

# INSTRUCTION MANUAL

**WTI 100**

**SWT 100**

**QWT 100**

**Supercharged**

**Heat exchanger**



## **BEHNCKE GmbH**

### **Bavaria:**

Michael-Haslbeck Straße 13  
D-85640 Putzbrunn

Phone: +49 (0)89 / 45 69 17-0  
Fax: +49 (0)89 / 45 69 17-61

### **Saxony-Anhalt:**

Stötterlinger Straße 36 a  
D-38835 Bühne

Phone: +49 (0)39421 / 796-0  
Fax: +49 (0)39421 / 796-30

**Email:** [info@behncke.com](mailto:info@behncke.com)  
**Website:** [www.behncke.com](http://www.behncke.com)

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## 1 Important basic information

### 1.1 General





Thank you for choosing our product. To make sure you can enjoy it for a long time, we ask that you follow these instructions on how to connect and handle the product correctly.

You must carefully read and understand this instruction manual before connecting and setting up the product!


The manufacturer does not assume any warranty and/or liability in the event of improper/inappropriate use. Before assembly, check that the delivery is complete and that none of the items delivered are damaged.

**Keep this instruction manual in a safe place as it contains all the important information about the product.**

### 1.2 Symbols and signal words

Symbol	Signal word / meaning
	<b>DANGER</b> Alerts you to a dangerous situation that will result in serious injury or death if it is not avoided.
	<b>CAUTION</b> Alerts you to a dangerous situation that will result in minor to moderate injury if it is not avoided.
	<b>ELECTRICAL CONNECTION</b> Alerts you to a dangerous situation that may result in electric shock and severe injury.
	<b>NOTE</b> Alerts you to possible material damage and other important information.

### 1.3 Copyright protection

	<b>NOTE</b> The information, text, plans, images and other illustrations contained herein are protected by copyright law and are subject to industrial property rights. Any misuse is punishable by law.
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### 1.4 Terms of warranty

Warranty according to current German legal regulations.

### 1.5 Product liability

Errors excepted and subject to technical changes.

## 2 General information and safety information

- All BEHNCKE products are made from high-quality materials. This guarantees years of trouble-free operation.
- These properties will be retained for many years so long as the installation parts are handled carefully and operated and maintained in accordance with our instruction manual.
- We recommend arranging a maintenance contract with your specialist swimming pool dealer. This is an optimal prerequisite for safe operation, even beyond the warranty period.
- The cross-wound coil heat exchanger is designed for heating swimming pool water in private pools in non-explosive spaces.



### CAUTION

Watch out for edges and corners during unpacking and assembly.  
Wear gloves.

- Assembly, installation and maintenance may only be carried out by trained and authorised specialists.
- Only use specially suitable stainless steel tools when handling stainless steel.
- Within the agreed warranty period, no unauthorised procedures or modifications may be carried out unless done with the express consent of our company. Failure to comply with this will invalidate the warranty.
- Please order replacement parts from your specialist swimming pool dealer.
- Only use the components / accessories supplied. If a component or accessory is missing, you can request the missing original part from us.

### 2.1 Product-related information

The heat exchanger is designed for heating swimming pool water in private pools in non-explosive areas.

The heat exchanger in the **QWT** series is designed exclusively for heating up pool water by means of a hot water heater.

The **SWT** series heat exchanger is designed exclusively for heating pool water using a heat pump, solar power system or a low-temperature heating system.




The **WTI** series heat exchanger is designed exclusively for heating pool water by means of a hot water heater; suitable for water with an increased chloride content (e.g. brine pools, therapy pools, seawater pools).

The **SWT-T** series heat exchanger is designed exclusively for heating pool water using a heat pump, solar power system or a low temperature heating system; suitable for water with an increased chloride content (e.g. brine pools, therapy pools, seawater pools).

Any other use or use that goes beyond this is considered improper use.

The manufacturer, Behncke GmbH, is not liable for any damage resulting from this.

Other uses are only possible following consultation with and approval from the manufacturer.

