FlexLine
Electrode Steam Humidifiers

Manual
Risk of electrical shock!
Hazardous electrical high voltage!
All electrical work to be performed by certified expert staff (electricians or expert personnel with equivalent training) only.
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1. Introduction

Dear Customer,

Thank you for choosing a HygroMatik steam humidifier.

HygroMatik steam humidifiers represent the latest in humidification technology.

In order to operate your HygroMatik steam humidifier safely, properly and efficiently, please read these operating instructions.

Employ your steam humidifier only in sound condition and as directed. Consider potential hazards and safety issues and follow all the recommendations in these instructions.

If you have additional questions, please contact your expert dealer.

For all technical questions or spare parts orders, please be prepared to provide unit type and serial number (see name plate on the unit).

1.1 Typographic Distinctions

• preceded by a bullet: general specifications

» preceded by an arrow: Procedures for servicing or maintenance which should or must be performed in the indicated order

☑ Installation step which must be checked off.

italics Terms used with graphics or drawings

1.2 Documentation

Please note

In addition to this manual, the appropriate FlexLine Control documentation is mandatory for the operation of the unit.

Retention

Please retain these operating instructions in a secure, always accessible location. If the product is resold, turn the documentation over to the new operator. If the documentation is lost, please contact HygroMatik.

Versions in Other Languages

These operating instructions are available in several languages. If interested, please contact HygroMatik or your HygroMatik dealer.

1.3 Symbols in Use

1.3.1 Specific Symbols related to Safety Instructions

According to ANSI Z535.6 the following signal words are used within this document:

⚠️ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠️ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠️ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

_notice

NOTICE is used to address practices not related to physical injury.

1.3.2 General Symbols

Please note

This symbol is used whenever a situation requires special attention beyond the scope of safety instructions.
1.4 Intended Use

HygroMatik electrode steam humidifiers serve for steam production based on tap water or partially softened water.

**Only use supply water featuring a conductivity of 125 to 1250 µS/cm.**

![Conductivity Chart]

- **D1:** Lower threshold
- **C1:** Range of reduced conductivity (adjustment required)
  - **A:** Normal Tap water
  - **B:** Range of increased conductivity
- **C2:** Range of high conductivity (adjustment required)
- **D2:** Upper threshold

In the C1 and C2 ranges, adaptation of the periodic blow-down frequency may be required. Pls. refer to parameter „2-1“ and „2-2“ explanations given in the „Detailed parameter descriptions“ section.

Proper usage also comprises the adherence to the conditions specified by HygroMatik for:
- installation
- dismantling
- reassembly
- commissioning
- operation
- maintenance
- disposal.

Only qualified and authorised personnel may operate the unit. Persons transporting or working on the unit must have read and understood the corresponding parts of the Operation and Maintenance Instructions and especially the chapter 2. „Safety Notes“. Additionally, operating personnel must be informed of any possible dangers. You should place a copy of the Operation and Maintenance Instructions at the unit's operational location (or near the unit).

**By construction, HygroMatik steam humidifiers are not qualified for exterior application.**

⚠️ **WARNING**

Risk of scalding!
Steam with a temperature of up to 100 °C (212° F) is produced.
Do not inhale steam directly!
2. Safety Instructions

These safety instructions are required by law. They promote workplace safety and accident prevention.

2.1 Guidelines for Safe Operation

2.1.1 Scope
Comply with the accident prevention regulation „DGUV Regulation 3“ to prevent injury to yourself and others. Beyond that, national regulations apply without restrictions.

2.1.2 Unit control
Do not perform any work which compromises the safety of the unit. Obey all safety instructions and warnings present on the unit.

In case of a malfunction or electrical power disruption, switch off the unit immediately and prevent a restart. Repair malfunctions promptly.

![WARNING]

Restricted use.
IEC 60335-1 stipulates as follows:
This device may be used by children of eight years of age and above as well as by persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge so long as they are supervised or have been instructed regarding the safe use of the device and understand the hazards that may result from it. Cleaning and user maintenance of the unit must not be undertaken by children without supervision.

2.1.3 Unit Operation

![WARNING]

Risk of scalding!
Uncontrolled hot steam escape in case of leaking or defective components possible.
Switch off unit immediately.

---

**NOTICE**

Risk of material damage!
The unit may be damaged if switched on repeatedly following a malfunction without prior repair.
Rectify defects immediately!

The unit must not be operated on a DC power supply.
The unit may only be used connected to a steam pipe that safely transports the steam.
Regularly check that all safety and monitoring devices are functioning normally. Do not remove or disable safety devices.
2.1.4 Mounting, dismantling, maintenance and repair of the unit

**NOTICE**
The HygroMatik steam humidifier is IP20 protected. Make sure that the unit is not object to dripping water in the mounting location.

Installing a humidifier in a room without water discharge requires safety devices to protect against water leakages.

- Use genuine spare parts only
- After any repair work, have qualified personnel check the safe operation of the unit
- Attaching or installing of *additional components* is permitted only with the *written consent* of the manufacturer

2.1.5 Electrical

**WARNING**
*Risk of electrical shock!*
Hazardous electrical voltage!

Any work on the electrical system to be performed by certified expert staff (electricians or expert personnel with comparable training) only.

Disconnect unit components from electrical power supply prior to work.

After electrical installation or repair work, test all safety mechanisms (such as grounding resistance).

**NOTICE**
Use only original fuses with the appropriate amperage rating.

Regularly check the unit’s electrical equipment. Promptly repair any damage such as loose connections or burned wiring.

Responsibility for intrinsically safe installation of the HygroMatik steam humidifiers is incumbent on the installing specialist company.

2.2 Disposal after dismantling

**NOTICE**
The operator is responsible for the disposal of unit components as required by law.
3. Transport

3.1 Overview

Please note
Proceed carefully when transporting the steam humidifier in order to prevent damage due to stress or careless loading and unloading.

3.2 Packing

Please note
Pay attention to the icons affixed to the packing box.

3.3 Interim Storage

Store the unit in a dry place and protect from frost and strong sunlight.

3.4 Check for Complete and Correct Delivery of Goods

Upon receipt of the unit, confirm that:

- model and serial number on the name plate match those specified in the order and delivery documents
- the equipment is complete and all parts are in perfect condition

Please note
In case of damage from shipment and/or missing parts, immediately notify the carrier or supplier in writing.

Time limits for filing freight claims with shipping companies are*:

<table>
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<tr>
<th>Shipping company</th>
<th>After receipt of goods</th>
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<tr>
<td>Carriers</td>
<td>no later than 4 days</td>
</tr>
<tr>
<td>Parcel service</td>
<td>immediately</td>
</tr>
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* Time limits for some services subject to change.
4. Functional Description and Device Composition

4.1 Mode of Action

Making use of the frictional heat caused by current flow in a water tank

The HygroMatik humidifier utilizes the conductivity normally present in tap water for steam production. Electrodes inside an enclosed steam cylinder are immersed directly into the tap water. They are connected to the alternating current. The conductivity of the water generates an electric current between the electrodes. In this way, the electric power supplied is converted directly into heat without energy loss. The steam produced has a temperature of about 100°C (212°F) with minimal excess pressure ("pressureless steam"). It is largely free of minerals and germ-free. Mineral deposits typically remain behind in the cylinder.

4.2 Mechanical Construction

The FlexLine humidifiers are designed for wall mounting. For maintenance purposes, the steam cylinders are separable in the middle.

Please note

Starting with the manufacturing date of 11/2018, the steam humidifiers FLE50/65/100/130 make use of a modified steam cylinder that are separable in the upper part of the wall. When replacing the steam cylinder, the new cylinders with the designation „CY45/2” may be incorporated in the older units as well. With the steam cylinder modification also the electrodes have changed. The new electrodes only fit in the new steam cylinders. The cylinders CY45/2 allow for unit operation without a cylinder star even in case of high conductivity of the cylinder water.
4.3 Operating sequence

By pressing the control switch (“Pos. I”) the humidifier is turned on. When the controller specifies an increase in humidity, the main contactor is switched on and the electrodes (48)* are supplied with power. The water inlet solenoid valve (25)* feeds water into the steam cylinder (16)*.

As soon as the electrodes are immersed, the current begins to flow. The water is now heated. When the pre-selected output is reached, the control turns off the solenoid valve and interrupts the water supply.

After a short heating up period, the water between the electrodes begins to boil and vaporize. The vaporization lowers the water level in the steam cylinder, reducing the output provided. The inlet solenoid valve, equipped with a fine mesh filter, intermittently admits fresh water.

