

# SPIROVENT® SUPERIOR S400

User Manual



# User Manual

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## 1 PREFACE

### 1.1 About the device

This user manual describes the installation, commissioning and operation of the following SpiroVent Superior types:

Type	Article code	Description
S400	MV04A..	Automatic vacuum degasser
S400-R	MV04R..	Automatic vacuum degasser, including integrated refill function with direct refill connection.
S400-B	MV04B..	Automatic vacuum degasser, including integrated refill function with backflow prevention.

### 1.2 About this document

Read the instructions before installation, commissioning and operation. Keep the instructions for future reference.

The original language of the document is English. All other available language versions are translations of the original instructions.

The illustrations in this document show a typical setup with relevant details for instructional use only. Differences between the illustrations and the device are possible but do not have an effect on the comprehensibility of this document.

All rights reserved. No part of this manual may be duplicated and/or made public through the Internet, by means of printing, photocopying, microfilm or in any other way without prior written permission from Spirotech bv.

This manual has been composed with the utmost care. Should, however, this manual contain any inaccuracies, Spirotech bv cannot be held responsible for this.

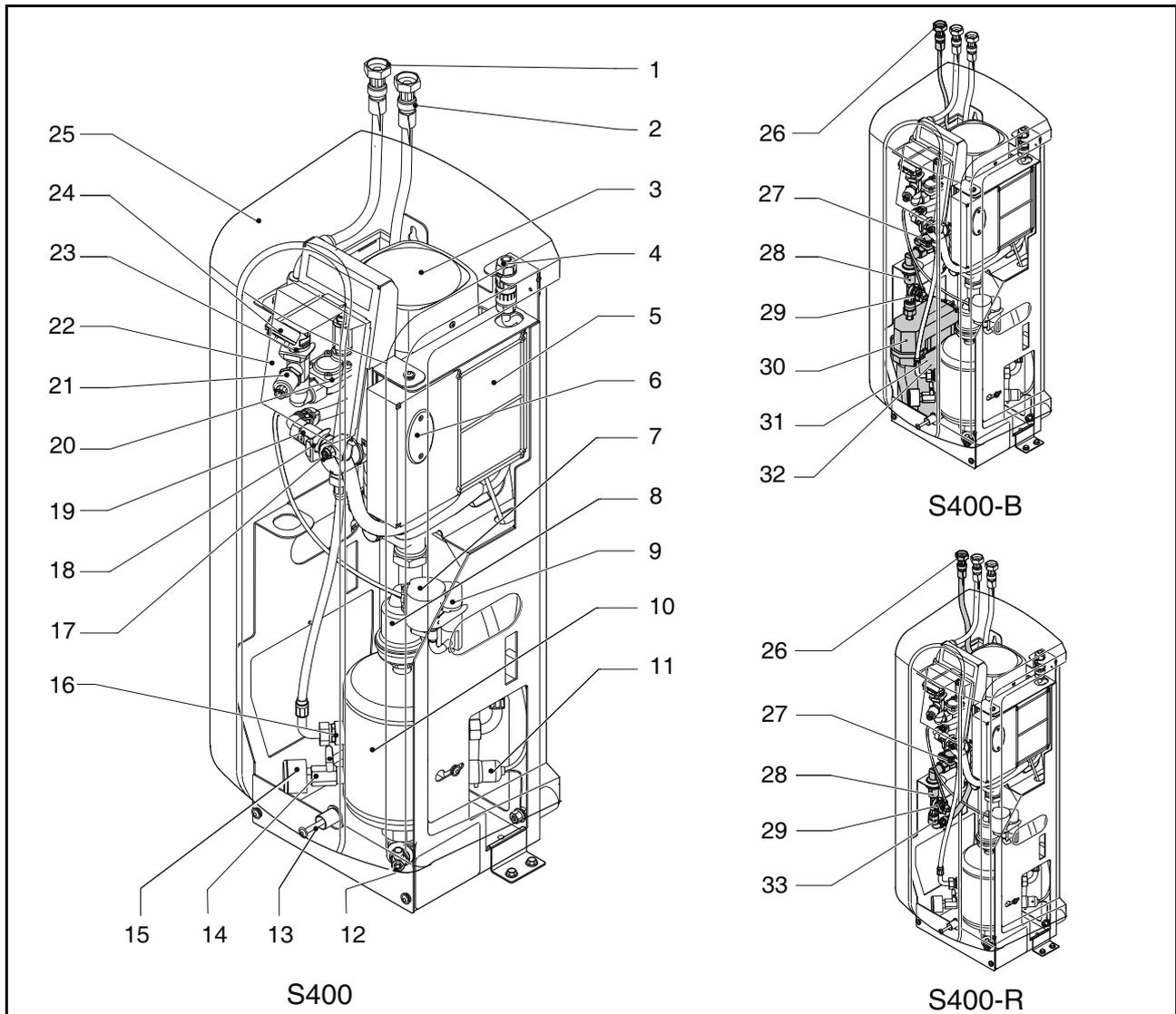
### 1.3 Symbols

Throughout the instructions the following symbols are used:

	Warning or important note
	Note
	Risk of electric shock
	Risk of burning

## 2 INTRODUCTION

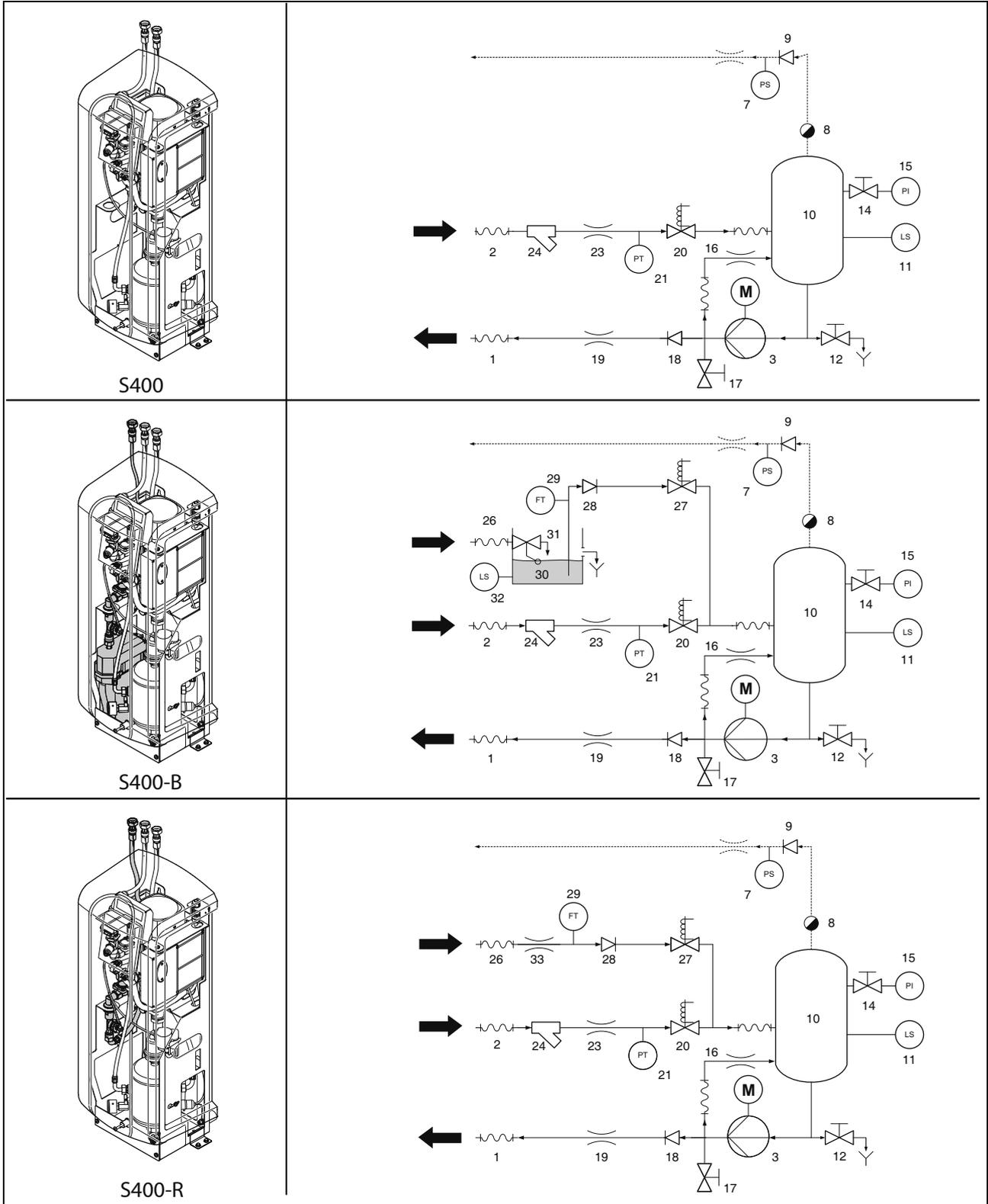
### 2.1 Overview of the unit



- |    |                                 |    |                           |
|----|---------------------------------|----|---------------------------|
| 1  | Outlet connection               | 18 | Check valve of the outlet |
| 2  | Inlet connection                | 19 | Flow limiter outlet       |
| 3  | Pump                            | 20 | Solenoid valve            |
| 4  | Power terminal                  | 21 | Pressure sensor           |
| 5  | Control unit - Power box        | 22 | Control unit (HMI)        |
| 6  | Fuses                           | 23 | Flow limiter inlet        |
| 7  | SmartSwitch                     | 24 | Y-filter                  |
| 8  | Automatic air vent              | 25 | Cover                     |
| 9  | Check valve of the air vent     | 26 | Refill connection         |
| 10 | Deaeration vessel               | 27 | Solenoid valve refill     |
| 11 | Level sensor                    | 28 | Check valve refill        |
| 12 | Drain connection                | 29 | Water flow meter          |
| 13 | Bolt                            | 30 | Break tank                |
| 14 | Valve behind the pressure gauge | 31 | Float valve               |
| 15 | Pressure gauge                  | 32 | Float switch              |
| 16 | Flow limiter bypass             | 33 | Flow limiter refill       |
| 17 | Deaeration valve                |    |                           |

## 2.2 Operation

The figure below schematically shows the operation of the unit. The letter indications correspond with the main figure on the previous page.



## 2.2.1 General

The Spirovent Superior is a fully automatic vacuum degasser for heating and cooling installations, filled with heat transfer fluids. These fluids contain dissolved and free gases. The Spirovent Superior removes these gases from the installation, preventing problems, caused by gases in the installation.

## 2.2.2 Degassing

The unit starts up a degassing process each day at a time set by the user. The process has two phases:

- 1 The rinsing phase: The fluid flows from the installation through the solenoid valve (20) into the vessel (10). The pump (3) continuously pumps the fluid from the vessel into the installation. Here the fluid absorbs gases present in the installation.
- 2 The vacuum phase: The solenoid valve (20) regularly closes, starting a vacuum phase. The continuously running pump (3) provides the necessary underpressure in the vessel (10). The underpressure causes the release of the gases dissolved in the fluid, and these gases are collected at the top of the vessel. At the end of the vacuum phase, the solenoid valve (20) opens again, releasing the gases from the installation through the automatic air vent (8). The SmartSwitch (7) at the automatic air vent ensures that the degassing is stopped as soon as the content of dissolved gases has reached the minimum level.

## 2.2.3 Refilling

S400-B and S400-R have an integrated refill function, and can control the pressure of the installation. To control the pressure the unit inserts, if necessary, additional (degassed) fluid into the installation. Alternatively, the unit can refill on demand of external equipment e.g. expansion systems.

The refill process consists of a vacuum phase where fresh fluid is sucked into the vessel (10): system valve (20) closed, refill valve (27) opened. This is followed by a flushing phase during which system fluid is flushed through the vessel to degass the refill fluid.

The unit can also refill the installation in case of abnormal or total pressure loss.

## 2.3 Operating conditions

The unit is suitable for use in systems filled with clean water or mixtures of water and glycol up to 40% . Operation in combination with other fluids may result in irreparable damage.

The unit should be used within the limits of the technical specifications as given in chapter 3. In case of doubt, always contact the supplier.

## 2.4 Remote monitoring

### 2.4.1 Building Management System (BMS)

The Superior has a series of external connectors for remote monitoring and control.

The device also has the possibility to connect Building Management Systems to the RS485 connector in order to communicate, utilizing the following bus system:

- Modbus RTU

### 2.4.2 Internet

The Superior control unit can be connected to the Internet, either by means of a LAN cable or by means of an optional WiFi connection dongle. This allows remote monitoring of the system. It is also possible to upgrade the Superior with new firmware (if available) when connected to the Internet.

## 2.5 Scope of delivery

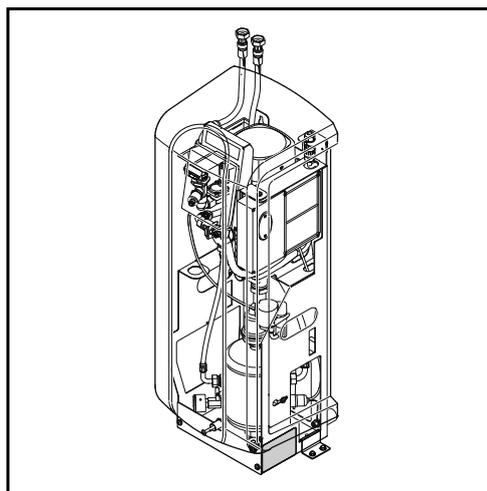
- 1x SpiroVent Superior
- 1x User documentation
- 1x Non-return protection (optional)

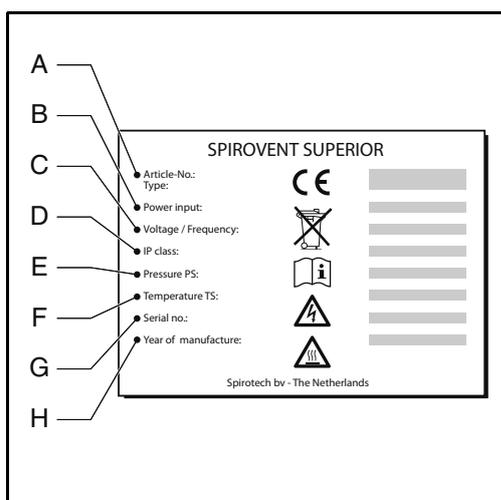
## 2.6 CE marking

The unit has a CE marking. This means that the unit has been designed, constructed and tested in compliance with the current safety and health regulations.

Provided that the user manual is adhered to, the unit can be safely used and maintained.

## 2.7 Type plate





- A Type of the unit
- B Absorbed power
- C Supply voltage
- D Protection class
- E System pressure
- F System temperature
- G Serial number
- H Year of construction

### 3 TECHNICAL SPECIFICATIONS

#### 3.1 General specifications

Item	S400	S400-R	S400-B
Empty weight [kg]	34	34	35
Noise level [dB (A)], at 1 m	55	55	55
Fluid connections inlet/ outlet	Swivel G <sup>3</sup> / <sub>4</sub> " female	Swivel G <sup>3</sup> / <sub>4</sub> " female	Swivel G <sup>3</sup> / <sub>4</sub> " female
Fluid connection refill	Swivel G <sup>3</sup> / <sub>4</sub> " female	Swivel G <sup>3</sup> / <sub>4</sub> " female	Swivel G <sup>3</sup> / <sub>4</sub> " female

#### 3.2 Operating characteristics

Item	S400	S400-R	S400-B
System pressure [bar]	1 - 4	1 - 4	1 - 4
Processing capacity [l/h]	500	500	500
Max. system volume [m <sup>3</sup> ]	100	100	100
System temperature [°C]	0 - 90	0 - 90	0 - 90
Ambient temperature [°C]	0 - 40	0 - 40	0 - 40
Refill pressure [bar]	n/a	0 - 10	1.0 - 10
Refill temperature [°C]	n/a	0 - 65	0 - 60
Effective refill flow [l/h]	n/a	200	250

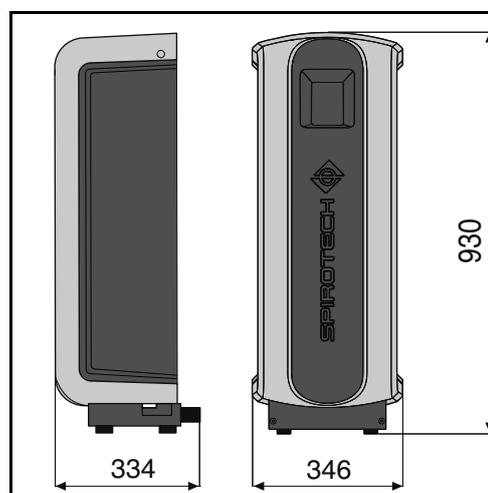
#### 3.3 Electrical specifications

Item	All types
Supply voltage	230 V ± 10% (50 Hz)
Required supply protection [A]	16
Nominal pump current [A]	3.1
Power consumption [W]	500
Ingress Protection class	IP 44
External contacts: common fault	Voltage free (NO), max. 24V 1A
External contacts: boiler interlock	Voltage free (NO), max. 24V 1A
External contacts: external refill voltage [V]	5
Fuse F1, electronic unit [A(M)]	1
Fuse F2, valves [A(T)]	2.5
Fuse F3, pump [A(T)]	10

