Spiraltec

Installation instructions for diffusion dialysis system

Type: DDP1-01
Status: 01/2020

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1 INTRODUCTION:

The installation instructions contains the most important information and notifications for use of the DDP1-01 diffusion dialysis system. Keep the installation instructions safely so that they are accessible for all users and so that they are available to any new owner of the system. *The German installation instructions* can be found on the internet at: www.spiraltecgmbh.com/de/download. *The English operating instructions* can be found on the internet at: www.spiraltecgmbh.com/en/downloads-en

1.1 System-specific data sheet:

A *system-specific data sheet* with information for the system is enclosed with every product. These instructions must be observed. In addition, there are *product-specific data sheets* and *general safety instructions*, and attention must be paid to these. If individual data sheets are no longer available, you can find them on the Internet at: www.spiraltecgmbh.com/en/downloads-en

1.2 Terminology:

The terms "system" or "diffusion dialysis system" used in these instructions always refer to the Series DDP1-01 diffusion dialysis system made by Spiraltec GmbH.
The term ‚spiral membrane module' used in these instructions always refers to a Series WD-AR10 spiral membrane module.

1.3 Presentation:

The following presentation styles are used in these instructions:

DANGER!

Warns of immediate danger!
Disregard results in death or severe injuries.

WARNING!

Warns of a potentially dangerous situation.
Disregard can result in serious death or injuries.

CAUTION!

Warns of a potential hazard.
Disregard can result in moderate or minor injuries.

NOTE:
(Warns of property damage).

REFERS TO INFORMATION IN THESE INSTALLATION INSTRUCTIONS OR IN OTHER DOCUMENTATION.

• Indicates a general explanation.
> Indicates an instruction for avoiding a hazard, which you must observe.

WARNING!

Important information for safety. Read through the installation instructions carefully. First and foremost, observe the „Proper intended use“ and „Basic safety instructions“ chapters.

The installation instructions must be read and understood.

2. PROPER INTENDED USE:

Unintended use of the system can cause hazards to arise for people, systems in the surrounding area and for the environment.

- The diffusion dialysis system is designed to separate metal salts from free acids from process baths.

> For this application, pay attention to the data and to the conditions for operation and service named in the *contract documents*, *system-specific data sheet* and the *product-specific data sheet* .

> Prerequisites for the safe and problem-free operation of the system include professional transport, storage and installation as well as diligent operation and maintenance.

> Only operate the system for its intended use.

3. BASIC SAFETY INSTRUCTIONS:

These safety instructions do not take into account

- Coincidental or random eventualities that could arise during the installation, operation or maintenance of the product.

- Location-specific safety provisions where the operating company is responsible for their compliance, also in respect of installation personnel.

DANGER!

Risk of injury caused by high pressure in the system.

> Before working on the system, turn off the pressure and drain the pipework.

DANGER!

Intoxication, chemical burns, contamination due to media escape.

> Check the system for leakage, before commissioning.

> With hazardous media, ensure that corresponding protective measures are implemented and wear personal protective equipment in accordance with the requirements of the media.

> Before loosening lines, ensure that the medium has been flushed out of the whole system.

General hazard situations:

The following must be observed to avoid injuries:

> The system may only be operated if it's in perfect condition.

> Installation work shall be performed only by authorised specialist personnel with suitable tools.

> After an interruption in the diffusion dialysis processes, a controlled re-start of the system must be assured.

> Comply with general good engineering practise when operating the system.

Pay attention to the following points to protect the system and/or the diaphragm module from damage to property:

> Protect the system from UV radiation and frost.

> Do not bring the system or spiral membrane module into contact with organic substances.

> Do not subject the system to any shocks.

> Always keep the interior of the spiral membrane module moist after filling.

> Do not exceed the maximum operating pressure.

> Avoid pressure being applied on a single side.

> Do not exceed the maximum operating temperature.

> Do not carry out any external alterations to the system.

> Do not subject the system or storage containers to mechanical loads (e.g. do not use it as a step).

> Only media listed in chapter 5.3 shall be fed into the media connections. Use of unlisted media is the sole responsibility of the user.

> Avoid mixing up the media connections.

4. GENERAL INFORMATION:

4.1 Contact address:

Spiraltec GmbH
Heinzenberger Weg 34
74343 Sachsenheim
Germany

Technical Support: +49 7147 9670 204
E-Mail: info@spiraltecgmbh.de
www.spiraltecgmbh.com

4.2 Warranty:

Prerequisite for the warranty is the intended use of the system and compliance with the specified operating conditions (see Section 2, intended use). Any other form of use, or any more extensive form of use, does not constitute intended use. No liability can be assumed for any damage resulting from this or from improper use.