Humidifier power usage is continuously monitored. With a cold start-up, the nominal current increases to 113% in order to achieve quick-start output parameters. This activates the electronic overflow limiter which causes a partial draining of the cylinder. This reduces the immersed surface area of the electrodes, lowering power usage.

The concentration of dissolved salts increases over time, which can lead to a rise in the conductivity of the water. If this continues, conductivity may increase until a short circuit occurs. This could damage the unit, but in any case would significantly reduce the life span of the electrodes.

For this reason, regular, periodic blow-downs of some of the concentrated water are very important. Following this procedure as recommended provides stable cylinder water conductivity as well as minimal water loss for the expected service life of the cylinder.

Water blow-down is performed by a blow-down pump 32)*. The functioning of the blow-down pump is continuously monitored during operation. If the pump is damaged, the steam humidifier shuts down.

With normal water quality the blow-down loss rate lies between 7 and 15 % of the amount of steam produced. Depending on water quality, a full steam cylinder blow-down is run every 3 to 8 days.

Mineral deposits settle in the open area below the electrodes and are removed through periodic maintenance. The blow-down pump itself has wide openings and can flush out smaller pieces of mineral deposit. This extends the service life of the unit and reduces the required maintenance interval.

On blow-down, water flows from the pump into the drainage system.

For maintenance purposes, the cylinder water may be pumped out by pressing and holding the control switch in the „II“ position.

Monitoring max. level

A sensor electrode (10)* monitors the maximum water capacity of the cylinder. When the water level reaches the sensor electrode, the water supply is interrupted. This can occur when the water has low conductivity or when the electrodes are worn out. In the case of low water conductivity, however, this state usually lasts only a short time. The built-in control and the large area electrodes combine to produce a rapid rise in conductivity by increasing the concentration of the water.

* numbers indicated correspond with those in the exploded view in the „Exploded view“ chapter.
5. Mechanical installation

⚠️ WARNING
Risk of foot injuries!
Prevent unit from dropping during installation!
Helping hand of a second person is advisable.

⚠️ WARNING
Risk of electrical shock!
Hazardous electrical voltage.
During installation, the unit must be disconnected from power supply.

5.1 Environment Parameters to be met and Mounting Recommendations

When selecting the installation site for the steam humidifier, take the following into account:

- The minimum clearances indicated in the fitting measures section must be observed in order to ensure adequate unit ventilation and allow for unobstructed access in case of maintenance
- Protection class IP20
- By design, HygroMatik steam humidifiers are not qualified for outdoor installation (electrical components and water-bearing parts may be damaged)
- Ambient temperature must lie between +5 and +40 °C (+41 and +104 °F) in order to protect the unit electronics against damage; frost may damage the steam cylinder, the solenoid valve and pump, as well as make hoses burst
- Relative humidity must not exceed 80 % r.h., since values beyond may lead to electronic malfunction or damage
- Installation in a closed room requires aeration and, eventually, temperature conditioning in order to meet the a.m. environmental conditions
- The steam humidifier should be installed as close as possible to the steam manifold. Optimum performance is only guaranteed when steam and condensate hoses are kept short
- Make use of existing water connections for supply and draining
- Hoses must be laid at a consistent 5 to 10 % incline/decline; sagging and kinking prevention is a must
- Mount the unit on a stable, preferably solid wall offering the bearing capacity required (s. unit technical specifications). If such a wall is not at hand, the unit may be attached to a stand bracket firmly bolted to the floor
- For proper functioning of the level control, plumb and level installation of the unit is required
- The steam humidifier rear panel heats up during operation to a maximum of 70 °C (158 °F). Take care that the construction on which the unit is to be mounted is not made of temperature-sensitive material
5.1.1 Dimensions and Mounting Directions

Table of dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>X [mm/inch]</th>
<th>Y [mm/inch]</th>
<th>Z [mm/inch]</th>
<th>A [mm/inch]</th>
<th>B [mm/inch]</th>
</tr>
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<tr>
<td>FLE05-FLE10</td>
<td>540/~21.3</td>
<td>535/~21</td>
<td>320~12.6</td>
<td>390~15.4</td>
<td>400~15.7</td>
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<tr>
<td>FLE15-FLE25</td>
<td>540/~21.3</td>
<td>695/~27.4</td>
<td>320~12.6</td>
<td>390~15.4</td>
<td>560/~22</td>
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<td>FLE30-FLE40</td>
<td>580/~22.8</td>
<td>750/~29.5</td>
<td>355/~14</td>
<td>425/~16.7</td>
<td>620/~24.4</td>
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<td>FLE50-FLE65</td>
<td>640/~25</td>
<td>785/~30.9</td>
<td>420~16.5</td>
<td>490~19.3</td>
<td>650~25.6</td>
</tr>
<tr>
<td>FLE80</td>
<td>1130/~43.1</td>
<td>750/~29.5</td>
<td>420~16.5</td>
<td>870/~34.4</td>
<td>620/~24.4</td>
</tr>
<tr>
<td>FLE100-FLE130</td>
<td>1170/~46</td>
<td>785/~30.9</td>
<td>420~16.5</td>
<td>1000/~39.4</td>
<td>660~25.6</td>
</tr>
</tbody>
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Wall clearances
When mounting the steam humidifier, the wall clearances shown in the fig. below must be obeyed:

Mounting principle

For wall mounting drill measures, please consult the table above (measure A). In case of no suitable wall available for mounting the unit, it is recommended that installation is made on brackets firmly anchored in the floor.

» mark the holes for the upper suspension brackets screws
» drill holes and dowel
» screw in the supplied mounting screws; let the screws protrude approx. 12 mm/.5 inch from wall
» ensure firm fixation and load-carrying capacity of the mounted screws!
» hook in the unit and ensure safe suspension
» mark the holes for the lower suspension brackets screws
» remove the unit
» drill holes and dowel
» hook in the unit and mount the lower screws firmly

To function properly, the steam humidifier must hang level and plumb.
Device connections:

- 1¼" Waste water connection
- ¾" Water inlet
- DN25, DN40 Steam outlet
- Cable entries
5.2 Unit Installation Check

Before start-up, pls. check proper unit installation following the list below:

☑ Unit perpendicularly aligned in both the vertical and horizontal axis?
☑ All clearances obeyed?
☑ Steam hose installed with a 5 - 10 % minimum incline/decline (see chapter "Steam line")?
☑ Condensate hose features a loop functioning as a steam barrier (see chapter „Condensate hose“)?
☑ Steam manifold(s) properly positioned?
☑ All bolts and clamps properly tightened?
☑ Steam manifold(s) horizontally mounted and suspended on the free end, if required?
☑ All seals (o-rings) in place?
☑ All ventilation slots on housing top unobscured?
5.3 Absorption Distance $B_N$

The "absorption distance" ($B_N$) is defined as the distance from the steam feed to where the steam is completely absorbed in the treated air. Within the absorption distance, steam is visible as mist in the air stream.

Condensation may occur on anything installed within the absorption distance.

Although steam outside the absorption distance ($B_N$) is completely absorbed, it is not yet evenly diffused in the duct. If you plan to install any parts or devices inside the absorption distance, such as sensors or elbows, we recommend increasing the absorption distance using the formulae below. The absorption distances required for certain installed fittings are distinguished by separate symbols and calculated as a multiplier of the absorption distance $B_N$.

The absorption distance has no fixed value, but depends on many factors. These are depicted in the absorption distance nomogram below.

<table>
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<th>Absorption Distance</th>
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<tbody>
<tr>
<td>$B_N$</td>
</tr>
<tr>
<td>$B_c = (1.5...2) \times B_N$ for fine filters, heat registers</td>
</tr>
<tr>
<td>$B_s = (2.5...3) \times B_N$ for particle filters</td>
</tr>
<tr>
<td>$B_d = (3...5) \times B_N$ for humidity sensors, duct humidistats</td>
</tr>
</tbody>
</table>

5.3.1 Determining the Absorption Distance

To determine the absorption distance, the following parameters are required:

- Quantity of steam introduced $m_D$ in kg/h.
- Air speed $w_L$ in m/s in air duct
- Total length $l_D$ of the steam manifold installed in the air duct

Length $l_D$ of the usable steam manifold depends on the dimensions of the air duct. The length of the absorption distance can be reduced by using multiple steam manifolds (also see section on the steam manifold).

Method:

Graphically determine absorption distance $B_N$ using the absorption distance nomogram (also see Section „Absorption Distance Nomogramm“). Enter the value of the parameters enumerated above into the respective quadrants. The resulting point of intersection indicates the value of the desired absorption distance $B_N$.

