SPIROVENT® SUPERIOR S4

User Manual

EN

USER MANUAL

SPIROTECH

maximising performance

TABLE OF CONTENTS

1 PREFACE

This user manual describes the installation, commissioning and operation of the SpiroVent Superior S4A and S4A-R.

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

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

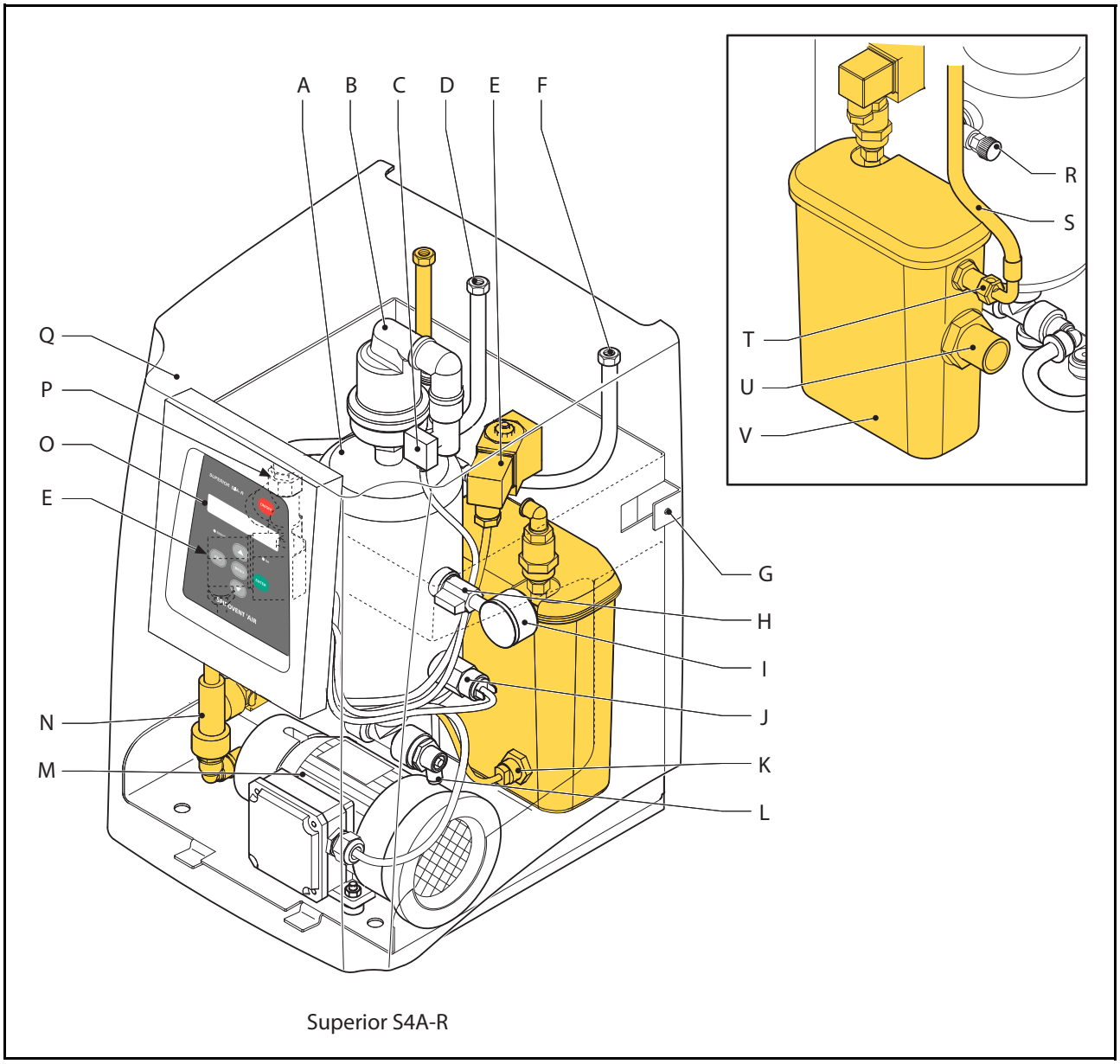
1.1 Symbols

Throughout the instructions the following symbols are used:

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

2 INTRODUCTION

2.1 Overview of the unit



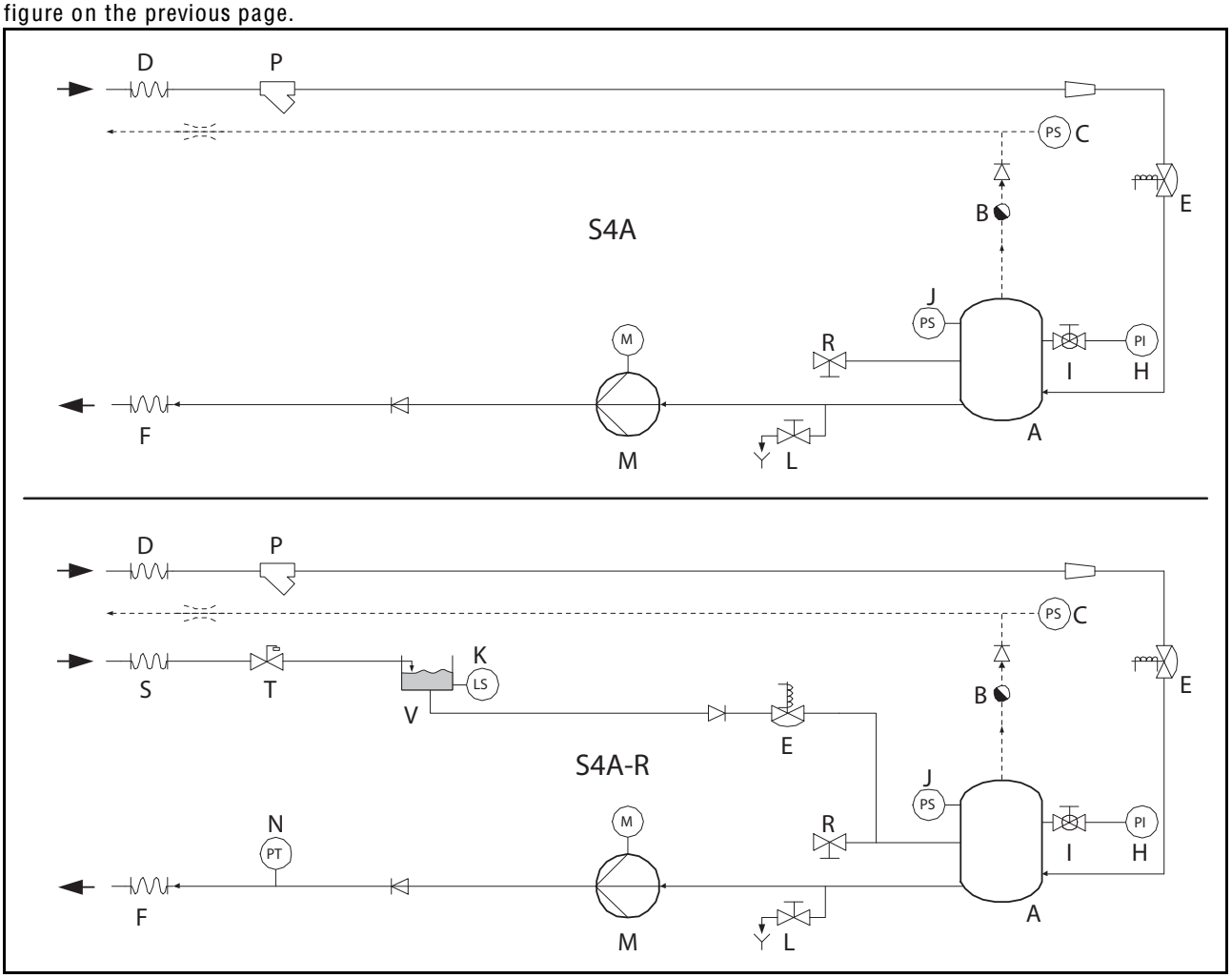
Superior S4A-R

A	Deaeration vessel	L	Drain connection
B	Automatic air vent	M	Pump
C	SmartSwitch	N	Pressure sensor[1)]
D	Outlet line	O	Control unit
E	Solenoid valve	P	Filter
F	Inlet line	Q	Cover
G	Screws	R	Aeration nipple
H	Valve behind pressure gauge	S	Refill connection[1)]
I	Pressure gauge	T	Float valve[1)]
J	Pressure switch	U	Overflow[1)]
K	Float switch [1)]	V	Refill reservoir[1)]

1.) S4A-R only (type with refill functionality).

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 is a fully automatic vacuum degasser for installations filled with fluid. Fluids contain dissolved and free gases. The unit removes these gases from the installation. Problems caused by gases in the installation are thus prevented.

2.2.2 (Re)fill

The SpiroVent S4A-R has also refill functionality.

2.2.3 Degassing

In normal operation the unit is either in rinsing or in the degassing phase.

1 The rinsing phase: The fluid flows from the installation through the solenoid valve (E) into the vessel (A). The pump (M) continuously pumps the fluid from the vessel into the installation. Here the fluid absorbs gases present in the installation.

2 The degassing phase: The solenoid valve (E) regularly closes, starting a vacuum phase. The continuously running pump (M) provides underpressure in the vessel (A). The underpressure causes the release of the gases dissolved in the fluid, which are collected at the top of the vessel. The gases are removed from the installation through the automatic air vent (B). The SmartSwitch (C) in the control unit makes sure that the degassing is stopped as soon as the content of dissolved gases has reached the minimum level. The solenoid valve (E) opens again, at the end of the vacuum phase.

2.2.4 (Re)filling

A unit with the refill functionality can control the pressure of the installation. To control the pressure the unit insert additional degassed fluid, if necessary. The unit can also fill the entire installation with degassed fluid.

2.3 Operating conditions

The unit is suitable for use in systems filled with clean water or mixtures of water with a maximum of 40% glycol. Use 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.

WARNING

- In case of doubt, always contact the supplier.
- In case of a heavily contaminated system fluid, a dirt separator is to be installed in the main return line of the installation.