#### 3.4 Internet specifications

Item	All types
LAN	RJ45; Cat 5e
WLAN	WiFi dongle (optional); 802.11 B/G/N

#### 3.5 Dimensions



Height [mm]	Width [mm]	Depth [mm]
930	346	334

## 4 SAFETY

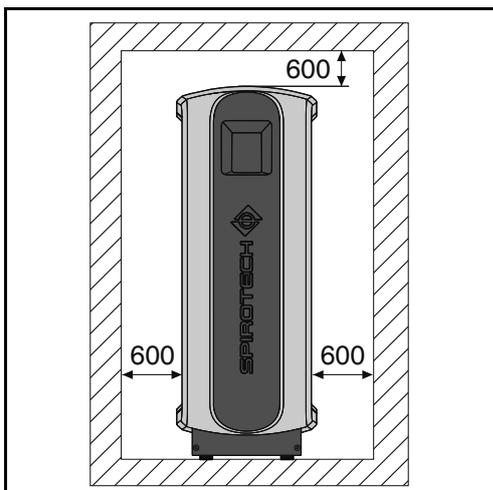
### 4.1 Safety instructions

Refer to the safety instructions document for the safety instructions and other safety information.

## 5 INSTALLATION AND COMMISSIONING

### 5.1 Installation conditions

- Install the unit on a frost-free, well-ventilated place.
- Install the unit in accordance with the local guidelines and rules.
- Connect the unit to a 230 V / 50 - 60 Hz supply.
- Install the unit as bypass on the main line of the installation.
- Preferably install the unit at the point in the installation with the lowest temperature. Here the most dissolved gases are found in the fluid.
- In case of a heavily contaminated system fluid, a dirt separator is to be installed in the main return line of the installation.
- Make sure that the expansion system has the proper dimensions. The water displacement in the unit can cause pressure variations in the installation. Take into account an extra net expansion volume of at least 2 litres. Make sure the expansion system connection is properly sized (at least 3/4"/22mm diameter).
- Make sure that the operating panel is always easily accessible.
- Make sure that you maintain at least the distance as indicated for service and repair.



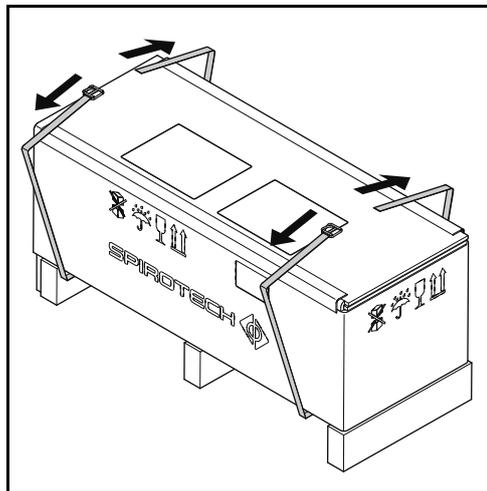
### 5.2 Unpack



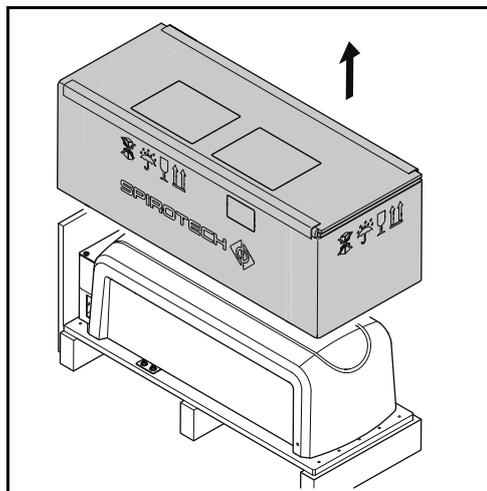
#### WARNING

To prevent damage to the unit do not hoist the unpacked unit.

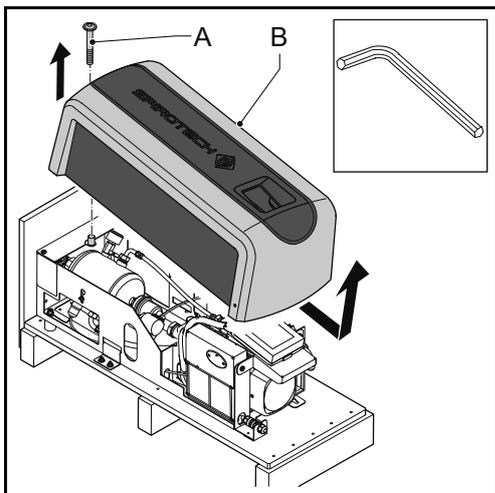
The unit is delivered on a pallet.



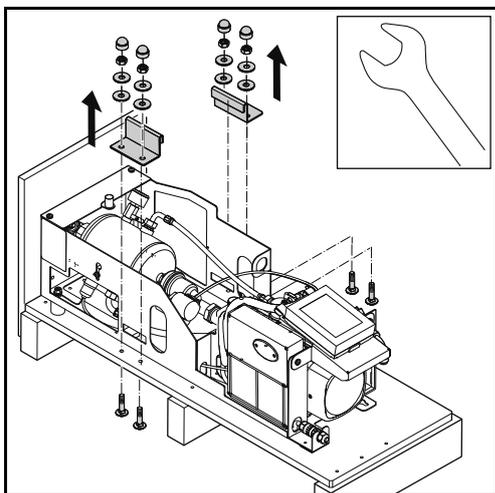
1. Remove the straps.



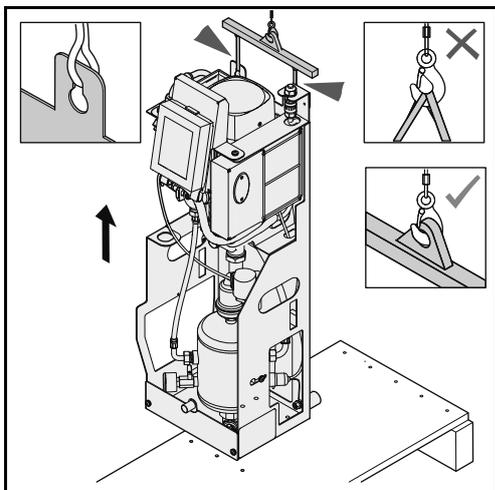
2. Remove the packaging.



3. Remove the fastener (A).
4. Remove the cover (B) from the unit.



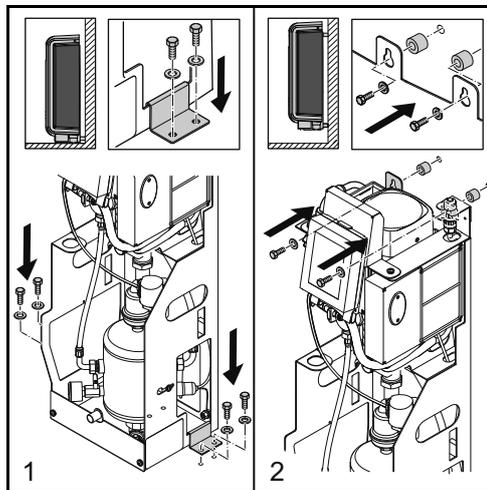
5. Remove the brackets and fasteners. Keep them for future use.



6. Move the unit to its location of installation. Lift the unit with a hoist.

## 5.3 Mounting and installation

### 5.3.1 Mounting



1. **Floor mounting:** Place the unit on a flat surface, against a flat, closed wall. Mount the unit to the floor. Use brackets and adequate fasteners.
2. **Wall mounting:** Mount the unit to a flat, closed wall using the holes and spacers.