	<p><b>DANGER</b></p> <p>Proper use also includes</p> <ul style="list-style-type: none"> <li>• observing all the instructions in the installation instructions</li> <li>• complying with inspection and maintenance works</li> </ul> <p><b>Modifications and alterations to the heat exchanger are forbidden for safety reasons!</b></p>				
	<p><b>CAUTION</b></p> <p>The maximum permissible positive operating pressure must not be exceeded:</p> <table border="0"> <tr> <td>Heating coil (primary side)</td> <td>max. 1000 kPa (10 bar)</td> </tr> <tr> <td>Pool water (secondary side)</td> <td>max. 300 kPa (3 bar)</td> </tr> </table>	Heating coil (primary side)	max. 1000 kPa (10 bar)	Pool water (secondary side)	max. 300 kPa (3 bar)
Heating coil (primary side)	max. 1000 kPa (10 bar)				
Pool water (secondary side)	max. 300 kPa (3 bar)				
	<p><b>DANGER</b></p> <p>The heat exchanger must be connected to additional protective potential equalisation.</p> <p><b>When it comes to electrical installations in swimming pools, please observe DIN VDE 0100 Part 702.</b></p>				



## 2.2 Dangers when handling the heat exchanger

The heat exchangers are state-of-the-art and built in accordance with recognised safety regulations. However, their use – especially if used or operated incorrectly – may pose a risk:

- to the life and limb of the operator or a third party or
- of damage to the heat exchanger or other material assets.

Anyone involved with assembly, start-up, operation, maintenance and servicing the heat exchanger must:

- be mentally and physically suitable for it.
- be trained in its use.
- strictly follow this instruction manual..

	<p><b>CAUTION</b></p> <p><b>There is a risk of combustion as the heating connections from the heat exchanger can reach a temperature of 100°C.</b></p>
	<p><b>CAUTION</b></p> <p>Contact corrosion is a risk due to water dripping onto the outer skin or when metal parts are washed into the heat exchanger.</p>

**CAUTION**

The heat exchanger itself can heat up to the flow temperature of the heating water if the pool water does not flow through it.

Connected plastic lines may be subjected to unacceptable thermal loads and damaged as a result.

If the heating circuit is not locked with the circulation/filter pump, the heat exchanger may heat up to the flow temperature of the heating water.

## 2.2 Safety measures at the installation site

The heat exchanger must be installed in a frost-free room with the mounting bracket supplied.

Ensure that the maximum positive operating pressures of 300 kPa (3 bar) on the secondary side or 1000 kPa (10 bar) on the primary side are not exceeded.

**CAUTION**

The heat exchanger and its surroundings may be damaged if the guidelines are not followed.

Check the heat exchanger and its connections for leaks and visible damage at least once a week while the pool is in use.

## 3 Accessories

Below you will find all suitable products we have on offer:

Product:	Item number
Pipe clamp attachment for QWT 100-20 30/40	305 100 10
Pipe clamp attachment for QWT100-70 to 209, SWT 100-40/52	305 100 12
InovaNH 25/40 heating pump, 230 volts, 50 Hz	391 091 11
InovaNH 25/60 heating pump, 230 volts, 50 Hz	391 091 12
Non-return valve MS 3/4	391 017 00
Non-return valve MS 1	391 018 00
Immersion sensors	309 190 10

## 4 Water requirements

Water in swimming/bathing pools or swimming/bathing ponds must not exceed or fall short of the following values.

	<b>QWT, SWT</b>	<b>WTI, SWT-T</b>
<b>Chloride</b>	max. 500 mg/l	max. 3000 mg/l
<b>Free chlorine content</b>	max. 1.3 mg/l	unlimited
<b>pH value</b>	min. 6.8 max. 8.2	min. 6.5 max. 8.2
<b>Iron</b>	max. 0.1 mg/l	max. 0.1 mg/l
<b>Copper</b>	max. 0.2 mg/l	max. 0.2 mg/l
<b>Salt content</b>	max. 0.08%	max. 3.5%
<b>Temperature</b>	max. 40°C	max. 40°C
<b>Langelier index</b>	of -0,3 – +0,3	of -0,3 – +0,3

## 5 Technical data

### 5.1 QWT 100

2 combi sockets 1 ½" x DN 40 or 2" x DN50

For heating the pool water by connecting to a central heating system.

Consisting of a stainless steel jacket with a welded-in stainless steel coil, complete with a thermowell for the installation of an electronic temperature sensor. Holder and rubber hose assembly kit.