2.4 Scope of delivery

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

3 TECHNICAL SPECIFICATIONS

3.1 General specifications

	S4A	S4A-R
Max. system volume	25 m^3	25 m^3
Empty weight	15 kg	16 kg
Volume of degassing vessel	2 l	2 l
Inlet connection	Swivel G½" Bi	Swivel G½" Bi
Outlet connection	Swivel G½" Bi	Swivel G½" Bi
Noise level	52 dB(A)	52 dB(A)
Refill connection	n/a	Swivel G¾" Inside
Overflow connection	n/a	G1" Bu

3.2 Electrical specifications

	S4A	S4A-R
Supply voltage[1)]	230 V ± 10% / 50 Hz	230 V ± 10% / 50 Hz
Absorbed power	100 W	100 W
Nominal power consumption	0.5 A	0.5 A
Protection	5 A(T)	5 A(T)
Protection class	IP X4D	IP X4D
Max. load of potential-free contact (unit failure)	24 V / 1 A	24 V / 1 A
External refill signal (supplied voltage)	n/a	5 Vdc

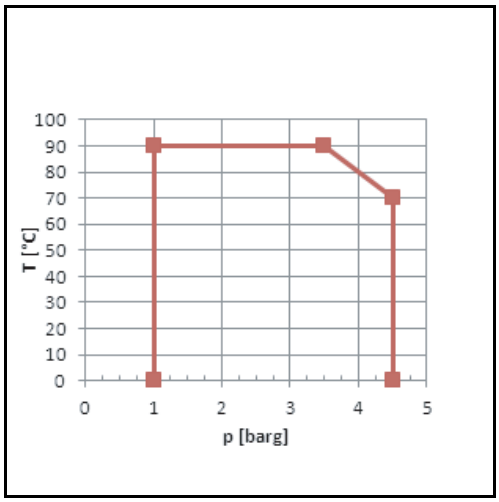
1) 60 Hz on request

3.3 Other specifications

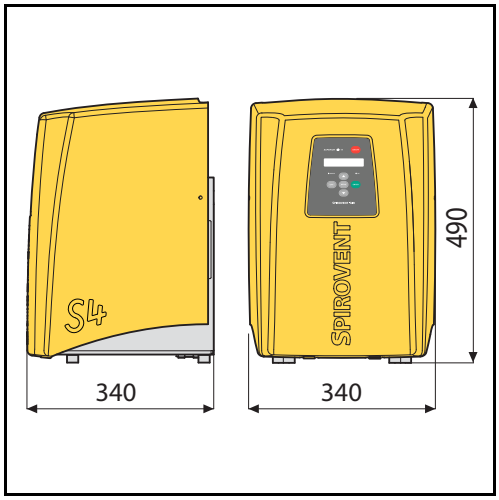
	S4A	S4A-R
System pressure[1)2)]	1 - 4.5 bar	1 - 4.5 bar
Ambient temperature	0 - 40 °C	0 - 40 °C
Maximum pressure (with closed valve behind pressure gauge)	10 bar	10 bar
Refill flow	n/a	50 l/hr.
System fluid temperature[3)]	0 - 90 °C.	0 - 90 °C
Refill pressure	n/a	min. 0.5 bar
Refill fluid temperature	n/a	0 -30 °C

1) 1.5 - 4.5 bar at 60 Hz
2) See *3.4: Operating conditions*.
3) See *3.4: Operating conditions*.

3.4 Operating conditions



3.5 Dimensions



Height [mm]	Width [mm]	Depth [mm]
490	340	340

3.6 Building Management System (BMS)

The unit has been provided with auxiliary contacts for communication with a BMS or other external system.

CAUTION

- The unit failure signal is not to be used as boiler interlock.

Signal	S4A	S4A-R
Unit failure	Potential-free	Potential-free

3.7 External refill control

If an external device controls the refill, feed in a cable and connect this to connector J8. The unit starts the fill-function as soon as an external (potential free) contact is registered. The unit stops when the contact is broken. These signals can be supplied by a BMS.

4 SAFETY

4.1 General precautions

WARNING

- Installation and maintenance of the unit should only be carried out by qualified personnel.
- Remove the power and pressure from the unit before starting the activities.

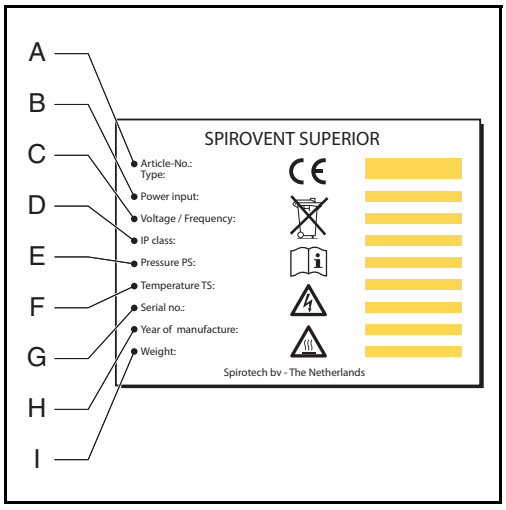
WARNING

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

4.2 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.