Structural changes to the system:

> No alterations or conversion work can be carried out on the system without the consent of Spiraltec GmbH.

> The only way to assure the function and resistance to stresses and strains on the system is through the use of spare parts that are sourced from Spiraltec GmbH.

> Without exception, our ‚General terms & conditions of sale and delivery' apply.
These are available as a download at this address: www.spiraltecgmbh.com/en/downloads-en
These are available to the operating company by no later than the date of signing of the contract. Warranty and liability claims for personal injury and material damage shall be rejected if they can be traced to one or more of the following causes, e.g.:

- Non-intended use of the system or of system components.
- Improper installation, commissioning, operating and maintenance of the system.
- Operation of the system while safety equipment is defective, or while safety and protection fixtures are not fitted properly or are not functional.
- Failure to observe the valid rules of engineering and/or notifications in the operating instructions in relation to transport, storage, installation, commissioning, operating and maintenance of the system.
- Structural modifications at own initiative to the controller, the system or to system components.
- Modifications to operating parameters made at own initiative.
- Deficient monitoring of system components that are subject to wear, or that require regular maintenance.

- Use of operating media other than those intended.
- Disaster scenarios resulting from the influence of foreign bodies and force majeure.
- Operation of the system by qualified and/or untrained personnel.

4.3 Information on the Internet:

Installation instructions, *system-specific data sheets* and *product-specific data sheets* can be found on the Internet at: www.spiraltecgmbh.com/en/downloads-en

5. TECHNICAL DATA:

5.1 System data:

Flow:	7 - 15 l/h per channel (freely selectable, but extreme differences between the channels should be avoided)
Minimum pre-pressure:	1.0 bar (overpressure at DI water inlet)
Maximum pressure:	2.5 bar (overpressure before the filters)
Recommended flow rate:	9 - 11 l/h per channel
Operating temperature:	5°C - 30°C
Weight when system is empty:	Approx. 175 kg (incl. empty module)
Fill volume:	Approx. 10 L per channel (without storage containers and filters)
Storage containers:	Max. 30 L per container
Switch cabinet number:	600-600-XXXX-XXX
Power supply:	L1/N/PE AC 230 V; 50 Hz
Connection:	CEE connector 1-16: L+N+PE
Line length:	Approx. 1.5 m
Min. supply line:	3 x 1.5 mm²
Full-load / short-circuit current:	16 A / 10 kA
Control voltage:	DC 24 V

For further system data, please refer to the *system-specific data sheet*.

5.2 Conditions for operation and service:

NOTE:

> The operating conditions (flow rates, operating pressures) are dependent on the respective application and the flow rates selected! The optimum combination should be determined during initial tests with the system.

> The upper and lower limit values for operating temperature and media composition must not be violated.

> Ambient temperature not higher than operating temperature, always frost-free.

Please refer to the *system-specific datasheet* for further information on the conditions for operation and service.

5.3 Suitable media:

When using media that are not named on the *system-specific data sheet*, please consult a representative of Spiraltec GmbH in advance. In the event of unlisted media being used without prior consultation, the responsibility lies with the operator and the warranty for the system is voided!

5.4 Forbidden media:

- Nitric acid
- Hydrofluoric acid
- Organic liquids (e.g. solvents)
- Alkalis
- Oxidation agents (e.g. H_2O_2)
- Liquids with particles > 10 microns

Other media may be on the *product-specific data sheet*.

6. INSTALLATION AND COMMISSIONING:

Danger!

Intoxication, chemical burns, contamination due to media escape.

> Check the system for leakage, before commissioning.

> With hazardous media, ensure that corresponding protective measures are implemented and wear personal protective equipment in accordance with the requirements of the media.

> Before loosening lines, ensure that the medium has been flushed out of the whole system.

Danger!

Danger of injury caused by high pressure in the system and in the spiral membrane modules.

> Before working on the system or diaphragm modules, relieve the pressure and empty the lines.

Risk of injury due to improper operation.

Improper operation can lead to injuries as well as damage to the system and its surroundings.

> Before commissioning, always ensure that the operating personnel are familiar with the content of the operating instructions and that they understand these fully.

> The safety instructions and the proper intended use must be observed.

> Only appropriately trained personnel are permitted to commission the system.

Warning!

Risk of injury with improper installation.

> Installation work shall be performed only by authorised specialist personnel with suitable tools.

Danger of injury through switching the system on unintentionally and uncontrolled restart.

> Secure the system from unintentional actuation.

> After the installation, ensure that the restart is carried out in a controlled manner.

6.1 Before initial commissioning:

> Check the system for external mechanical damage.

> Remove packaging and transport attachments if fitted.

6.2 Preparatory measures for initial commissioning of the system:

Only persons who have received instruction are permitted to connect the system to the supply lines and to install the spiral membrane module. Work by untrained personnel is prohibited.

