Built-in automatic dishwashers

Series 640

IGV 6506.1 - IGVS 6506.1
IGV 6509.1
IGV 6508.1
IGV 6509.1 - IGVS 6509.1
IGV 6609.1 - IGVS 6609.1

Küppersbusch

THE HEART OF A GOOD KITCHEN

GB

Service Manual: H7-71-07

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1. Safety

Danger!

Repairs may only be carried out by a qualified electrician!
Repairs that are not carried out properly may lead to risks and injuries for the user!

It is essential that you observe the following instructions in order to prevent electric shocks:

- The casing and the frame may be live in the event of faults!
- Touching live components inside the appliance may cause dangerous currents to flow through your body!
- Disconnect the appliance from the mains prior to carrying out any repair work!
- When inspecting live parts, a residual current circuit breaker must always be used!
- The earthed conductor resistance must not exceed the resistance specified in the standard! It is vital for ensuring the safety of persons and the functioning of the appliance.
- On completion of repairs, an inspection must be carried out in accordance with VDE 0701 [Association of German Electrical Engineers] regulations or with the corresponding regulations for your country!
- On completion of repairs, a function and impermeability inspection must be carried out.

Attention!

It is essential that you observe the following instructions:

- Due to the all-pole disconnection (relay, press switch), when carrying out measurements via the connector plug in accordance with VDE 0701, a direct measurement must be used to check the heating (flow heater) for insulation faults or the appliance's differential current must be measured!
- When changing additional devices and the pump cavity, beware of sharp edges around the stainless steel components.
- The appliances must be disconnected from the mains prior to all repairs. If inspections must be carried out on live appliances, make sure you use a residual current circuit breaker.

Cuts on sharp edges: use protective gloves.

Components may be electrostatic!
Observe handling regulations!

2. General Technical Specification

This service manual serves the purpose of providing customer service technicians who already have the know-how required to repair dishwashers with specific information on the operating mode of the GV 640 series.

This manual deals with all of the appliance specifications relevant to this model.

Please note!

Work on electrical appliances may only be carried out by suitably qualified staff.

Always disconnect the mains plug before touching components inside the appliance.

2.1 General Features

Mains voltage	➔	220-240V / 50Hz
Power consumption in the stand-by mode	➔	
- Panel with push-buttons:		< 0.1 W
- Panel with a piezo electronic unit:		< 0.8 W
Filling capacity	➔	12 place settings
Overall dimensions:		
- Width	➔	59.6 cm
- Height	➔	81.8 - 87.8 cm
- Depth	➔	55.5 cm
Control elements	➔	Horizontal / vertical
- Switching on/off	➔	Bipolar switch, separated from the electronic unit
- Programme selection / additional function	➔	By buttons (min. 3, max. 6)
Display	➔	2.5 numbers and LEDs
Washing system	➔	Combined / pulse
Water intake level	➔	Pressure control + software
Heating up water	➔	Encased heating element (2100 W)
Temperature control	➔	NTC temperature sensor
Drying system	➔	Activated / turbo
Safety systems / alarms	➔	Full water protection / total protection of electronic components and software

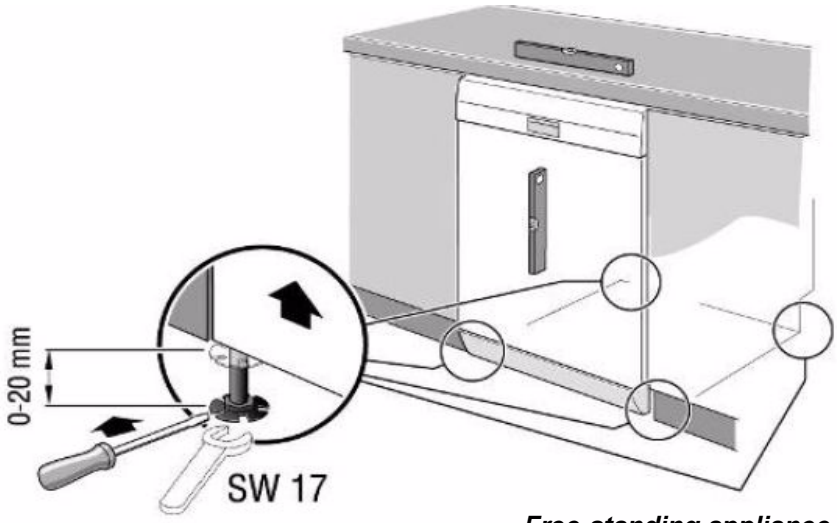
3. Installation and Connection

3.1 Assembly

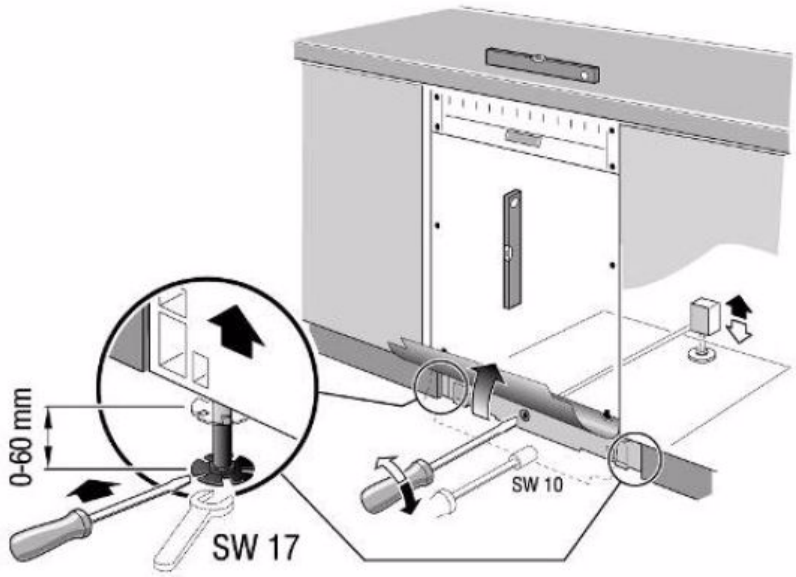
In order to ensure that the lock functions perfectly and to prevent any leakages in the area of the door, the appliance must be perfectly aligned with the adjustable feet. The middle adjustable foot of integrated appliances, located at the back of the dishwasher, can be adjusted from the front. Screw the adjustable feet to lift the appliance until the outer casing is at the same level as the worktop.

The appliances have 3 or 4 feet, depending on the design.

The adjustable heights vary.



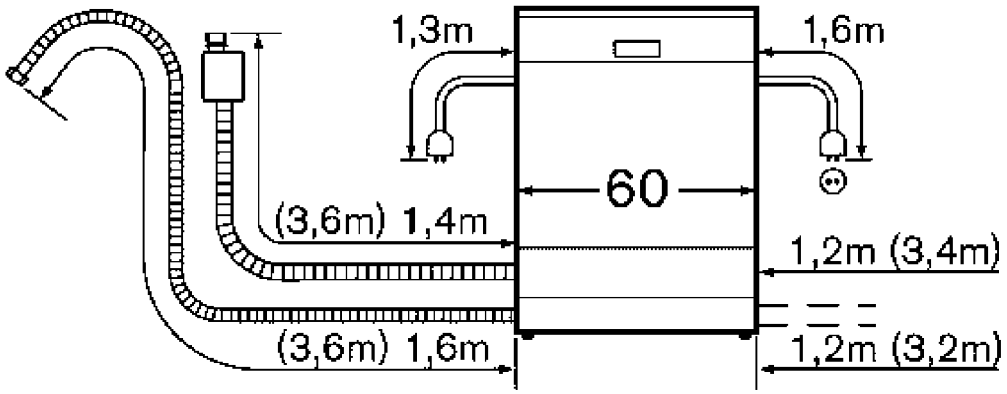
Free-standing appliance



Integrated/ fully integrated

3.2 Water connection

If the appliance is installed onto the drain with the standard length of hose, the max. permissible height above the floor is 90 cm. If the discharge hose is extended, a max. height of 80 cm is not to be exceeded.



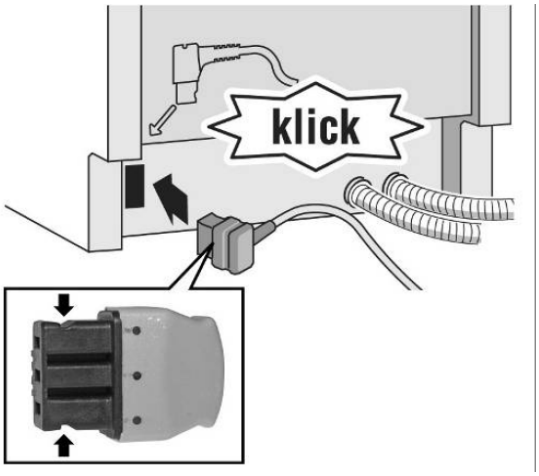
Connection dimensions
for all dishwashers 60 cm
( ) dimensions with extensions

3.3 Electric Connection

Only connect the appliance to a wall socket with earthing in accordance with regulations. Please observe the information on the identification plate (see the technical data).

The mains supply line is fitted with a low-heat system connection and is supplied with the appliance. The cable must be connected to the back of the dishwasher when it is put into operation.

Two strong catches on the sides prevent the plug from accidently becoming loose or coming off the appliance.



Extension cables

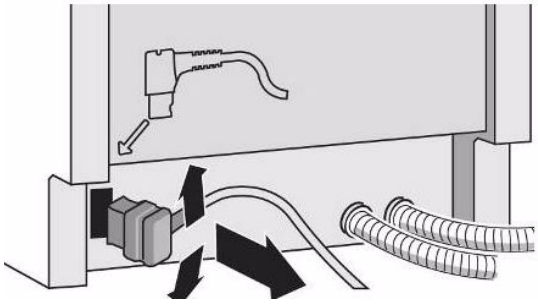
Customer service has extension cables of 3 metres in length on offer. These have currently been released by PG.

EU material number:	644533
GB material number:	644534

3.4 Disassembly

Tools required

Special tools for the ring nut on the salt box; cover of the expansion opening; exhaust air duct; water intake bolts.



1. **Drain off water.**
   - Start up any programme and close the water tap in order to empty the heat exchanger. The heat exchanger is emptied.
   - Then reset to pump off the rest of the water.
   - Remove the remaining water in the pump cavity with a suction syringe.
2. **Remove the mains cable from the appliance plug by moving it carefully up and down and pulling it at the same time (do not move it side-ways!).**

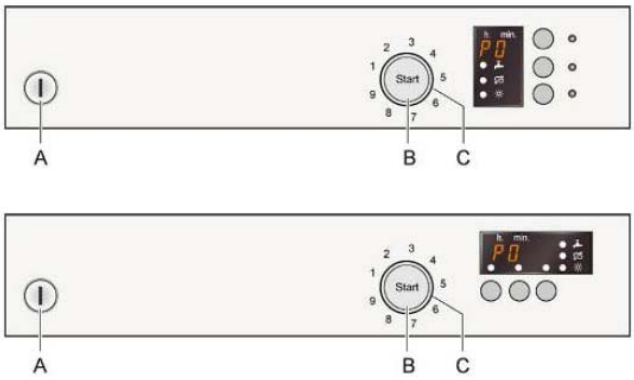
4. Control Panel

4.1 Control Panel

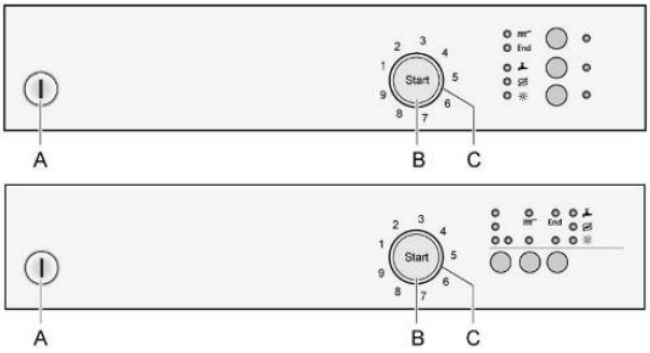
The structure of the control panels are different; they come with a display or without.

- 9 programmes operated with a rotary swich
- Number of LEDs

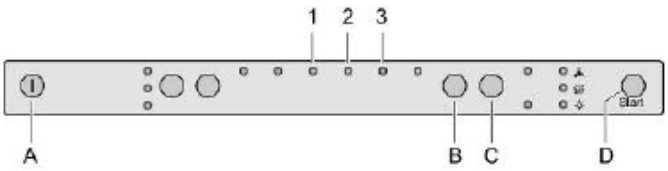
Control panel with a display



Control panel without a display



Control panel fully integrated, no display



4.1.1 On/Off button (A)

The models are all fitted with this button which is used to switch the dishwasher on and off. Switching the button off does not delete a programme in operation.

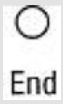
4.2 Setting Options - Appliance With a Display

4.2.1 Programme selection

1. Close the door and switch the dishwasher on.
2. Press button B and keep it pressed.
3. Turn control knob C until the chosen setting range is shown in the display.
4. Release button B.
5. Turn control knob C until the chosen setting is shown in the display.

4.2.2 Water hardness

1. Keep start button B pressed.
2. Turn the programme selection knob C until the salt refill indicator blinks.
3. Release start button B. The current setting is shown, see charts
4. To change the setting turn the programme selection knob until the right setting is shown.

°dH	Hardness range	mmol/l	Setting			
0 - 6	Soft	0 – 1.1	0 (off)	0	0	0
7 - 16	Medium	1.2 – 2.9	1	0	0	X
17 – 21	Hard	3.0 – 3.7	2	0	X	X
22 - 35	Hard	3.8 – 6.2	3	X	X	X

4.2.3 Storing

1. Keep start button B pressed.

4.3 Setting Options - Appliance Without a Display

4.3.1 Programme selection

1. Close the door and switch the dishwasher on.
2. Press button B and keep it pressed.
3. Turn control knob C until the chosen setting range is shown in the display.
4. Release button B.
5. Turn control knob C until the chosen setting is shown in the display.

4.3.2 Water hardness

1. Keep start button B pressed.
2. Turn the programme selection knob C until the salt refill indicator blinks.
3. Release start button B. The current setting is shown, see charts.
4. To change the setting turn the programme selection knob until the right setting is shown.

Range	Display	Selection
Hardness range	H:00 – H:07	8 ranges, factory setting: H:04
Intensive drying	d:00 – d:01	Switching on and off, factory setting: d:00 - off
Rinse aid	r:00 – r:06	6 ranges, factory setting: r:05

4.3.3 Amount of rinse aid

1. Keep start button B pressed.
2. Turn the programme selection knob C until the rinse aid refill indicator blinks.
3. Release start button B. The current setting is shown, see chart: Setting.
4. To change the setting turn the programme selection knob until the right setting is shown.

4.3.4 Intensive drying

1. Keep start button B pressed.
2. Turn the programme selection knob C until the “water intake display” blinks.
3. Release start button B. The current setting will be shown.
4. To change the setting turn the programme selection knob until the right setting is shown.

	○ End
ON	0
OFF	X

4.3.5 Storing

1. Keep start button B pressed.

4.4 Setting Options - Appliance Fully Integrated Without a Display

4.4.1 Programme selection

1. Open the door and switch the dishwasher on.
2. Press button B and keep it pressed.
3. Turn control knob C until the chosen setting range is shown in the display.
4. Release button B and turn control knob C until the chosen setting is shown in the display.

4.4.2 Water hardness

1. Keep button C pressed.
2. Press button D as well until the finish display and the salt refill display blink.
3. Release the buttons. The salt refill display will blink and the current setting will be shown, see chart. To change the setting press button B until the right setting is shown.

°dH	Hardness range	mmol/l	Setting	LED 1	LED 2	LED 3
0 - 6	Soft	0 – 1.1	0 (off)	0	0	0
7 - 16	Medium	1.2 – 2.9	1	X	0	0
17 – 21	Hard	3.0 – 3.7	2	X	X	0
22 - 35	Hard	3.8 – 6.2	3	X	X	X

4.4.3 Amount of rinse aid

1. Keep button C pressed.
2. Press button D as well until the finish display and the salt refill display blink.
3. Release the buttons. Press button C repeatedly until the rinse aid display blinks; the current setting will be shown. To change the setting press button B until the right setting is shown.

4.4.4 Intensive drying

1. Keep button C pressed.
2. Press button D as well until the finish display and the salt refill display blink.
3. Release the buttons. Press button C repeatedly unti the salt refill display and the water intake display blink; the current setting will be shown, see chart.

	1
ON	0
OFF	X

4. Release the buttons. To change the setting turn the programme selection knob until the right setting is shown.

4.4.5 Storing

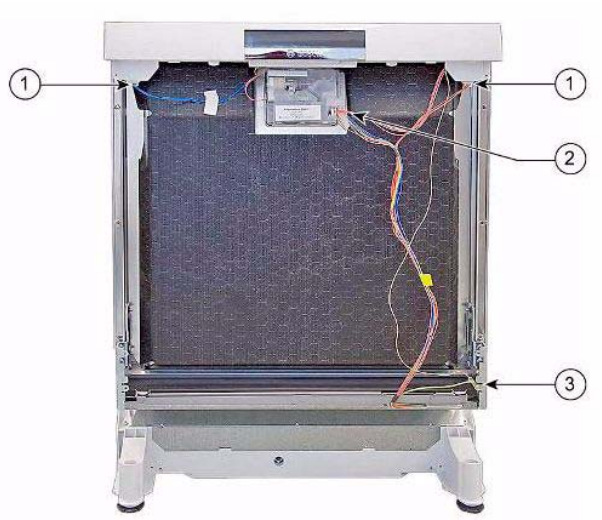
1. Press the start button.

4.5 Removing the Control Panel

This is only possible if the outer door (if present) is removed.

Preparation

1. Remove the cables on the left and right from their sockets.
2. Remove the cable for the rinse aid refill sensor.
3. Remove the earth cable.



Please note!

Hold the control panel with one hand when you take out the last screw. The panel is not secured by more than the screws and may fall down. Use 4x16 mm screws.

Please note.

Removal

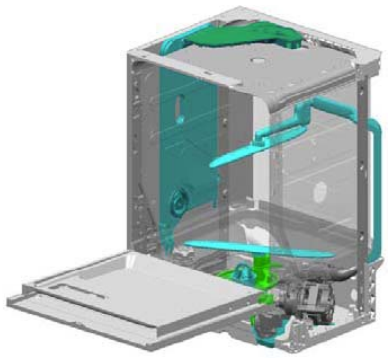
1. Open the door.
2. Remove the top 6 screws.
3. Remove the control panel.

Installation

1. Fix the control panel onto the inner door and then fasten the 6 screws.
2. Reconnect the plug connections.

5. Appliance Components

The dishwasher can be divided up as follows:

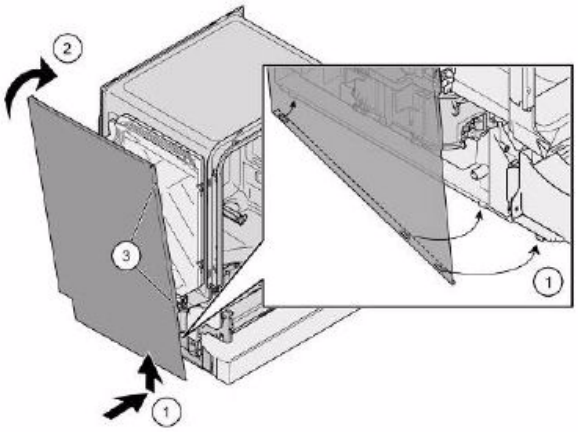


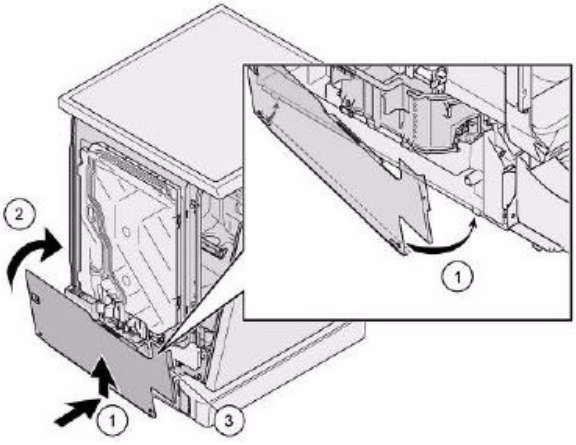
- Modular conversion structure, in the following designs: free-standing, integratable, fully integratable.
- Monobloc load-bearing base in a sound-absorbing plastic material.
- Two removable side panels.
- Styling variable to meet the various configurations requested.
- Simpler installation and mounting.
- The rear foot of built-in models can be adjusted from the front.