4.3 Type plate



A Article number
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
I Weight

The type plate has been applied on the outside of the unit, lateral on the lower part of the cover.

5 INSTALLATION AND COMMISSIONING

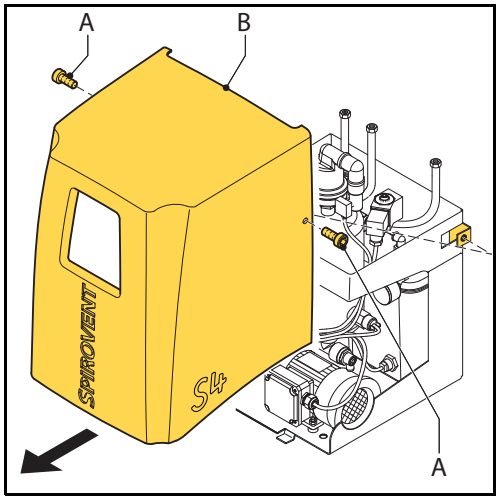
5.1 Installation conditions

- Install the unit on a frost-free, well-ventilated place.
- Connect the unit to a 230 V / 50 -60 Hz supply.
- Make sure that the expansion system has the proper dimensions. The water displacement in the unit can cause pressure variations in the installation.

5.2 Unpack

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

1. Remove the packaging.



2. Loosen the screws (A).
3. Remove the cover (B) from the unit.
4. Move the unit to the location where it is to be installed.

5.3 Mounting

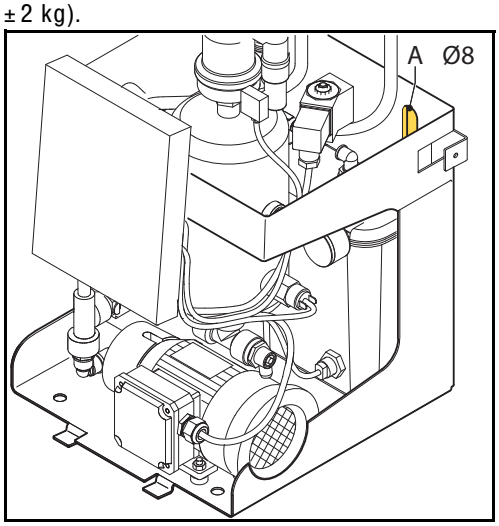
CAUTION

- Install the unit as bypass on the main transport line of the installation.
- Install the unit in accordance with the local guidelines and rules.
- Install the unit at a point in the installation with a temperature always above 0°C.

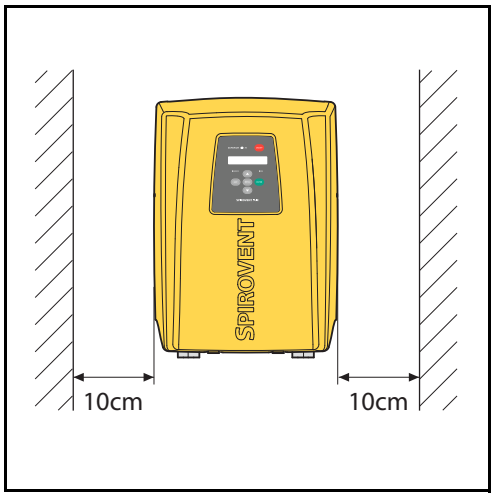
NOTE

- Install the unit at a point in the installation with a low temperature. Most dissolved gases can be removed from the fluid. Avoid too low temperatures where condensation on components of the unit occurs.
- Install the unit close to the expansion system to minimise pressure fluctuations caused by the intake of water by the system.
- Make sure that the operating panel is always easily accessible.
- Keep the right side of the unit, at the location “hole S4” free at all times to allow an unblocked airflow.

1. **Wall mounting**: Mount the unit to a flat, closed wall using the holes (A). Make sure that the mounting can support the filled unit (empty weight ± 2 kg).



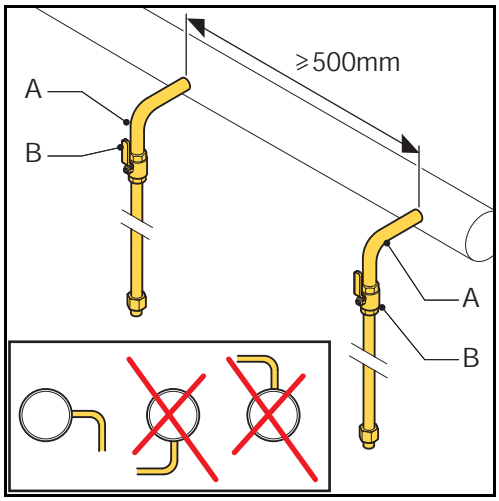
2. **Floor mounting**: Place the unit on a flat surface, against a flat, closed wall.



NOTE
Make sure that you maintain at least the distance for service and repair as indicated.