**Operating pressure:**            **on the heating side:            10 bar**  
    **on the pool water side:            3 bar**

Item	output	Minimum pump capacity		Pressure loss		Item no.
	kW at 90°	Heating	Pool water	Heating	Pool water	
		m³/h	m³/h	kPa	kPa	
QWT 100-20	23	2	10	4.1	4.3	305 018 00
QWT 100-30	32	2	10	6.2	4.9	305 026 00
QWT 100-40	46	2	10	9.3	5.3	305 003 00
QWT 100-70	75	3	12	3.4	7.2	305 017 00
QWT 100-104	137	5	15	13.2	11.3	305 027 00
QWT 100-140	168	2 x 3	20	2 x 3.4	14.1	305 037 00
QWT 100-209	304	2 x 3	25	2 x 13.2	17.0	305 047 00



## 5.2 SWT 100

### Combo socket 1 ½" x DN 40

For heating the swimming pool water by connecting to a solar power system, heat pump or a low-temperature heating system.

Consisting of an outer stainless steel jacket with welded-in stainless steel coil, complete with a thermowell for the installation of an electronic temperature sensor. Including a holder and rubber hose assembly kit.

Operating pressure:            on the heating side:            10 bar  
    on the pool water side:            3 bar

Item	output	Minimum pump capacity		Pressure loss		Item no.
	kW at 50°	Heating	Pool water	Heating	Pool water	
		m <sup>3</sup> /h	m <sup>3</sup> /h	kPa	kPa	
SWT 100-20	22	1.2	10	4.1	5.8	330 004 00
SWT 100-25	38	1.8	10	6.2	6.9	330 006 00
SWT 100-40	46	3.0	10	9.3	5.5	330 008 00
SWT 100-52	67	3.6	12	3.4	9.2	330 010 00

## 5.3 SWT 100 titanium

### 2 sockets 1 ½" (titanium)

For use with water with a high chloride content (unlimited)

For heating the pool water by connecting to a central heating system, complete with a welded thermowell.

Less prone to calcification.

Operating pressure:            on the heating side:            10 bar  
    on the pool water side:            3 bar

Item	output	Minimum pump capacity		Pressure loss		Item no.
	kW at 50°	Heating	Pool water	Heating	Pool water	
		m <sup>3</sup> /h	m <sup>3</sup> /h	kPa	kPa	
SWT 100-20	22	1.2	10	7.6	5.8	330 004 00 -19
SWT 100-40	46	3.0	10	6.9	5.5	331 008 00 -19

## 5.4 WTI 100

2 sockets 1 ½" or 2" (titanium)

For use in water with a high chloride content (unlimited).

For heating the pool water by connecting to a central heating system, complete with a welded thermowell.

Less prone to calcification.

Operating pressure:            on the heating side:            10 bar  
    on the pool water side:            3 bar

Item	output	Minimum pump capacity		Pressure loss		Item no.
	kW at 90°	Heating	Pool water	Heating	Pool water	
		m³/h	m³/h	kPa	kPa	
WTI 100-20	23	2	10	4.1	4.3	305 080 55-19
WTI 100-30	32	2	10	6.2	4.9	305 081 55-19
WTI 100-40	46	2	10	9.3	5.3	305 082 55-19
WTI 100-70	75	3	12	3.4	7.2	305 083 55-19
WTI 100-104	137	5	15	13.2	11.3	305 084 55-19
WTI 100-140	168	2 x 3	20	2 x 3.4	14.1	305 085 55-19
WTI 100-209	304	2 x 5	25	2 x 13.2	17.0	305 086 55-19

## 5.5 Supercharged

Combo socket 1 ½" x DN40

For heating the pool water by connecting to a central heating system.

Consisting of an outer stainless steel jacket with a cross-wound coil, complete with a thermowell for the installation of an electronic temperature sensor.

Holder and rubber hose assembly kit.

Efficiency increased by 20%.

Safe from calcification!

Operating pressure:            on the heating side:            10 bar  
    on the pool water side:            3 bar

Item	output	Minimum pump capacity		Pressure loss		Item no.
	kW at 90°	Heating	Pool water	Heating	Pool water	
		m³/h	m³/h	kPa	kPa	
SC 50	50	2	10	33.4	5.2	305 050 00
SC 100	85	3	12	10.2	6.6	305 050 10

## 6 Installation and connection dimensions

### 6.1 Transport and storage



#### NOTE

Only transport the water heat exchanger when it is empty!