5.1 Side Panels

5.1.1 Installation

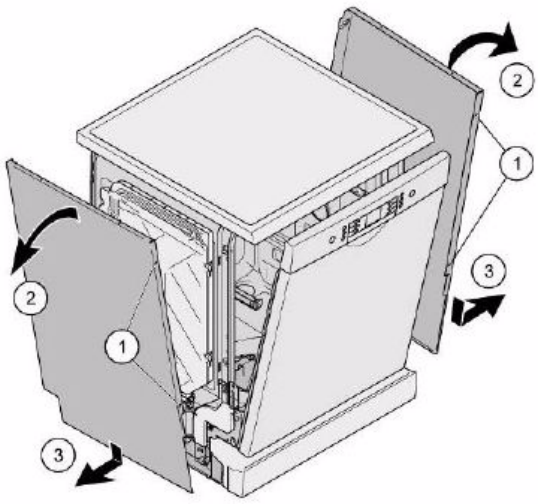
1. Hang the side panel into the catches on the underside of the dishwasher.
2. Press them evenly into the dishwasher and
3. screw them at the front.

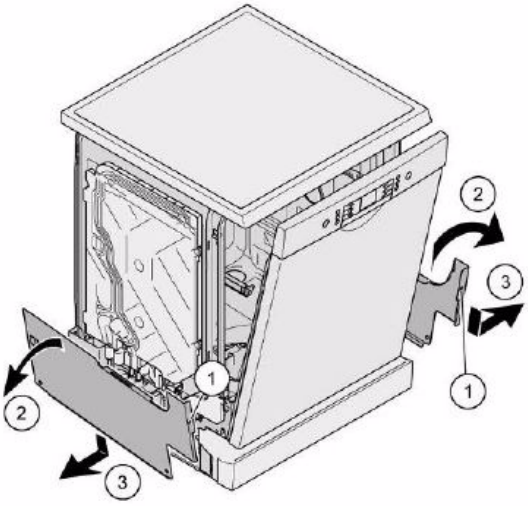




5.1.2 Removing

1. Remove the 2 screws on the front of the side panel.
2. Fold the top of the side panel outwards.
3. Push the side panels downwards and remove them from the retaining clips of the base pan.





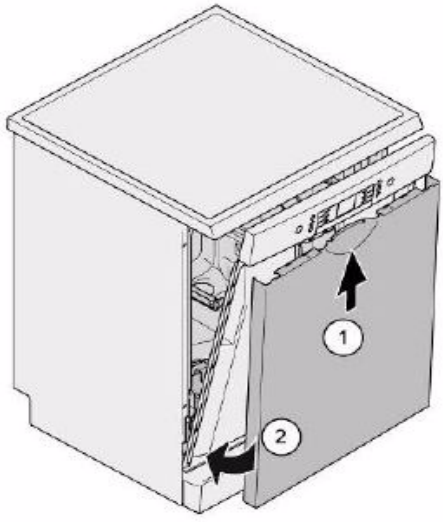
5.2 Outer Door

5.2.1 Installation

Position the insulation mats and the force transducer.

Close the inner door but do not engage it.

1. Push the outer door under the control panel with the top at an angle
2. Press the outer door onto the inner door. Screw from the inside with the door slightly open.



Please note!

Use 4x11mm screws.

5.2.2 Removing

1. Remove the outer door from each side of the inner door by removing the 3 screws.

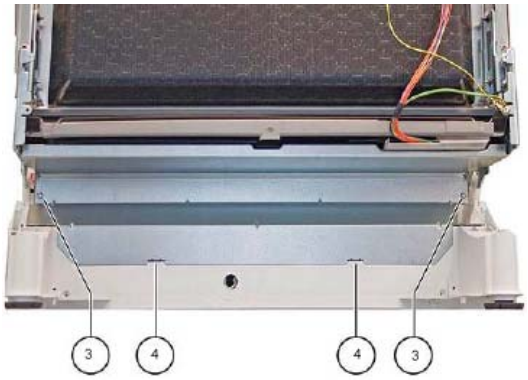
> ***Please note!***
>
> *The six panel screws at the top do not need to be removed when the outer door is taken off.*

2. Hold the outer door on the sides to prevent it from falling down.

5.3 Base Panel

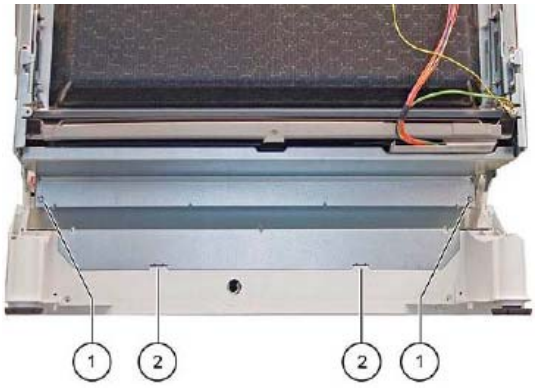
5.3.1 Removing

3. Remove the base panel by removing the Torx screws.
4. Lift the panel upwards out of the catches and remove it.



5.3.2 Installation

1. Position the base panel in the catches.
2. Press it upwards and screw it tight.

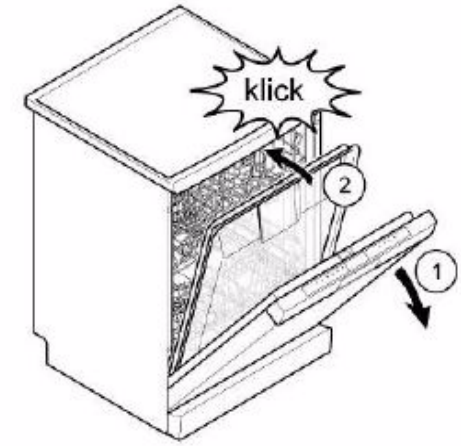


5.4 Door Section

The door section has several sub-sections.

5.4.1 Transparent door

1. Open appliance door.
2. Place the transparent door in the appliance and engage it in the door lock.

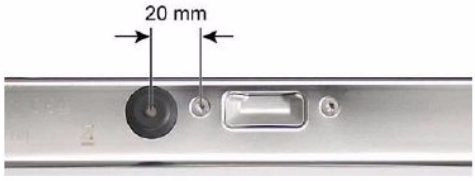


Permanent magnet

A permanent magnet will need to be placed in the inner door when the transparent door is used. The magnet signals “doors closed” to the door contact switch. The door contact switch reacts to the direction of the magnetic field. If necessary, the permanent magnet must be turned so that the appliance can recognise the magnetic field properly.

The system will need to be unlocked again if the spring-loaded latch is locked manually. To do so close the door firmly.

- Fasten the suction cup with magnets onto the top of the inner door.



5.4.2 Door springs

The door springs are located on the right side and on the left side below the base pan.

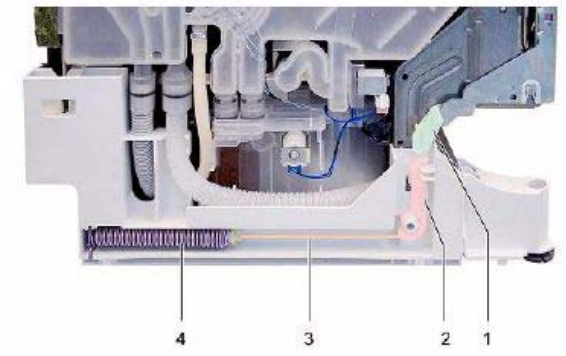
The traction force is transmitted to the door hinge with a load cable drawn over a reversing lever. The traction force of the door springs cannot be adjusted. The built-in springs and the cable system have been coordinated with the permissible door weights.

1 Tensioning cable holder

2 Reversing lever

3 Load cable

4 Door spring



Please note!

The door springs are marked with a coloured dot on the back of the appliance.

Only pairs of door springs may be replaced!

Springs used must always match!

The same colour codes must be used on the right and the left!

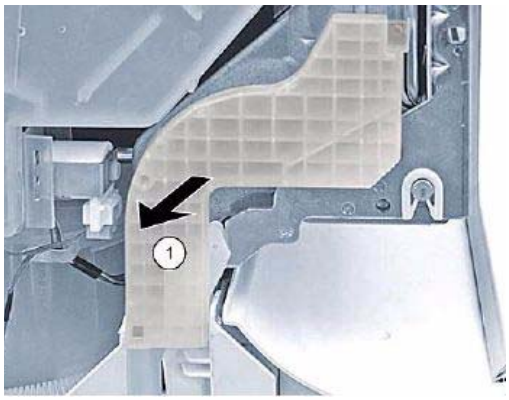
Spring schedule

Structural shape	Height	Colour marking	Spare-part no.	Weights of the unit doors
Fully integrated	81.5 cm	Black		2.5 kg to 8.5 kg
Integrated	81.5 cm	Blue		2.5 kg to 8.5 kg
Integrated	86.5 cm	Green	611339	2.5 kg to 8.5 kg
Fully integrated	86.5 cm	Pink	611340	3 kg to 10 kg

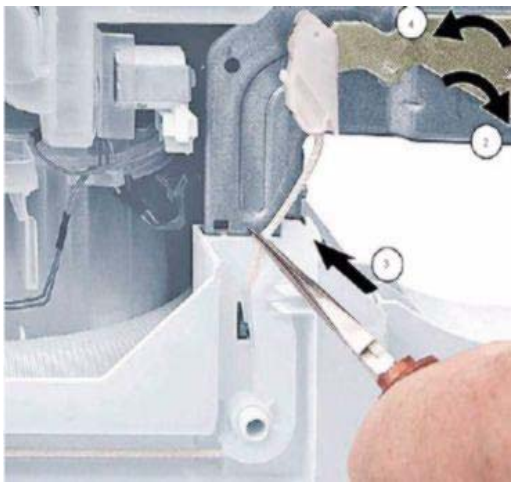
Dismantling

The corresponding side panel must be removed for dismantling.

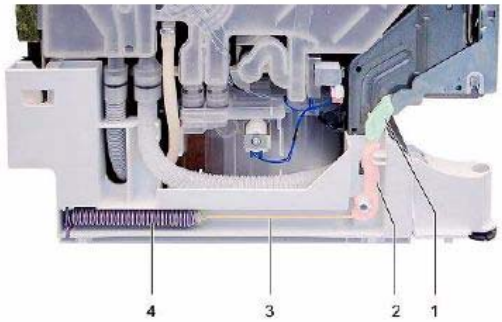
1. Remove the cover of the cable guide outwards.



2. Open the door slightly.
3. Hold the load cable with a pair of flat pliers
4. and close the door.



5. Remove the cable system with the holder (1), reversing lever (2), cable (3) and spring (3) from the front.

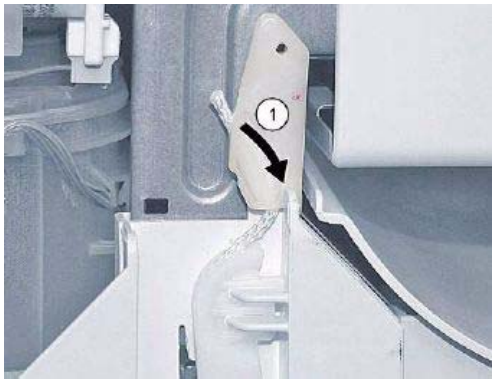


Installation
Instal the cable system as for removal.

Please note concerning the load cable holder!

The load cable holder must be suspended exactly according to the illustration in order to prevent friction with the base pan.

1. **Fasten the load cable holder into the slot on the base pan.**
   The cable system will automatically engage into the door lever.



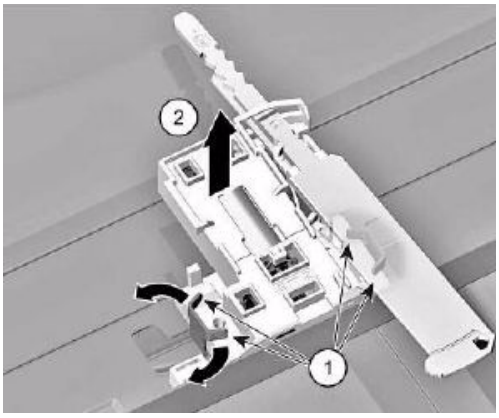
5.4.3 Door lock

Replacing / resetting the door lock

In order to do this, the worktop will need to be removed or the appliance pulled out as far as the frame of the rinsing cavity.

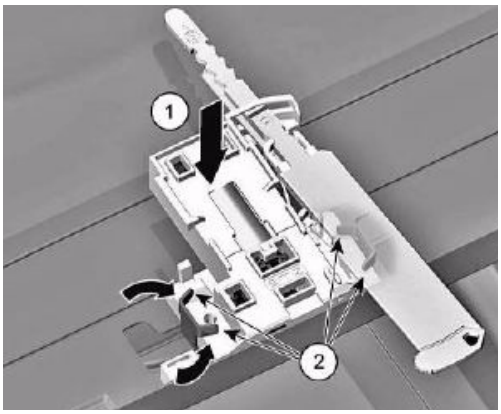
Removing

1. Straighten the metal clamps on the right and the left of the door lock.
2. Remove the door lock towards the top.



Installation

1. Position the new door lock.
2. Bend the two metal clamps to the inside again to fasten the door lock.



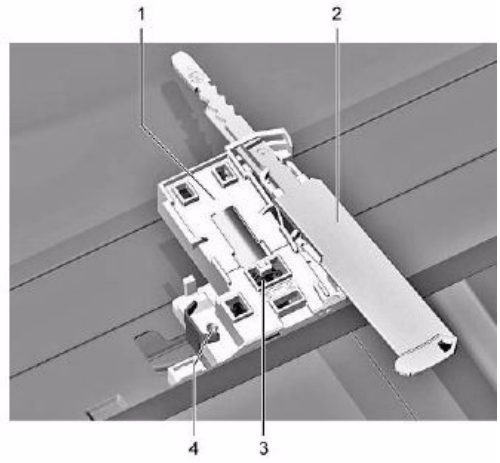
Resetting

The system will need to be unlocked again if the spring-loaded latch is locked manually. To do so close the door firmly.

You will need to overcome strong mechanical resistance!

5.4.4 Door lock / child safety lock

General view of the mechanical door lock



1 Door lock

2 Mechanical child safety lock (optional)

3 Mechanical spring-loaded lock

4 Permanent magnet

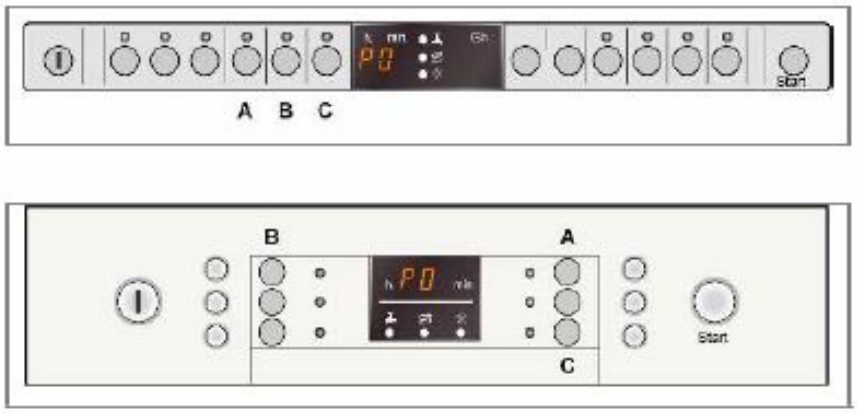
The door is locked mechanically. A spring-loaded lock in the cavity frame engages in a cavity in the door frame. The mechanical child safety lock prevents the door from being opened.

To **activate**, pull the lever outwards and push it to the right.

To **deactivate**, push the lever right to the inside.

Electronic door lock (optional)

The dishwasher can be secured against unintentional programme interruptions or faulty operation (e.g. by children).



Activating the button lock:

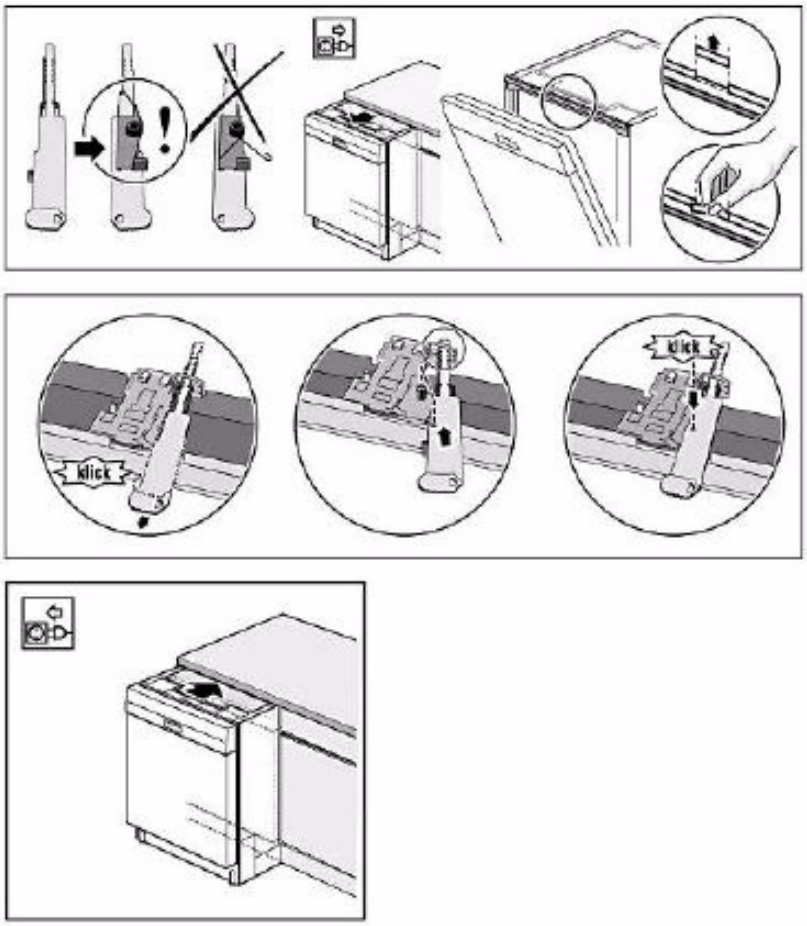
1. Start the chosen programme.
2. Press button B for approx. 4 seconds until the numerical display shows CL. CL is displayed in the numerical display when a button is pressed while the programme is running. It is not possible to interrupt the programme (reset).

Deactivating the button lock:

1. Press button B for approx. 4 seconds until CL not longer lights up in the display.
2. The button lock will be cancelled when the programme is completed (in the numerical dislay). The button lock is maintained in the event of a power failure.
   Whenever a programme is started, the button lock must be re-activated.

5.4.5 Installing the child safety lock

This is only possible if the worktop is removed.

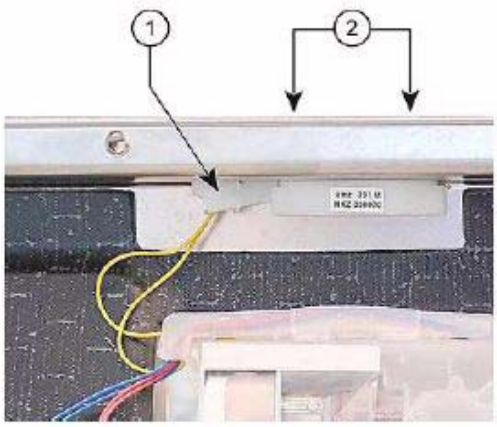


5.5 Door Sensor

The door sensor is located in the centre of the top of the inner door.

1 Door sensor (Hall element)

2 Door sensor screw fastenings



5.5.1 Functioning of the door sensor

Hall sensors (also Hall probes, named after Edwin Hall) use the Hall effect to measure magnetic fields. A permanent magnet is installed in the door.

When the door is closed the permanent magnet is positioned right above the Hall sensor.