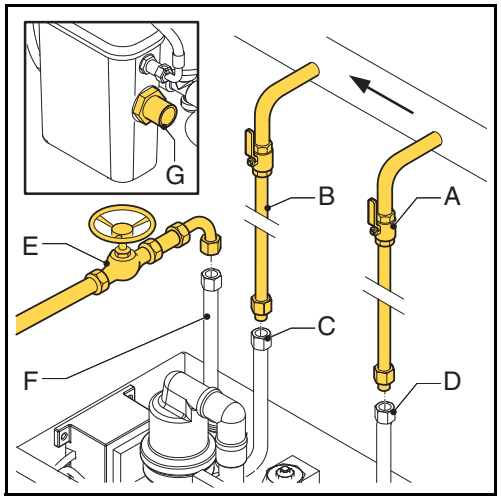
5.4 Installation

5.4.1 Mechanical



1. Make two branch lines ½" (A) on the side of the main transport line. The distance between them should be at least 500 mm.
2. Insert a valve (B) in each branch. With this the unit can be depressurised.

CAUTION
Make sure that the valves are open before putting the unit into operation.



NOTE
As seen from the direction of the volume flow, the first branch is the inlet into the unit.

3. Connect the line (B) to the flexible outlet line (C).
4. Connect the line (A) to the flexible inlet line (D).
5. **Only for units with the refill functionality:** Insert valve (E) and a non-return protection (E) in the refill supply line.
6. **Only for units with the refill functionality:** Connect the supply line to the refill connection (F) of the unit.
7. **Only for units with the refill functionality:** Connect the overflow (G) to a drainpipe connected to the sewage system.

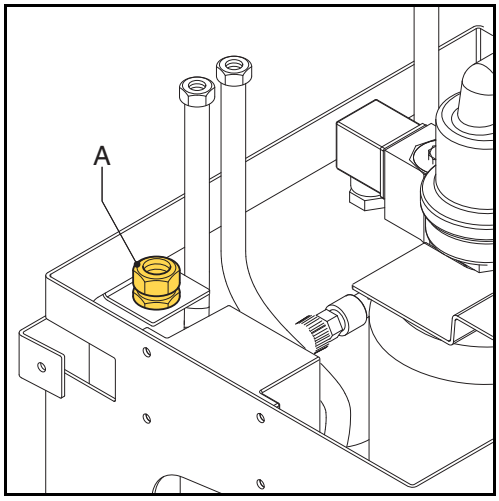
CAUTION

- Use a locally approved non-return protection. A non-return protection can also be supplied as an option with the unit.
- Make sure that the pressure in the water lines is below the system pressure. This prevents undesired refilling.
- Make sure that the lines leave the unit at the rear.

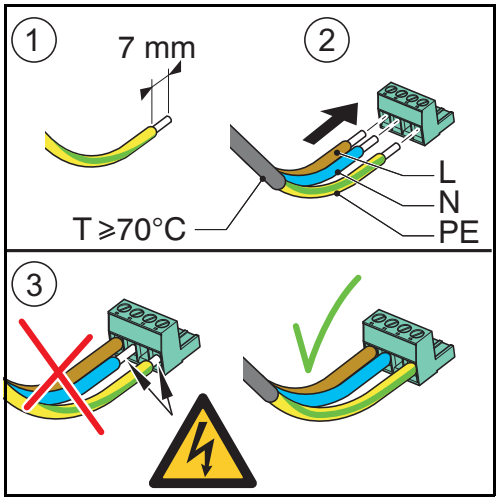
5.4.2 Electrical

CAUTION

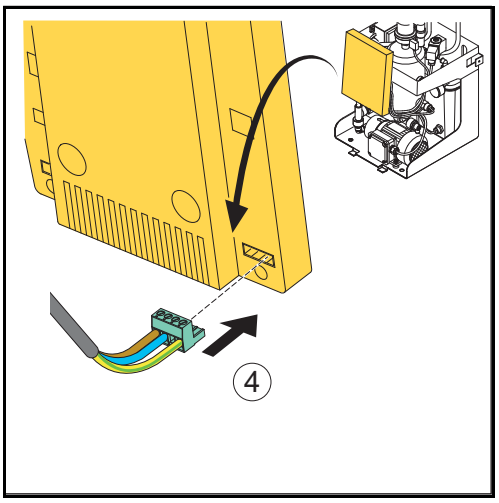
- Preferably use a wall socket for the power supply to the unit. The socket should remain accessible.
- Mount an all-pole main switch (contact opening > = 3mm) if the unit is directly connected to the power supply.
- Use supply cables with the correct dimensions.
- Always replace a defect fuse with a fuse of the same value. refer to §3.2.



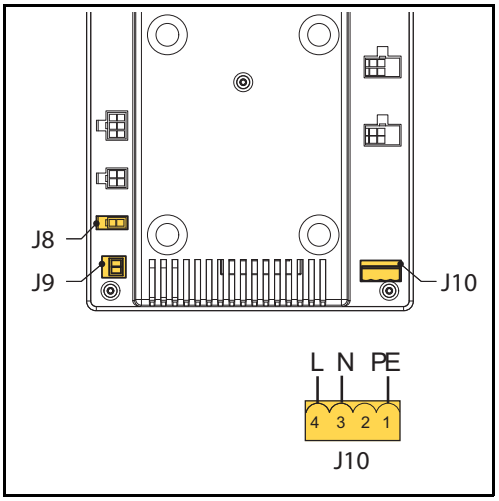
1. Feed a 3-core supply cable through swivel (A).