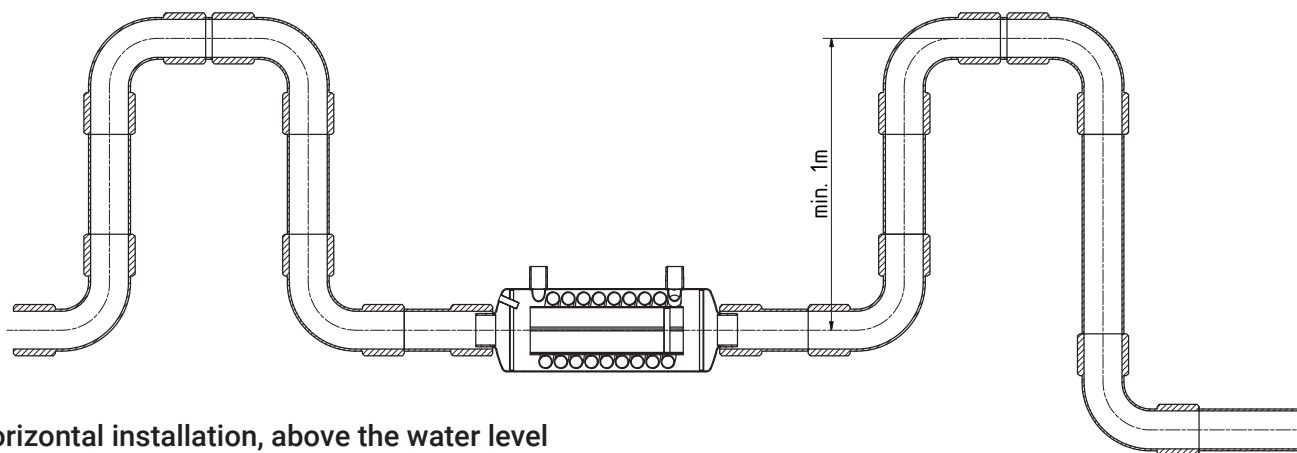
Only store the rinsed and drained water heat exchanger inside rooms with a non-aggressive atmosphere.

## 7 Installation

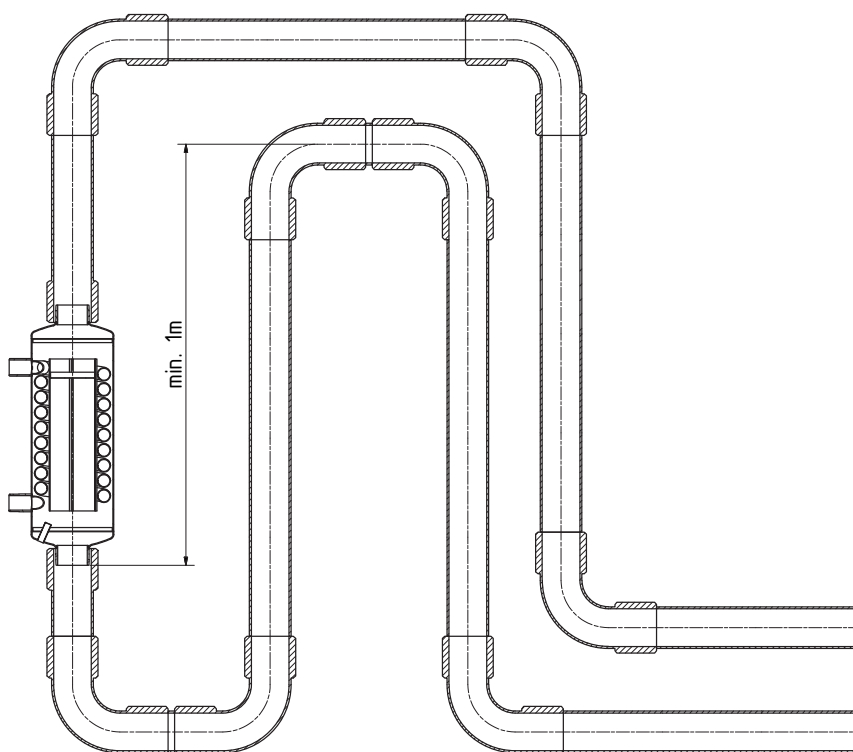
Before installation, check the heat exchanger for visible damage.

The heat exchanger can be installed horizontally or vertically above or below the water level.