When the door is opened or closed, the strength of the magnetic field on the Hall sensor changes. The power consumption of the Hall sensor changes. The electronic unit recognises whether the door is open or closed.

If the power consumption is beyond a defined range, the electronic unit will detect this as an error. The Hall sensor reacts to the direction of the magnetic field. False information in the electronic unit may result if the permanent magnet has not been properly installed or if the signal leads are incorrectly polarised.

5.5.2 Checking the door sensor

This is only possible if the outer door has been removed, the control panel has been removed and the right-hand side panel has been removed.

Measuring the voltage

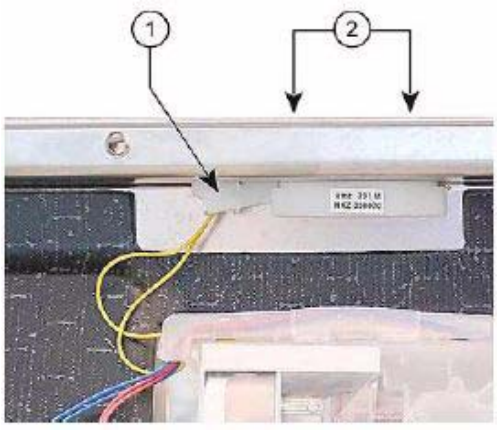
1. Pull the plug out of the door sensor very carefully. Do not pull on the leads.
2. Measure the voltage on the two contacts of the supply line.
   - If this amounts to 13.5 V DC, the power module and the connecting lead are OK -> replace the door sensor.
   - If this voltage is not supplied measure the voltage on the power module.
   - No voltage present -> replace the power module.
   - Voltage present -> measure the resistance of the connecting wires between the power module and the component connections. Rectify the interruption.

Measuring the voltage on the module

The power supply can be measured when the plug has been inserted from the front to the two yellow leads on the power module. When the plug has been disconnected, the main switch will not operate.

5.5.3 Removing the door sensor

- Remove the two Torx 10 screws (2) on the side of the hollow for the door lock and remove the door sensor (1).



Please note!

The panel of the door lock hollow may become loose when the door sensor is removed. It will need to be held.

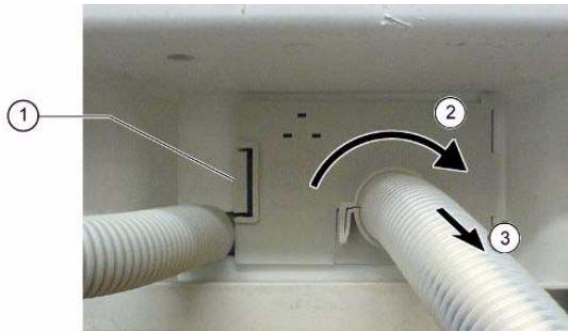
Assembly

Assembly is carried out in reverse order.

The plugs are coded.

5.6 Replacing the Supply Hose

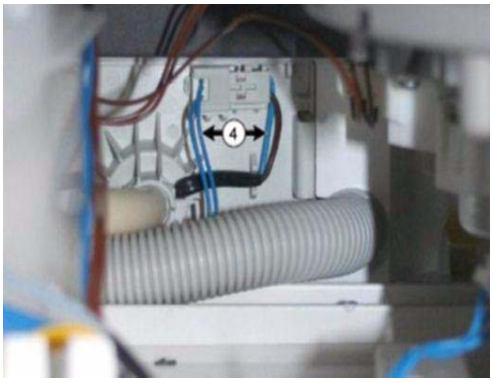
This is only possible if the left side panel has been removed.



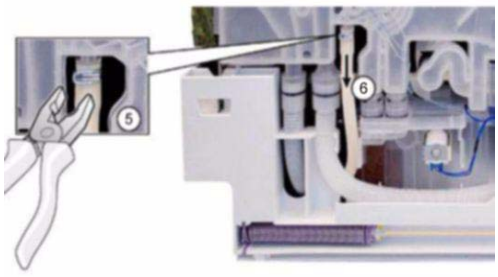
Removing

1. Release the catch on the panel.
2. Fold it away to the right.
3. Pull out the panel.

4. Disconnect the electrical connection.



5. Open the clamp.
6. Pull the supply hose off the heat exchanger.



Installation

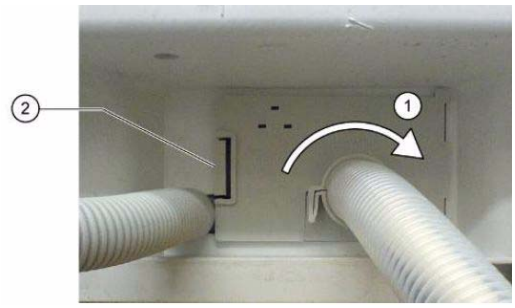
Assembly is carried out in reverse order.

5.7 Replacing the Discharge Hose

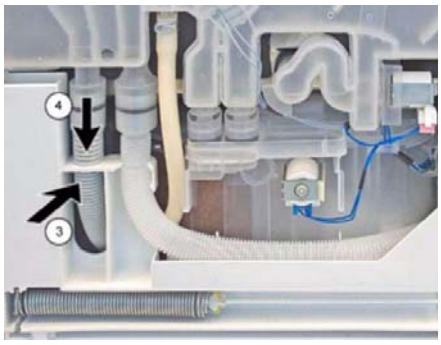
This is only possible if the left side panel has been removed.

Removing

1. Release the catch on the panel.
2. Fold out the panel.



3. Press the discharge hose to the back out of the holder.
4. Pull it downwards off the heat exchanger.



Installation

Installation is carried out in reverse order.

5.8 Basket System

The basekt system covers 2 - 3 levels. The baskets differ in design and colour, depending on the appliance category. The chart shows the differences in design (revised 7.2008).

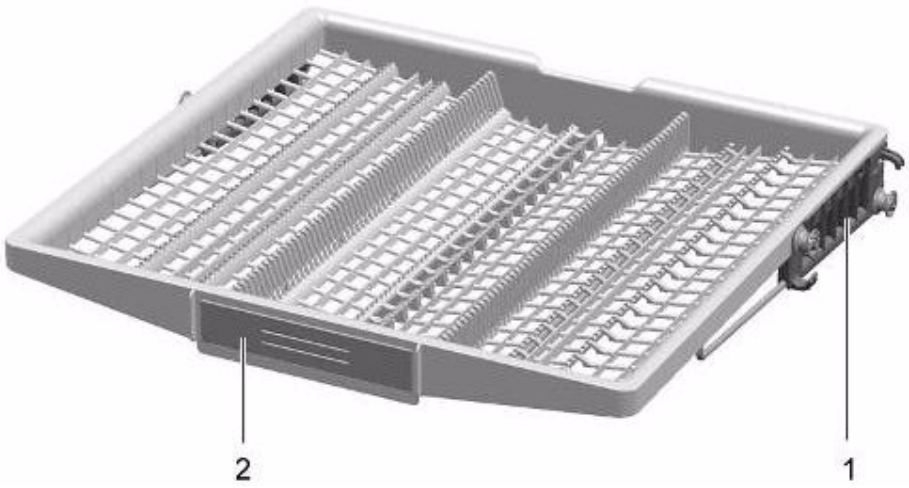
	Vario	VarioFlex	VarioFlexPlus
Top basket			
Rounded, thickened spike tips	—	—	🗐
Divided levels, foldable	🗐	🗐	🗐
Fold-down spikes	Optional	🗐	🗐
Optimised glass holder	—	—	🗐
Height-adjustable basket (triple rackmatic)	Optional	🗐	🗐
Basket handle	—	🗐	🗐
Dispensing assistant	🗐	🗐	🗐
Bottom basket			
Rounded, thickened spike tips	—	—	🗐
Divided levels, foldable	Optional	🗐	🗐
Holder for long-stemmed glasses	—	—	🗐
High basket back	—	—	🗐
Basket handle	—	🗐	🗐

5.8.1 Cutlery drawer

The cutlery drawer is located right at the top of the rinsing cavity. It holds cutlery, other cooking utensils and espresso cups. The dishes to be washed are mainly rinsed with the ceiling centrifugal arm. See the spray system.

1 Glide-out platter

2 Basket handle



5.8.2 Top basket

The glide-out top basket is loaded with small plates, glasses and cups. The dishes are rinsed with a spray arm located below the top basket. When the top basket is pushed into the dishwasher, it engages onto the water intake pipe at the back to make a water connection (see spray system).

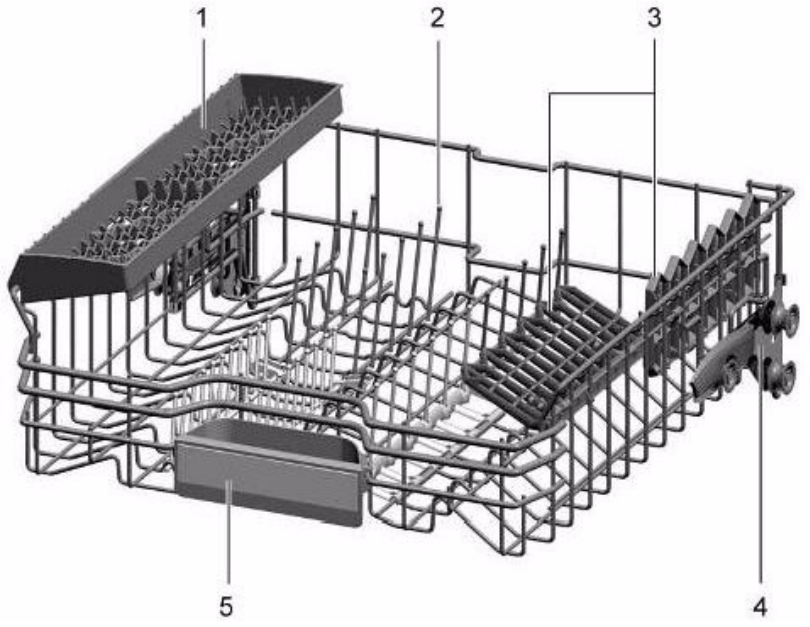
1 Knife holder

2 Fold-down spikes

3 Divided, foldable rack

4 Rackmatic platter

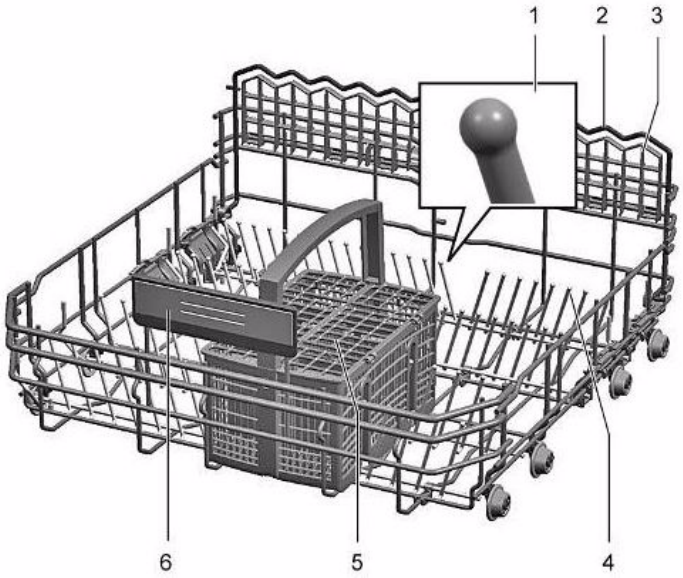
5 Basket handle



5.8.3 Bottom basket

The bottom basket is rolled out of the dishwasher on rollers The bottom spray arm is rigid and rinses the dishes in the bottom basket (see spray system).

1 Rounded, thickened spike tips
2 Holder for long-stemmed glasses
3 Divided, foldable rack
4 Fold-down spikes
5 Cutlery basket



Rounded, thickened spike tips (ball ends)

Ball ends are small balls on the tips of the fold-down spikes. When glasses or plates make contact with standard spikes stripes may occur in the area of contact between the dishes and the spikes. The ball ends ensure a minimum clearance. This means that rinsing and drying will leave no stripes on the dishes.

Rack

The rack is an additional foldable holder in the baskets. An extra level results as the rack is attached to the top of the basket. Mocca cups or small items can be placed there.

Fold-down spikes

Fold-down spikes are spikes that can be folded down for more flexible loading of dishes. They can be folded down in several steps or in a single step.

Rackmatic

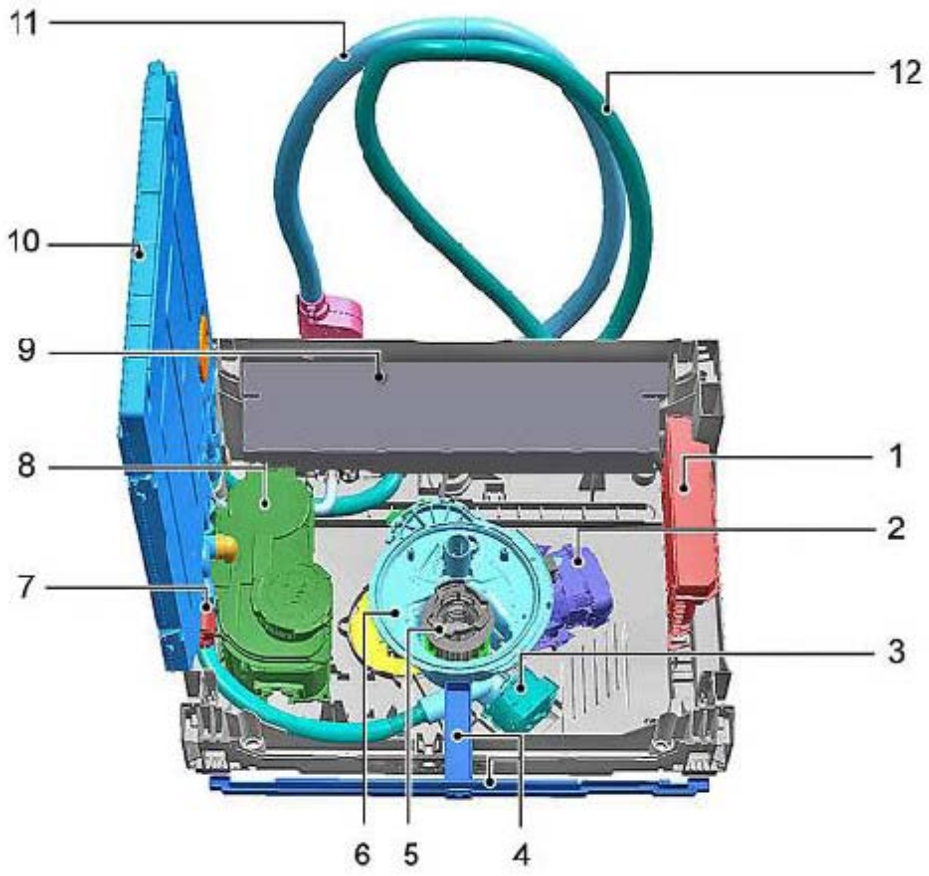
The height-adjusting device for the top basket is called rackmatic. Height may be adjusted in several stages (3 stages). The water intake pipe has connections for a 3-stage rackmatic.

The top basket can also be pushed in at a slope to the left or the right here. The metal holders of the rackmatic are automatically pressed into the top basket. Bending the holders may result in damage to the surface of the top basket.

Holder for long-stemmed glasses

A hinged clamp on the back of the bottom basket can be folded down to the front so that long-stemmed glasses can also be loaded in a second row.

6. Appliance Functions and Components

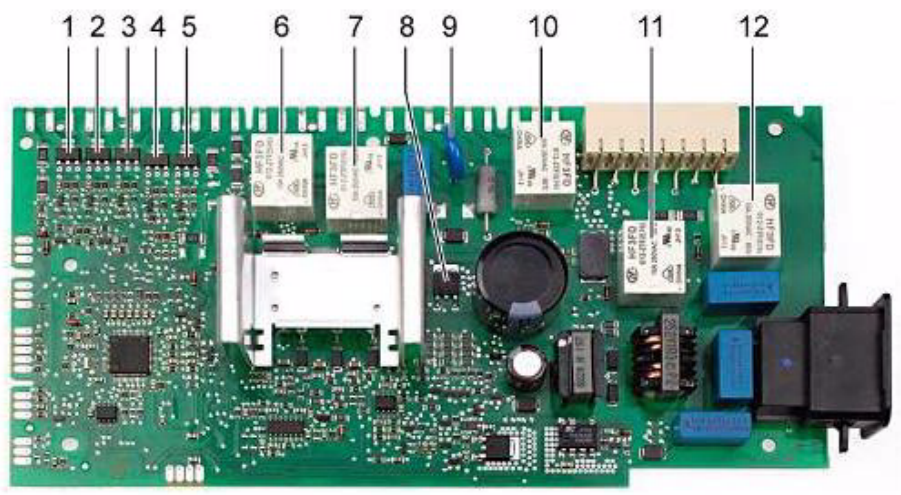


1	Power module
2	Heater pump
3	Discharge pump
4	Flow-off channel / channel (see 7.1.1 Safety system components, page 45)
5	Sieve system
6	Pump cavity
7	Drain valve
8	Water softening equipment
9	Counterweight
10	Heat exchanger
11	Supply hose
12	Discharge hose

6.1 Power module

Components may be electrostatic!
Observe handling regulations!

6.2 Connections

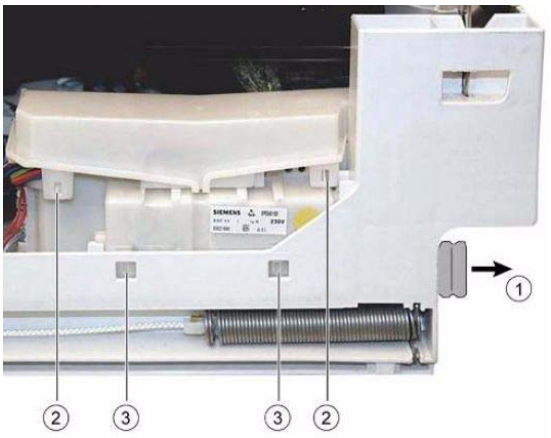


1 TH401 = Water diverter
2 TH403 = Reserve
3 TH404 = Heat exchanger drain valve
4 TH405 = Regeneration valve 11 K303 = heater
5 TH402 = Filling valve 12 K301 = heater
6 K201 = Circulation pump change-over relay
7 K202 = Discharge pump change-over relay
8 T412 = Dispenser coil
9 Varistor, excessive voltage protection
10 K304 = Starting current limiter

6.3 Removing the Power Module

This is only possible if the right-hand side panel has been removed

1. Disconnect the mains lead from the appliance
2. Release the catches on the splash guard cover and disengage the cover to the back - top.
3. Remove the catches and take out the module towards the top.
4. Disconnect all the cable contact plugs of the cable harness from the power module.



Assembly

Assembly is carried out in reverse order. The power module must be heard when it engages into the base pan.

Instal the splash guard cover again.

The plugs are coded.

6.4 Opening the Rinsing Cavity

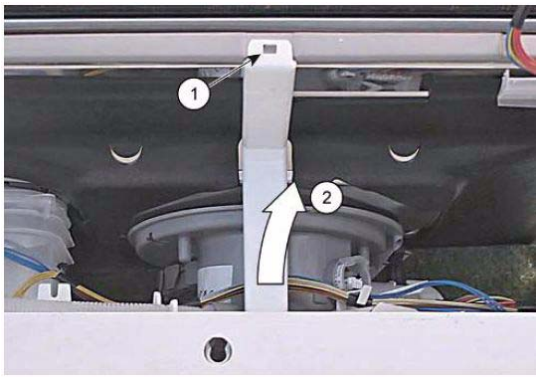
The rinsing cavity must be completely folded off the base pan for the following work to be carried out:

- Replacing the water softening equipment
- Replacing the pump cavity
- Replacing the heater pump
- Replacing the water diverter

provided that the worktop has been removed (optional)
the side panels have been removed
the outer door has been removed
the power module has been removed

1. Remove the flow-off channel.

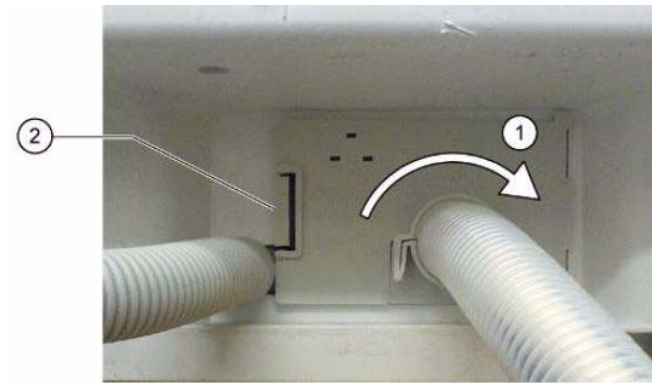
1. Release from the top catch.
2. Remove from the bottom guide and fold down to the side.