Before initial commissioning, the following work must be completed:

1. Connection of system to the supply lines:

a. Unscrew, remove and store the 4 cover caps from the side of the system.

b. Connect system connections with supply lines:
1. DI water inlet
2. Feed inlet
1.1 Diffusate return flow
2.2 Dialysate sequence

Make sure that valves installed by the customer in the inlets/outlets are then opened!

c. Check connections for leaks.

2. Connection of system to the power supply:

a. The main switch must be in its Off position!
If the main switch is not in its Off position, move it into the Off position.

b. Insert power connector into a suitable socket!
If an extension cable is needed (min. IP54), provide spray protection for the connection!
Avoid any trip hazard associated with the cable!

3. Connection of the spiral membrane module:

a. Unpack separately supplied spiral membrane module and remove threaded plug.

b. Screw adapter pieces with EPDM flat seal into the connections (max. torque 3 Nm).

c. Insert the spiral membrane module into the system.

d. Connect the hoses to the spiral membrane module according to the label. Insert the separately supplied seals into the cap screw fittings.

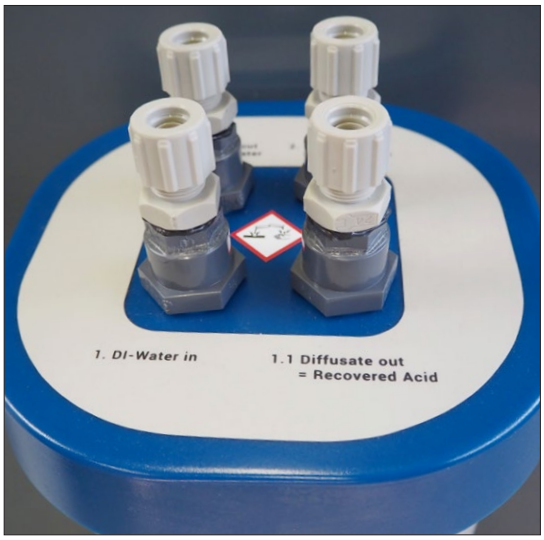

Figure 1: Membrane module not connected

Figure 2: connected membrane modul

4. Filling the storage containers:

Check the storage containers for foreign bodies and contamination before filling them. If necessary, remove foreign bodies and clean the storage containers.

NO organic substances (e.g. oils) and NO particles > 10 microns are permitted to enter the diffusion dialysis system. To protect the spiral membrane module, 2 particle filters (10 µm, 1 µm) and an activated carbon filter were installed. These must be replaced if necessary (latest at a pressure of 2.5 bar on the filter)!

a. Turn the main switch on the right side of the switch cabinet, turning it to ON. This starts up the electronics, the system is booted and the homepage appears on screen.

b. Pressing button F3 opens the solenoid valves (QM1 and QM2) and starts the feed pump (GP5). Now DI water container 1 and feed container 2 are filled. A green lamp flashes to indicate this. If the maximum filling level of the respective container is reached, its filling stops (duration: approx. 90 minutes).

c. Press the F2 button to start the pumps (GP1 and GP2). Now first fill the spiral membrane module and then the 1.1 diffusate and 2.2 dialysate containers. A green lamp flashes to indicate this. If the containers are half full, the filling can be terminated by pressing the F2 button again.

d. For conditioning the membrane film, leave the spiral membrane module filled for approx. 48 hours. The system can then be started in automatic mode (see 6.3 Commissioning the system).

6.3 Initial commissioning of the system:

1. Switching on the system:

a. Check the fill levels of the storage containers (topping up/emptying if required).

b. Check inflows/outflows: Make sure that valves installed by the customer in the inlets and outlets are open!

c. Turn the main switch on the right side of the switch cabinet, turning it to ON. This starts up the electronics, the system is booted and the homepage appears on screen. Follow the instructions on the display.

d. Pressing button F1 starts automatic mode. The display now shows the current flow rates for DI water and feed.

e. If the green control lamp lights up, the system is in automatic mode.

2. Setting the flow rates:

a. The current flow rates are shown on the display. Scroll through the display with C1 or C2 if necessary.

b. By pressing the button combination ESC + C1 the flow rate of the DI water can be increased by 0.1 l/h.

c. By pressing the button combination ESC + C2 the flow rate of the DI water can be decreased by 0.1 l/h.

d. By pressing the button combination ESC + C4 , the flow rate of the feed can be increased by 0.1 l/h.

e. By pressing the button combination ESC + C3 , the flow rate of the feed can be decreased by 0.1 l/h.

Extreme differences between the flow rates should be avoided. The difference must not exceed 3 l/h. The minimum flow rate is 7 l/h. The maximum flow rate is 15 l/h.