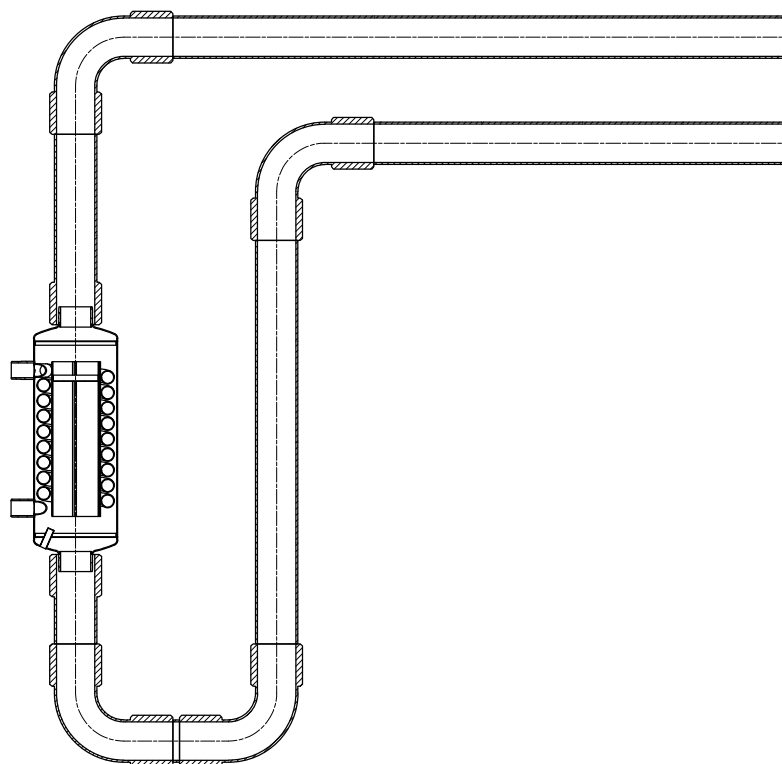
### 7.1 Installation arrangement above the water level



Horizontal installation, above the water level

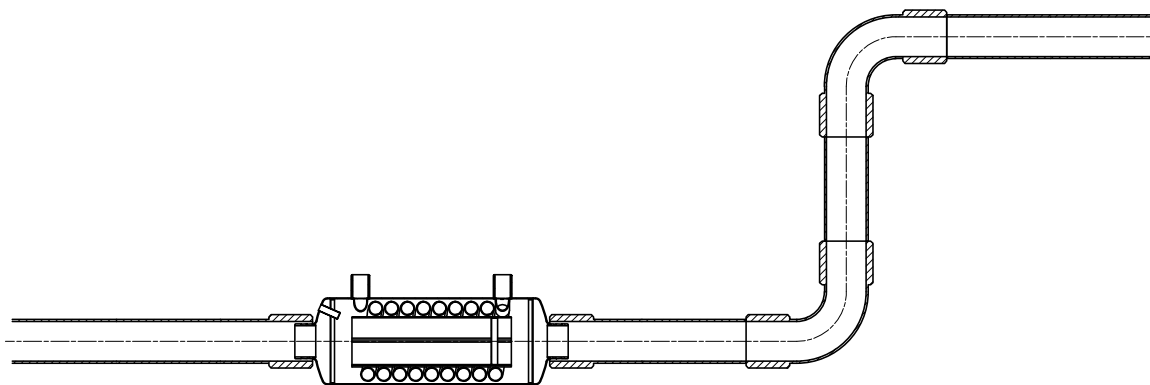


Vertical installation, above the water level



Vertical installation, above the water level





## 7.2 Installation arrangement below the water level



Horizontal installation, below the water level

### 7.3 Connecting the heat exchanger

Install shut-off valves and drain valves in the flow and return lines of the heating circuit within the frost-proof building area.

	<p><b>CAUTION</b> Ensure that the water quality and the maximum pressures are maintained.</p>
	<p><b>CAUTION</b> When connecting to external circuits, ensure that no metal parts are introduced into the heat exchanger.  Brass connections between the heat exchanger and the steel pipes are electrically isolated</p>
	<p><b>CAUTION</b> The heat exchanger may be damaged by chemicals. If chemicals (e.g. chlorine gas) are used, no gases may enter the heat exchanger during filter downtimes.</p>
	<p><b>NOTE</b> Generally, disinfectors must be installed after the heat exchanger.</p>

#### 7.3.1 Connecting WTI / SWT / QWT to a circulation pump / filter system

- Connect the heating water circuit to the primary side of the heat exchanger.
- Connect the secondary side of the heat exchanger to the pool water pipework via hose connections with hose clamps or via the internal thread with plastic and brass fittings.
- Connect the WTI and SWT-T to the pool water pipework on the secondary side using PVC pipe adhesive joints.