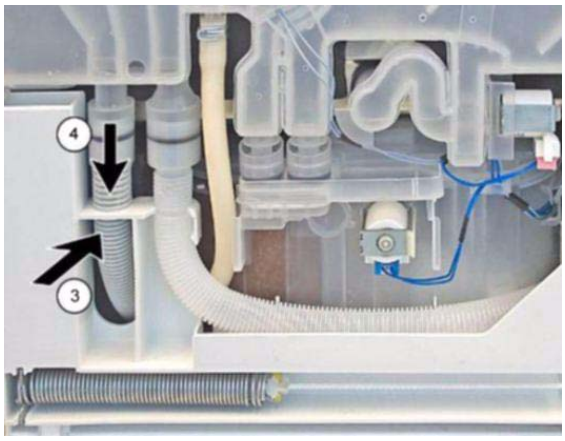
2. Remove the discharge hose.

This is only possible if the left side panel has been removed

1. Release the catch on the panel.
2. Fold out the panel.



3. Press the discharge hose to the back out of the holder.
4. Pull it downwards off the heat exchanger.

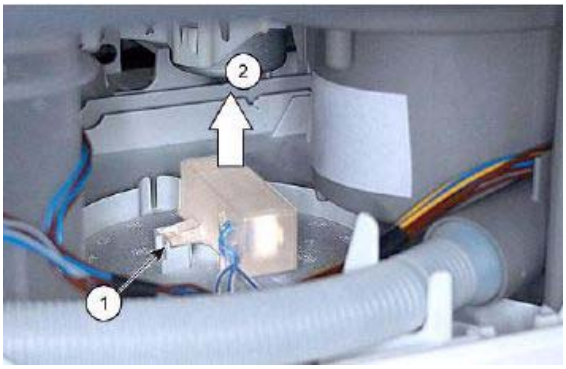


Installation

Installation is carried out in reverseorder.

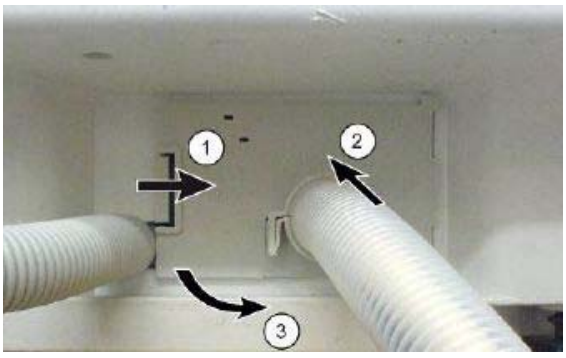
3. Remove the float switch safety system.

1. Release the catches.
2. Pull the switch off upwards.



4. Open the duct for the supply hose.

1. Release the catch on the panel.
2. Fold out the panel and
3. press the hose guide at a slight angle into the base pan. There is more space when the container is removed.



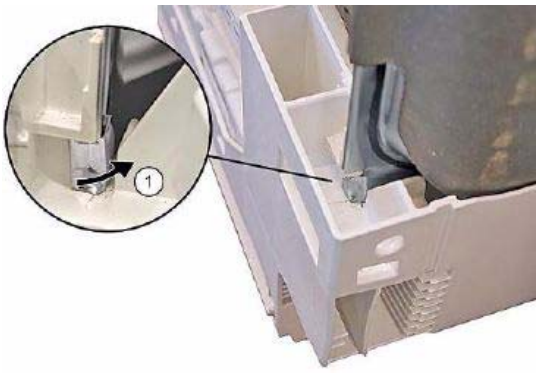
5. Remove the power module.

See the section on replacing the power module.

6. Release the container catch.

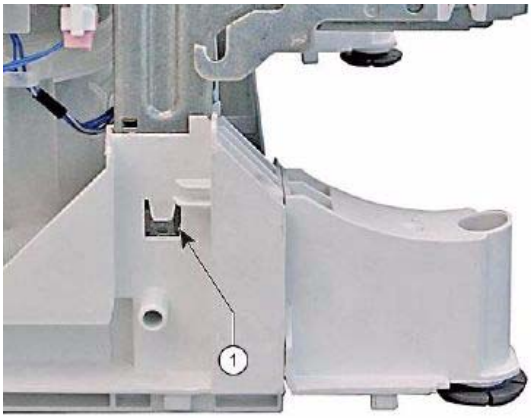
The rinsing container is held in the guides of the basic support and is engaged into the guides at the back and the front.

The rinsing container is fastened with metal clamps on the left and the right at the back. These are bent around a plastic clamp in the base pan.



- Bend the metal clamps straight with a screwdriver (1).

- Use a screwdriver to take the hinge plates out of the catch upwards at the side of the front. To do so bend the catch of the hinge plates to the inside (1).



7. Open up the rinsing cavity.

Please note!

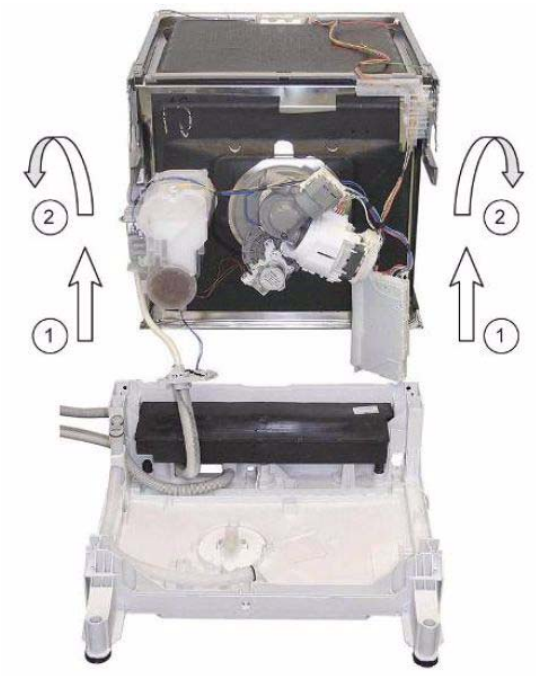
Close the salt box!

It is essential to check that the cover of the salt box is screwed closed so that no salt solution escapes when the container is folded down!

Protect the supporting surface for the rinsing cavity against scratches.

The container is firmly seated in the guides and can only be removed with a little force. The appliance can be laid on its back and the base pan carefully removed for easier handling.

For floor-mounted appliances it must be ensured that the weight does not drop out of the base pan.



1. Lift the rinsing cavity carefully up to the top.
2. Lay the rinsing cavity down towards the back.
   When the appliance is lying on its back and the base pan removed, it must be ensured that the weight does not fall out in the case of floor-mounted appliances.

Container components

In this condition the following components/assemblies that are fastened to the container can be replaced.

1. Cable harness
2. Heater pump
3. Power module (not fastened to the container)
4. Water diverter with the motor and the pulse generator
5. Water softener
6. Pump cavity

6.5 Positioning the Rinsing Cavity

1. Carefully fold the rinsing cavity down towards the front.

2. Insert it into the guides.

Please note!

Make sure that it is properly positioned!

Make sure that the weight is properly installed for floor-mounted appliances.

If the heat exchanger is installed on the rinsing cavity, the joints of the hose connections must be clean.

Do not crush the supply and discharge hoses.

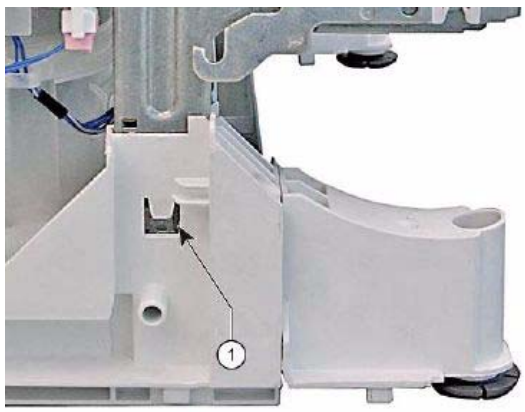
Push the softening equipment into the guides.

Make sure that the power module is not jammed.

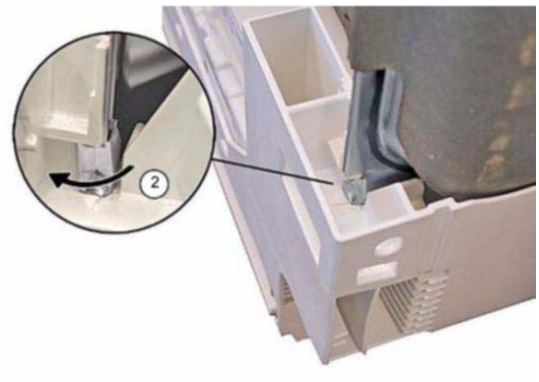
Protect the cable harness from being crushed.

3. Secure the container catches.

1. Bend the catches of the hinge plate outwards with a screwdriver.



2. Bend the metal clamps with a screwdriver.



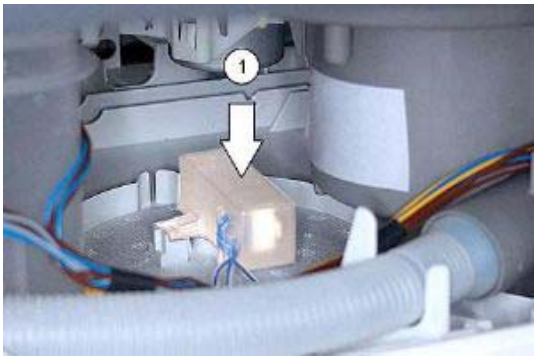
4. Instal the supply hose.

Remove the hose duct from the base pan.

1. Release the catch on the panel.
2. Fold out the panel.

5. Instal the float switch safety system.

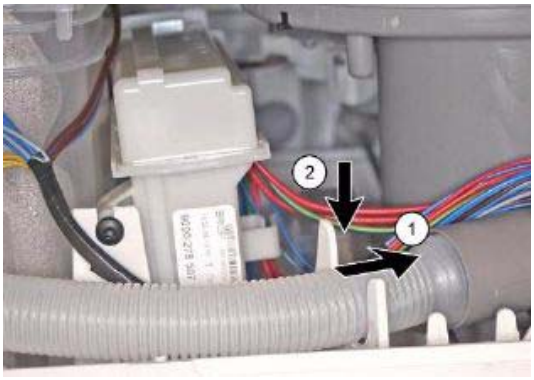
1. Press the float switch into the catch in the bottom plate.



6. Mount the discharge hose.

1. Push the discharge hose into the pump cavity,
2. Press the soft discharge hose into the fixture.

7. Install the power module and engage it.



Visual inspection!

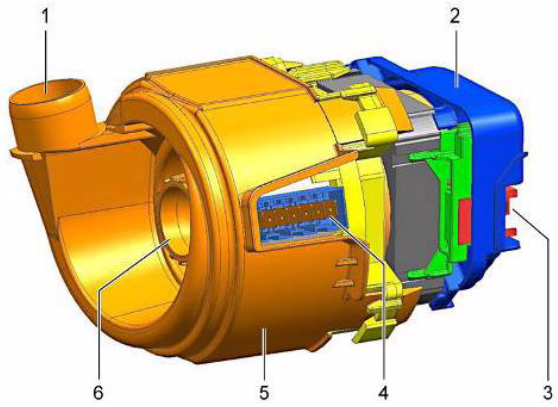
You will finally need to carry out a visual inspection to make sure that no components, cables or hoses have been jammed or improperly engaged!

6.6 Heater Pump

The heater pump comprises a heater, temperature sensors and a circulation pump in a casing.

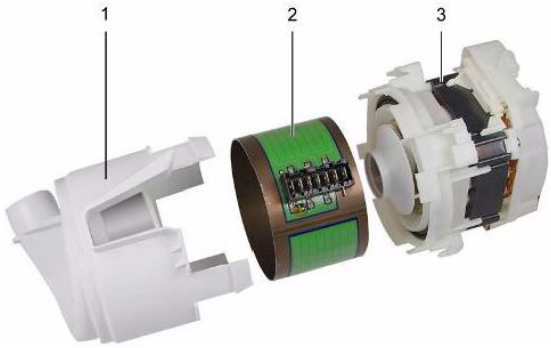
6.6.1 Structure of the heater pump

1 Pressure joint
2 Circulation pump motor
3 Circulation pump motor connection
4 Heater connection
5 Casing coverl
6 Intake socket



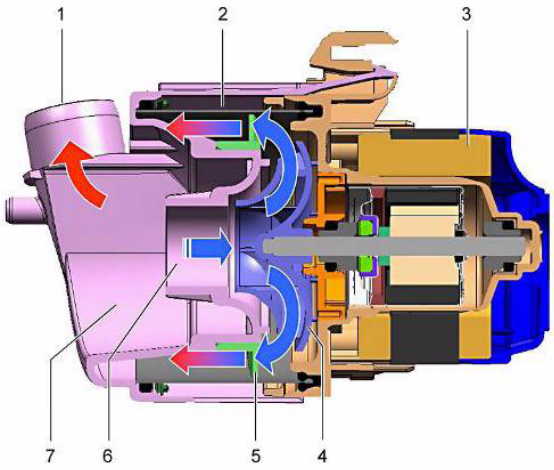
6.6.2 Structure of the pump casing

1 Pump casing with an integrated temperature shield made of metal
2 Heating tube with NTCs
3 BLDC motor



6.6.3 Structure of the circulation pump

1 Pressure joint
2 Heating tube with NTCs
3 BLDC motor
4 Pump wheel
5 Guiding wheel
6 Intake socket
7 Pump housing with air intake and pressure joint



6.6.4 Functioning of the circulation pump

Water is drawn in through the intake socket. The guide wheel leads the water smoothly through the heating tube. The water is pumped across the pressure joint to the water diverter.

The brushless DC motor (BLDC) signals different water circulation states to the power electronics unit via the power consumption of the individual windings.

- No water
- Too little water
- Sufficient water
- Pump blockage

Safety-relevant conditions, such as “heating without water” or “water temperature too high”, are recognised and analysed for heating operation.

A pump blockage will be recognised by the electronics unit. The pump will attempt to solve the blockage with brief stuttering pump activities.

If this does not help the current programme will be discontinued. A corresponding error code is stored in the error memory.

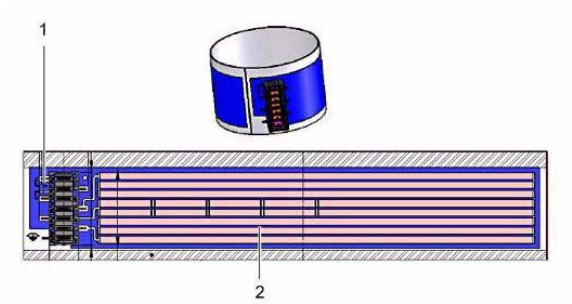
6.6.5 Structure of the heater

The heater tracks are installed on a metal pipe with a special coating. The connections and two NTCs are integrated in the heater tracks.

The heating tube itself cannot be replaced.

1 NTCs

2 Heater tracks



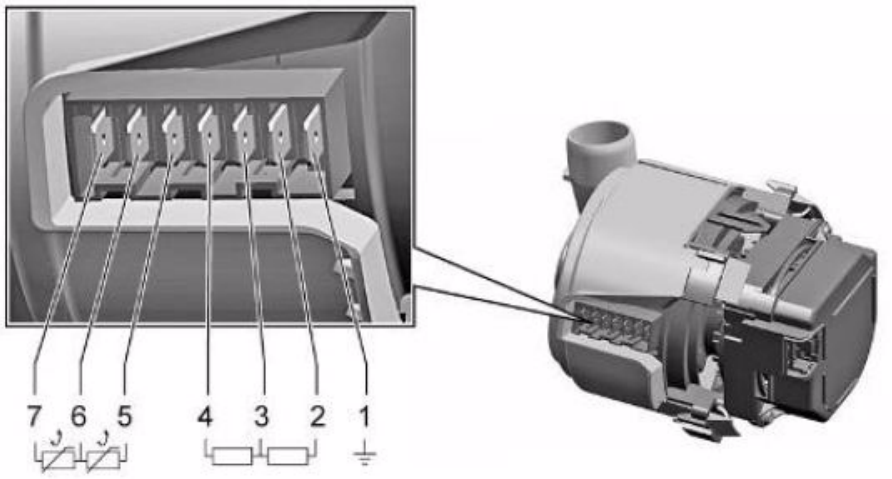
6.6.6 Functioning of the heater / NTCs

The water temperature is measured with the NTCs.

In the heating mode the electronics unit recognises which temperature increase is taking place.

The heater is to heat the water by 2.5 °C/min. If the dishwasher is connected to a warm water connection or a solar system, the heater will be switched off at a water intake temperature of > 75 °C.

6.6.7 Checking the heater pump



Measuring the heater resistance

The heater resistance is measured on the heater contacts of the heater pump.

Readings for an intact heater:

Contact 2 - 3	about 10.5 Ω
Contact 3 - 4	about 10.5 Ω
Contact 2 - 4	approx. 21 ± 2 Ω

Measuring NTC resistance

The NTC resistance is measured on the heater contacts of the heater pump.

Readings for intact NTCs and 25 °C.

Contact 5 - 6	approx. 10 kΩ ± 500 Ω
Contact 6 - 7	approx. 10 kΩ ± 500 Ω
Contact 5 - 7	approx. 20 Ω
Measured at 25 °C	

Resistance measurement of the NTCs

The NTC measurement must result in a symmetrical reading.

6.6.8 Heating capacity insufficient

The water is to be heated by 2.5 °C/min. If it is heated up more slowly, the water hardness and the setting of the softening equipment must be checked. It is possible that deposits have built up on the heater.

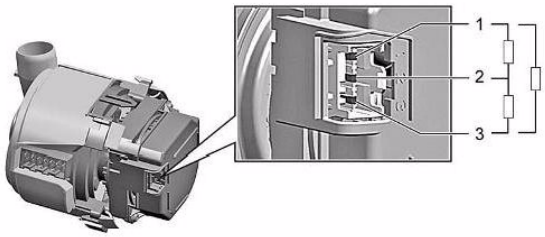
Clean the dishwasher with a suitable cleaning agent and descale if necessary. The Küppersbusch Customer Service descaler is to be used.

Measure the winding resistance of the BLDC motor.

Measure the winding resistance on the winding contacts.

Resistance: approx. 41.5 Ω ± 4 Ω or approx. 53.5 Ω ± 4.5 Ω depending on the manufacturer.

Resistance readings are approximate readings. Results must be symmetrical.



6.6.9 Removing the heater pump

This is only possible if the rinsing cavity is opened up.

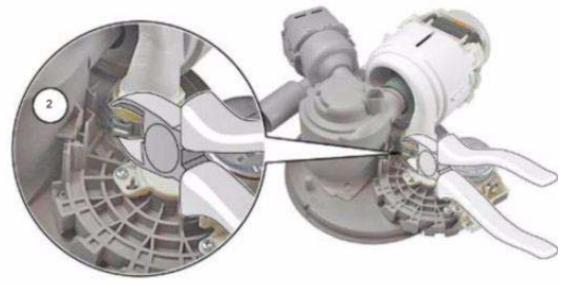
Please note!

Do not open the heater pump!

The heater pump can only be replaced as a whole component. Spare parts are not available.

1. Remove the rubber support between the pump unit and the pump cavity.

2. Remove the hose clamp on the connection to the water diverter with a side cutter.



3. Carefully pull out/turn the heater pump upwards out of the hose to the water diverter.
4. Pull the heaer pump backwards, turning it slightly.

6.6.10 Installing the heater pump

Please note!

Moisten the rubber sealing on the inside with rinse aid.