Notes:

Air humidity before humidification $x_1$: $[\text{g/kg}]$

Air temperature after humidification $t_2$: $[\text{°C}]$

Specific increase in humidity $\triangle x$: $[\text{g/kg}]$

Quantity of steam introduced $m_D$: $[\text{kg/h}]$

Air speed $w_L$: $[\text{m/s}]$

Total length of steam manifold $l_D$: $[\text{mm}]$
5.3.2 Absorption Distance Nomogram

Example
Given: circulating air mode
\( x_i = 5 \text{ g/kg}, \Delta x = 3 \text{ g/kg} \)
\( t_i (= t_o) = 20^\circ C \)
\( \dot{m}_o = 100 \text{ kg/h}, l_o = 1,25 \text{ m} \)
\( w_L = 5 \text{ m/s} \)

Result:
absorption distance \( B_n \approx 0,8 \text{ m} \)

Source: Henne, Erich: Luftbefeuchtung (Air Humidification), 3\textsuperscript{rd} Edition 1984 (Page 101), Oldenbourg Industrieverlag, Munich
5.4 Steam Manifold

5.4.1 General installation guidelines

When installing steam manifolds, pls. follow these guidelines:

Positioning within duct
- Install the steam manifold as close as possible to the steam humidifier in order to minimize steam loss through condensation.
- Steam manifold placement on the supply side of the air duct is preferable.
- Install steam manifold strictly horizontal in order to ensure proper condensate drain.
- Shown installation and positioning dimensions are based on empiric values. Special environmental conditions may require adjustments. Pay special attention to avoid condensate generation in air duct.

Allowable pressures
- Max. allowable pressure in air duct is 1500 Pa/.218 PSI (exemption: SLE02 only allows for 1200 Pa/.174 PSI).
- On suction side, max. -500 Pa (.07 PSI) is tolerable.
- With high-pressure air conditioning systems, modifications of the unit’s drain hose system may possibly be required depending on the overall pressure situation. These modifications must be coordinated with your expert dealer.

Water drain
- We point out that according to the German Association of engineers (VDI) guideline VDI 6022, a water drain must be provided within the absorption distance inside the air duct.

When increased airflow speed is encountered
- Air flow rates beyond 3m/s (9.84 ft/s) may lead to condensate drainage problems at the steam manifolds due to vacuum built-up. A possible remedy is twisting the steam manifold in its horizontal axis by few angular degrees. In case of problems, pls. consult your expert dealer.

5.4.2 Recommendations for dimensioning

The recommendations given below are based on homogenous air flow in the duct.

Horizontal installation of steam manifold

Standard steam manifold arrangement:

```
Air duct

Steam manifold
  (Side view)

Air flow direction

L1 = L2 = L3
```

An even distribution of steam manifolds ensures a uniform steam distribution.

*) s. table of manifold lengths
Minimum distance for condensation avoidance:

- **L_{min} = 210mm/8.3 inch**: "Steam manifold - Next steam manifold" distance
- **L_{4min} = 120mm/4.7 inch**: "Lowest steam manifold - Duct bottom plane" distance
- **L_{5min} = 120mm/4.7 inch**: "Highest steam manifold - Duct ceiling plane" distance

### Steam manifold arrangement for special air duct shapings

<table>
<thead>
<tr>
<th>Flat</th>
<th>Steam manifold laterally staggered (with respect to air flow direction) in case of ( L_{min} ) (s. above) not to be met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very flat</td>
<td>by tilting the steam manifold 30 - 45° towards the air flow direction, the minimum upper clearance can be reduced to 70 mm/2.8 inch.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Min[mm/inch]</th>
<th>( 30^\circ )</th>
<th>( 45^\circ )</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN25/1&quot;</td>
<td>182/7.2</td>
<td>168/6.6</td>
</tr>
<tr>
<td>DN40/1 1/2&quot;</td>
<td>193/7.6</td>
<td>179/7.2</td>
</tr>
</tbody>
</table>

| Narrow, high | Identical lengths one on top of the other, staggered laterally if possible |
| Square       | Identical lengths, staggered vertically and laterally |
| Low, very wide | Facing each other |
Vertical steam manifold installation

Steam manifold arrangement

Horizontal installation of the steam manifolds is preferable. However, vertical installation into the air duct from below is also possible.

Standard manifold dimensions [mm]/[inch]***:

<table>
<thead>
<tr>
<th>Size</th>
<th>Length</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>220</td>
<td>8.7</td>
<td>15.7</td>
</tr>
<tr>
<td>400</td>
<td>23.6</td>
<td>35.4</td>
</tr>
<tr>
<td>600</td>
<td>35.4</td>
<td>47.2</td>
</tr>
<tr>
<td>900</td>
<td>47.2</td>
<td>57.1</td>
</tr>
<tr>
<td>1200</td>
<td>57.1</td>
<td></td>
</tr>
<tr>
<td>1450</td>
<td>57.1</td>
<td></td>
</tr>
</tbody>
</table>

*** Special lengths on demand.

**** will be replaced in 2019 by 1500 mm / 59.1 inch long steam distributors.

Number and size of the steam manifolds available as well as the nominal diameter of the respective steam and condensate hoses may be taken from the tables shown in chapter „Technical Data“.
5.5 Steam line and condensate hose layout

Please note
Because of the high requirements on hose material under the operating conditions given, it is recommended to use genuine HygroMatik hoses only.

5.5.1 Guide lines for steam line design

- Steam hose nominal diameter must not be smaller than the steam outlet of the HygroMatik steam humidifier (do not restrict the cross-section, otherwise back pressure will increase).
- Steam hoses must be laid without sags and kinks and with a continuous slope of 5-10% (otherwise sags may result).
- Steam hoses must be supported every 500 mm (20 inches) by clamp brackets.
- Steam hoses should be kept as short as possible. Implement lengths beyond 5 m (16 ft.) as insulated fixed piping to keep energy loss and condensate generation to a minimum. Beyond 10 m (32 ft.) insulated installation is a must. Fixed piping is generally recommended for straight steam line segments.
- When 2 steam manifolds are in use (other than with a standard implementation), place steam Y piece as close as possible to the steam manifolds. Such, for the main part of the piping just one steam hose is required and condensate loss is minimized.
- Allow easy access to the steam pipe/steam hose installation.
- Pressure conditions within the duct are influenced by device steam output, steam line layout and the duct composition itself. In some rare situations it may become necessary to optimize steam line layout for achieving the results intended.
- Respect minimum bending radii:

DN 25 Steam hose: Rmin = 200 mm/8”
DN 40 Steam hose: Rmin = 400 mm/16”

5.5.2 Condensate hose layout

The condensate hose may be run from the steam manifold back to the steam cylinder, as depicted in the schematic drawing below with concern to installation type 1. Alternatively, the condensate hose may be fed directly in a wastewater pipe or a drain (s. installation type 2).

Please note
Should condensate return into the steam cylinder be intended, the connection stub on the cylinder upper part must be drilled out first with a ANSI drill size „O“ drill. To do so, the steam cylinder must be removed from the housing (s. maintenance chapter, section „Steam cylinder removal and reinstallation“).

Drill out condensate hose connection stub with an 8 mm (ANSI drill size „O“) drill, if required

Steam cylinder top view
5.5.3 Steam line and condensate hose installation types

Installation type 1

Steam manifold is positioned more than 500 mm above device upper edge:

- Run steam hose to a height of 400 mm/16 inch minimum above the steam humidifier and then to the steam manifold with a continuous incline of 5 to 10%.
- Feed condensate hose from steam manifold with a decline into wastewater pipe or drain.
- As a steam barrier, lay out a 200 mm/8 inch min. loop (s. schematic representation below). Minimum distance from steam manifold to loop must be 500 mm/20 inch. Fill loop with water prior to steam humidifier commissioning.

![Installation type 1, schematic representation](image)

Installation type 2

Steam manifold is positioned less than 500 mm above or below device upper edge:

**Please note**

In this arrangement the condensate hose cannot be fed back to the steam humidifier.

- Run steam hose to a height of 400 mm/16 mm minimum above the steam humidifier and then to the steam manifold with a continuous decline of 5 to 10%.
- Feed condensate hose to a wastewater pipe/drain with a 200 mm/8 inch diameter loop as a steam barrier. Minimum distance from steam manifold to loop must be 500 mm/20 inch. Fill loop with water.

![Installation type 2, schematic representation](image)
6. Water connection

**WARNING**

Risk of scalding!
Very hot water to be found in and around the steam humidifier during and after operation.