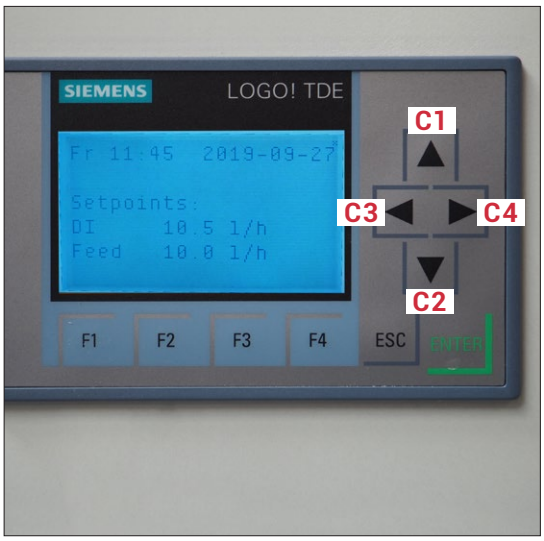

Figure 3: Display

3. Take a sample (diffusate and dialysate):

a. Hold a suitable sampling vessel under the sampling cock.

b. Remove the required sample quantity from the sampling cock.

c. To obtain current values, discard first sample.

d. Take and analyse samples of diffusate 1.1 and dialysate 2.2, respectively.

NOTICES:

Wear personal protective equipment (PPE) when taking samples.

In order to obtain meaningful samples, they must be taken in a stationary process.
This occurs approximately 90 minutes after the pumps start up.

The performance capability of the membrane module can be determined with the samples. If the spiral membrane module is intact, and the system is stationary, the metal salt content in the diffusate should be < 5% of the feed salt content.

The performance capability is dependent on the volumetric flow rates set, and on the composition of the feed, and they are subject to fluctuations. If the metal salt content of the diffusate rises significantly, the diaphragm module needs to be replaced.

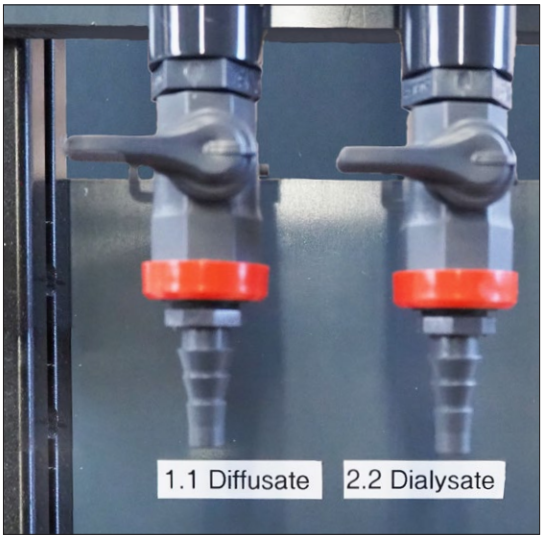

Figure 4: Sampling points

4. Powering down the system:

a. Pressing button F1 again stops the pumps, and the green control lamp goes out. Automatic mode is now stopped.

b. Control voltage to the system is switched off by turning the main switch into the Off position.

7. MAINTENANCE / SERVICE:

7.1 Regular checks:

Every time the system starts up:

- Check the system for leaks. Small leaks at the hose clips can be remedied directly by tightening the hose clips.

- Check the pumps for leaks. Check whether liquid is escaping from the outlet opening or from the dosing head.

Weekly checks:

- Check the performance of the spiral membrane modules by analysing the diffusate and dialysate.

- Check all hoses for embrittlement and cracking, and replace them if necessary.

Filter:

- Replace the activated carbon filter by no longer than 3000 operating hours. Higher load levels or particulate in the feed reduce the service life of the filter substantially.

- Depending on the contamination level of the feed, the particle filters must be replaced when needed. The filter must be changed immediately if the pre-pressure at the filter exceeds 2.5 bar.

Storage containers:

- The storage containers must be replaced every 5 years (see adhesive label on the container).

Hoses:

- The fabric hoses, PVC hoses and PE hoses must be replaced annually or when required. For safety reasons, whenever any damage is detected on a hose, all hoses must be replaced.

Service contract:

- If a service contract has been concluded with Spiraltec GmbH, employees of Spiraltec GmbH will come to replace the containers, hoses and service the pumps. The materials involved in this work will be invoiced.