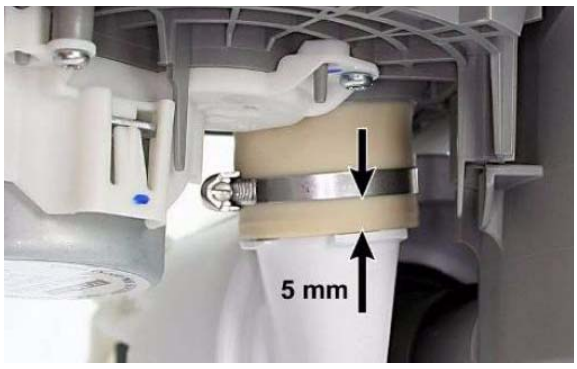
1. Push the heater pumo out of the pump cavity and

2. press the discharge channel into the water diverter.

Discharge pump gasket

The gasket of the intake duct is to be fitted tightly into the heater pump housing after replacement.

- Tighten the hose clamp as shown.
  Hose clamp is required for reinstalling. This is supplied with the water diverter, pump cavity and heater pump spare parts (set).

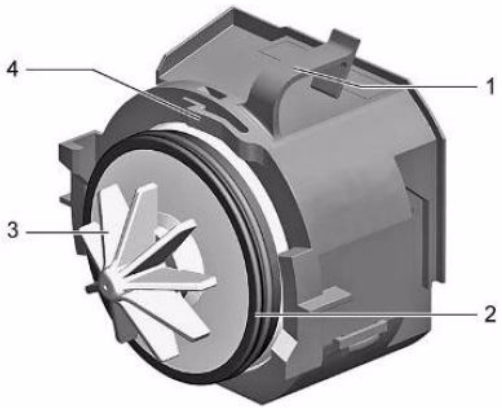


6.6.11 Cleaning the heater pump

The heater pump may only be cleaned from the outside. If it is opened, no guarantee can be given that it will be impermeable when it is closed again.

6.7 Discharge Pump

Water is drawn in through the water dischanrge opening in the pump cavity. The impeller wheel pumps the water through the non-return valve into the discharge hose.



1 Catch

2 Seal

3 Impeller wheel

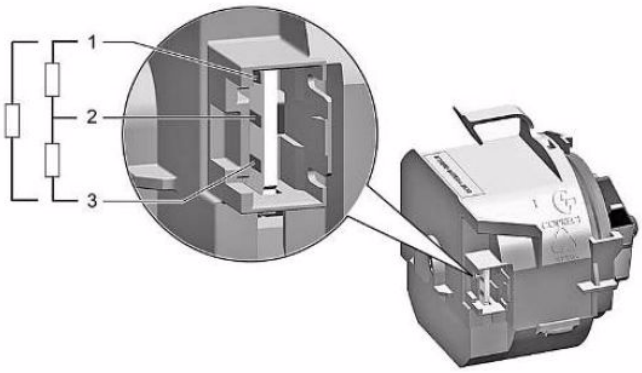
4 Cable holder

The brushless DC motor (BLDC) signals different states to the power electronics unit for discharge pumping via the power consumption of the individual windings.

- No water, idle state
- Too little water
  Water will no longer be pumped off if there is too little water in the pumping section.
- No build-up of pressure
  If the cover of the pump cavity is not present it will not be possible to build up water pressure. An error code will be stored in the electronics unit.
- Pump blockage
  A pump blockage will be recognised by the electronics unit. The pump will attempt to solve the blockage with brief stuttering pump activities.
- Blocked or bent discharge
  Water will no longer be pumped off if the discharge is blocked or if the discharge hose is kinked. An error code will be stored in the electronics unit.

6.7.1 Checking the discharge pump

Identification is made by means of the power consumption of the pump in the idling mode and the various charge states.



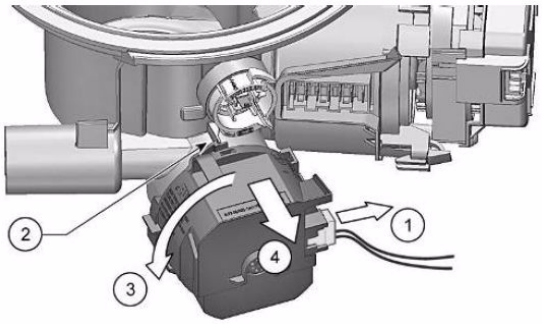
1. Measure the winding resistance of the BLDC motor

2. Measure the winding resistance on the winding contacts of the discharge pump.

Resistance: approx 82 Ω ± 8 Ω

Resistance readings are approximate readings. Results must be symmetrical.

6.7.2 Removing the discharge pump



This is only possible if the base panel and the sheet metal have been removed - water has been drained off.

1. Pull out the plug.
2. Pull the engaging lever of the discharge pump to the front.
3. Turn the discharge pump clockwise.
4. Remove the pump from the pump cavity towards the front.

Base pan

Some force may be needed to dismount the discharge pump, depending on the base pan model.

Installation

Installation is carried out in reverse order.

6.8 Sieve System

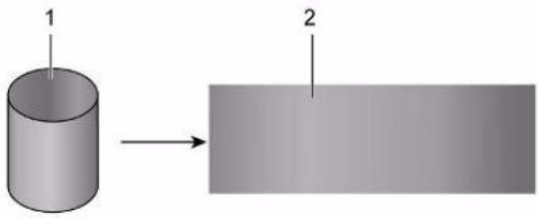
The 3-stage sieve system has been designed to prevent particles of dirt from getting into the rinse cycle and impairing pump operation or the spray system.

1 Fine sieve cylinder, rolled

2 Horizontal sieve

3 Coarse sieve

6.8.1 Fine sieve cylinder



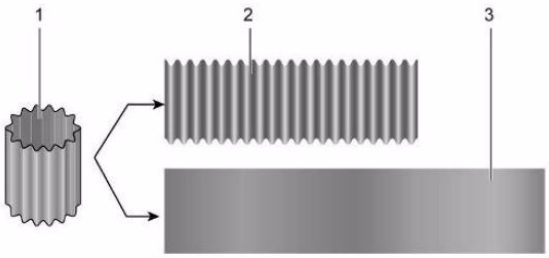
Conventional fine sieve systems are based on a round cylinder shape. When the cylinder is rolled out the filtering surface is shown.

1 Fine sieve cylinder, rolled

2 Fine sieve cylinder unrolled

The new fine filter system is based on a corrugated fine filter system.

When this filter is unrolled, a 1.5-fold filtering surface is shown.



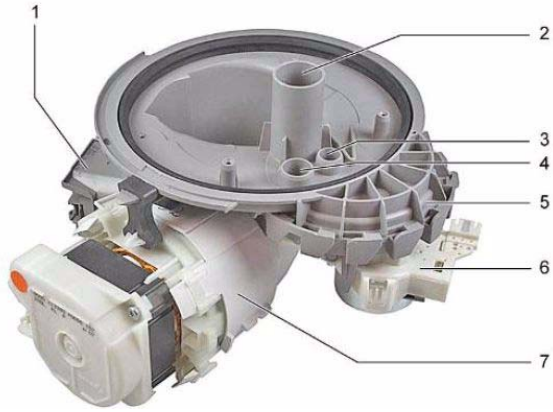
1 Corrugated fine sieve cylinder, rolled

2 Fine sieve cylinder, unrolled

3 Fine sieve cylinder, unrolled

6.9 Pump Cavity

This shows the pump cavity and all the attachments.



1 Discharge pump

2 Lower spray arm connection

3 Ceiling centrifugal arm water intake pipe connection

4 Top spray arm intake pipe connection

5 Water diverter

6 Water diverter motor with a pulse generator

7 Heater pump

1 Aqua sensor

2 Discharge pump cover

3 Intake cover

A non-return valve has been fitted into the hose connection of the pump cavity. This prevents dirty water from flowing back into the pump cavity.

Covers in the pump cavity

The intake cover ensures optimal intake and flow properties of the pump. No air and no dirt are taken in. This cover should not be removed by the customer.

The cover of the discharge pump serves to channel the water. The discharge pump would not be able to build up pressure without the cover. Customers can remove the cover of the discharge pump for cleaning purposes. The pump will not operate if it is not properly engaged.

6.9.1 Removing the pump cavity

Risk of injury! Cuts on sharp edges!
Use protective gloves.
The metal edge on the opening for the pump cavity may be sharp!

Removing

Preconditions: - Rinsing cavity opened up
- Heater pump dismounted
- Water diverter dismounted
- Discharge pump dismounted
- Intake pipe dismounted

Remove the four screws (1 to 4) in the inner container and take the pump cavity out towards the bottom.

Installation

1. Make sure that the gasket is correctly positioned! Coat it with a little promol or rinse aid.
2. Place the pump cavity from below onto the container so that it is straight and not tilted.
3. Put the screws in in the following sequence and tighten them:
    1. Back right
    2. Back left
    3. Front left
    4. Front right

Note: The sequence for the screws must be observed. Leaks may occur.

7. Functions

This section describes the individual functions, explains the corresponding components and how they are to be installed and removed.

7.1 Safety System

Should functional defects in the dishwasher control system or in the structural elements occur, resulting in an over-filling of the machine, the valve combination will be closed by means of the safety system, thus blocking off the water supply.

The safety system is based on an “active” system.

The electronics unit permanently monitors the safety switch in the base pan, even when the dishwasher is switched off. If water gets into the base pan, the safety switch will be activated and the dishwasher will switch on.

The electronics unit recognises that the dishwasher has been switched on via the safety system and immediately activates the discharge pump mode. The acqua stop valve is deactivated.

Error code E 15 or a flashing tap LED show the customer that there is a fault.

The dishwasher will not be able to be operated until

- the cause has been rectified and no more water is in the base pan;
- the appliance has been disconnected from the mains.

If leaking water gets into the base pan via the rinsing cavity and the flow-off channel, further overflowing can be prevented if the discharge pump is switched on.

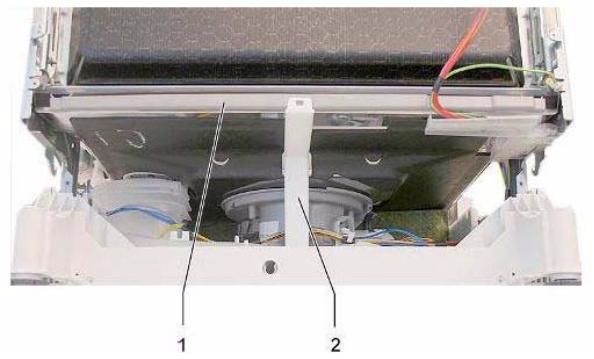
If the supply hose is faulty, water will get into the base pan direct through the outer hose (leak water hose). The aqua stop valve will be deactivated.

7.1.1 Safety system components

- Flow-off channel and discharge channel
- Base pan safety switch
- Aqua stop valve
- Smart electronics unit

Flow-off channel and discharge channel

Leaking water is specifically lead from the container into the flow-off channel and through the discharge channel into the base pan.

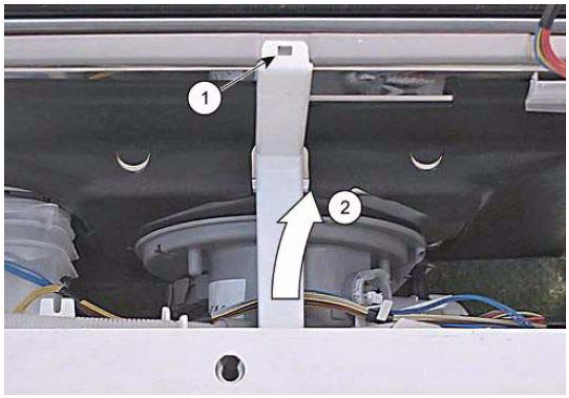


1 Flow-off channel

2 Discharge channel

Removing the flow-off channel

1. Release from the top catch.
2. Remove from the bottom guide and fold down to the side.

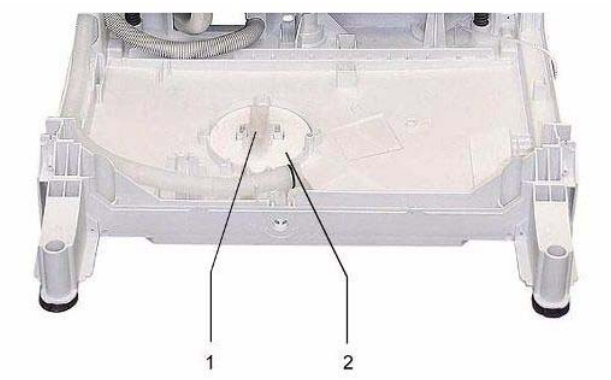


Base pan safety switch

The safety switch is mechanically connected to the styrofoam float.

1 Safety switch

2 Styrofoam float



7.2 Aquastop valve

The aquastop valve is an electromechanical safety valve. The coarse and the fine sieve are located at the screw connection to the water tap. The flow limiter is located below the sieves.

The aquastop valve is enclosed by a housing. A leaking water hose (outer hose -> sheath of the supply hose) into the base pan.

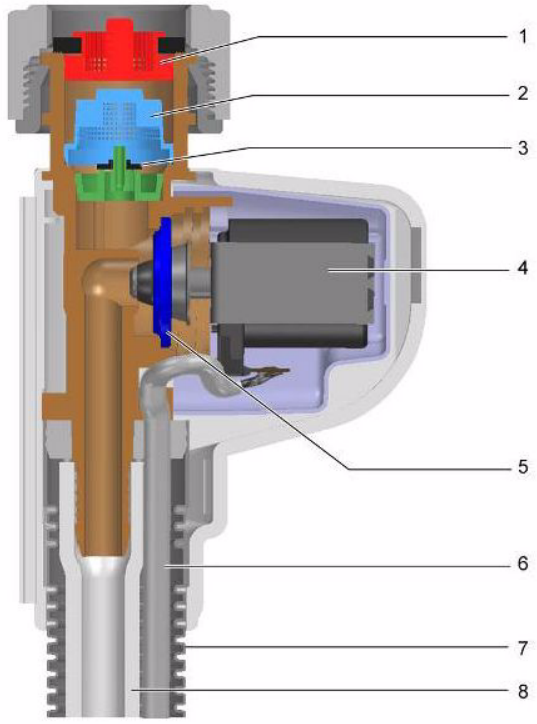
The supply hose and the electrical control line for the solenoid valve are located in the leaking water hose.

7.2.1 Functioning

Leaks which occur in the region of the valve or the supply hose are led into the base pan through the leaking water hose.

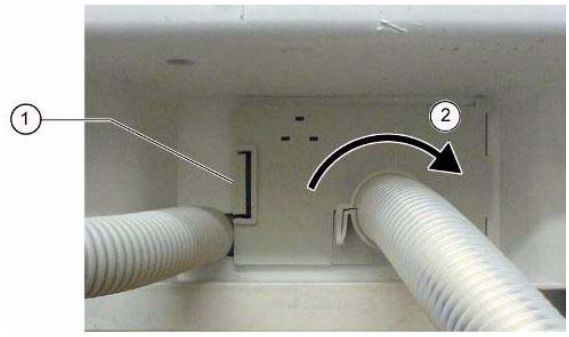
A styrofoam float triggers a microswitch to activate the electronic safety system. The coil of the aqua stop valve is deactivated by the electronics unit and stops water from flowing into the dishwasher.

1 Coarse sieve
2 Fine sieve
3 Flow limiter
4 Coil
5 Seal
6 Control pipe
7 Leaking water hose
8 Pressure hose water intake



7.2.2 Checking the Aquastop valve electrically

1. Release the catch.
2. Fold the panel with the supply hose outwards.



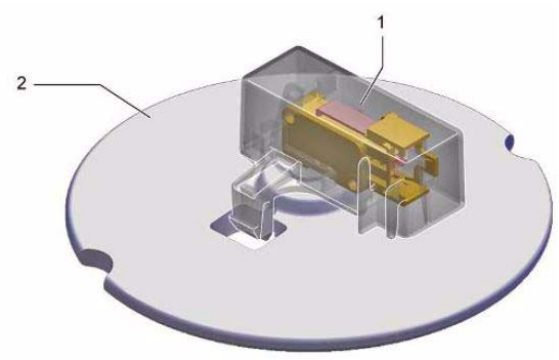
3. Disconnect the plug connection and measure the resistance.

Technical data

Nominal voltage	230-240 V
Frequency	50 / 60 Hz
Resistance	4.2 kΩ ± 1 kΩ

7.3 Float System

A movable styrofoam disc has been let down into the base pan. Styrofoam is lighter than water, so that it floats. The styrofoam disc is mechanically connected to the safety switch. If water gets into the base pan the styrofaom disc floats to the top and activates the safety switch.



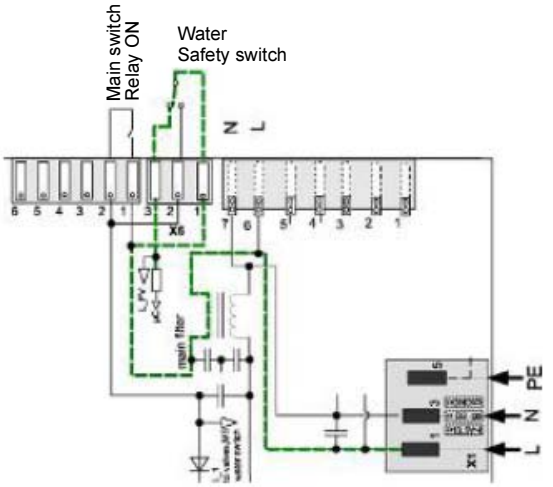
1 Safety switch

2 Styrofoam float

7.3.1 Functioning

The safety switch is a selector switch. The power module activates the switching contact with a mains power supply lead.

This signal is reported back to the electronics unit when the dishwasher is in the idle mode.

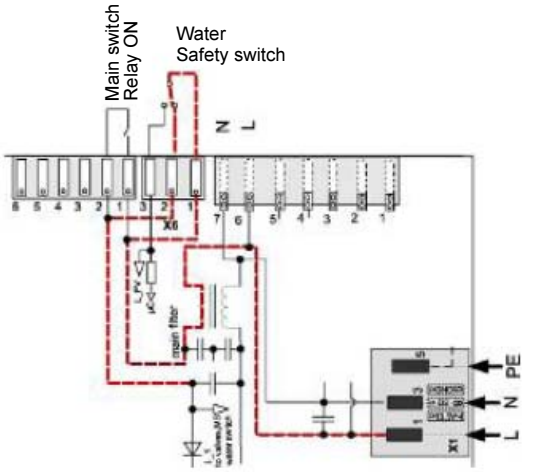


Idle mode signal path

When the safety switch is activated, the mains power supply signal reaches a differerent electronics unit contact.

This bypasses the main switch.

The electronics unit recognises that the dishwasher has been switched on with the safety switch and immediately begins to pump off water.



Active safety system signal path

7.4 Dispensing device

The cover is closed once the reservoir has been filled with rinse aid. The reservoir remains closed until it is opened again manually.

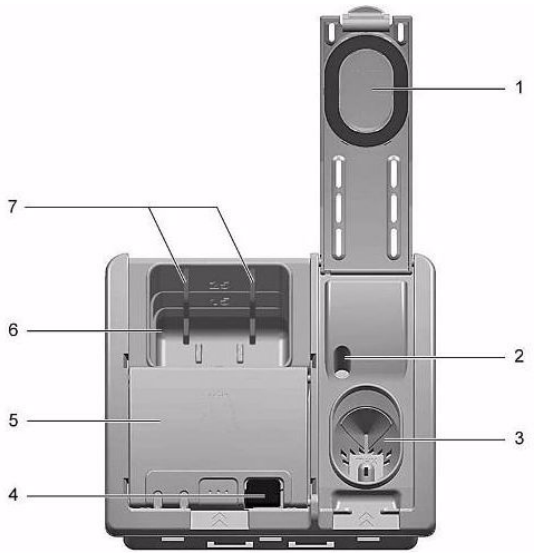
The detergent dispenser is mechanically opened in the corresponding rinsing stage. Power detergent gets into the rinsing cavity. Tabs fall into the moulded handle (dispensing assistant).

1 Coil

2 Armature with a switching mechanism

3 Dosing pump

4 Rinse aid refill sensor



1 Rinse aid reservoir and gasket

2 Rinse aid outlet

3 Rinse aid filling opening

4 Detergent flap closing button

5 Detergent dispenser cover

6 Detergent dispenser

7 Plastic spacers

7.4.1 Functioning

The trigger mechanism for the detegent cover is activated with a coil. The coil is activated by a pulse from the power electronics unit.