Have all installation work done by expert staff in order to avoid scalding hazards due to improper water guidance.

**WARNING**

Risk of electrical shock!
Hazardous electrical high voltage!
Before starting installation work ensure that the unit is not yet connected to the power supply.

---

**General Rules**

- Obey local water utility regulations
- Verify that necessary safety measures have been taken – in compliance with either German Technical and Scientific Association for Gas and Water (DVGW) guidelines (DIN EN1717) or local regulations – to eliminate backflow of polluted water into drinking water treatment facilities. This may require the installation of a system separator and free discharge into the drainage system. Within the humidifier, a double check valve (58) is located in the water supply line. It prevents - in accordance with DIN EN 61770 - the backflow of water. As an option for installation by the customer, the DVGW-conform HyFlow system separator or a aftermarket system separator of the BA/CA type are available from HygroMatik.
- Use feed water without chemical additives and with a conductivity between 200 and 800 µS/cm only. Beyond conductivity levels of 800µS/cm up to a maximum of 1250µS/cm and below conductivity levels of 200µS/cm to a minimum of 125µS/cm, special adjustments are required. In this case please contact your specialist dealer

- Supply water must not exceed 40 °C (104 °F)
- Allowable range of water pressure: 100000 to 1000000 Pa (14.5 to 145 psi)
- For connection to the water supply pipe, make use of a water hose
- Blow-down water must drain freely

---

**6.1 Operation with softened water**

**NOTICE**

Do not use softened water unless special measures are taken!

When feeding softened water into the HygroMatik steam humidifier, the aspects outlined below must be taken into account.

Softened water may cause

- unacceptably high conductivity
- the formation of salt bridges between the electrodes and the electrode leads on the inner surface of the steam cylinder upper part
- foaming in the steam cylinder

Salt bridges may cause electrical arcs. These are indicated by the presence of black grooves in the top part of the cylinder. The cylinder must then be replaced to prevent further damage to the cylinder material, as well as short circuits which may trip main circuit breaker.

Foam may come into contact with the maximum level sensor electrode and trigger the max. level status message despite the cylinder not being full yet and the nominal current not yet established.

With softened water, at operating temperature conductivity level usually is higher than is the case with tap water.

If using a water softening system, we recommend diluting the softened water with normal tap water to produce an overall hardness between 4-8°gH. This value can be set lower if the water does not foam.
6.2 Water supply

**NOTICE**

Foreign material in water supply pipe may cause premature wear of the solenoid valve. Flush the water supply pipe before making connection to the solenoid valve. This is of particular importance in case of a newly installed pipe.

» Install a shut-off valve (AV) in the supply line.

» Install a water filter (WF) if required due to bad water quality.

**Please note**

In case of no safety device for drinking water protection according to DIN EN 1717 present in the house installation system, a system separator at least of the CA type or use of the Hyflow retrofit option is mandatory.

[Diagram of water supply system]

**Please note**

Shut-off valve (SV) and water filter (WF) are not included in the delivery.

For connection to the water supply line, the water hose (56) with cap nuts on both ends supplied with the unit may be used.

Make connection as follows:

» Attach cap nut with inner seal ring to inlet screw joint on the humidifier housing and tighten.

**NOTICE**

Do not overtighten the cap nut!

Excessive tightening will destroy the fitting.

**Please note**

Strainer must be placed inside the solenoid valve.

» Screw the other hose end cap nut with its inner seal on a customer-provided water tap (cap nut internal thread is ¾“).

6.3 Water discharge

**WARNING**

Risk of scalding!

During blow down up to 0.3 l/sec (.08 gal./sec) are being drained with a temperature of about 95 °C (203 °F). Ensure that the drain hose is reliably fastened and wastewater can drain freely and pressureless.

**Please note**

Humidifier installation location and wastewater discharge must be on the same pressure level.
Guidelines for water discharge composition

- Use flexible water hose
- Do not buckle drain hose
- Discharge line and drain pipe material must be temperature resistant up to 95°C (203 °F)

How to proceed

» Run a 1 1/4 " drain hose of 250 to 1000 mm (10 to 40 inch) length into a pressure-free outlet according to DIN EN 1717. The hose must be guided sideways of the humidifier to prevent ascending vapor from condensating on the humidifier’s housing.

» Fit drain hose to connection stub on humidifier housing bottom side.

Grounding clip functioning

The two grounding clips attached to the inner surface of the housing drain stub are in direct contact with water and shunt potential residual electric currents away from the housing during blow-down and in case of a cylinder water overflow.

Between the pump drain hose jacket and the inner surface of the cabinet drain connection, a gap exists due to the diverging diameters. If water collects on the base plate, it will flow through this gap into the drain hose and then into the drainage system.

Please note

With the optional wastewater cooling system HyCool, HygroMatik offers an option for limiting the steam humidifier wastewater temperature in order to protect thermosensitive wastewater pipe lines. By blending with tap water during blow-down and rinse processes, wastewater temperature is below 60 °C (140 °F) as long as inlet water temperature does not exceed 30 °C (86 °F).

6.4 Water connections final check

Go down the following water installation checklist:

✓ All screws and clamps properly tightened?
✓ Water supply line flushed before making connections?
✓ Water connection properly installed?
✓ Water discharge properly installed?
✓ Does blow-down water drain freely?
✓ Water supply line and water discharge leakage-free?
7. Electrical connection

**WARNING**

Risk of electrical shock!
Hazardous electrical voltage.
All work related to electrical installation to be performed by expert staff (electricians or expert personnel with equivalent training) only.

Do not connect the steam humidifier to the live power supply before all installation work has been completed.

**Please note**
The customer is responsible for checking expert staff qualification.

---

**General installation rules**

- All local rules concerning the implementation of electrical installations must be obeyed
- Electric connector cables to be laid professionally
- Install the electrical connections according to the wiring diagram
- With units of a nominal power output > 33 kW electrical connection to a permanent line is mandatory (according to VDE 0700 Part 98, IEC 60335-2-98)

---

**NOTICE**

Possible electronical components destruction through electrostatical discharge!
Prior to commencing electrical installation work, steps must be taken to guard the sensitive electronical components of the unit control against damage from electrostatical discharge.

---

7.1 Electrical installation approach

- Provide fuses with a contact gap of at least 3mm per pole.
- Install a separate main connection for each steam cylinder including main circuit breaker, main switch etc.
- Make main connection according to the table below.

**Main connection and Fusing**

For the FlexLine steam humidifiers FLE05 - FLE130 (version AA10) main connection is to be implemented as follows:

380-415 VAC/3/50-60 Hz

Other operating voltages on request.

**Please note**

HygroMatik recommends the use of slow blowing up to middle time-lag main fuses (only applies to the a.m. mains supply voltage).

Steam humidifier installations should incorporate an individual resilient current circuit breaker.

Maximum current draw of the FlexLine standard models and the required fusing resulting from that can be taken from the table below.

<table>
<thead>
<tr>
<th>Model</th>
<th>Current draw [A]</th>
<th>Fusing [A]</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLE05</td>
<td>5.4</td>
<td>3 x 10</td>
</tr>
<tr>
<td>FLE10</td>
<td>10.8</td>
<td>3 x 16</td>
</tr>
<tr>
<td>FLE15</td>
<td>16.3</td>
<td>3 x 20</td>
</tr>
<tr>
<td>FLE20</td>
<td>21.7</td>
<td>3 x 25</td>
</tr>
<tr>
<td>FLE25</td>
<td>27.2</td>
<td>3 x 32 (35)</td>
</tr>
<tr>
<td>FLE30</td>
<td>32.5</td>
<td>3 x 40</td>
</tr>
<tr>
<td>FLE40</td>
<td>43.5</td>
<td>3 x 50</td>
</tr>
<tr>
<td>FLE50</td>
<td>54.5</td>
<td>3 x 63</td>
</tr>
<tr>
<td>FLE65</td>
<td>70.4</td>
<td>3 x 80</td>
</tr>
<tr>
<td>FLE80</td>
<td>2 x 43.5</td>
<td>6 x 50</td>
</tr>
<tr>
<td>FLE100</td>
<td>2 x 54.5</td>
<td>6 x 63</td>
</tr>
<tr>
<td>FLE130</td>
<td>2 x 70.4</td>
<td>6 x 80</td>
</tr>
</tbody>
</table>
7.2 Cable connections

The table below shows the number and dimensioning of the cable connections provided by the various FlexLine housing types.