Spare parts list:

- The spare parts required can be obtained from Spiraltec GmbH by quoting the following item numbers (prices on request):

itemnumber	description	unit	RRP / pce.	
			without service contract	with service contract*
32100179	Ring spanner for filter housing	1 pce	10,50 €	8,93 €
32100032	Activated carbon filter cartridge (20")	1 pce	161,50 €	137,28 €
32100142	Cartridge filter 10 µm	1 pce	29,00 €	24,65 €
32100140	Cartridge filter 1 µm	1 pce	29,00 €	24,65 €
32100183	DDA-30 pump	1 pce	725,00 €	616,25 €
32100247	Pump service kit	1 pce	325,00 €	276,25 €
32100054	Replacement pressure sensor	1 pce	177,00 €	150,45 €
32000012	Storage container set 35l DDP1-01	1 pce	525,00 €	446,25 €
32000013	Replacement hose set DDP1-01	1 pce	110,00 €	93,50 €

7.2 Filter Change

Before changing the filters, ensure that the main switch on the right side of the switch cabinet is in the OFF position. Then secure the system to prevent it from being switched back on accidentally (Lock out/Tag out). When changing filters, always wear appropriate protective equipment.

Replacing 10 µm or 1 µm particle filter:

Please note: Acid!

Lower the feed above the lower drain cock on the filter housing to be changed into a suitable receptacle. Unfasten the filter housing with a wrench. Wait until the residual acid has drained off. Then close the drain cock, completely screw down the housing and lift it out carefully. Dispose of residual acid and the cartridge filter properly.
Clean the dirty filter housing with DI water and dispose of sludge properly with splash water. Install the new cartridge filter in the housing, screw in by hand, then tighten down with a wrench. Ensure that the seal is correctly seated on the filter housing. Check that the drain cock is closed. The system can then be put back into operation. After starting up the system, examine the filter housings for signs of leakage and retighten them wherever necessary.

Replacing activated carbon filters:

Please note: Acid!

Lower the feed above the lower drain cock on the corresponding filter housing into a suitable receptacle. Unfasten the filter housing with a wrench. Wait until the residual acid has drained off. Then close the drain cock, completely screw down the housing and lift it out carefully. Dispose of residual acid and the active carbon filter properly. Insert the new activated carbon filter into the housing. Ensure that the seal is correctly seated on the filter housing. Check the seals on the activated carbon filter and ensure that they are correctly seated. Screw in the housing by hand, then tighten down with a wrench. The system can then be put back into operation. After starting up the system, examine the filter housings for signs of leakage and retighten them wherever necessary.

Figure 5: Key for filter housing 2

Figure 6: Active carbon filter

Figure 7: Particle lfilter

7.3 Replacing the spiral membrane module:

Wear personal protective equipment (PPE) when replacing the diaphragm module.

1. Flush the system with DI water.

2. Unscrew the cap screw fittings on the spiral membrane module.
   Attention, medium is still escaping!

3. Remove the used spiral membrane module from the system. Unscrew the adapter connection piece from the spiral membrane module. Dispose of the old spiral membrane module properly, paying attention to legislative provisions!

4. Screw the adapter connection piece with the new flat seal into the spiral membrane module and insert it into the system.

5. Screw the cap screw fittings to the adapter connection piece as shown on the label.
   Do not forget to insert seals.

6. Start the system with the F2 button. Check the screw fittings for signs of leakage and retighten them wherever necessary. If the spiral membrane module is filled, medium escapes at outputs 1.1 and 2.2. The system can be switched off by pressing the F2 button again.

7. The system can now be restarted in automatic mode.

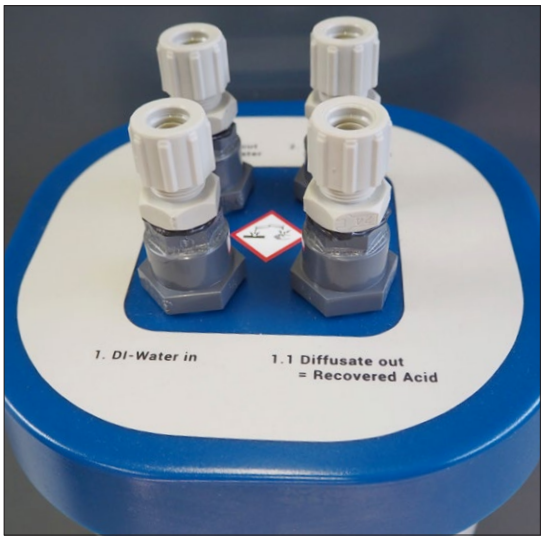

Figure 8: Membrane module not connected

Figure 9: Connected membrane module

8. REMOVAL:

Danger!

Intoxication, chemical burns, contamination due to media escape.

> With hazardous media, ensure that corresponding protective measures are implemented and wear personal protective equipment in accordance with the requirements of the media.

> Before loosening lines, ensure that the medium has been flushed out of the whole system.

Risk of injury through high pressure in the system/product.

> Before working on the system or the spiral membrane modules, shut off the pressure and bleed the lines.