The armature is moved to the left when the coil is activated. The armature is connected to the detergent cover unlatching lever. Turning the release lever unlocks the detergent cover and it snaps open.

A switch mechanism is located between the coil armature and the rinse aid valve. This prevents rinse aid from being dispensed on initial activation.

Once the detergent cover has been opened the mechanism will switch over, similar to the “mechanism of a ball point pen”. The dosing pump for rinse aid is activated now instead of the detergent cover.

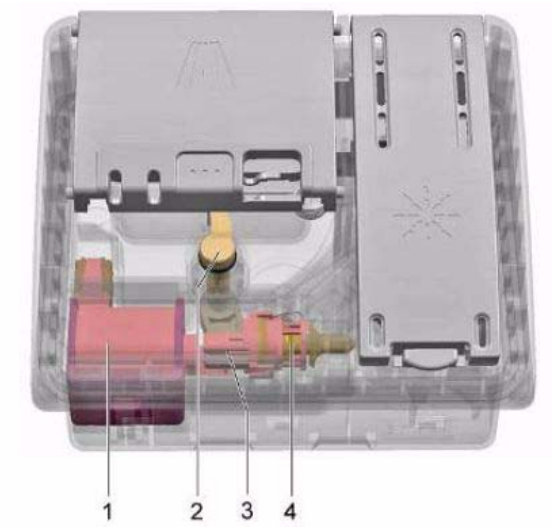
1 ml of rinse aid is added for each pulse. The setting for rinse aid matches the pulses and the amount dispensed.

A ventilation system balances the pressure in the dispenser.

When the dishwasher door is opened, the trigger mechanism will “reset”. This ensures that the detergent cover is opened first when the coil is next activated.

If moisture remains in the detergent box and if a detergent tab is then put into the box, the tab will begin to dissolve slowly.

Two plastic spacers in the box prevent detergent from “sticking” onto the casing.



1 Coil

2 Unlatching lever

3 Armature with a switching mechanism

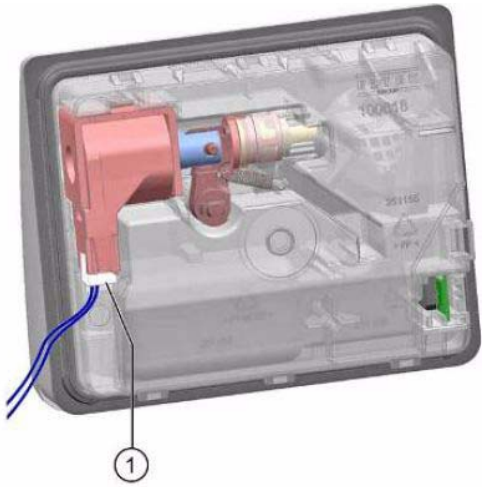
4 Dosing pump

7.4.2 Checking the dispenser electrically

This is only possible if the outer door has been removed.

Measuring the coil

1. Disconnect the cable connection.
2. Measure the resistance on the coil.



Technical Data:

Coil pulse voltage:	195-254 V
Frequency:	50/60 Hz
Resistance:	11 kΩ ± 1,5 kΩ
Rinse aid fill quantity:	80 ml
Rinse aid quantity for settings 1-6	1 ml for each setting

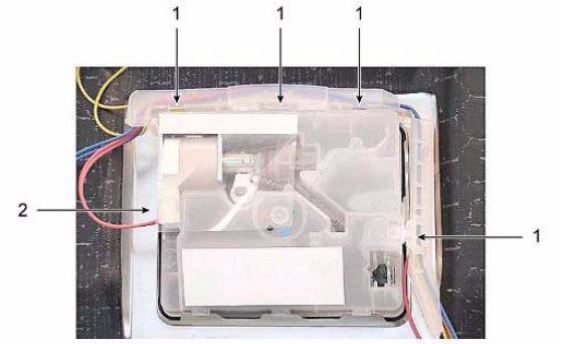
7.4.3 Replacing the dispenser

This is only possible if the outer door or the fascia have been removed.

Removing

1. Take the cable channel out of the catches.
2. Disconnect the plug connection.

Cuts on sharp edges:
Use protective gloves.



Removal 2

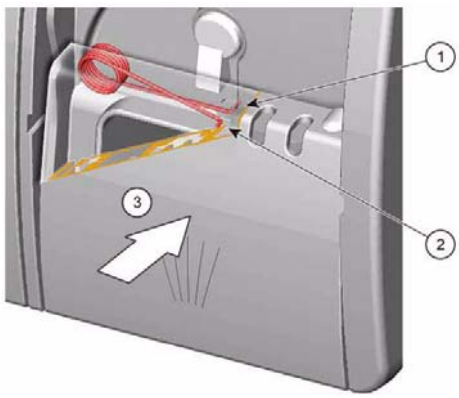
1. Carefully bend the metal clamps away from the dispenser.
2. Press the dispenser carefully to the inside, making sure that it does not fall into the dishwasher.

Installation

1. Before installing the dispenser bend the metal clamps back to their original position.
2. Engage the dispenser evenly into the door, making sure that all 8 catches have engaged.
3. Mount the cable guide.
4. Restore the plug connection.

7.4.4 Mounting the detergent cover

1. Suspend a spring by the long end into the dispenser.
2. Suspend the short end of the spring in the dispenser cover.
3. Press the cover into the dispenser.



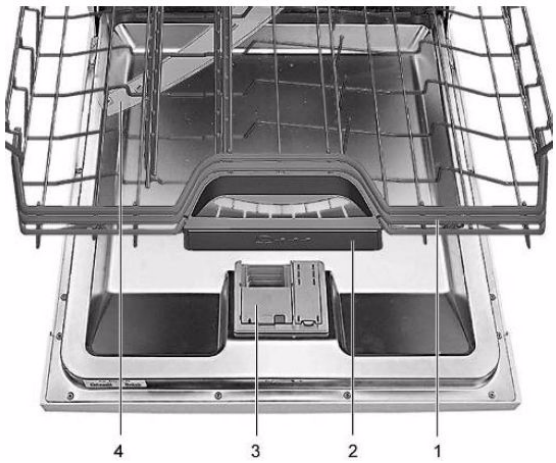
7.4.5 Dispensing assistant

The dispensing assistant is made up of interaction between the arrangement of the dispenser and the moulded handle in the top basket.

The dispenser is in the middle of the door on the top surface.

The moulded handle of the tab drawer is located on the top basket. The tab falls into the mould. The top basket spray arm sprays this direct from the bottom so that the tab dissolves.

The bottom basket can no longer be pulled over the dispenser when it is pulled out. Scraps of food can no longer fall into the detergent dispenser and block it.



1 Top basket
2 Moulded handle
3 Dispenser
4 Top basket spray arm

7.5 Aqua Sensor (Optional)

Caution
No aqua sensor installed!

Some of the dishwashers are supplied without an aqua sensor. The electronics unit nevertheless checks for an aqua sensor and stores an error message.

An infrared diode and a photo diode are arranged opposite in a U-shaped transparent casing on a circuit board.

The infrared diode transmits its infrared light through the rinse water flowing in the U-shaped casing. Depending on the level of clouding, the light-sensitive basis of the photo diode becomes conductive.

Readings are analysed by turbidity levels. They are stored in the electronics unit. The aqua sensor operates in the pre-rinse and rinsing cycles and at the end of the rinsing cycle. The result of the aqua sensor analysis influences the procedure of rinsing cycles and water-exchange intervals.

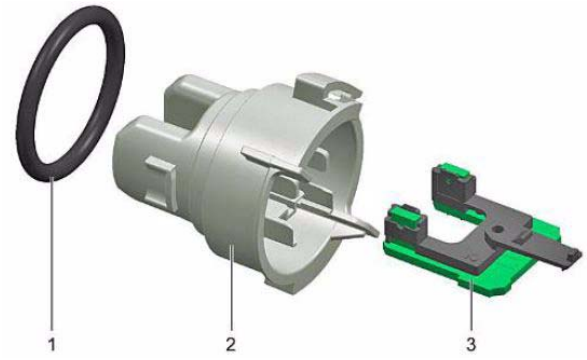
A wide variety of programme structures are possible in the automatic programme.

The aqua sensor is calibrated during each programme sequence in which it is active. If calibration is defective, an error is written in the error memory of the power electronic module. The reading is adjusted to “turbid” and a maximum programme sequence is run.

1 Seal

2 Housing

3 Circuit board with a light barrier

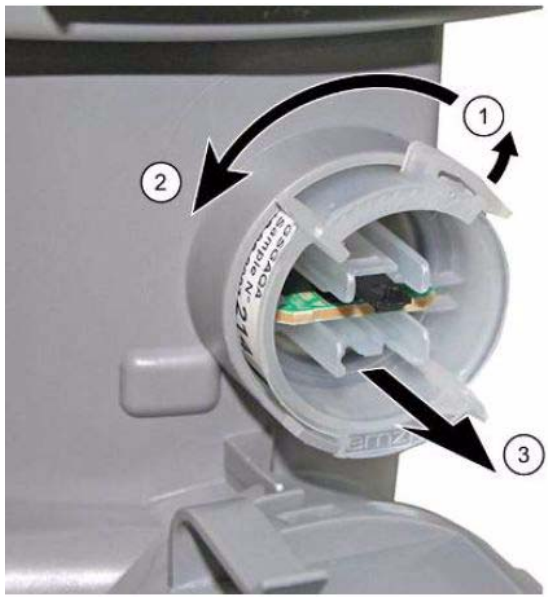


7.5.1 Replacing the aqua sensor

This is only possible if the base panel and the base sheet have been removed

Removing

1. Release the catch.
2. Turn the aqua sensor housing anti-clockwise by 90°.
3. Pull it out to the front.

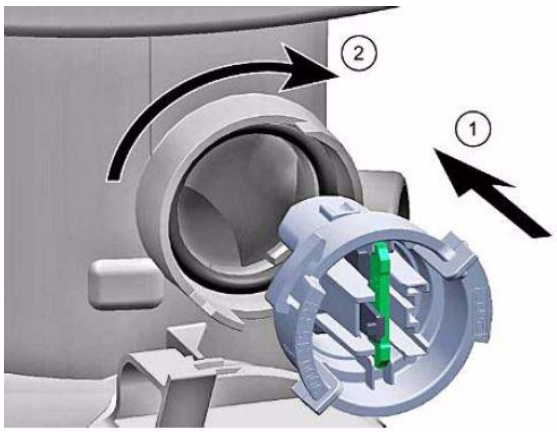


Installation

Insert the circuit board and engage it.

1. Press the aqua sensor with the circuit board upright into the pump cavity.
2. Turn clockwise by 90° and engage.

Note: Gasket
The gasket can be coated with Promol or rinse aid to make it easier to turn the aqua sensor.

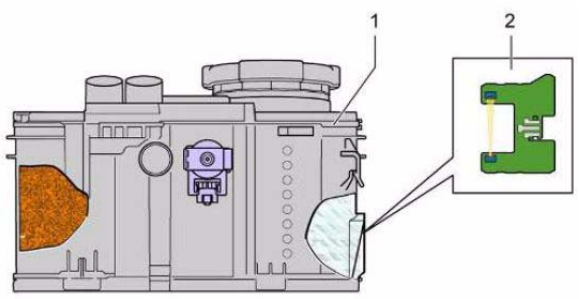


7.6 Salt refill identification

The circuit board for salt refill identification is fastened to the right-hand side of the softening equipment (front of the diswasher) with catches.

1 Water softening equipment

2 Circuit board with a light barrier



A light barrier identifies the level of salt. If the regenerating salt level becomes too low, the light barrier sequence is released and the electronics unit identifies “refill with salt”.

When the salt refill display lights up there is still enough salt in the dishwasher for a few regeneration cycles.

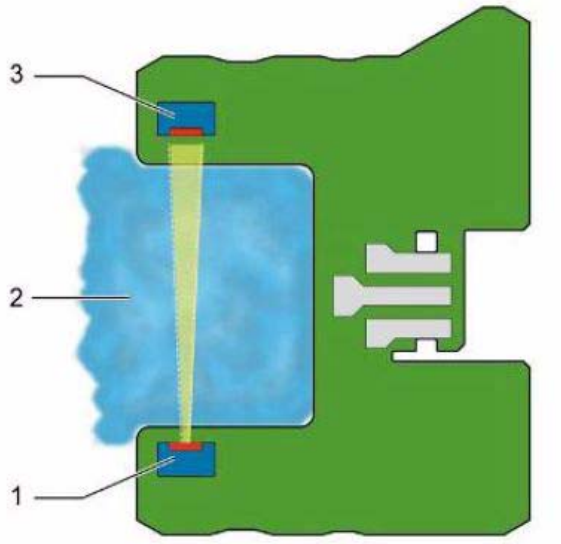
With this principle it is not necessary to fill the salt box with water when the diswasher is put into operation.

The system does not recognise salt tabs that are filled in.

1 Photo diode

2 Regenerating salt

3 Transmitting LED



7.7 Visual clear rinse fill-up sensor

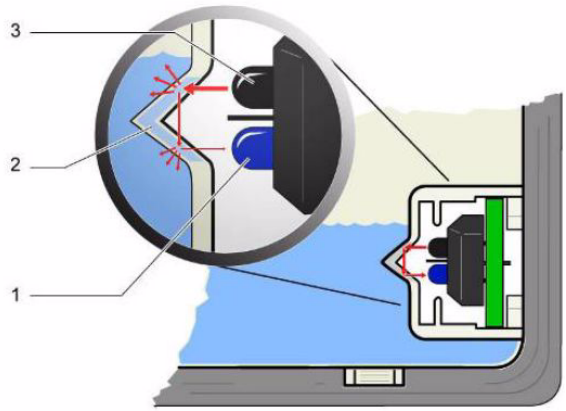
The visual rinse aid fill-up sensor comprises a transmission and a receiving diode.

The transmission diode sends a light beam to the receiving diode via a prism. If the reservoir is filled up, the light beam will be dispersed in the prism. The signal received is weaker than the signal transmitted.

1 Receiving diode

2 Prism

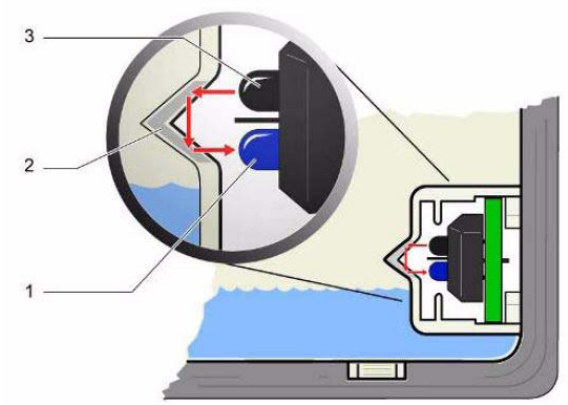
3 Transmitting diode



If the reservoir is empty the light beam will be reflected in the prism.

The signal received is the same as the signal transmitted.

The power electronics unit will evaluate the signal received and will display it.



1 Receiving diode

2 Prism

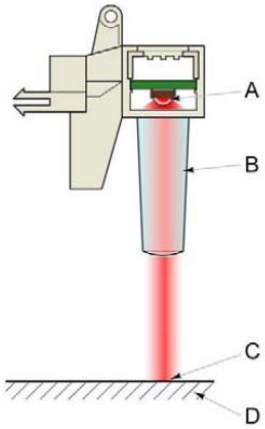
3 Transmitting diode

7.8 Info Light (Optional)

The fully-integratable models are fitted with a program status display (info light) which is visible from the outside and provides users with additional information.

The info light comprises an LED (A) and a fibre optic cable (B). The fibre optic cable focuses the light which is projected as a spot of red light (C) on the background (D) in front of the dishwasher while the programme is in operation.

The info light is fastened on the hinge plate between the inner door and the outer door and is regulated by the module.

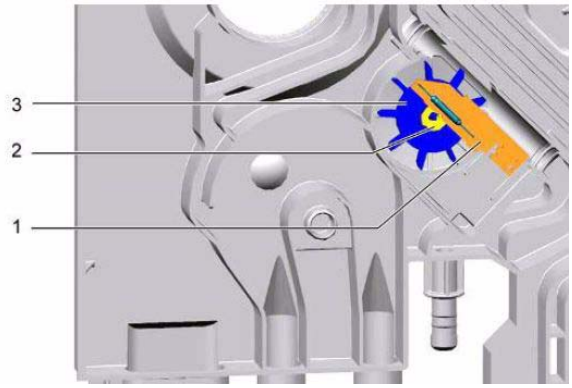


7.9 Flow Sensor

7.9.1 Functioning

The flow sensor (impeller metre) is installed in the water channel of the heat exchanger. The impeller is turned when water flows through the channel.

A small permanent magnet installed on the impeller activates the two solenoid-operated switch contacts (Reed switch). This results in electric pulses. These pulses are counted by the electronics unit. The electronics unit uses the pulses to calculate the amount of water that flows into the dishwasher.



1 Circuit board with a Reed contact switch

2 Permanent magnet

3 Impeller wheel

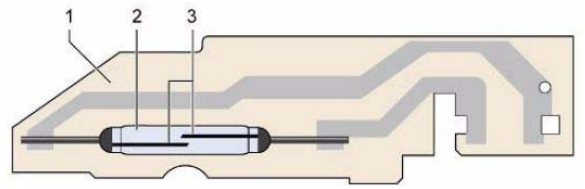
7.9.2 Structure of the mechanical Reed contact

Reed contact switches activate or cut off electric circuits. They comprise contact studs melted into a glass envelope hermetically sealed with vacuum or inert gas; they form both the contact spring and the armature. The name originates from the reed of wooden wind music instruments which are similar to the moving contacts. The contacts are made of ferromagnetic material plated with a thin layer of precious metal (e.g. soft iron). The contacts are activated by a magnetic field from the outside which is generated electrically by a permanent magnet installed close by or in a corresponding solenoid. The magnetic field attracts the two contacts thus closing the electric circuit. As soon as the magnetic field weakens or falls below a specific level, the contact opens again due to the spring effect. Reed contact switches are very sensitive to mechanical effects such as distortion.

1 Circuit board with a Reed contact switch

2 Glass envelope

3 Contact studs

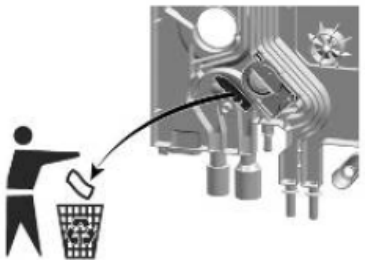


7.9.3 Replacing the flow sensor

This is only possible if the side panel on the left is removed.

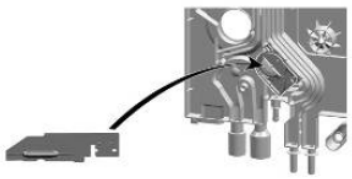
Risk of breakage! Do not bend or kink circuit boards with a flow sensor in a glass envelope! Very sensitive component!

1. Carefully bend the plastic flap on the heat exchanger outwards.
2. Disconnect the plug connection.
3. Remove the whole circuit board and the flow sensor from the catches.



4. Unpack the new flow sensor, take the circuit board out of the transport securing device and dispose of the holder.

5. Carefully engage the new circuit board in the heat exchanger.
6. Restore the electric connection and bend the plastic flap back again.



8. Water Cycle

8.1 Water Inlet

The aquastop valve (filling valve) is opened by the electronic controls when a programme is started.