<table>
<thead>
<tr>
<th>Model</th>
<th>M25</th>
<th>M25 with MSI*)</th>
<th>M32</th>
<th>M40</th>
<th>Blind plug**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLE05/10</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLE15/20</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLE25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLE30/40</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>FLE50/65</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>FLE80</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>FLE100/130</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

*) Multiple seal insert  
**) Ø 25 mm/~ 1.0 inch

Characteristics of metric cable connections

<table>
<thead>
<tr>
<th>Thread</th>
<th>Wrench size [mm/in.]</th>
<th>Cable diameter supported [mm/in.]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M25x1.5</td>
<td>30/~ 1.2</td>
<td>9 - 17/~ .35 - .67</td>
</tr>
<tr>
<td>M25 MSI*)</td>
<td>30/~ 1.2</td>
<td>6 (3x)/~ .24 (3x)</td>
</tr>
<tr>
<td>M32x1.5</td>
<td>36/~ 1.4</td>
<td>13 - 21/~ .51 - .83</td>
</tr>
<tr>
<td>M40x1.5</td>
<td>46/~ 1.6</td>
<td>16 - 28/~ .63 - 1.1</td>
</tr>
</tbody>
</table>
### 7.3 Safety interlock

**WARNING**

**Risk of electrical shock!**
Hazardous electrical voltage!
When standard wiring was made, terminal 1 shows 230 VAC after commissioning.

Across terminal 1 and 2 the so-called safety interlock is wired. This wiring allows for integration of safety devices. In case of an open safety interlock the steam humidifier does not operate.

![Safety interlock terminals 1/2 on main PCB](image)

**Please note**
Factory setting leaves the safety interlock open!

Install contact interlocks, e.g. a max. hygrostat, vane relays, pressure controllers, air interlock devices etc. in series across terminal 1 and 2.

**NOTICE**

**Contacts across terminals 1 and 2 must be potential free and properly rated!**
Rating must comply with the control voltage in use.

Best practice implies the integration of a max. hygrostat in the safety interlock wiring to protect against over-humidification due to a r.h. sensor malfunction.

### 7.4 Connection diagrams

Pls. find full wiring diagrams in the FlexLine control manuals.

### 7.5 Electrical installation check list

Check electrical installation with respect to customer-site requirements and local power supply regulations.

- Safety interlock properly wired across terminals 1 and 2?
- Supply voltage in accordance with name plate voltage rating?
- All electrical connections made according to the wiring diagram?
- Is the sensor (temperature sensor or r.h. sensor, depending on the application scenario) properly connected to the main p.c.b. (make sure that the input selected is adequate for the type of sensor installed with respect to the signal type and range specified) ?
- All screw terminal connections properly tightened?
- Have all electrical cable and plug connections been properly tightened?
- Proper unit grounding made?
8. Commissioning

**WARNING**

Risk of operating error!
Start-up of the unit is restricted to expert staff only (electricians or expert personnel with equivalent training).

---

**Step 1: Check of mechanical integrity and wiring**

» Open housing cover.
» Check cylinder seating.
» Check steam, condensate and drainhose clamps.
» Check that all electrical wire connections (including steam cylinder wiring) are tight and secure.

**Step 2: Switching on the steam humidifier**

» Switch on main breaker.
» Open water supply stopcock (operating pressure should be 1 bar min., 10 bar max.).
» Switch on unit by setting control switch to "I".

**Step 3: The unit performs a self-test and, then, commences normal operation**

- During self-test, the On/Off button icon flashes for a couple of seconds.
- After the self-test of the controller, the display shows the setup view for the basic device settings (language, date, time and control settings). Refer to the chapter "Commissioning" in the operating instructions for the control system.
- Consequently, normal operation is commenced. However, steam is not produced without a demand pending

**Step 4: Trigger steam demand**

» Set control to 1-step operation, i.e. permanent steam demand, and close safety interlock.
» Allow all electrical functions to terminate in their programmed order.

**Step 5: Monitor unit function and check for leakage**

» Let unit operate for 15 to 30 minutes.
» If leaks appear, switch off the unit.

**WARNING**

Risk of electrical shock!
Hazardous electrical voltage!
Follow safety instructions for work on live components.

**Step 6: Repair leaks**

» Find leaks and eliminate.
» Check again for leaks.
» When everything is o.k., reattach housing cover.
9. Maintenance

9.1 General

For the achievement of a long unit life span, regular maintenance is a must. Maintenance works to be performed refer to unit assemblies that underlie either mechanical or electrical wear and tear, or may be impeded by residues in their proper functioning.

A steam humidifier’s optimal performance and the maintenance intervals required primarily depend on the water quality encountered and the amount of steam produced. A particular water quality may shorten or lengthen maintenance intervals. The amount of residues found in the steam cylinder allows for a hint on future maintenance intervals.

Another scenario influencing the unrestricted unit availability is the main contactor lifetime in terms of a maximum number of switch cycles allowed, as indicated by its manufacturer. Unit control monitors the number of switch cycles and produces a service message when the max. number is reached.

9.1.1 Service messages

In case of a service message produced, the HygroMatik logo in the main section of the touch display (for explanation s. „FlexLine controls” manuals) is blanked. Instead, a frame is shown with the service icon 🛠 in it and a „Service message (xx)“ („xx“ indexes the message code). When the message frame is touched, the service message is displayed in clear language.

The service messages are listed in detail in the „FlexLine controls“ manuals. Following hereafter, pls. find 2 service messages denoted as examples:

- „Steam_amount_counter“ is output when the pre-set produced steam amount is reached
- „Cycles_main_contactor x“ is indicated when the number of cycles pre-set for main contactor „x“ (x = 1...5) is reached. The main contactor should then be replaced and the counter reset (s. „Service“ submenu in the „FlexLine controls“ manuals).

After a „Steam_amount_counter“ message, maintenance work mainly encompasses checking and cleaning all of the unit parts including the steam cylinder inside, and a unit test run. Steam humidifier electrodes are prone to burn-off during steam production and must, consequently, be replaced in a regular time frame.

As part of the maintenance work, screw terminals and plug connections must be checked every time. If required, retightening the terminal screws is a must as well as ensuring tight fit of all of the plug connections.

Since steam and condensate hoses are subject to wear as well, hoses must also be checked regularly for tightness, flexibility and firm seating.

Seals are wear parts. As such, seal integrity checks and replacement is also a part of the regular maintenance work.

9.1.2 Service messages for preventive maintenance

HygroMatik steam humidifiers continuously monitor the performance of the following functional areas:

- Electrode condition (wear control by means of cylinder full monitoring)
- Blow-down operations
- Cylinder filling

When reaching pre-set trigger levels, unit control outputs preventive service messages that relate to the corresponding functional area.

The functional area addressed should then be checked at short term and maintained, if required (s. „FlexLine controls“ manuals, „Faults and service messages“ chapter").
9.1.3 Safety instructions for maintenance

⚠️ WARNING

Risk of electrical shock!
Hazardous electrical voltage. Unit must be switched off and protected against restart by expert staff (electricians or expert personnel with equivalent training) before any maintenance work is commenced.

⚠️ WARNING

Risk of skin burning!
Hot steam cylinder during operation and for some time afterwards. Drain steam cylinder before any maintenance work is commenced. After that, wait approx. 10 mins before starting maintenance work. Check steam cylinder temperature by cautious approximation with hand (do not touch!).

⚠️ WARNING

Risk of scalding!
Water pumped or drained from the steam cylinder may have a temperature of up to 95 °C (203 °F). Wear proper PPE (Personal Protection Equipment)!

NOTICE

Take care of ESD protection!
The electronic components of the humidifier control are very sensitive to electrostatic discharges. In order to protect these components during maintenance, steps must be taken to guard against damage from electrostatic discharge.
9.2 Maintenance frame work

Mineral deposits precipitate and crystallize very differently in different types of water, even when two types have the same conductivity and hardness levels (the various constituents in the water interact differently).

Instructions on maintenance and cleaning intervals, or on electrode service life, are based entirely on empirical data.

In most cases, the conductivity levels given in the "Directions for Use" section of this manual may be considered as typical values. Individual parameter settings as part of the control software may be necessary.

Very seldomly, water pretreatment may be necessary (softening by dilution to approx. 4 - 8 °gH; decarbonization/partial desalination to achieve target reductions in carbonate hardness).

For any questions with regard to water treatment systems pls. contact your expert dealer.