Risk of injury with improper removal.

> All work on the system must be carried out by trained personnel.

1. Drain the system as completely as possible:

    a. Pressing the F2 button empties the storage containers of DI water and feed. In order to accelerate this, the flow rates can be increased to 15 l/h. When the minimum level is reached, the pumps switch off.

    b. Pressing the F4 button empties the diffusate and dialysate containers. When the minimum level is reached, the pumps switch off.

2. Emptying the filter housing:

    a. Place a suitable container under all filter housings.

    b. Open drain cocks and drain medium.

    c. Loosen the filter housing of the activated carbon filter with the wrench and allow the remaining medium to drain off.

    d. Close the drain cocks again and open all filter housings with the wrench.

    e. Dispose of residual acid and the filter cartridge properly.

    f. Screw in empty filter housings again.

3. Empty feed container 2 with external pump (not included). The suction line of the pump can be connected to container connection GP2.

4. Flush the system for at least 120 minutes with DI water:

   a. Fill the DI water and feed storage containers manually with DI water.
   Or connect DI water to both inlets and fill the containers by pressing the F3 button.

   b. Pressing the F2 button flushes the system. When doing so, increase the flow rate to 15 l/h.

   c. Pressing the F4 button empties the diffusate 1.1 and dialysate 2.2 containers and disposes of the „splash water“ properly.

   d. Repeat steps a - c (min. 2 times).

5. Empty the splash water from the system and dispose of it properly.
   Please note: Despite this, residual acid may still remain in the system.

6. Unscrew the cap screw fittings on the diaphragm module and remove the spiral membrane module from the system.

7. Empty the diaphragm module by turning it upside-down. Then close with the plugs.
   Dispose of the spiral membrane module and the „splash water“ properly.

8. Empty the entire system as far as possible and dispose of splash water properly.

9. Separate inlets/outlets and close system entries with end caps.

10. Dismantle all containers and empty any residues. To do this, the filter housings, the hose connections and the float switches must first be dismantled. Alternatively, the containers can be emptied with an external pump.

11. The system can now be packaged and stored and/or transported. Ensure that the ambient temperature is at least 5°C. When recommissioning the system, proceed as described in Section 6.

9. SHUTDOWN / STORAGE:

Danger!

Intoxication, chemical burns, contamination due to media escape.

> With hazardous media, ensure that corresponding protective measures are implemented and wear personal protective equipment in accordance with the requirements of the media.

> Before loosening lines, ensure that the medium has been flushed out of the whole system.

Risk of injury through high pressure in the system/product.

> Before working on the system or the diaphragm modules, shut off the pressure and bleed the lines. Risk of injury with improper removal.

> All work on the system must be carried out by trained personnel.

Used spiral membrane modules must be kept damp at all times. To prevent bacterial growth during extended periods of downtimes or storage, the spiral membrane modules should be flushed through with diluted salt-free acid (e.g. diffusate), emptied and then sealed. We therefore recommend
preserving the spiral membrane modules inside the system. If you remove the spiral membrane modules from the system, only place them into storage:

Upright with their connections facing upwards and completely emptied!

9.1 Short-term storage:

Shutdowns up to 7 days in length:

> No measures necessary.

9.2 Long-term storage:

Shutdowns longer than 7 days:

1. Drain the system as completely as possible:

    a. Pressing the F2 button empties the storage containers of DI water and feed.
    In order to accelerate this, the flow rates can be increased to 15 l/h.
    When the minimum level is reached, the pumps switch off.

    b. Pressing the F4 button empties the storage containers of diffusate and dialysate.
    When the minimum level is reached, the pumps switch off.

2. Emptying the filter housing:

    a. Place a suitable container under all filter housings.

    b. Open drain cocks and drain medium.

    c. Loosen the filter housing of the activated carbon filter with the wrench and allow the remaining medium to drain off.

    d. Close the drain cocks and tighten all loosened filter housings with the wrench.

10. PACKAGING AND TRANSPORT:

Note:

Transport damage:

> Insufficiently protected systems can be damaged while in transit.

> Ensure that the permissible storage temperatures are not infringed.

> Storage temperature 5°C - 30°C.

Environmental damage caused by system components contaminated by media:

> Dispose of system and packaging in an environmentally friendly manner.

> Observe applicable disposal regulations, transport provisions and environmental regulations.

11. RETURNING A SYSTEM:

If a system is to be returned, please contact a representative of Spiraltec GmbH beforehand. Flush out the system and storage containers as described in Section 8 Disassembly.

Return the system with the storage containers to Spiraltec GmbH, simply first rinsing them out, draining them and packaging them well. Please provide information with a description of the application (media used etc.) in writing.