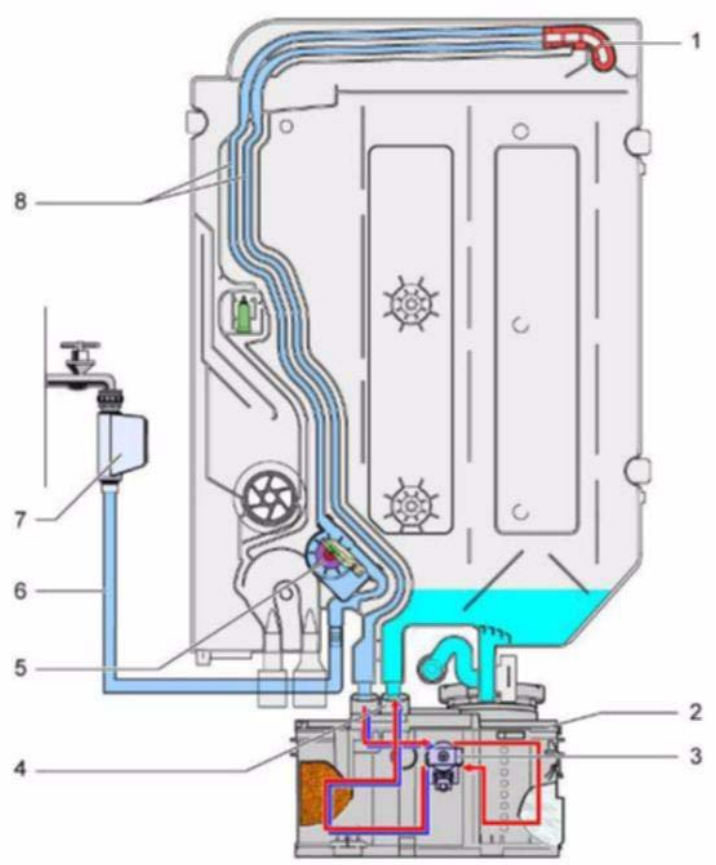
Water flows into the heat exchanger through the supply hose. The flow sensor and the free flow section are located in the water channel of the heat exchanger for the intake of water.

Water flows over the regeneration valve in the softening equipment, either to the granule box (softening) or into the salt box (regeneration). The drain opening of the softening equipment leads the water back into the heat exchanger. The discharge valve has not been installed. A sealing plug instead of the discharge valve ensures that water flows direct into the rinsing cavity.

When a rinsing programme is started, the aquastop valve will be activated for five seconds. Water will not flow in before. The electronics unit waits for pulses from the impeller metre here. If no pulses follow, an error code is shown and the programme is not started.

The program is started when pulses are received.

1 Free Flow Section
2 Water softening equipment
3 Regeneration valve
4 Drain opening
5 Impeller wheel with a flow sensor
6 Supply hose
7 Aquastop valve
8 Heat exchanger water channel



8.2 Free flow section

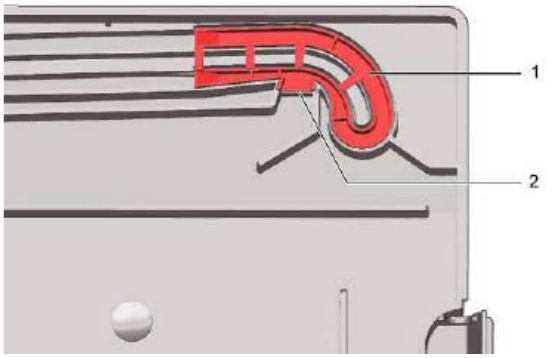
The free flow section is a water curve with an opening. The curved shape accelerates the water so that it flows past the opening.

This ensures that virtually no water flows through the opening, even when the water pressure is low.

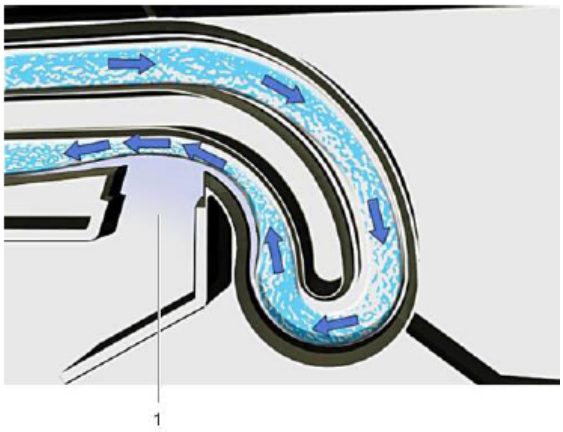
This measure is prescibed by the “Deutsche Vereinigung des Gas- und Wasserfaches” (DVGW-German Association of Gas and Water).

If a vacuum develops in the water pipe water may flow from the diswasher into the system of water pipes in a most unfavourable case.

Only air is drawn into the opening in the flow section so that water is prevented from flowing back.



Flow course in the free flow section

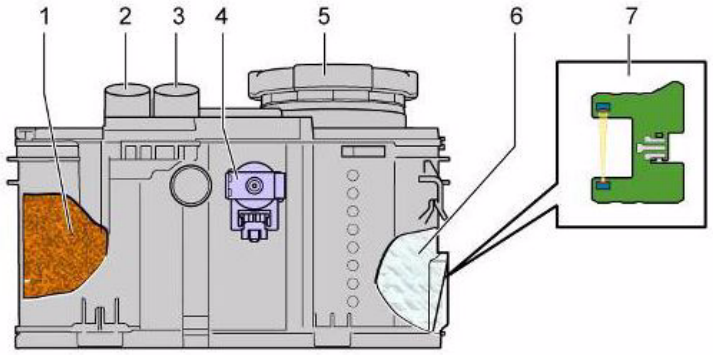


1 Air balance opening

8.3 Water Softening Equipment

The softening equipment (ion exchanger) is a container filled with fine-grained synthetic resin granules. This synthetic resin replaces calcium and magnesium ions in the water with sodium ions on the surface.

1 Ion exchanger
2 Water inlet
3 Water drain
4 Regeneration valve
5 Salt box cover
6 Salt box
7 Salt refill sensor



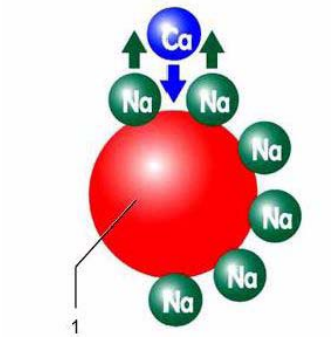
Capacity:

Fine-grained salt approx. 1.3 kg

Coarse-grained salt approx. 0.9 kg

8.3.1 Softening

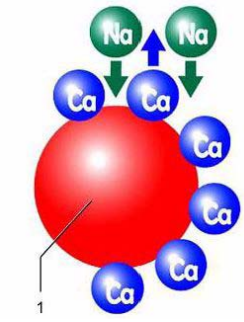
The incoming water with its hardness constituents is conveyed via the synthetic resin. Calcium and magnesium are bonded to the surface of the exchange compound while sodium ions are released into the water. When all the sodium ions have been replaced with ions of the hardness constituents, the capacity of the water softening system is exhausted and it must be regenerated.



1 Synthetic resin

8.3.2 Regeneration

In order to restore the ability to work of the ion exchanger, a concentrated salt solution (sodium chloride) is led from the salt box through the softening equipment. The great concentration makes the sodium ions force the calcium and magnesium ions from the salt solution and they are then once again deposited on the exchanger body. The ion exchanger is now once again “loaded” (regenerated) and ready for operation.



1 Synthetic resin

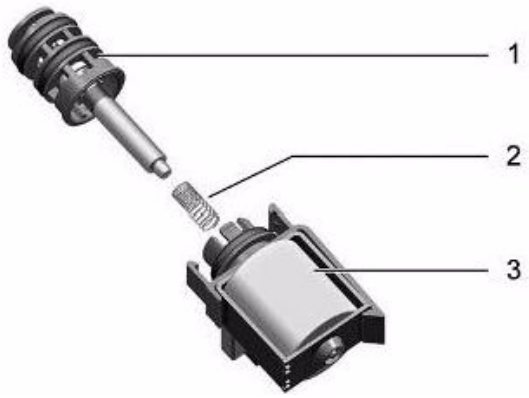
Regeneration cycle

The regeneration cycle is regulated by the electronics unit in dependence of the water hardness setting and the water quantity that is identified.

8.3.3 Regeneration valve

A 2-way valve (regeneration valve) is installed in the softening equipment. This valve controls the flow of water:

- Direct flow into the ion exchanger
- Salt box regeneration



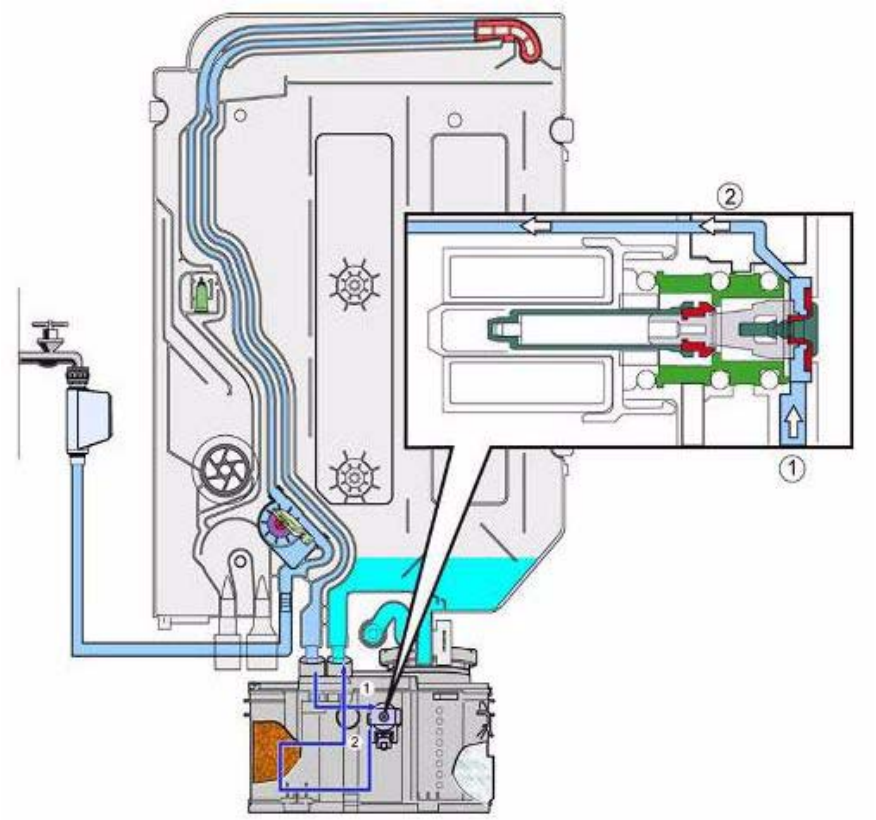
1 Valve with an armature

2 Spring

3 Coil

8.3.4 Flow of water in the softening equipment

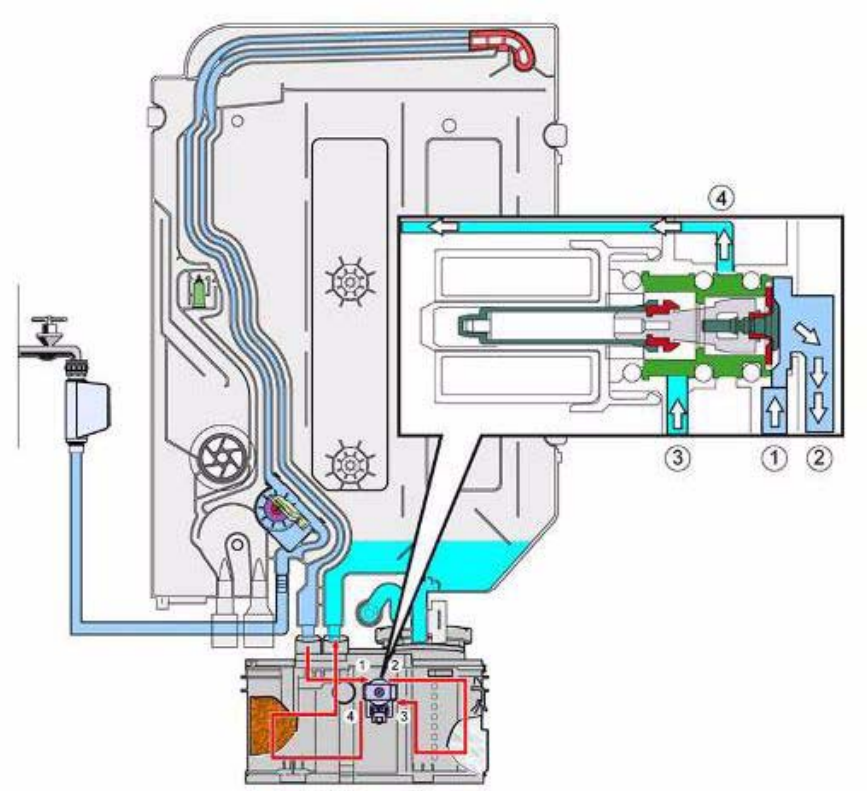
In the idle mode of the regeneration valve water is led direct to the ion exchanger and softened.



1 Incoming water inlet regeneration valve

2 Incoming water outlet regeneration valve

When the regeneration valve is activated water flows into the salt box and accumulates salt. Water is led back to the regeneration valve through the water channels of the softening equipment. The brine flows into the ion exchanger. The granules are regenerated. The brine is led into the rinsing cavity through the heat exchanger and is drained off.



1 Incoming water inlet regeneration valve

2 Incoming water outlet regeneration valve

3 Salt water intake regeneration valve

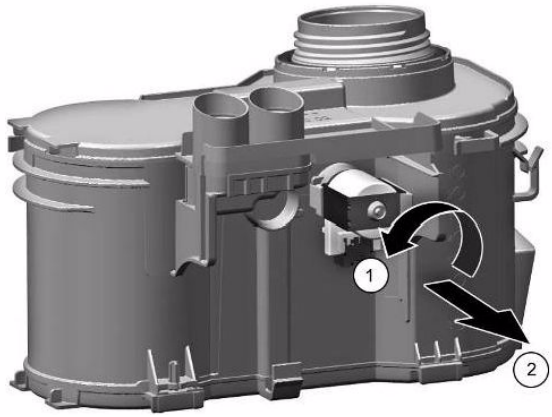
4 Salt water outlet regeneration valve

8.3.5 Replacing a regeneration valve

Removing

Preconditions:

- side panel on the left has been removed
- heat exchanger has been emptied
- water has been taken out of the salt box



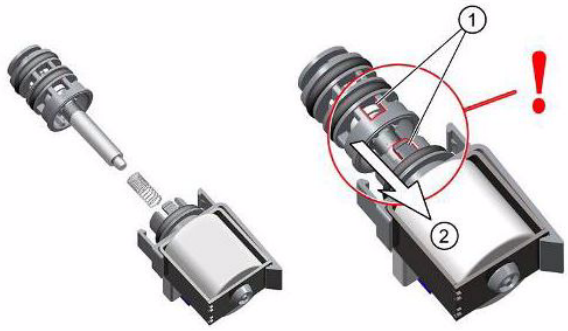
1. Turn the valve anti-clockwise.
2. Pull the valve out to the front.

Installation

The **installation** of the valve is carried out in reverse order.

Positioning the armature

1. Bring the marked points into position
2. Press the valve with the spring into the coil again until it engages.



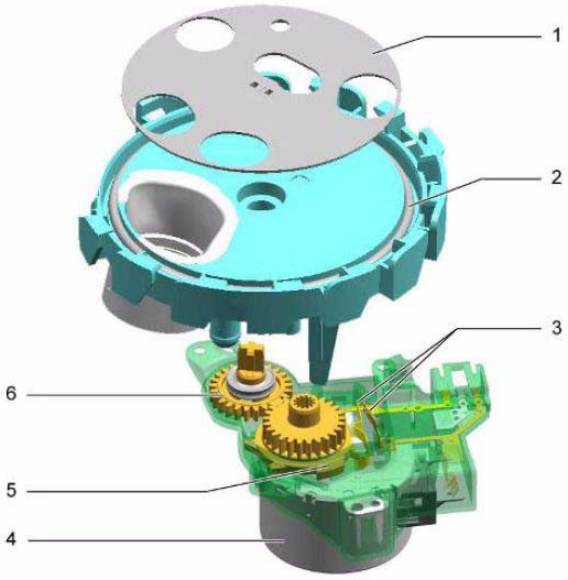
8.4 Water Diverter

The water diverter contols the flow of water of the three spray levels.

It comprises a drive motor with a cam disk, pulse generator and the sealing washer.

When the dishwasher is switched on the engine is activated with a triac. The cam disk is installed on the motor shaft.

The disc activates a switch (pulse generator) which sends off pulses of various lengths and intervals to the electronics unit. If this unit recognises the basis setting, the water diverter will have been initialised.



1 Sealing washer

2 Seal

3 Pulse generator (switch)

4 Drive motor

5 Toothed wheel with a cam disk

6 Toothed wheel

The sealing washer is turned in dependence of activation. Here different hole sizes determine the flow of water to each spray level.

The arrangement of the 5 openings in the sealing washer enables several levels to be activated simultaneously or in alternation.

8.4.1 Checking the water diverter electrically

This is only possible if the side panel on the right has been removed.

Measuring the water diverter motor (standard measurement)

1. Disconnect plug X2 on the power module on the leads to the water diverter motor, contact 3 and 4, measure the resistance.

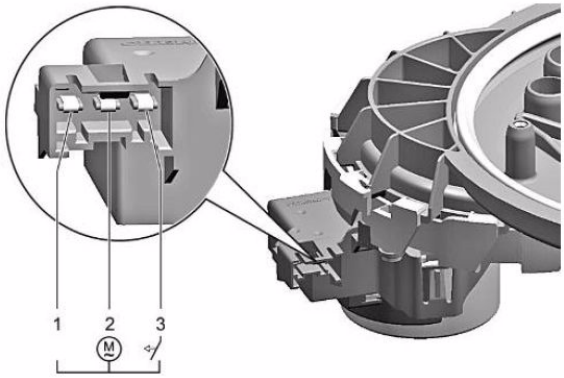
If the resistance reading is 8 check the leads for discontinuity and take a measurement direct on the motor of the water diverter.

Technical Data:

Rated voltage:	120 V
Power consumption:	5 W
Frequency:	50/60 Hz
Resistance:	approx. 1.05 kΩ ± 50 Ω or approx. 1.4 kΩ ± 70 Ω depending on the manufacturer.
Number of rev.	5/6 min

Measuring the water diverter (on the component)

This is only possible if the rinsing cavity is opened up.



8.4.2 Water diverter pulse generator

The pulse generator of the water diverter cannot be checked. The resistance of the supply line must be measured.

If the pulse generator is faulty, the water diverter will operate constantly. There will be no pulses for initialisation.

8.4.3 Replacing the water diverter

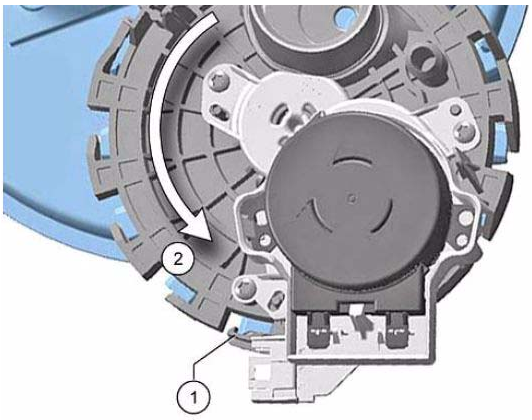
This is only possible if the rinsing cavity has been folded down and the circulation pump has been dismounted

Removing

Removing the water diverter

The casing of the water diverter can only be turned with force!

Wear gloves.



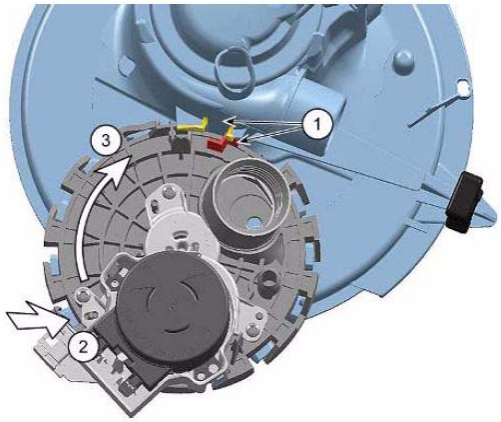
1. Release the catch.
2. Turn the water diverter anti-clockwise.

Installation

Please note!

Coat the rubber gasket with a little promol or rinse aid.

.



1. Position the Z-shaped spacer of the water diverter between the two spacers of the diverter.
2. Press the water diverter evenly onto the pump cavity.
3. Engage it by turning it clockwise.