<table>
<thead>
<tr>
<th>Cycle time</th>
<th>Maintenance work</th>
</tr>
</thead>
</table>
| 4 weeks after commissioning (with normal water quality) | Visual inspection of electrical and mechanical connections  
Remove mineral deposits from steam cylinder, water drain hose and blow-down pump  
Check electrodes for burn-off  
Re-tighten electrode hand nuts and all screw terminals |
| semiannually (with Normal Tap water quality (please refer to chapter 1.4 “Intended use”) and “normal“ operation, i.e. 8 hours per day) | Visual inspection of electrical and mechanical connections  
Remove mineral deposits from steam cylinder, water drain hose and blow-down pump  
Check electrodes for burn-off and replace, if required. Re-tighten electrode hand nuts and all screw terminals |
9.3 Removal and reinstallation of the steam cylinder

**CAUTION**

Risk of eye injuries!
The clips that fix the steam cylinder halves have sharp edges and can jump off during dismantling.
Eye injuries are possible.
Wear proper PPE (Personal Protection Equipment)!

Steam cylinder removal

- Set control switch to „II“ position for residual water draining
- When cylinder is empty, set control switch to „0“ position
- Disconnect unit from power supply
- Remove SuperFlush solenoid hose from cylinder bottom (if applicable)
- Remove steam hose from steam hose adapter

If the steam hose is not to be disconnected, the steam hose adapter with the steam hose still attached may be detached from the steam cylinder as shown in the next figure.
Push clip onto adapter outside of unit housing

Remove clip from steam hose adapter

Remove cylinder flange clamps

Lift steam cylinder from cylinder base

Disconnect cabling

Separate cylinder halves

Remove o-ring in use
Reinstallation

When re-assembling the cylinder, brackets and reinforcement joints of the two cylinder parts must be aligned.

Please note
When re-assembling the cylinder, brackets and reinforcement joints of the two cylinder parts must be aligned.

- Insert new o-ring in steam hose adapter and cylinder base positions
- Place cylinder vertically in cylinder base
- Join cylinder halves and affix with clamps
- Reconnect electrode cabling
- Remove o-rings in use from steam cylinder top and cylinder base
The electrode connections must not show any signs of corrosion. Replace plugs, if required. Plugs must sit firmly on the electrode pins and must be pushed down as far as they will go.

» Reattach SuperFlush solenoid hose (if applicable) to steam cylinder bottom stub.

» Activate main circuit breaker

» Open water supply

» Affix steam hose adapter with clip

» Check for leakage in relevant areas

» Reattach unit housing cover
9.4 Steam cylinder, electrodes and cylinder base cleaning

For cleaning, mechanical removal of the deposits is usually sufficient.

**NOTICE**

Risk of functional disruption!
When using acids or other chemicals for cleaning, thoroughly flushing and rinsing is essential otherwise cylinder water conductivity may be impaired.

Steam cylinder cleaning

» Check the inside of the top part of steam cylinder for crust build-up and possible salt bridges (black grooves between the electrode leads). If present, wash away/scrape off completely.

» Check the inside of the top part of steam cylinder for crust build-up and possible salt bridges (black grooves between the electrode leads). If present, wash away/scrape off completely.

Electrode cleaning

» Clean the sensor electrode until metallically bright.

» Clean electrodes and check electrode wear (s. „Changing electrodes“ section).

Cylinder base cleaning

» Just as the cylinder, the cylinder base and its connection joints must be checked for deposits and be cleaned, if required.

Reinstallation of the steam cylinder is to be performed as described in the „Cylinder removal and reinstallation“ section.

9.5 Checking cable connections

**NOTICE**

Risk of functional disruption!
Risk of material damage!
Loose cable connections may result in increased transition resistance and contact area overheating.

» Check all cabling screw terminals and plugs for tight seating. Plugs must sit on their respective contacts as far as they will go.

» Check electrode plugs for corrosion. Replace, if stained.

**Please note**

If electrical arcs have burned deep grooves into the material, the complete cylinder must be replaced.
9.6 Solenoid valve removal/reinstallation and fine filter cleaning

Removal

» Shut off water supply and disconnect tap water hose cap screw connection.

» Remove connecting hose (20) from cylinder base.

» Detach electrical cable connector from solenoid valve (25).

» Unscrew solenoid valve mounting screws.

» Remove solenoid valve from housing bore.

Fine filter cleaning

» Remove fine filter from solenoid valve tap water connection side and clean under running water.

Reinstallation

» Reinsert fine filter into solenoid valve.

» Reinsert solenoid valve with seal in unit housing bore.

» Bolt-down solenoid valve.

» Reestablish tap water connection.

» Reconnect electrical cable to solenoid valve.

» Reattach connecting hose (20) to cylinder base using clamp.

» Turn on water tap.

» Switch on unit and check for leakages after 15 to 30 mins of operation.

**WARNING**

Risk of electrical shock!
Hazardous electrical voltage!
Follow safety instruction for work on live components.
Leakages may invoke leak currents.

» In case of leakage turn off power supply and secure against being switched on again.

» Find leakage and eliminate.

» Check again.
9.7 Cleaning of blow-down pump

Removal and cleaning

» Remove steam cylinder as described in „Removal and reinstallation of steam cylinder“ section.
» Detach adapter (30) from pump (32).
» Detach electrical cable from pump.
» Unscrew mounting screws from housing bottom plate (safe vibration buffer, bolts and washers for reinstallation) and pull pump out of cylinder base (37).
» Open pump bayonet lock.
» Remove residues from pump and drain hoses (replace O-ring if required).

Reinstallation

» Moisten O-ring (33) and insert into cylinder base (37) horizontal stub.
» Push pump back into cylinder base and bolt to bottom plate enorporating the vibration buffer and washers saved during removal.
» Moisten O-ring (31) and insert into adapter.
» Slide adapter (30) onto pump stub.
» Refit electrical cable to pump connector (no polarisation).
» Let unit run for 15 to 30 mins, then check for leakages.

WARNING

Risk of electrical shock!
Hazardous electrical voltage!
Follow safety instructions for work on live components.
Leakages may invoke leak currents.

» In case of leakage turn off power supply and secure against being switched on again.
» Find leakage and eliminate.
» Check again.
9.8 Inspection of hoses
Since steam and condensate hoses are prone to wear as well, those hoses should undergo regular checks as well.

9.9 Electrode replacement

» Remove and open cylinder, as described in section "Removal and reinstallation of the steam cylinder"

Please note
When mounting the electrodes, make sure that the hand nut colours corresponding with the wiring colours remain in the same position as before in order to omit any unwanted shift of electrical potential. Hence, the hand nut positions must be recorded before they are removed. During reassembly, particular care must be taken to ensure that no grey wire is connected to the electrode plug next to the (grey) sensor electrode hand nut.

» Unscrew hand nuts (49)

» Remove electrodes (48)

» Install new electrodes (48). Make sure that the electrodes are positioned correctly (see exploded view).

Please note
The electrodes for use with the CY45/2 steam cylinder feature a two-fold sealing (s. fig.) In order to allow for the problemfree electrode installation, moisten the upper o-ring with water or soap solution.

Two-fold sealing of the electrodes for the steam cylinder CY45/2 (FLE50/65/100/130)

» Hand tighten the nuts (49).
» Use solvent-free, HygroMatik-quality o-rings (for flange, electrodes, cylinder base and steam hose adapter).
» Assemble steam cylinder
» Plug the electrode plugs (4) directly onto the electrodes (48)
» Install the steam cylinder
Genuine electrode length

HygroMatik large area electrodes made from stainless steel have the following genuine lengths:

<table>
<thead>
<tr>
<th>Model</th>
<th>Length [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLE05/10</td>
<td>155</td>
</tr>
<tr>
<td>FLE15</td>
<td>235</td>
</tr>
<tr>
<td>FLE20</td>
<td>210</td>
</tr>
<tr>
<td>FLE25</td>
<td>235</td>
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<tr>
<td>FLE30/40</td>
<td>265</td>
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<tr>
<td>FLE50/65</td>
<td>310</td>
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<tr>
<td>FLE80</td>
<td>265</td>
</tr>
<tr>
<td>FLE100/130</td>
<td>310</td>
</tr>
</tbody>
</table>

*) The electrodes installed in the new CY45/2 steam cylinder feature a length of 300 mm

Electrode wear

Electrode wear depends on:
- composition and conductivity of the supply water
- the amount of steam produced

9.10 Functional check

» Run the system with maximum output for a couple of minutes
» Check all safety devices.
» Check hose connections and seals for leakage.

9.11 Finishing maintenance

After finishing substantial maintenance work, the service interval must be reset by means of the „Service-reset_cyl. 1“ or „Service-reset_cyl. 2“ parameters (only with double cylinder units), s. „FlexLine controls“ manual, „Service“ submenu.