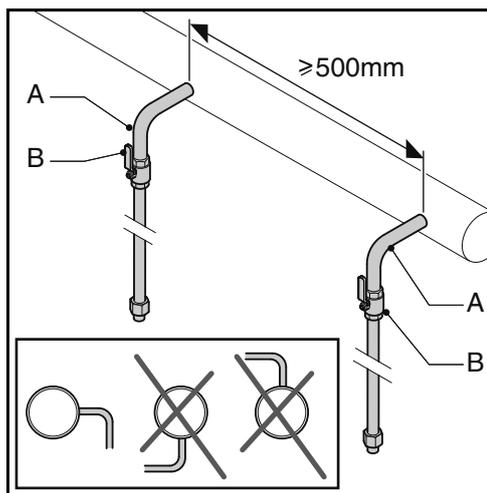


#### CAUTION

Make sure that the mounting can support the filled unit: empty weight + 5 kg!

### 5.3.2 Installation

#### Mechanical



1. Make two branch lines  $\frac{3}{4}$ " (A) on the side of the main transport line.



#### NOTE

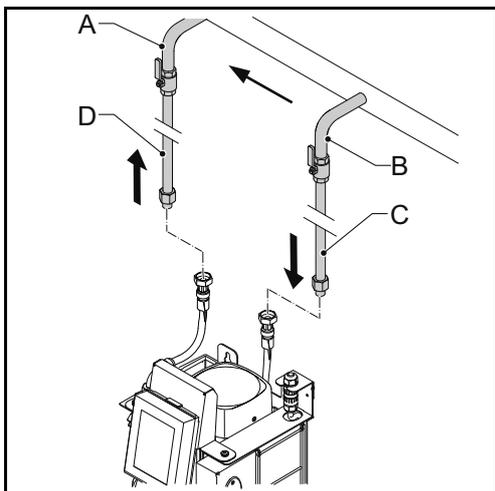
The distance between them should be at least 500 mm. The inlet of the unit should be connected to the first connection point in the flow direction.

2. Insert a valve (B) in each branch. Preferably, use lockable ball valves.



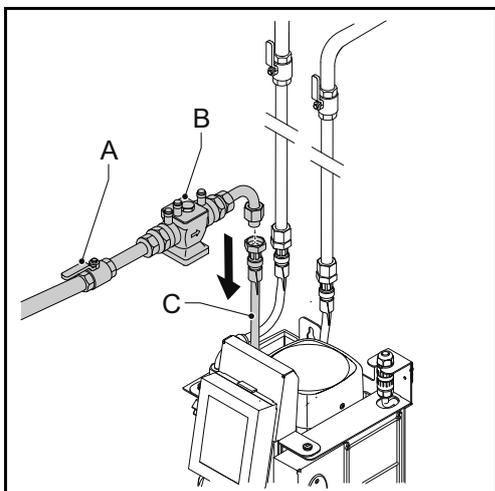
### NOTE

With these valves the unit can be isolated. Keep valves closed until the unit is installed and taken in operation. Refer to § 5.4.



3. Connect the line (A) to the flexible outlet line (D).
4. Connect the line (B) to the flexible inlet line (C).

### Only applicable to refill units:



1. (-B versions): Connect the makeup water supply line to the refill connection line (C).

2. (-R versions): Insert a shutoff valve (A) and a backflow protection (B) in the makeup water supply line. And then connect it to the flexible refill line (C).



### CAUTION

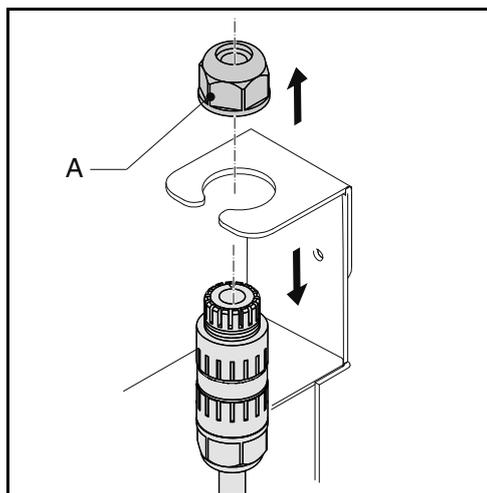
- Use a locally approved backflow protection. A backflow protection can also be supplied as an option with the unit.
- Make sure that the pressure of the feed water is below the system pressure.
- Make sure that the lines leave the unit at the top. This will avoid fast wear of hoses.
- Make sure that the breaktank overflow hose ends inside the unit.

### Electrical

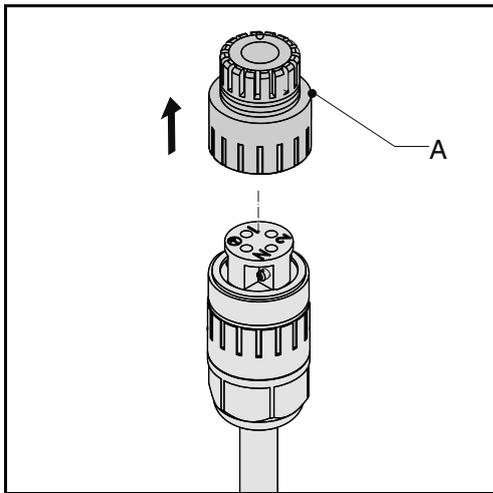


### CAUTION

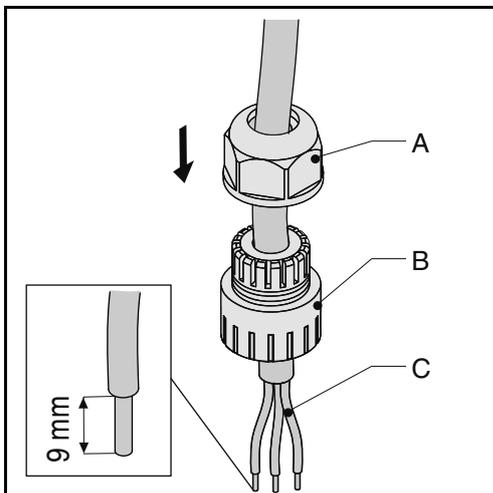
- Preferably, use a grounded wall socket for the power supply to the unit. The socket must stay accessible.
- Mount an all-pole main switch (contact opening  $\geq 3\text{mm}$ ) if the unit is directly connected to the power supply.
- Use supply cables with the correct dimensions.



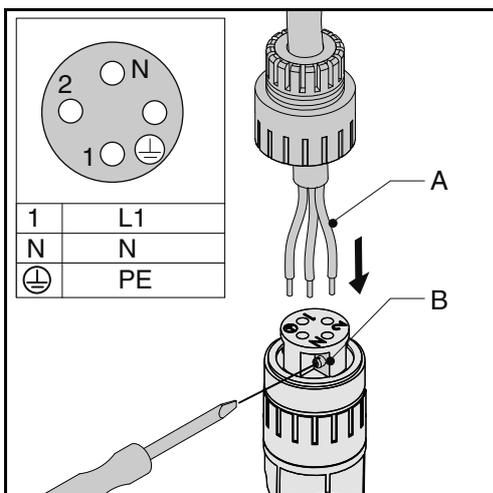
1. Loosen the cable gland (A) and take the connector out of the frame.



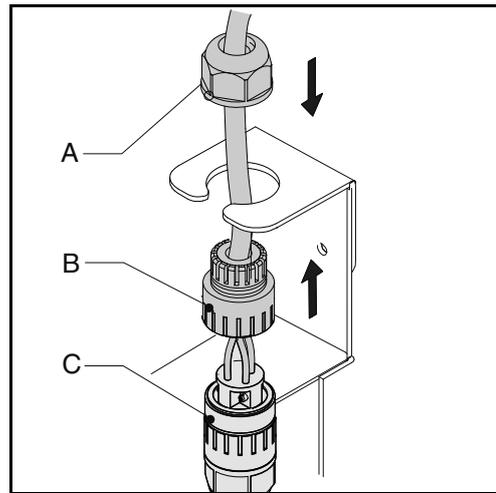
2. Loosen and remove the connector cap (A).



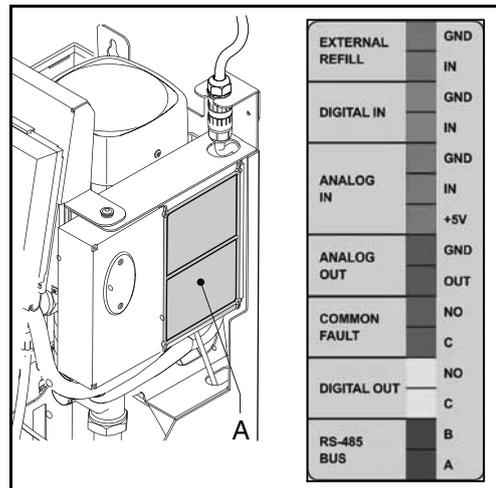
3. Feed a 3-core supply cable (C) through cable gland (A) and the connector cap (B).