2. Insert the wires into the connector.



3. Insert the connector into receptacle J10.



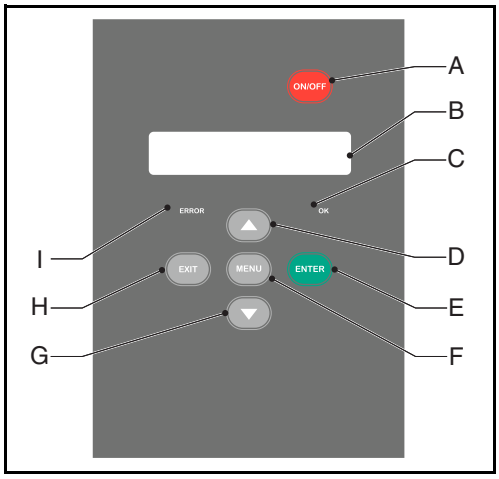
connector	contact	connection
J9	1 and 2	Failure
J8	1 and 2	External refill[1)]

1) Only for units with refill functionality

4. If a BMS or other external device is used, use connector J8 and/or J9 to connect to that device.

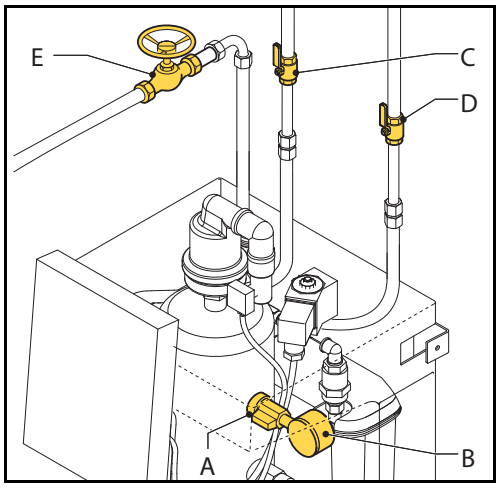
5.5 Commissioning

5.5.1 Display and keyboard



A On/off
B Display
C Status report in operation / OK
D Up
E Confirm / Enter
F Menu
G Down
H Cancel / Exit
I Status report failure

5.5.2 Preparation



1. Open valve (A) behind the pressure gauge (B)
2. Open the valves (C and D) in the inlet and outlet lines.
3. **For the units with refill functionality:** Open the valve (E) in the refill line.

5.5.3 Set date and time

NOTE

- The start-up routine starts automatically when the unit is switched on for the first time.
- Press EXIT to go back one step in the menu while programming.

1. Press ON/OFF.
2. Select a language using ▲ and ▼. Press ENTER.
3. Set the date using ▲ and ▼. Press ENTER.
4. Set the day using ▲ and ▼. Press ENTER.
5. Set the time using ▲ and ▼. Press ENTER.

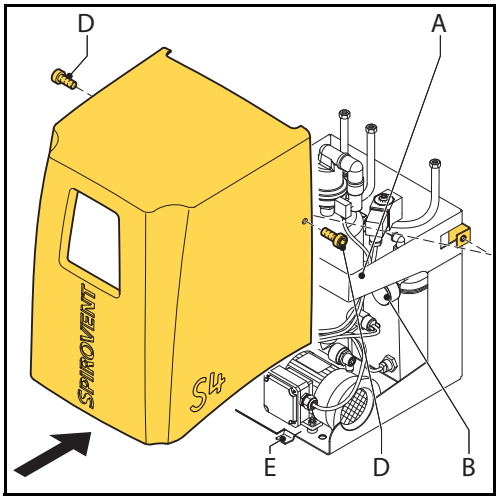
5.5.4 Filling the unit

1. Press ENTER. The unit starts filling.
2. Wait for 50 seconds until `Initial filling in process` disappears.
3. Press EXIT two times.

NOTE

When the green LED is lit this indicates that the unit is ready for use. Degassing starts by default every day at 08:00 hours.

5.5.5 Check function



1. Start manual operation, see §5.6.
2. Check that the pressure gauge (B) alternates between overpressure and underpressure.
3. Close the valve (A) behind the pressure gauge.
4. Place cover (C) back onto the unit. Slide the bottom of the cover in the recess (E).

5. Fasten the cover with the screws (D).

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

5.6 Manual operation

NOTE
After a manual stop the unit reports `process stopped`, see §6.2. Operation must be restarted via `Manual operation start`.

1. Press MENU. Select `User menu` > `Manual operation` using ▲ and ▼. Press ENTER.
2. Select `Manual operation start` or `Manual operation stop` using ▲ and ▼. Press ENTER.