#### 7.3.2 Connecting QWT 100-140/100-209 and WTI 100-140/100-209 to a filter system

- Connect both heating coils of the heat exchanger to the heating water circuit.
- Connect the secondary side of the heat exchanger to the pool water pipework via hose connections with hose clamps or via the internal thread with plastic and brass fittings.
- Connect the WTI to the pool water pipework on the secondary side using PVC pipe adhesive joints.

### 7.4 Start-up

Have you read and understood this instruction manual – in particular “Chapter 1 – Safety”?

Do not activate the heat exchanger until you have!

The heat exchanger may be damaged.

Do not climb on the heat exchanger.

Only carry out maintenance and cleaning work when the shut-off valves are closed in both water circuits!

Bleed the air from both water circuits.

## 7.5 Function

In the counter-current heat exchanger **QWT**, the heat is transferred from the heating water circuit to the pool water circuit.

In the counter-current heat exchanger **WTI**, the heat is transferred from the heating water circuit to the pool water circuit.

In the counter-current heat exchanger **SWT**, the heat is transferred from the low-temperature heating water circuit or the solar power system to the pool water circuit.

The **SWT-T** is made of titanium and is suitable for use in water with increased free chlorine levels (e.g. brine pools, therapy pools, seawater pools).

A temperature sensor can be inserted into the integrated clamping device in the thermowell. In conjunction with a control system, the temperature of the pool water can be regulated via the thermostat.

## 8 Maintenance and servicing

Check the heat exchanger and the connections for leaks every week.

### 8.1 Storing the heat exchanger over winter in frost-free rooms

When shutting down in frost-free rooms, the heat exchanger must be completely filled with water.



#### **CAUTION**

Procedures carried out on technical systems by non-experts may lead to injuries and material damage.

### 8.2 Store the heat exchanger over winter in spaces at risk of frost

It is possible to store the heat exchanger over winter without frost damage if the following steps are taken.

- Close the shut-off valves in both water circuits.
- Drain the heat exchanger and the connecting pipework to the shut-off devices.

#### 8.2.1 Emptying the heat exchanger in a vertical position

Completely drain the heat exchanger via drain fittings.

#### 8.2.2 Emptying the heat exchanger in a horizontal position

Remove the heat exchanger properly, then rinse thoroughly to remove impurities and store when dry.



#### **CAUTION**

Do not store the heat exchanger in the immediate vicinity of chemicals.

## 9 Diagnosing malfunctions


	<p><b>DANGER</b></p> <p>Maintenance and repair may only be carried out by trained and approved specialists. We recommend making a maintenance contract that includes inspecting and servicing the heat exchanger.</p>
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Assessment	Possible causes	Remedy
No output		Are the shut-off valves open?
		Is the heat exchanger completely filled with water in both circuits?
		Has the heat exchanger been bled?
		Is there sufficient flow (see technical data) in the heating circuit?
Lower output	Calcification of the heat exchanger	Remove the appliance and rinse with limescale-removing acid.
Formation of corrosion	Missing connection to protective potential equalisation	Check connection (if possible)
	Chloride content too high pH value too low	Check water values Check target values and adjust settings if necessary Increase fresh water supply If possible, remove corrosion Remove

## 10 Removal and disposal

You can dispose of the heat exchanger packaging materials separately in their respective household waste bin.



	<p><b>DANGER</b></p> <p>Removal and disposal may only be carried out by trained and approved specialists.</p>
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	<p><b>CAUTION</b></p> <p>Ensure your own safety during removal. Wear safety equipment (e.g. safety gloves, boots and goggles)! Stainless steel edges may be sharp after disassembly.</p>
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Before starting work, disconnect the heat exchanger from the water supply; the supply and discharge lines must be closed beforehand.

Remove the heat exchanger properly.

Please also dispose of the stainless steel parts according to the applicable local regulations, separately from other materials, and take the scrap stainless steel to a recycling plant.