4. Loosen the screws (B).  
 5. Insert the wires (A) into the correct holes of the connector plug.  
 6. Fasten the screws (B).

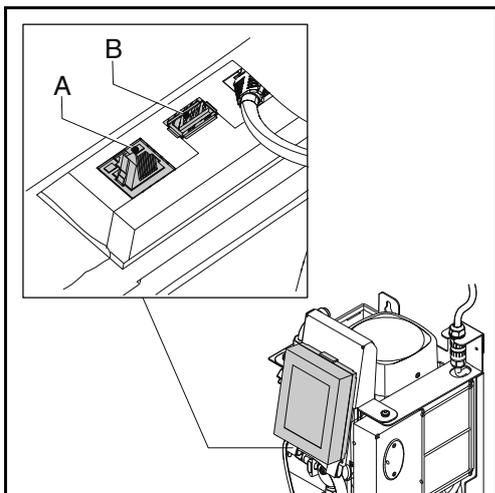


7. Fasten the connector cap (B) to the connector (C).  
 8. Put back the connector in the frame.  
 9. Fasten the cable gland (A).



Contact	Connector
External refill	Blue
Common fault	Grey
Boiler interlock	Yellow
BMS	Purple

10. If an external contact (external refill, common fault, and/or boiler interlock) or BMS is used, connect the cables of the external contact or BMS to the correct connector in the power box (A).



11. For internet connection, either connect the LAN cable to the LAN connector (A), or connect the WiFi dongle (optional) to the USB connector (B).

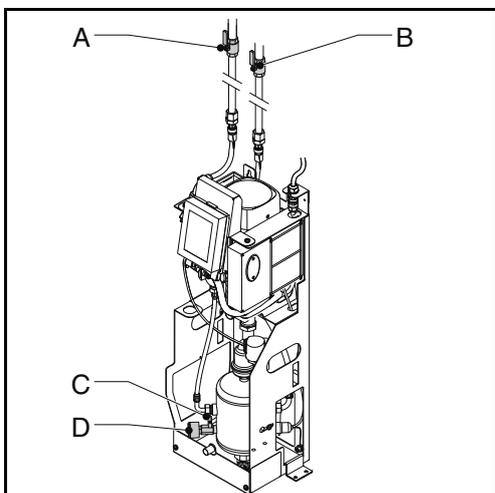


**CAUTION**

Make sure that the LAN cable does not touch warm parts.

## 5.4 Commissioning

### 5.4.1 Filling the unit

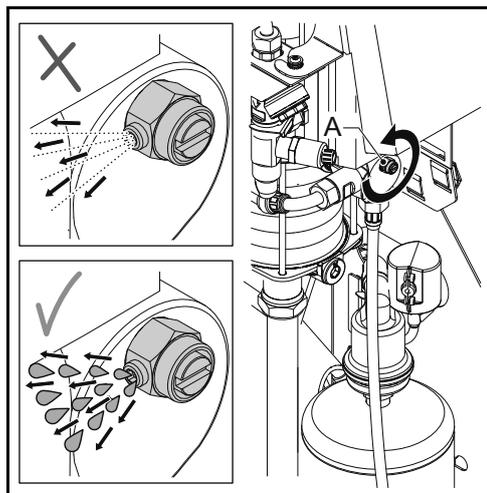


1. Open the valve (C) behind the pressure gauge (D).
2. Open system valves (A and B).

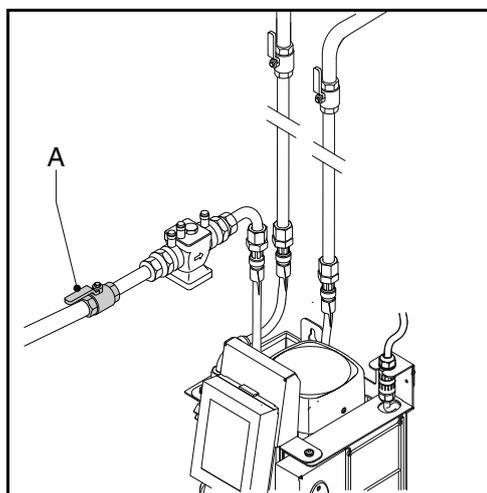


The following processes will automatically start:

- The unit will be filled with water.
- Air will be released.
- The vessel pressure will equalise with system pressure.



3. Open the deaeration valve (A) to deaerate the pump.



4. **For units of -R and -B versions:** Open the shutoff valve (A) in the refill line.
5. **For units of -B versions:** Make sure that there is water in the break tank.

### 5.4.2 First startup

1. Connect the unit to the mains power.



**NOTE**

The display of the touchscreen starts and will guide you through the startup procedure (Automatic Commissioning Procedure) and all the basic necessary settings.

For information on the content of the HMI (user interface), refer to § 6.1.

### Automatic Commissioning Procedure

The Automatic Commissioning Procedure will guide you through the startup via several screens.

The Automatic Commissioning consists of several steps:

1. Push the start button to start the commissioning procedure.
2. Select the preferred language, refer to *Select the preferred language*.
3. Set the actual time and date, refer to *Set the actual time and date*.
4. Select the correct system fluid, refer to *Select the correct system fluid*.
5. Set the pressure levels, refer to *Set the pressure levels*.
6. Fill up the unit with system fluid, refer to *Fill up the unit with system fluid*.
7. Execute the functional test, refer to *Execute the functional test*.

### Select the preferred language

1. Select your preferred language. The indicator shows the selected language.
2. Select the next page button ( > ).

### Set the actual time and date

1. Set the actual time. Move the wheels of the time indicator (HH:MM:SS) to the correct time in hours (HH), minutes (MM), and seconds (SS).
2. Set the correct time zone (UTC). Move the wheel to the correct time zone.
3. Select the next page button ( > ).
4. Set the actual date. Move the wheels of the date indicator (DD:MM:YY) to the correct date in day (DD), month (MM), and year (YY).
5. Select the next page button ( > ).

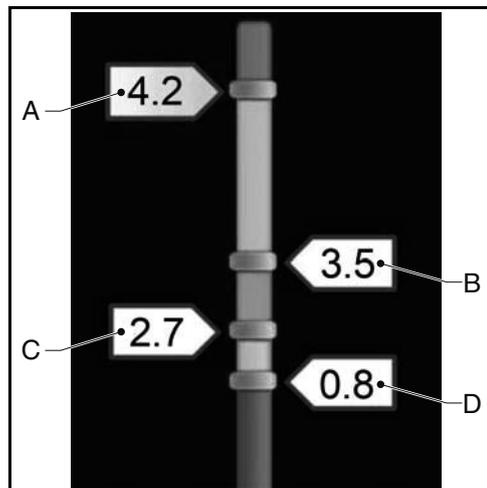
### Select the correct system fluid

1. Select the type of fluid in the system. The indicator shows the selected type.
2. Select the next page button ( > ).

### Fill up the unit with system fluid

1. Open the valves. Refer to § 5.4.1.
2. Select the next page button ( > ).
3. Deaerate the pump. Refer to § 5.4.1.
4. Select the next page button ( > ).

### Set the pressure levels



1. Drag the label of the maximum pressure (A) to the desired maximum pressure.
2. **For units of -R and -B versions:** Drag the label of the operating pressure (B) to the desired operating pressure.
3. **For units of -R and -B versions:** Drag the label of the refill pressure (C) to the desired refill pressure.



#### NOTE

The minimum operating pressure (D) cannot be changed.

4. Select the next page button ( > ).

### Execute the functional test

1. Push the start button to start the functional test.



The functional test only starts if the unit meets the following conditions:

- The deaeration tank is filled with system fluid.
- The measured pressure is above the minimum pressure (0.8 bar).
- **For -B versions:** the break tank is filled with refill fluid.

- When the display shows that the test is completed successfully, push the OK button and proceed to the next step, refer to § 5.4.4. *The display shows the home screen and the status is standby.*



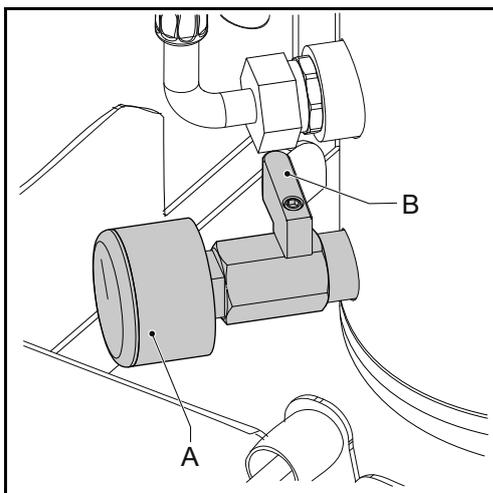
**NOTE**

During the functional test, warnings and faults can be triggered (refer to § 7.5). If this happens, remedy the failure and start the functional test again.