5.7 Switch on unit after switch off

1. Press ON/OFF.
2. Do the procedure described in §5.5.4.

5.8 User settings/parameters

5.8.1 Accessing user settings/parameters

1. Press MENU. Select `Settings` using ▲ and ▼. Press ENTER.
2. Select the parameter to be changed using ▲ and ▼. Press ENTER.
3. Change the setting using ▲ and ▼. Press ENTER.
4. Repeat steps 2 and 3, if necessary.
5. Repeatedly press EXIT to return to the status report.

5.8.2 Available user settings/parameters

Parameter	Description
Language	Language for the display texts.
Date	The current date.
Weekday	The current weekday.
Time	The current time.
Auto start	Time for starting the degassing process.
Block.time, day	Time for stopping the degassing process.
Block.time week	Days of the week on which the unit is not working. Selected days are marked with an *. After having changed this parameter, select `Store` using ▲ or ▼. Press ENTER.
Block.time year 1	Period per year during which the unit is not working.
Block.time year 2 - 3	See Block.time year 1.
Max. Psystem[1)]	Pressure at which the unit stops.
Psystem desired[1)]	Pressure at which the refilling stops. Set this as low as possible if the refilling is controlled by the BMS or external devices (J8).
Refill on at[1)]	Pressure at which the refilling starts. Set this point as low as possible when the refilling is controlled by BMS or external devices.
Refill alarm after[1)]	Continuous refilling time (0 - 255 min.; 0 = switched off).
Max. refill freq[1)]	Maximum number of times per day that refilling is allowed (0 - 10 times; 0 = switched off).

1) Only units with refill functionality.

5.9 Statistics

5.9.1 Accessing statistics

1. Press MENU. Select `User menu` > `History` using ▲ and ▼. Press ENTER.
2. Select `Fault history` or `Operation history` using ▲ and ▼. Press ENTER.
3. Select an item using ▲ and ▼. Press ENTER.
4. Repeatedly press EXIT to return to the status report.

5.9.2 Available statistics

- Accumulative running hours.
- Degassing history.
- Fault history.
- Refill history when applicable.

5.10 System data

5.10.1 Accessing system data

The general data can be read in the following way:

1. Press MENU. Select `User menu` > `General info` using ▲ and ▼. Press ENTER.
2. Select an item using ▲ and ▼. Press ENTER.
3. Repeatedly press EXIT to return to the status report.

5.10.2 Available system data

- Unit type
- Software version
- Installation date.

6 USE

6.1 General

- The display lights automatically after a key press.
- The display lighting automatically dims after no key has been pressed for 5 minutes.
- Is the unit is stopped, the system remains under overpressure. Make sure that the overpressure can not damage the installation or the unit.
- When a pump has not run for 96 hours, an automatic pump test is run at the first next `Auto start`.
- Press ON/OFF to switch off the unit. Press ON/OFF again to switch on the unit again.
- At low fluid temperatures condensation may occur at certain parts. The condensation is drained through the openings in the frame.
- For unit with refill functionality:
  The refill flow is about 50 litres per hour.

6.2 Status reports

Report	Description	LED indication
Auto pump test	The unit runs a pump test.	Green
End of degassing End of refilling[1)]	The stop procedure is in process.	Green
Degassing	The degassing process is in process.	Green
Process stopped	The unit has been stopped manually.	None
Standby	The unit is waiting for a starting signal.	Green
Failure	The unit has stopped because of a failure. Remedy the failure and reset the unit, see §7.4.	Red
Refill[1)]	The unit is refilling.	Green

1) Applies only to units with refill functionality.

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 §7.2 on how to put the unit out of operation.
- Pressing ON/OFF does **not** remove the power from the unit.

WARNING

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

NOTE

- In case of a failure the red LED is lit. The display shows the failure report.

NOTE

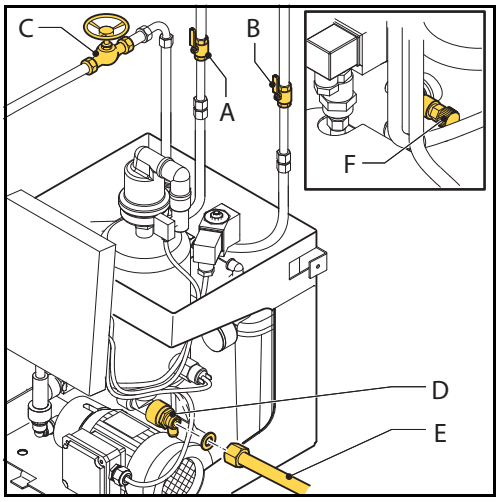
- Only applicable to systems with the refill option: The seriousness of the failure determines whether the whole unit or a part of the unit switches off. The refill process can remain active when a failure has been detected. In this case both the red and the green LEDs are lit.

1. Use the failure table in §7.3 to localise the cause.
2. If necessary, put the unit out of operation. Refer to §7.2.
3. Remedy the failure.
4. Reset the unit, refer to §7.4 or put the unit into operation again, see §5.7.

7.2 Putting out of operation

WARNING

- Make sure that under no circumstance it is possible to unintentionally supply power to the system.