The steam amount counter now again holds the value preset that determines the next maintenance requirement when reached.

In case of the electrodes being burned-off to less than one third to half of their genuine length, electrode replacement should be made.
10. Dismantling

Once the steam humidifier will no longer be used, dismantle (demolish or scrap) it by following the installation procedures in reverse order.

**WARNING**

*Warning:* Dismantling of the unit may only be performed by qualified personnel. Electrical dismantling may only be performed by trained electricians.

**Please note**

Obey the safety guidelines in section “Safety Instructions,” especially the guidelines for disposal.
11. Declaration of Conformity

EU Konformitätserklärung
EU Declaration of Conformity

Hersteller / Manufacturer: HygroMatik GmbH
Anschrift / Address: Lise-Meitner-Straße 3, D-24558 Henstedt-Ulzburg, Germany


Die bezeichneten Produkte stimmen in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinien überein:
The products described above in the form as delivered are in conformity with the provisions of the following European Directives:

2014/30/EU Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit.

2014/35/EU Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen.

Die Konformität mit den Richtlinien wird nachgewiesen durch die Einhaltung folgender Normen:
Conformity to the Directives is assured through the application of the following standards:

Referenznummer: Ausgabedatum: Referenznummer: Ausgabedatum:
Reference Number: Edition: Reference Number: Edition:
DIN EN 61000-6-2 2006-03 DIN EN 60335-1 2012-10
DIN EN 61000-6-3 2011-09 DIN EN 60335-1 Ber.1 2014-04
DIN EN 62233 2008-11 DIN EN 60335-2-98 2009-04
DIN EN 62233 Ber.1

The requirements of the German Product Safety Law ProdSG regarding the assurance of safety and health are met. Product modifications after delivery may result in a loss of conformity.

Henstedt-Ulzburg, den / the 03.04.2017

HygroMatik GmbH

Dirk Menssing
Geschäftsführer / General Manager

I.V. Frank Michaelsen
Leitung Technik / Head of Engineering

This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.
### 12. Spare Parts

<table>
<thead>
<tr>
<th>Article No.</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>Steam generation</strong></td>
<td></td>
</tr>
<tr>
<td>8 1</td>
<td>B-3204029 Sensor electrode</td>
</tr>
<tr>
<td>8 1</td>
<td>B-3204032 Sensor electrode</td>
</tr>
<tr>
<td>1 1 1 1 1</td>
<td>E-2214023 Mounting set for Cylinder base</td>
</tr>
<tr>
<td>1 1 1 1 1 1 1</td>
<td>E-2216023 Mounting set for Cylinder base</td>
</tr>
<tr>
<td>1 E-2205008 Adapter for Steam hose, HVAC</td>
<td></td>
</tr>
<tr>
<td>1 E-2205009 Adapter for Steam hose, SPA</td>
<td></td>
</tr>
<tr>
<td>2 E-2205000 Up for adapter</td>
<td></td>
</tr>
<tr>
<td>Steam generation, operating voltage above 240V up to 480V</td>
<td></td>
</tr>
<tr>
<td>1 SP-03-00000 Steam Cylinder CY08 compl.</td>
<td></td>
</tr>
<tr>
<td>1 SP-04-00002 Steam Cylinder CY17 compl. with 3 electrodes</td>
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</tr>
<tr>
<td>1 SP-04-00003 Steam Cylinder CY17 compl. with 6 electrodes</td>
<td></td>
</tr>
<tr>
<td>1 SP-05-00000 Steam Cylinder CY30 compl.</td>
<td></td>
</tr>
<tr>
<td>1 E-2206090 Cylinder base</td>
<td></td>
</tr>
<tr>
<td>1 E-2209018 Adapter for Steam hose, HVAC</td>
<td></td>
</tr>
<tr>
<td>Steam generation, special voltage 208V to 249V</td>
<td></td>
</tr>
<tr>
<td>1 SP-03-00000 Steam Cylinder CY08 compl.</td>
<td></td>
</tr>
<tr>
<td>1 SP-04-00001 Steam Cylinder CY17 compl. with 2 electrodes</td>
<td></td>
</tr>
<tr>
<td>1 SP-05-00001 Steam Cylinder CY30 compl.</td>
<td></td>
</tr>
<tr>
<td>1 SP-06-00001 Steam Cylinder CY45/2 compl. (from 11/2018)</td>
<td></td>
</tr>
<tr>
<td>Steam generation, operating voltage above 240V up to 480V</td>
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</tr>
<tr>
<td>1 AC-03-00000 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38)</td>
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<tr>
<td>1 AC-04-00000 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38)</td>
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<tr>
<td>1 AC-04-00100 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38)</td>
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<tr>
<td>1 AC-05-00000 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38)</td>
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</tr>
<tr>
<td>1 AC-06-00000 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38)</td>
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<tr>
<td>1 AC-06-00001 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38) for cylinders until 10/2018</td>
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<tr>
<td>1 AC-06-00002 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38) for cylinder CY45/2 from 11/2018</td>
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<tr>
<td>Steam generation, special voltage 500V</td>
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<tr>
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</tr>
<tr>
<td>1 SP-04-00004 Steam Cylinder CY17 compl. with 3 electrodes</td>
<td></td>
</tr>
<tr>
<td>1 SP-04-00005 Steam Cylinder CY17 compl. with 6 electrodes</td>
<td></td>
</tr>
<tr>
<td>1 SP-05-00004 Steam Cylinder CY30 compl.</td>
<td></td>
</tr>
<tr>
<td>1 SP-06-00004 Steam Cylinder CY45/2 compl.</td>
<td></td>
</tr>
<tr>
<td>Steam generation, special voltage 208V to 249V</td>
<td></td>
</tr>
<tr>
<td>1 AC-03-00001 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38)</td>
<td></td>
</tr>
<tr>
<td>1 AC-04-00001 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38)</td>
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</tr>
<tr>
<td>1 AC-04-00101 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38)</td>
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</tr>
<tr>
<td>1 AC-05-00001 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38)</td>
<td></td>
</tr>
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<td>1 AC-06-00001 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38) for cylinders until 10/2018</td>
<td></td>
</tr>
<tr>
<td>1 AC-06-00002 O-ring set (Pos. 3, 17, 31, 33, 34, 35, 36, 38) for cylinder CY45/2 from 11/2018</td>
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</tr>
<tr>
<td>Article No.</td>
<td>Description</td>
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<tr>
<td>WF-03-00010</td>
<td>Water feed, 1.4l/min, 220-240V, 0.2 - 1 bar, with mounting set</td>
</tr>
<tr>
<td>WF-04-00010</td>
<td>Water feed, 2.3l/min, 220-240V, 0.2 - 1.6 bar, with mounting set</td>
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<tr>
<td>WF-06-00010</td>
<td>Water feed, 3.4l/min, 220-240V, 0.2 - 1.6 bar, with mounting set</td>
</tr>
<tr>
<td>E-2604002</td>
<td>Connecting hose solenoid valve - Cylinder base [m]</td>
</tr>
<tr>
<td>E-2304080</td>
<td>Flush for cleaning</td>
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<tr>
<td>E-2604084</td>
<td>Double check valve</td>
</tr>
<tr>
<td>E-850064</td>
<td>Hose clamp: 12 - 22mm</td>
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<tr>
<td>B-2304031</td>
<td>Hose for water connection, 0.6m, 3/4&quot; cap nuts on both sides</td>
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<tr>
<td>E-2425009</td>
<td>Pump-drain-hose-system (Pos. 6, 14, 15, 30, 31)</td>
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<tr>
<td>E-2404027</td>
<td>Drain pump without mounting set, with 2 o-rings</td>
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<tr>
<td>E-2424014</td>
<td>Mounting set for drain pump</td>
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<tr>
<td>CN-07-00020</td>
<td>Mainboard incl. Plug (please note serial no. of unit in border)</td>
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<tr>
<td>CN-07-00030</td>
<td>Extension board for double units</td>
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<tr>
<td>CN-07-00040</td>
<td>Relay board</td>
</tr>
<tr>
<td>CN-07-00021</td>
<td>Display FlexLine</td>
</tr>
<tr>
<td>E-2502412</td>
<td>Control switch, double pole, middle position = &quot;0&quot;</td>
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<tr>
<td>E-2507040</td>
<td>Main contactor 20A</td>
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<tr>
<td>E-2507060</td>
<td>Main contactor 50A</td>
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<tr>
<td>WR-03-00001</td>
<td>Connecting cables for electrodes and sensor electrode with plugs (Pos. 4, 5)</td>
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<tr>
<td>WR-04-00001</td>
<td>Connecting cables for electrodes and sensor electrode with plugs (Pos. 4, 5)</td>
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<td>WR-04-00101</td>
<td>Connecting cables for electrodes and sensor electrode with plugs (Pos. 4, 5)</td>
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<tr>
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<td>Connecting cables for electrodes and sensor electrode with plugs (Pos. 4, 5)</td>
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<td>Connecting cables for electrodes and sensor electrode with plugs (Pos. 4, 5)</td>
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<tr>
<td>WR-07-00101</td>
<td>Connecting cables for electrodes and sensor electrode with plugs (Pos. 4, 5)</td>
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<tr>
<td>WR-08-00001</td>
<td>Connecting cables for electrodes and sensor electrode with plugs (Pos. 4, 5)</td>
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<tr>
<td>WR-08-00101</td>
<td>Connecting cables for electrodes and sensor electrode with plugs (Pos. 4, 5)</td>
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</tbody>
</table>
For ordering spare parts, a template can be found on the www.hygromatik.com website under the „Contact“ tab. Your spare parts order may as well be directed per e-mail to the HygroMatik main office using the address hy@hygromatik.de.