If it is not possible to remedy the failure at the moment, abort the functional test and remedy the failure later on. When the failure is solved, check if the unit is functioning properly. Refer to § 5.4.3.

**5.4.3 Check the operation when the functional test was aborted**

- Go to the home screen.
- Push the menu button.
- Select *Operating mode*.
- Select *Automatic mode*.
- Push the button *Degass start*.



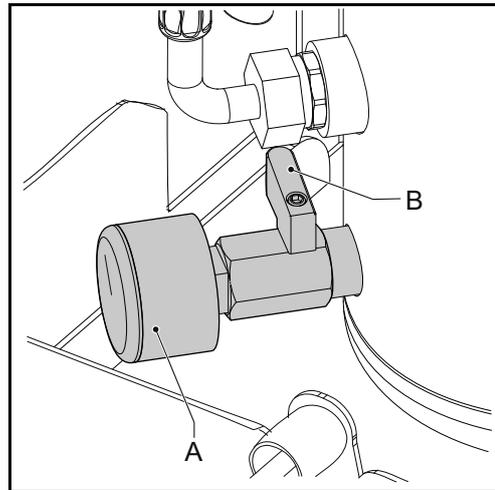
- Check the indication of the pressure gauge (A). This should alternately display overpressure and underpressure.



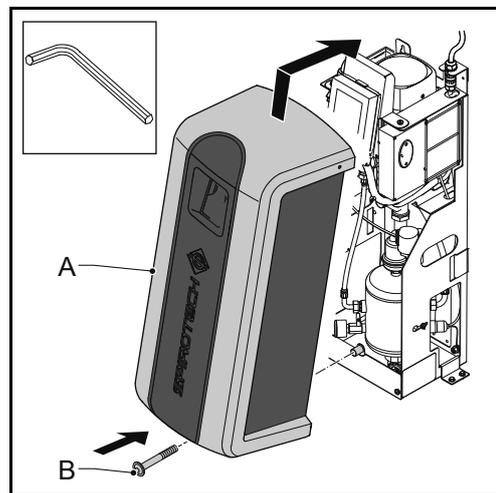
**NOTE**

The SmartSwitch will automatically turn off the unit when the concentration of dissolved gases has reached the minimum level.

**5.4.4 Finish the startup**



- Close the valve (B) behind the pressure gauge (A).



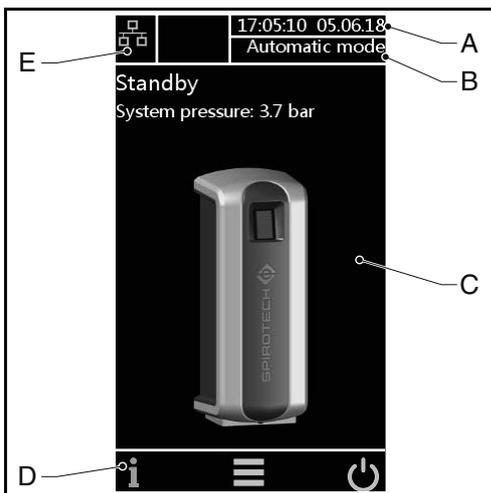
- Put back the cover (A) on the unit and fasten it with the fastener (B).

## 6 OPERATION

### 6.1 HMI (user interface) description

This section shows an overview of the content on the display.

#### 6.1.1 Screen layout



- A Date and time indicator
- B Operating mode indicator
- C Page-specific content
- D Navigation bar
- E System connection indicator; and Error/warning indicator

#### 6.1.2 Buttons and indicators

Button/indicator	Description
	On/off button
	Menu button
	Information button
	Home button
	Confirm button
	Next page button
	System connection indicator

Button/indicator	Description
	WiFi indicator
	Error indicator
	Warning indicator
	Radio button (not selected)
	Radio button (selected)
	Action button (available)
	Action button (not available)
	Selection wheel
	Range indicator with movable labels

#### 6.1.3 Overview of the pages

Page	Content
Start	On/off button
Home	<ul style="list-style-type: none"> <li>• Actual unit state, refer to § 6.1.4</li> <li>• Actual system pressure</li> <li>• Unit illustration</li> </ul>

Page	Content
Main Menu	<p>Navigation buttons to go to other pages:</p> <ul style="list-style-type: none"> <li>• Operating mode</li> <li>• User settings</li> <li>• History</li> <li>• Software upgrade</li> <li>• Network</li> <li>• Help (Info)</li> </ul>

## Main menu

Page	Content
Operating mode	<p>Operating mode selection:</p> <p>a Automatic mode:</p> <ul style="list-style-type: none"> <li>- Button Degass start</li> <li>- Button Stop processes</li> <li>- Button Low Pressure refill</li> </ul> <p>b Manual mode:</p> <ul style="list-style-type: none"> <li>- Button Degass start</li> <li>- Button Stop processes</li> <li>- Button Low Pressure refill</li> <li>- Button Manual mode cancel</li> </ul>

User settings	<p>Navigation buttons to go to the user settings pages:</p> <ul style="list-style-type: none"> <li>• Language</li> <li>• Date and Time</li> <li>• System fluid</li> <li>• Degassing</li> <li>• Refill</li> <li>• Pressures</li> <li>• Boiler interlock</li> <li>• Common fault</li> </ul> <p>For user settings, refer to § 6.1.5</p>
---------------	--

History	<p>Navigation buttons to go to history pages:</p> <ul style="list-style-type: none"> <li>• Work history</li> <li>• Faults history</li> <li>• Degass graphs</li> <li>• Counters</li> </ul>
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## Main menu

Page	Content
Software upgrade	Only accessible for Spirotech
Network	Shows the type of network
Help	<p>Navigation buttons to go to help pages:</p> <ul style="list-style-type: none"> <li>• Launch guide</li> <li>• Device description: <ul style="list-style-type: none"> <li>- Overview</li> <li>- External contacts</li> <li>- Fuses</li> </ul> </li> <li>• Spare parts</li> <li>• Warnings description</li> <li>• Errors description</li> <li>• Device info (e.g. software version)</li> </ul>

### 6.1.4 Unit state

State	Description
Device turned OFF	The unit is switched off
Standby	The unit is not operating and waiting for a starting command
Pump test	The pump is running. The system valve will stay open
Degassing	The unit is degassing
Refill	The unit is refilling
Low pressure refill	Refill the unit manually
Stopping	The system valve will open
Error	The unit has stopped because a critical error has occurred

### 6.1.5 User settings

#### General settings

Parameter	Description
Language	<p>The language of the display texts</p> <p>Select the desired language by pressing the corresponding radio button.</p>
Date and Time	<p>The actual date and time</p> <p>Set time (HH:MM:SS), UTC timezone (HH:MM) and date (DD:MM:YY) by scrolling the selection wheels.</p>

General settings	
Parameter	Description
System fluid	<p>System fluid.</p> <p>Select the used system fluid out of the list by pressing the corresponding radio button.</p> <ul style="list-style-type: none"> <li>• Water</li> <li>• Water glycol mixture</li> </ul>
Boiler interlock	<p>Boiler interlock settings.</p> <p>External connections/interfaces can be programmed to open when pressure drops below or rises above a critical boiler limit.</p> <p>These limits can be set after selecting the boiler interlock.</p>
Common fault	<p>General contact for errors</p> <p>Contact is normally open (NO) by default, but can be switched to normally closed (NC).</p> <p>Is the common fault set to normally closed (NC), switching off the mains power will make this contact NO as long as the power is switched off.</p>
Degassing settings	
Parameter	Description
Auto degass time 1	Time setting for daily start time and stop time of the degassing process.
Auto degass time 2	Second time setting for daily start time and stop time of the degassing process.
Block time	<p>Periods that the unit is not allowed to degass.</p> <ul style="list-style-type: none"> <li>• Weekday (every day of the week can be chosen)</li> <li>• Year (max. 5 periods per year can be chosen)</li> </ul>

Refill settings (only for S400-R and S400-B versions)	
Parameter	Description
Refill volume alarm after	<p>Maximum allowed refill quantity per refill. Issues an alarm if a refill exceeds this threshold.</p> <p>Range: 0 - 2500 l; 0 = switched off.</p>
Refill time alarm after	<p>Maximum continuous refill time.</p> <p>Range: 0 - 255 min.; 0 = switched off.</p>
Max. refill frequency	<p>Maximum number of times per day that refilling is allowed</p> <p>Range: 0 - 10 times; 0 = switched off.</p>

Pressure settings	
Parameter	Description
Max. system pressure	<p>Pressure at which the unit stops and triggers an alarm.</p> <p>This pressure should be lower than the system safety valve setting.</p> <p>Drag the label to the desired pressure</p>
Desired operating pressure	<p>The preferred system pressure.</p> <p>This is the pressure at which the refilling stops.</p> <p>Drag the label to the desired pressure.</p> <p>Only for S400-R and S400-B versions.</p>
Refill pressure	<p>The preferred system pressure at which the refilling starts.</p> <p>Set this value as low as possible when the refilling is controlled by an external refill system.</p> <p>Drag the label to the desired pressure.</p> <p>Only for S400-R and S400-B versions.</p>

## 6.2 Switch on the unit

1. Connect the unit to the mains power.
2. Touch the display of the touchscreen.



### NOTE

The start page shows on the display.