1. If the unit is switched on Press ON/OFF to stop the unit.
2. Take the plug out of the wall socket.
3. Close the valves (B) and (A).
4. **Only for units with refill functionality:** Close valve (C) in the refill supply line.
5. Connect a drain line (E) to the drain connection (D).
6. Open the drain connection (D).
7. Open the aeration nipple (F)
8. Drain the unit through the drain connection (D).

7.3 Failure table

The letter indications correspond with the main figure in §2.1. An overview of the replacement parts has been included in § 8.2.

General

Problem	Possible cause	Correction
`Err 5 Inlet flow` The flow in the inlet line has been blocked.	The solenoid valve (E) in the inlet line does not open.	Replace (a part of) the solenoid valve.
	A valve in the inlet line is closed.	Open the valve.
	The filter (P) is clogged.	Clean the filter.
	The pressure switch (J) is defect.	Replace the pressure switch.
`Err 6 Flow` The flow in the outlet line has been blocked.	The solenoid valve (E) does not close.	Replace (a part of) the solenoid valve.
	The valve in the outlet line is closed.	Open the valve.
	The outlet line has been obstructed.	Remove the obstruction.
	The pump (M) does not run.	Check the pump.
	The unit sucks in air during the vacuum phase.	Replace the automatic air vent.
	The pressure switch (J) is defect.	Replace the pressure switch.
The unit runs continuously and does not switch off automatically. The SmartSwitch does not seem to work.	The content of dissolved gases has not reached the minimum yet.	Check whether there is a possibility of gases entering the installation.
	The SmartSwitch (C) is defect.	Replace the SmartSwitch.
The unit runs maximal 10 min. per degassing period. Gases remain in the installation. The SmartSwitch does not seem to work.	The SmartSwitch (C) is defect.	Check whether gas is released through the valve. Replace the SmartSwitch if the valve does not work.
	The automatic air vent (B) is defect.	Replace the automatic air vent.

Errors only applicable for units with refill functionality (S4A-R).

Problem	Possible cause	Correction
`Err 1 Psystem too low` The system pressure is below 1 bar.	A failure in the installation.	Provide a system pressure of > 1 bar.
	There is a leak in the installation.	Repair the leak.
	The pressure sensor (N) is defect.	Replace the pressure sensor.
`Err 2 Psystem too high` The system pressure exceeds the set maximum.	A failure in the installation.	Provide a system pressure that is below the set value.
	The set value is too low.	Increase the set value.
	The pressure sensor (N) is defect.	Replace the pressure sensor.
`Err 10 Refill flow too low` In flow of refill fluid too low[1)].	A valve in the refill line is (partly) closed.	Open the valve.
	The refill line has been obstructed.	Remove the obstruction.
	The float switch (K) is defective.	Replace the float switch.
	The float valve (T) is defective	Replace the float valve
`Err 13 Refill freq. too high` Refill occurs too frequently.	There is a leak in the installation.	Repair the leak.
		Check the setting `Max. refill freq.`
`Err 14 Refill too long` Refill takes too much time.	There is a leak in the installation.	Repair the leak.
		Check the setting `Alarm refill after:`

1) The refill function remains active\.

7.4 Resetting the unit

1. Press MENU. Select `User menu` > `Manual operation` using ▲ and ▼. Press ENTER.
2. Select `Manual operation reset` using ▲ and ▼. Press ENTER.

8 MAINTENANCE

8.1 Periodic maintenance

1. Inspect and clean the filter (P) regularly.
2. Replace the automatic air vent every two years.

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. Regular analyses of the system fluid will help to take the right measures to maintain the correct fluid quality and consequently system performance.

8.2 Replacement parts

The letter indications correspond with the main figure in §2.1.

Article number	Letter	Description
R16.181	M	Pump type MK309XE 50 Hz
R18.781	M	Pump type MK309XE 60 Hz
R18.782	M	Capacitor 50/60Hz
R18.748	Q	Cover
16.342	E	Solenoid valve (excluding coil)
16.343	E	Coil for solenoid valve
16.344	I	Pressure gauge
16.345	B	Automatic air vent
16.346	J	Pressure switch
R18.704	O	Control unit (S4A)
R18.705	O	Control unit (S4A-R)
16.349	C	SmartSwitch
R18.703	N	Pressure sensor (S4A-R)
16.355	P	Filter interior
R72.780	T	Float tank
R18.904	K	Float switch

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-authorised personnel trying to make repairs.
- **Consequential damage** is not covered by the guarantee.

10 CE STATEMENT

10.1 Declaration of conformity

According to EN-ISO/IEC 17050:2004

Manufacturer	:Spirotech bv
Adress	:Churchilllaan 52 5705 BK Helmond The Netherlands
Products	:SpiroVent Superior S4A / S4A-R

We declare entirely on our own responsibility that these products comply with the following standards:

EN 12100-1, EN 12100-2, EN 809, EN 60204-1, EN60335-1,
EN 61000-3-2, EN 61000-3-3, EN 55014-1, EN 55014-2, EN 61000-6-1, EN 61000-6-2, EN 61000-6-3 and EN 61000-6-4.

in accordance with the stipulations of:

- Machine Directive 2006/42/EC
- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC

Helmond, validated 1 July 2010,

Dr. D. Scholten
Managing Director