> Observe applicable disposal regulations, transport provisions and environmental regulations.

12. ACCESSORIES:

The following accessories can be obtained from Spiraltec GmbH:
There are currently no accessories available for this type of system.
Contact a representative of Spiraltec GmbH for this.

13. TECHNICAL MALFUNCTIONS THAT MAY OOCUR:

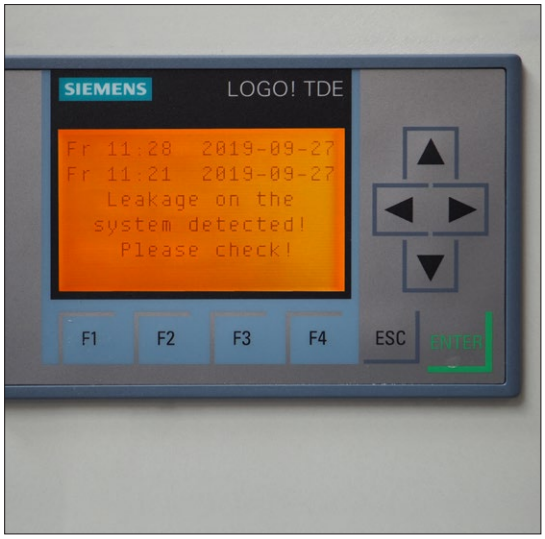

Figure 10: Example of a fault message

Malfunctions:

Malfunctions are shown on the display located on the front of the switch cabinet. In addition, the yellow indicator lamp flashes and the red indicator lamp lights up. The system shuts down every time there is a malfunction. After remedying the malfunction, the error message can be acknowledged by pressing the Enter button, and the system can be restarted using the F1 button.

Leakage:

If liquid escapes at one location on the system or on the diaphragm module, and if the system has not gone into fault mode, then switch off the system immediately, first taking personal safety precautions. Try to prevent the escaped medium from spreading by catching and collecting it.

Please note: Use appropriate protective equipment and acid-resistant containers.

If medium escapes from a hose connection, this can be remedied by tightening the pipe clip gently. Always ensure that the plastic screw connection is not damaged. If the leakage is greater, also close the external valves in the inlets/outlets.

Power failure:

In the event of a power failure, proceed as follows:

Power failure (< 30 minutes)
- Start the system by pressing the F1 button in automatic mode.

Power failure (> 30 minutes)
- Proceed as described in Section 6.3.

13.1 List of error messages:

Error message on display:	Possible cause:	Possible workaround:
Pressure drop at the filter is too high! Please check! dp = xxxx bar	- Particle filter blocked - Activated carbon filter blocked	- Replace particle filter. - Replace activated carbon filter
DI water container is too full. System stops!	- Inflow does not stop - Fill level monitor defective	- Check actual fill level: 1. Fill level is overfull and continues to rise: - stop external feed - Solenoid valve QM1 defective (must be replaced). 2. Fill level not overfull: - Sensor defective (must be replaced).
Feed container is too full. System stops!	- Feed does not stop - Fill level monitor defective	- Check actual fill level: 1. Fill level is overfull and continues to rise: - stop external feed - Solenoid valve QM2 defective (must be replaced). 2. Fill level not overfull: - Sensor defective (must be replaced).
Dialysate container is too full. System stops!	- Error message on pump GP3 - Pump GP3 defective - Pipeline (external) blocked	- Correct the pump fault. - Replace pump GP3. - Check pipeline, clean if necessary.
Diffusate container is too full. System stops!	- Error message on pump GP4 - Pump GP4 defective - Pipeline (external) blocked	- Correct the pump fault. - Replace pump GP4. - Check pipeline, clean if necessary.
Leakage on the system detected! Please check!	- Diaphragm module leaky - Hose line leaky/broken - Pipeline leaky	- Replace diaphragm module. - Retighten hose clamp. - Retighten cap screw fitting. - Retighten filter housing - Close the drain cocks on the filter. - Replace hose line.

Error message on display:	Possible cause:	Possible workaround:
DI water container is not being filled. System stops!	- External supply not connected - DI water supply inadequate - Solenoid valve QM1 not opening	- Connect external supply. - Check supply line, repair if necessary (open valve). - Replace solenoid valve QM1. - Check connecting line.
Pump GP1 DI water does not work. Please check!	- Error message on pump GP1 - Pump GP1 defective	- Correct the pump fault. - Replace pump GP1.
Pump GP2 Feed does not work. Please check!	- Error message on pump GP2 - Pump GP2 defective	- Correct the pump fault. - Replace pump GP2.
Feed container is not being filled. System stops!	- External supply not connected - Feed supply inadequate - Solenoid valve QM2 not opening - Error message on pump GP5 - Pump GP5 defective	- Connect external supply. - Check particle filter, replace if necessary. - Check filter sieve in anodising bath, clean if necessary. - Replace solenoid valve QM2 - Check connecting line. - Correct the pump fault. - Replace pump GP5.