3. Select the menu button.
4. Select the button `User settings`.
5. Check if the settings are correct. If not, change the settings.
6. Select the home button.
7. Select the on/off button.



### NOTE

The unit is standby.

## 6.3 Change a setting

1. If you are not at the `User settings` page, go to the `User settings` page.
2. Select the setting you want to change.
3. Change the setting.
4. Select the confirm button (↵).



### NOTE

The new setting parameter shows on the display.

## 6.4 Switch off the unit

1. Select the on/off button.
2. Select the button `Turn off`.



### NOTE

The unit stops.

3. If necessary, disconnect the unit from the mains power.

## 6.5 Operating mode

### 6.5.1 Manual operation

1. Go to the `Operating mode` page.
2. Select `Manual mode`.
3. Select the button `Degass start`.



### NOTE

Every degassing cycle will start in the pump test mode, which is the rinsing phase. After 15 seconds, the degassing mode will appear and the degassing cycle will start (vacuum phase).



### CAUTION

Manually started degassing will not be controlled by the Smart switch nor by blocking times and will run continuously.

4. Select the button `Stop processes` to stop the degassing.
5. Select the button `Manual mode cancel`.

### 6.5.2 Automatic operation

1. Go to the `Operating mode` page.
2. Select `Automatic mode`.



### NOTE

Now the degassing process is controlled by the Smart switch and will start again at the next Auto degass time. A new degassing action always starts with a pump test as a part of the degassing cycle.

The refill process always has priority over the degassing process. As soon as system pressure drops below the "refill pressure", the refill process will start.

## 6.6 Refill

The refill process is automatically controlled by the pressure limits as defined under settings. Available in the direct refill version (-R) or the break tank refill version (-B). The net refill flow depends on water supply pressure (-R versions) and system pressure.

## 6.7 Low pressure refill

When the system pressure has dropped to a value below the minimum operating pressure (1 bar), a low pressure warning will occur and the unit will ask whether a special refill procedure will be started to bring the system to the refill pressure again. In this manual refill cycle, the pump will be switched on and off and the refill valve will stay open.

## 6.8 Various remarks

- When the unit is connected to mains power, the display is shown automatically after touching the screen.
- The display switches off automatically after not being touched for 5 minutes.
- The degassing or refilling process is stopped by a stop procedure, making sure that the unit stops in a safe situation (overpressure). This stopping procedure may take some time (max. 20 seconds).
- When a pump has not run for 96 hours, an automatic pump test (15 seconds) will run at the next Auto degass time.

## 7 FAILURES

### 7.1 Remedy failures



#### WARNING

- In case of a failure always warn the installer.
- Remove the power and pressure from the unit before starting repairs. Refer to § 7.3 on how to put the unit out of operation.
- After re-opening the system isolation valves, always check for possible leakages.

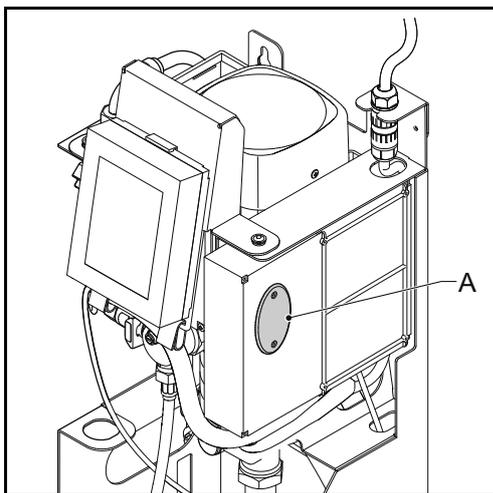


#### WARNING

- There are hot parts under the cover. Let the unit cool down before starting repairs.

1. Use the failure table in § 7.5 to find the cause.
2. If necessary, put the unit out of operation. Refer to § 7.3.
3. Remedy the failure.
4. Reset the unit, refer to § 7.4, or put the unit into operation again, refer to § 6.2.

### 7.2 Replace a fuse



- For electrical specifications, refer to § 3.3.
- Broken fuses F2 and F3 are indicated by error codes, refer to § 7.5.

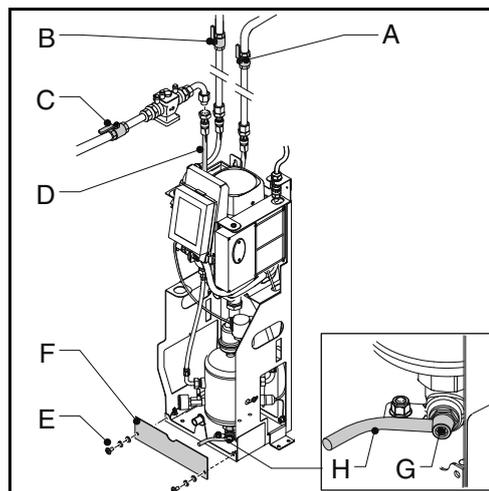
1. Open the cover (A).
2. Replace the broken fuse.
3. Close the cover.
4. Do a check to see if the failure is resolved.

### 7.3 Taking out of operation



#### WARNING

- Make sure that it is not possible to unintentionally supply power to the system.



1. If the unit is switched on, switch off the unit and disconnect it from the mains power. Refer to § 6.4.
2. Close the valve of the inlet line (A) and the valve of the outlet line (B).
3. **For units of -R and -B versions:** Close the valve (C) in the refill supply line (D).
4. Remove the fasteners (E) and front panel (F).
5. Connect a drain line (H) to the drain connection (G).
6. Drain the unit through the drain connection.
7. Open the air vent screw on the main pump to completely empty the unit. Refer to the figure in § 5.4.1.

### 7.4 Resetting the unit

1. At the error or warning pop up, select the button CLEAR FAULT.



#### NOTE

It is only possible to select the button CLEAR FAULT when it is yellow. If the button is grey, first solve the error.

## 7.5 Failure table

The number indications correspond with the main figures in § 2.1 and § 2.2. An overview of the replacement parts has been included in § 8.2.



### NOTE

Faults and warnings are indicated on the display of the unit as Exx or Wxx, where xx designates a problem (abnormal behaviour). The following tables provide an overview of problems, possible causes and possible remedies. Some problems (warnings) automatically disappear when the cause is taken away. For some problem situations, the unit is blocked completely. In some situations, degassing is blocked but refill is still active. For some other problem situations, refilling is blocked and degassing is still active.



### NOTE

In case the Superior continues to run only 10 minutes per event, please check if:

- 1 The gas concentration is sufficient (low enough).
- 2 The Smart Switch hose connection (7) is properly connected (no sharp bends).
- 3 The filter (24) is clean.

### General - all types (S400, S400-R, S400-B)

Problem	Possible cause	Correction
W1 The pressure too low	A failure in the installation	Make sure that the system pressure is above 1.0 bar.
	There is a leak in the installation	Repair the leak.
	The inlet valve is closed	Open the valve.
	The pressure sensor (21) is defective	Replace the pressure sensor.
W2 The pressure is too high	A failure in the installation	Make sure that the system pressure is below the max. pressure setting.
	Max pressure setting is too low	Increase the max pressure setting.
	The pressure sensor (21) is defective	Replace the pressure sensor.
W7 / E7 Low level vessel (fluid lack)	The inlet valve is closed	Open the valve.
	The automatic air vent (8) is defective	Replace the automatic air vent.
	The liquid is not conductive	Contact your liquid supplier.
E19 Pressure sensor out of span	Bad connection	Repair the connection.
	The pressure sensor (21) is defective	Replace the pressure sensor.
E20 Fuse 2 broken	The fuse is broken	Replace the fuse.
E21 Fuse 3 broken	The fuse is broken	Replace the fuse.