Please make sure to specify your unit model and serial number.
### Technical specifications

#### FLE Steam Humidifier Climate

<table>
<thead>
<tr>
<th>Unit type</th>
<th>FLE05</th>
<th>FLE10</th>
<th>FLE15</th>
<th>FLE20</th>
<th>FLE25</th>
<th>FLE30</th>
<th>FLE40</th>
<th>FLE50</th>
<th>FLE65</th>
<th>FLE80</th>
<th>FLE100</th>
<th>FLE130</th>
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<tbody>
<tr>
<td>Steam output [kg/h]</td>
<td>4,8-5,2</td>
<td>9,5-10,4</td>
<td>14,3-15,6</td>
<td>19,0-20,8</td>
<td>24,0-26,0</td>
<td>28,5-31,2</td>
<td>38,2-41,7</td>
<td>47,8-52,2</td>
<td>62,0-67,5</td>
<td>76,4-83,4</td>
<td>95,5-104,4</td>
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<td>Electrical connection(1)</td>
<td>380-415V /3Ph /50-60Hz</td>
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<td>Rated power [kW]</td>
<td>3,6-3,9</td>
<td>7,1-7,8</td>
<td>10,7-11,7</td>
<td>14,3-15,6</td>
<td>18-19,5</td>
<td>21,4-23,4</td>
<td>28,6-31,3</td>
<td>35,9-39,2</td>
<td>46,3-50,6</td>
<td>2 x 28,6-31,3</td>
<td>2 x 35,8-39,1</td>
<td>2 x 46,3-50,6</td>
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<td>Nominal current [A]</td>
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<td>10,8</td>
<td>16,3</td>
<td>21,7</td>
<td>27,2</td>
<td>32,5</td>
<td>43,5</td>
<td>54,5</td>
<td>70,4</td>
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<td>Fuse <a href="3">A</a></td>
<td>3 x 10</td>
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<tr>
<td>Control</td>
<td>FlexLine mainboard with capacitive 3.5&quot; touch colour display</td>
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<tr>
<td>Separate control voltage(4)</td>
<td>220-240V /N /2,5A</td>
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<tr>
<td>Steam hose connection [mm]</td>
<td>16</td>
<td>22</td>
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<td>27</td>
<td></td>
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<tr>
<td>Empty weight [kg]</td>
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<td>13</td>
<td>21</td>
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<tr>
<td>Max. filling capacity [l]</td>
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<td>36</td>
<td>47</td>
<td>48</td>
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<td>Operation weight [kg]</td>
<td>540</td>
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<td>750</td>
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<tr>
<td>Water connection</td>
<td>tap water of varying qualities</td>
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<tr>
<td>Drain water connection</td>
<td>Connection Ø 1 1/4&quot;</td>
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(1) Other voltages upon request.
(2) 13/28% above nominal power consumption after full blowdown. Observe actuation characteristics of automatic circuit-breakers. If necessary, select the next highest circuit-breaker level.
(3) Internal control voltage upon request.
(5) Outer dimensions of width and depth. Height incl drain connection.
FLE Steam Humidifier Spa

<table>
<thead>
<tr>
<th>Unit type</th>
<th>FLE05</th>
<th>FLE10</th>
<th>FLE15</th>
<th>FLE20</th>
<th>FLE25</th>
<th>FLE30</th>
<th>FLE40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam output [kg/h]</td>
<td>4.8-5.2</td>
<td>9.5-10.4</td>
<td>14.3-15.6</td>
<td>19.0-20.8</td>
<td>24.0-26.0</td>
<td>28.5-31.2</td>
<td>38.2-41.7</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>380-415V /3Ph /50-60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated power [kW]</td>
<td>3.6-3.9</td>
<td>7.1-7.8</td>
<td>10.8-11.7</td>
<td>14.3-15.6</td>
<td>18-19.5</td>
<td>21.4-23.4</td>
<td>28.6-31.2</td>
</tr>
<tr>
<td>Nominal current [A]</td>
<td>5.4</td>
<td>10.8</td>
<td>16.3</td>
<td>21.7</td>
<td>27.2</td>
<td>32.5</td>
<td>43.5</td>
</tr>
<tr>
<td>Fuse [A]</td>
<td>3 x 10</td>
<td>3 x 16</td>
<td>3 x 20</td>
<td>3 x 32</td>
<td>3 x 40</td>
<td>3 x 50</td>
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</tr>
<tr>
<td>Number of steam cylinder</td>
<td>1</td>
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<td></td>
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</tr>
</tbody>
</table>

Control

Separate control voltage | 220-240V /N /2,5A |

Empty weight [kg] | 16 | 22 | 23 | 26 | 27 |

Max. filling capacity [l] | 5 | 13 | 21 |

Operation weight [kg] | 21 | 36 | 37 | 47 | 48 |

Width [mm] | 540 | 580 |

Height [mm] | 535 | 695 | 750 |

Depth [mm] | 320 | 355 |

Water connection | tap water of varying qualities |

Drain water connection | Connection Ø 1 1/4 |

(1) Other voltages upon request.
(2) Internal control voltage upon request.
(3) Incl. Y-piece DN40.
(4) Outer dimensions of width and depth. Height incl.drain connection.

---

<table>
<thead>
<tr>
<th>Unit type</th>
<th>FLE50</th>
<th>FLE65</th>
<th>FLE80</th>
<th>FLE100</th>
<th>FLE130</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam output [kg/h]</td>
<td>48.0-52.0</td>
<td>62.0-67.5</td>
<td>76.4-83.4</td>
<td>95.5-104.4</td>
<td>124.0-135.0</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>380-415V /3Ph /50-60Hz</td>
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<td></td>
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<tr>
<td>Rated power [kW]</td>
<td>35.9-39.2</td>
<td>46.3-50.6</td>
<td>2 x 28.6-31.2</td>
<td>2 x 35.9-39.2</td>
<td>2 x 46.3-50.6</td>
</tr>
<tr>
<td>Nominal current [A]</td>
<td>54.5</td>
<td>70.4</td>
<td>2 x 43.5</td>
<td>2 x 54.5</td>
<td>2 x 70.4</td>
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<tr>
<td>Fuse [A]</td>
<td>3 x 63</td>
<td>3 x 80</td>
<td>2 x 3 x 50</td>
<td>2 x 3 x 63</td>
<td>2 x 3 x 80</td>
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<tr>
<td>Number of steam cylinder</td>
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<td>2</td>
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<td></td>
</tr>
</tbody>
</table>

Control

Separate control voltage | 220-240V /N /2,5A |

Steam hose connection [mm] | 2 x 40 |

Empty weight [kg] | 33 | 34 | 66 | 75 | - |

Max. filling capacity [l] | 36 | 42 | 71 |

Operation weight [kg] | 69 | 70 | 108 | 147 | - |

Width [mm] | 640 | 1130 | 1170 |

Height [mm] | 785 | 750 | 785 |

Depth [mm] | 420 |

Water connection | tap water of varying qualities |

Drain water connection | Connection Ø 1 1/4 |

(1) Other voltages upon request.
(2) Internal control voltage upon request.
(3) Incl. Y-piece DN40.
(4) Outer dimensions of width and depth. Height incl.drain connection.
14. Exploded view
15. View of housing

FLE05 - FLE30

FLE40

FLE50, FLE65

FLE80

FLE100, FLE130