Error message on the pump:	Possible cause:	Possible workaround:
Broken cable (alarm)	- Defect in control line	- Check cable/plug connection, replace if necessary.
Service now (Warning)	- Time interval for service elapsed	- Perform service.

Stand: 09/2019

14. EC CONFORMITY DECLARATION

Version: 2019-01
Datum: 22.07.2019
Verfasser: F. Moser

EG-Konformitätserklärung:

Konformitätserklärung nach EG-Richtlinie CE 2006/42/CE
Declaration of conformity according to EC directive CE 2006/42/CE
Déclaration de conformité selon la directive CE CE 2006/42/CE

Wir **Spiraltec GmbH**
We/Nous (Name des Anbieters / supplier´s name / nom du fournisseur)

Heinzenberger Weg 34
D-74343 Sachsenheim
(Anschrift / address / addresse)

erklären in alleiniger Verantwortung, dass (die) Anlage(n) / declare under our sole responsibility that the plant(s) / Déclarons sous notre seule responsabilité, que le(s) facilité(s)

Type: **DDP1-01**
Bezeichnung: **Diffusionsdialyseanlage**
Diffusion Dialysis System

(Bezeichnung, Typ oder Modell / name, type or model / nom, type ou modèle,)

den folgenden grundlegenden Anforderungen der Maschinen-Richtlinie **(2006/42/EG)** entspricht:
is complying with all essential requirements of the Machinery Directive (2006/42/EG) / est conforme aux dispositions fondamentales de la directive Machines (2006/42/EG) suivantes
Anhang I, Artikel /Annexe I, Sections/ Annexe I, Article **1.1.2, 1.1.3, 1.1.5, 1.3.1, 1.3.2, 1.3.4** und/and/et **1.5.1**.

EG-Richtlinie Maschinen in der Fassung von 2006/42/EG, EU-Abl. L 157/24 vom 09.06.2006 / EC Machinery Directive in the version of 2006/42/EC, EU Supplement L 157/24 of 09.06.2006 / Directive Machines CE dans la version 2006/42/CE, Supplément UE L 157/24 du 09.06.2006

Niederspannungsrichtlinie, Die Schutzziele der Niederspannungsrichtlinie 2014/35/EU, EU-Abl. L 96/357 vom 29.03.2014 wurden eingehalten. / Low Voltage Directive, The protective goals of the Low Voltage Directive 2014/35/EU, EU Supplement L 96/357 of 29.03.2014 have been met. / Directive Basse Tension, Les objectifs de protection de la Directive Basse Tension 2014/35/EU, Supplément UE L 96/357 du 29.03.2014 ont été atteints.

EMV-Richtlinie 2014/30/EU, EU-Abl. L96/79 vom 29.03.2014 / EMC Directive 2014/30/EU, EU Data Sheet L96/79 dated 29.03.2014 / Directive CEM 2014/30/UE, Fiche technique UE L96/79 du 29.03.2014

Folgende harmonisierte Normen wurden angewandt: / The following harmonized standards were applied: / Normes harmonisées appliquées:

EN 12100:2010	Sicherheit von Maschinen / Safety of machinery. General principles for design. Risk assessment and risk reduction. / Sécurité des machines - Principes généraux de conception - Appréciation du risque et réduction du risqué.
EN 60204-1	Sicherheit von Maschinen - Allgemeine Anforderungen /Safety of machinery. General principles for design. Risk assessment and risk reduction./ Sécurité des machines - Exigences générales - Principes généraux de conception - Appréciation du risque et réduction du risque.

Folgende nationale technische Spezifikationen wurden angewandt: / The following national technical specifications have been applied: / Les spécifications techniques nationales suivantes ont été appliquées:

VDE 0100-100, -200, -410, -510
DGUV 3: Elektrische Anlagen / Electrical systems / Systèmes électriques

Die zur Maschine gehörenden speziellen technischen Unterlagen nach Anhang VII Teil A wurden erstellt. / The relevant technical documentation of the machine have been compiled in conformity ANNEX VII, Part A. / La documentation technique faisant partie selon l'annexe VII, partie A de la machine a été établie.

Sachsenheim, 22.07.2019

(Ort und Datum der Ausstellung
Place and date of issue
Lieu et date de l´édition)

H.P. Härter,

(Name und Unterschrift des Geschäftsführers / Name and signature of the managing director / Nom et signature de l'administrateur délégué)

AFTER EVERY MALFUNCTION, CONTACT YOUR APPOINTED ADVISOR - CONTACT DETAILS BELOW

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