## General - all types (S400, S400-R, S400-B)

Problem	Possible cause	Correction
W31 / E31 Fill time too long	The inlet valve is closed	Open the valve.
	The inlet line is (partly) blocked	Remove the obstruction.
	The filter (24) is clogged	Clean the filter element.
	The Hose between the solenoid (20) and the vessel (10) has a flat shape in the vacuum phase	Replace the hose
W32 Pressure drop inlet too high	The inlet valve is closed	Open the valve.
	The inlet is (partly) blocked	Remove the obstruction.
	The filter (24) is clogged	Clean the filter element.
W33 / E33 Pressure drop inlet too low	The outlet valve is closed	Open the valve.
	The outlet line is (partly) blocked	Remove the obstruction.
	The solenoid valve (20) does not open	Replace (part of) the solenoid valve.
	The pump is not running	Check the pump and pump fuse. Replace, if necessary. Refer to § 7.2.
W34 Smart switch problem	The SmartSwitch (7) is broken	Replace the Smart switch.
E36 Check valve problem	Check the valve of the air outlet (9)	If necessary, replace the valve.
E37 Pressure too high, repeatedly	Incompressible system	Check the expansion system.
W38 Pressure increase too high	Incompressible system	Check the expansion system.

## Only applicable to the systems with the refill functionality (S400-R, S400-B)

Problem	Possible cause	Correction
W10 / E10 Refill flow too low	A valve in the refill inlet line is closed	Open the valve.
	The solenoid valve (27) does not open	Replace (part of) the solenoid valve.
	The refill line is blocked	Remove the obstruction.
	The flow meter (29) is defective	Replace the flow meter.
W11 / E11 Refill valve open	The solenoid valve (27) of the refill stays open	Replace or clean (part of) the solenoid valve.
W13 Refill: too often	A leak in the system	Repair the leak.
	Interaction with some expansion systems	Check the settings (max. freq. / Refill frequency alarm).
W14 Refill: too long	A leak in the system	Repair the leak.
	Big installation	Check the settings Refill time alarm.

Only applicable to the systems with the refill functionality (S400-R, S400-B)

Problem	Possible cause	Correction
W15 Refill: too much	A leak in the system	Repair the leak.
	Big installation	Check the settings Refill volume alarm.
W24 Low level break tank	The inlet valve is closed	Open the valve.
	The inlet is blocked	Check and clean the inlet.
	The float valve is broken	Check or replace the float valve.

## 8 MAINTENANCE

### 8.1 Periodic maintenance

1. With every periodic inspection, check the float valve (31) by removing some water from the break tank (30), or by a short push on the float of the float valve (31). If necessary clean the inlet filter of the float valve (31).
2. Inspect and clean the filter element (24) regularly.
3. Replace the automatic air vent (9) every two years.

4. Replace the interior of the solenoid valve (22) every year.
5. Always fix the vapor-tight insulation after maintenance.



#### NOTE

- Proper and regular maintenance will ensure correct functioning of the unit and maximize the life time expectancy as well as a trouble free operation of the unit and system.

### 8.2 Replacement parts

The number indications correspond with the main figures in § 2.1.

Main item		Spare part	Article number
Pump	3	Pump, 50Hz	R61.418
	3	Capacitor, 50Hz	R61.632
	3	Seal set	R61.631
Cover	25	Cover S400	R72.540
Control unit	5	Control unit Power Box	R61.628
	22	Control unit (HMI)	R61.629
	-	Connector for control unit Power Box	R61.471
	-	WiFi dongle (USB)	R61.526
	-	Fuse set: - Solenoid fuse 20x5; 2,5AT (10 pcs) - Pump fuse 20x5; 10AT (10 pcs) - Mains supply fuse 20x5; 1AM (10 pcs)	R61.529
Cables	-	Cable set - basic cable harness	R61.630
	-	Cable set - additional cable harness refill	R61.440
Break tank	30	Break tank assembly	R73.563
	31	Float valve	R73.262
	32	Float switch	R73.359
Automatic air vent	9	Automatic air vent	R73.287
	8	Check valve including O-ring, air vent	R61.417
	7	Smart Switch	R61.531
Inlet	24	Filter element	R73.207
	23	Inlet flow limiter	R73.217
	21	Pressure sensor	R61.412
	21	Pressure sensor spacer	R73.367
	20	Solenoid valve - internal parts	R61.532
	20	Solenoid valve - coil	R10.343

# SPIROVENT® SUPERIOR

Main item		Spare part	Article number
Outlet	18	Check valve, including O-ring, outlet	R61.417
	19	Flow limiter	R61.416
	19	House limiter	R73.224
Refill line	29	Flow sensor	R61.424
	33	Flow limiter refill	R61.443
	28	Non-return valve	R61.423
	27	Solenoid valve - internal parts	R12.003
	27	Solenoid valve - coil	R10.343
Level sensor	11	Level sensor	R11.559
Hoses	2	Inlet hose (system to unit)	R61.403
	1	Outlet hose (unit to system)	R73.566
	26	Refill inlet hose break tank (-B versions)	R73.562
	26	Refill inlet hose mains (-R versions)	R73.566
	-	Hose inlet to vessel	R73.564
	-	Hose inlet to vessel - Refill	R61.437
	-	Hose outlet to vessel	R73.565
	-	Hose inlet to refill	R73.560
Miscellaneous	-	- O-ring EPDM 17 x 1.5 - O-ring EPDM Ø13 x 1 - O-ring EPDM Ø33 x 2	R61.633
	-	- Gasket 3/8" - Gasket 3/4" - Gasket 1/2"	R61.634

## 8.3 Maintenance card

Type: \_\_\_\_\_  
Serial number: \_\_\_\_\_  
Installation date: \_\_\_\_\_  
Installed by firm: \_\_\_\_\_  
Installed by technician: \_\_\_\_\_

Inspection date:	Technician:	Initials:
Nature of the maintenance:		

Inspection date:	Technician:	Initials:
Nature of the maintenance:		

Inspection date:	Technician:	Initials:
Nature of the maintenance:		

Inspection date:	Technician:	Initials:
Nature of the maintenance:		

Inspection date:	Technician:	Initials:
Nature of the maintenance:		

Inspection date:	Technician:	Initials:
Nature of the maintenance:		

## 9 GUARANTEE

### 9.1 Terms of guarantee

- The guarantee for Spirotech products is valid until 2 years following the purchasing date.
- The guarantee lapses in cases of faulty installation, incompetent use and/or non-authorized personnel trying to make repairs.
- **Consequential damage** is not covered by the guarantee.

## 10 CE STATEMENT



### EC Declaration of Conformity

Manufacturer: Spirotech bv  
Address: Churchillaan 52  
5705 BK Helmond  
The Netherlands

Technically represented by the Manager PD&I, declares that the vacuum degassers:  
Spirotech SpiroVent Superior, models: S4, S400, S6, S600, S10 and S16 (all types)

Are in compliance with all relevant demands of the following European Directives:

Machine Directive - 2006/42/EC  
Low Voltage Directive - 2014/35/EC  
EMC Directive - 2014/30/EU  
Pressure Equipment Directive - PED 2014/68/EU  
Restriction of the use of certain hazardous substances in electrical  
and electronic equipment - directive 2011/65/EU

The following harmonised and national standards have been applied:

EN 12100: 2010  
EN 60730-1: 2012  
EN 60204-1: 2006  
EN 60335-1: 2012  
EN 61000-3-2: 2014  
EN 61000-3-3: 2013  
EN 61000-6-2: 2005  
EN 61000-6-3: 2007

Helmond, 6 February 2018

Drs. A.F.M. van Denderen RA  
CFO Spirotech bv

A handwritten signature in black ink, appearing to be "A.F.M. van Denderen", written over a horizontal dotted line.

ABNAMRO IBAN: NL23ABNA0523172168 Swift: ABNANL2A BTW: NL-007020995 B01 HR nr: 17061117, Eindhoven NL  
Onze algemene inkoop-, verkoop- en leveringsvoorwaarden zijn gedeponeerd bij de KvK Eindhoven nr. 17061117





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