8.5 Rotary Spray System

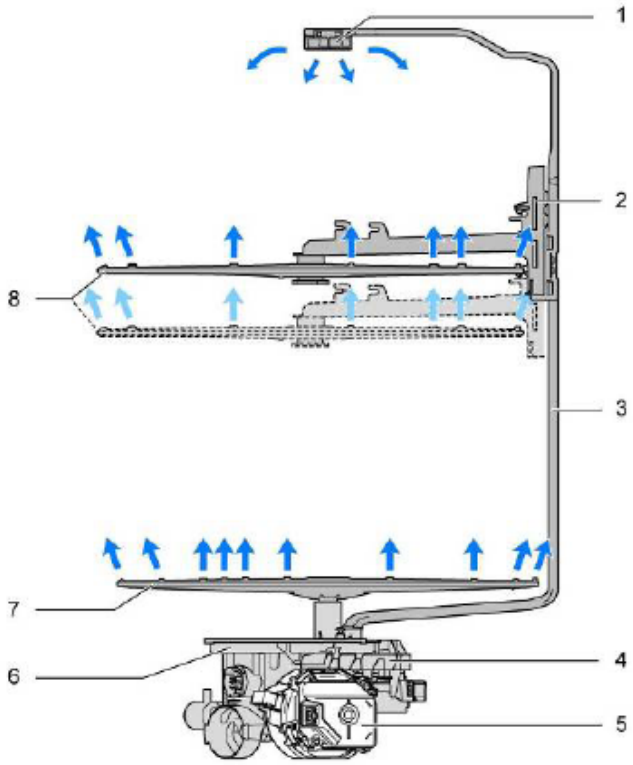
The spray system has 3 spray levels: The bottom and top spray arms and a ceiling spray. The water supply to the top spray arm and the ceiling spray is brought through the inlet pipe attached to the inside of the container rear wall. This pipe is connected to the pump cavity with a direct connection.

The water intake pipe has 2 separate water channels. This means that the top spray arm and the ceiling spray can be separately activated.

The top spray arm with its inlet pipe is fastened direct to the top basket. The inlet pipe is connected with a coupling. There is an option of setting a max. of 3 levels (rackmatic).

The bottom spray arm with its bearing is attached direct to the pump cavity. It has a nozzle on the bottom to clean the horizontal sieve and to rinse dirt into the sieve system.

1 Ceiling spray / ceiling centrifugal arm
2 Top spray arm coupling
3 Feed pipe
4 Water diverter
5 Heater pump
6 Pump cavity
7 Bottom spray arm
8 Top spray arm



8.6 Feed Pipe

The water supply to the top spray arm and the ceiling spray is brought through the inlet pipe attached to the inside of the container rear wall. This pipe is connected to the pump cavity with a direct connection.

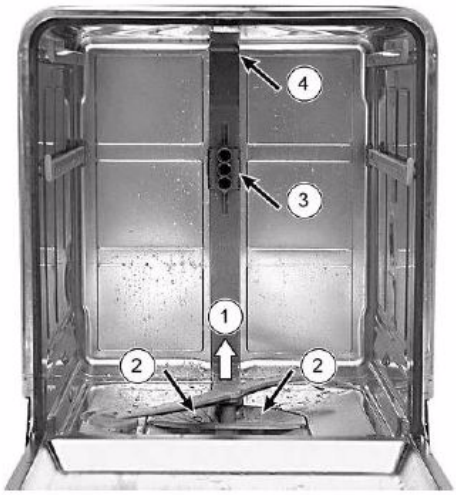
The water intake pipe has 2 separate water channels. This means that the top spray arm and the ceiling spray can be separately activated.

When the top basket is pushed into the dishwasher, it engages onto the water intake pipe at the back to make a water connection.

Replacing the feed pipe

Removing

1. With a slight jerk, pull the bottom spray arm upwards off the feed pipe.
2. Screw off the two Torx screws on the pump cavity.
3. Release the catches in the region of the coupling point.
4. Carefully release the catches of the ceiling centrifugal arm with a small longitudinal slot screwdriver



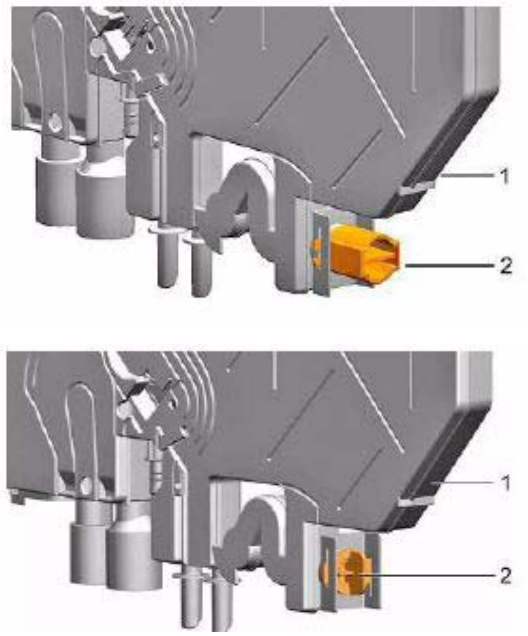
Installation

Installation is carried out in reverse order

8.7 Heat Exchanger

The heat exchanger is for taking in and draining off water.

The illustration shows the heat exchanger components and connections.



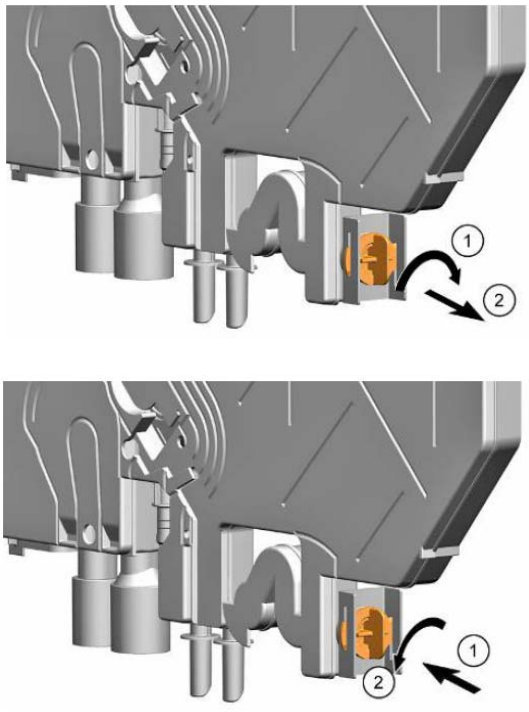
1 Heat exchanger

2 Heat exchanger sealing washer

8.7.1 Replacing the sealing washer

Please note!

Drain off or collect the water if the washer needs to be replaced.



Removing

1. Remove the sealing washer by turning it clockwise.

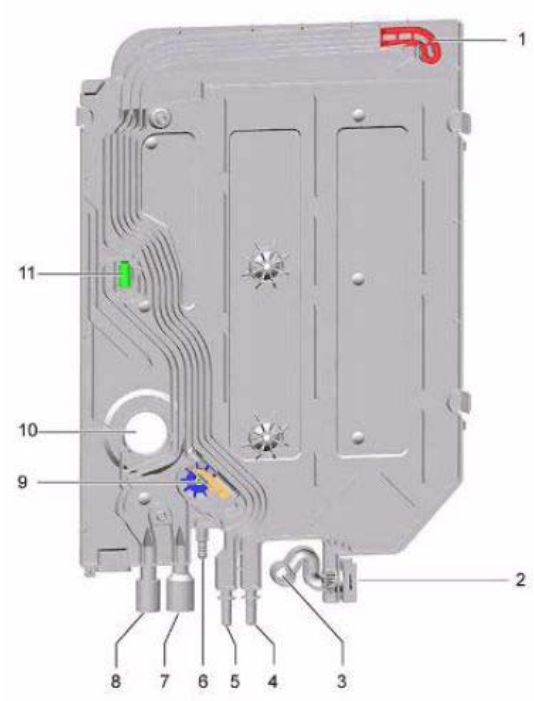
2. Pull it out of the heat exchanger.

Installation

1. Insert the sealing washer into the heat exchanger.

2. Secure by turning it anti-clockwise.

1 Free flow section
2 Heat exchanger sealing washer
3 Water drainage system on the rinsing cavity
4 Feed from the softening equipment
5 Water discharge to the softening equipment
6 Water intake
7 Feed from the discharge pump
8 Water drainage (to the syphon)
9 Flow sensor
10 Expansion opening
11 Discharge hose ventilation valve



8.7.2 Emptying the heat exchanger

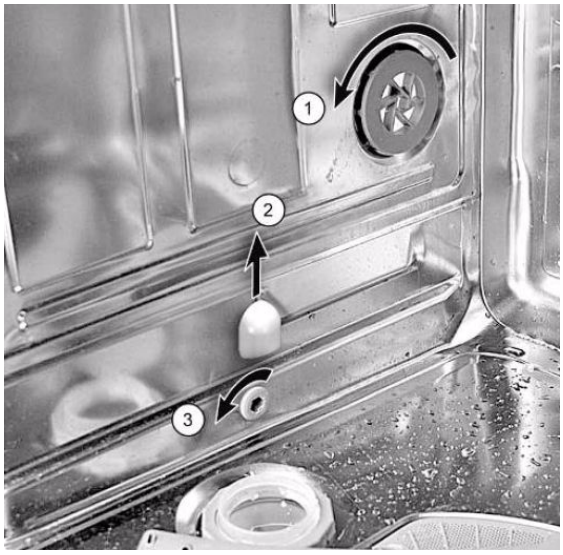
Start up any programme and close the water tap in order to empty the heat exchanger. The heat exchanger is emptied.

Then reset to pump off the rest of the water.

8.7.3 Replacing the heat exchanger

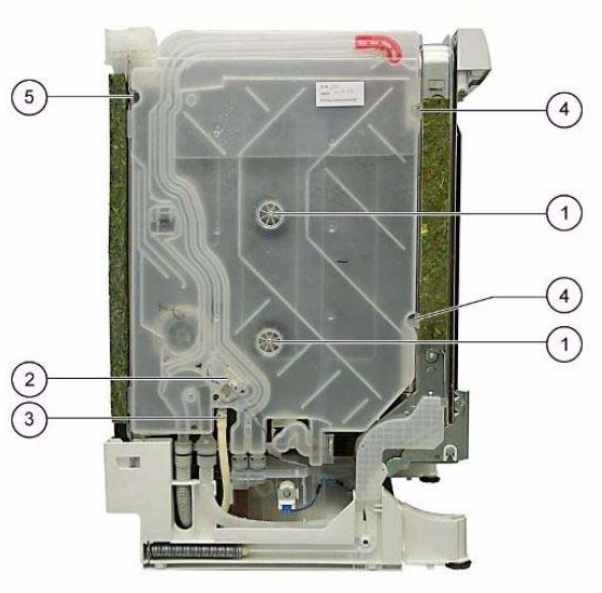
This is only possible if the left side panel is removed and the heat exchanger is emptied.

1. Remove the plastic screw fittings on the ventilation opening with a special tool.
2. Remove the splash guard cover from the water intake connections in the interior.
3. Remove the water intake connections with a special tool.



Removing

1. Remove the two Torx screws on the exterior of the containers.
2. Bend the protective cover of the impeller metre outwards and disconnect the plug connection.
3. Remove the hose clamp from the water intake and pull of the supply hose.
4. Release the catches on the front of the dishwasher.
5. Pull the heat exchanger out carefully to the front. To do so take it out of the holder on the back of the dishwasher and take it off.



Please note!

After many hours of operation the heat exchanger may stick to the bitumen insulation material and cause problems with demounting.

Installation

Assembly is carried out in reverse order.

8.8 Expansion Opening

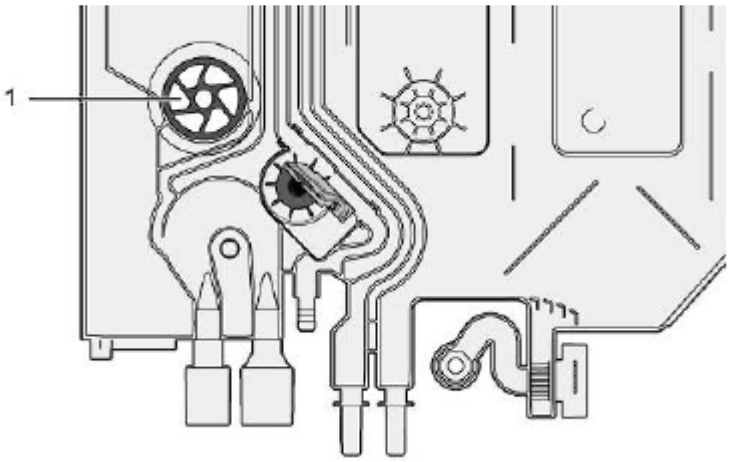
The expansion opening connects the heat exchanger to the rinsing cavity.

The air in the rinsing cavity will expand during the heating process. The air escapes through the expansion opening so that no excess pressure can build up and push the door open.

If the door is opened when the dishes are warm, cold air will get into the dishwasher.

If the door is closed this cold air will be heated up by the hot dishes and will expand. Excess pressure builds up.

This excess pressure is transported to the heat exchanger through the expansions opening where it is reduced through a small vent hole.



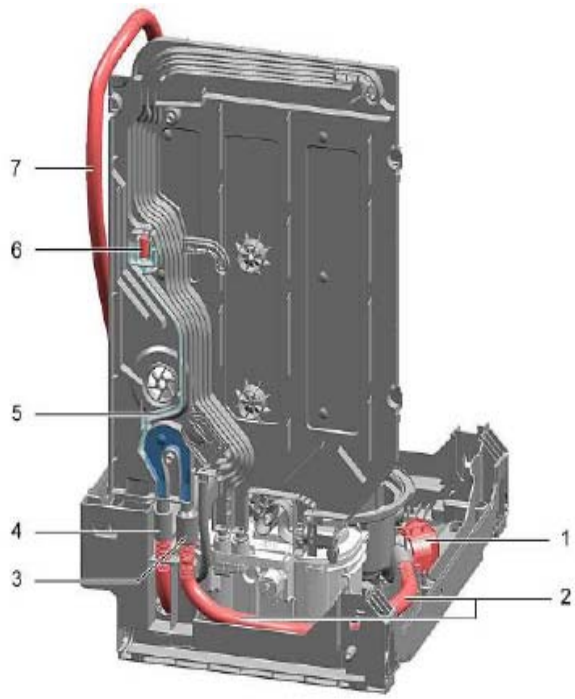
1 Expansion opening

8.9 Water Discharge

When the discharge pump is activated so that water is drained off, the water is pumped to the heat exchanger. The water passes through the heat exchanger to the discharge hose so that it leaves the dishwasher.

A non-return valve has been fitted into the hose connection of the pump cavity. This prevents dirty water from flowing back into the pump cavity.

1 Discharge pump
2 Internal discharge hose
3 Water discharge inlet
4 Water discharge outlet
5 Air channel
6 Float chamber with floats
7 Discharge hose



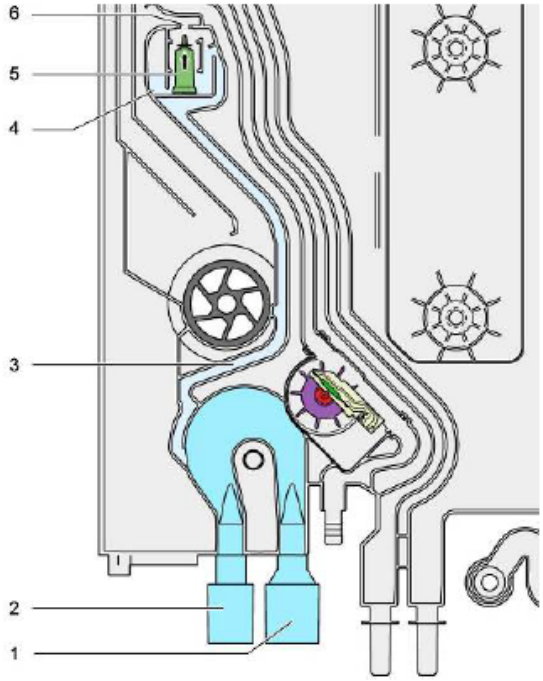
8.10 Discharge Ventilation

During the pumping out process water is pumped through the discharge channel of the heat exchanger to the discharge hose.

The water flows through continuously. If the discharge is located lower than the dishwasher, the water will flow out of the dishwasher as a result of the suction effect even if the discharge pump is no longer activated.

The float chamber has enough water for the float to float on the water and the ventilation opening to be closed. The ventilation opening is uncovered by the float as soon as the flow of water in the discharge slows down. The dishwasher cannot be completely emptied when the discharge pump is deactivated. If the discharge hose has developed a fault (blockage or kink), pressure will build up.

The electronics unit identifies a higher discharge pump load and switches the pump off. An error code will be stored in the electronics unit.

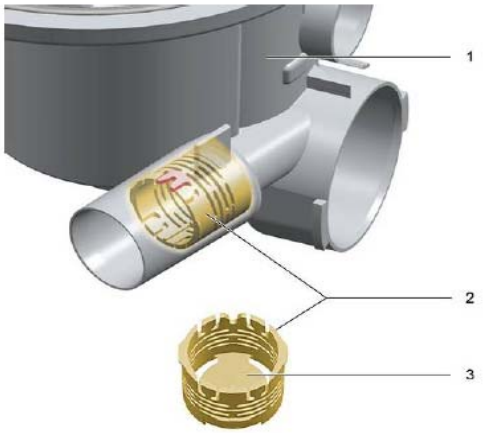


1 Water discharge inlet
2 Water discharge outlet
3 Air channel
4 Float chamber
5 Float
6 Ventilation opening

8.11 Non-Return Valve

The non-return valve prevents water from running back from the discharge section of the dishwasher.

This prevents residual dirt particles, dirty water or residual detergent from flowing back into the rinsing cycle.

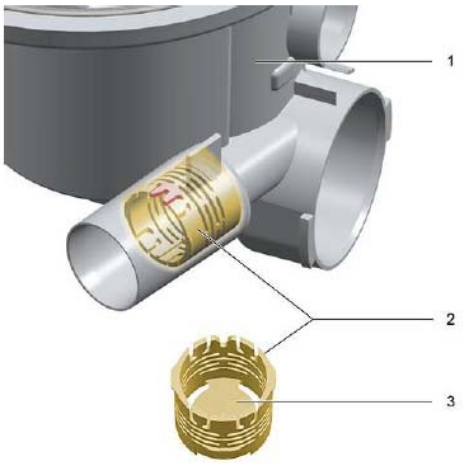


1 Pump cavity
2 Non-return valve
3 Sealing lip

8.11.1 Removing the non-return valve

This is only possible if:

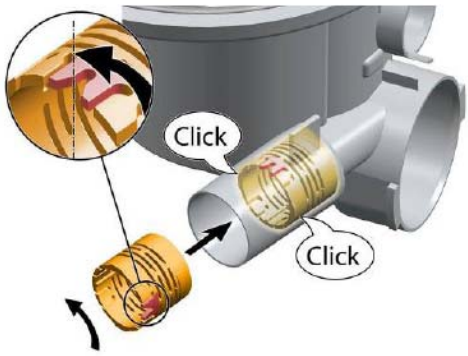
- the outer door has been removed;
- the base panel and the sheet metal have been removed;
- water has been drained out of the pump cavity;
- the discharge hose has been taken out of the pump cavity.



Scratches!

When removing the non-return valve, the inside of the discharge connecting pipe may not be scratched if you use a sharp-edged screwdriver.

8.11.2 Installing the non-return valve



9. Error Diagnosis

9.1 Malfunctions

Error	Cause	Rectifying errors
Tab does not dissolve.	Spray arm stiff, jams.	Check the functioning of the top spray arm (use of glass doors, material number: 81 cm: 341333; 86 cm: 341334).
Tab does not drop into the basket handle of 86 cm appliances.	Tolerances.	Insert a tab slide (material number 614935) into the top basket.
No function.	Main switch mechanically defect.	Replace the main switch.

9.2 Result Errors

Error	Cause	Rectifying errors
Poor rinsing results in the top basket.	Spray arm stiff, jams.	Check the functioning of the top spray arm (use of glass doors, material number: 81 cm: 341333; 86 cm: 341334).
Poor drying results.	Leak in the drain valve of the heat exchanger. Heat exchanger empties between rinsing and clear rinse cycles.	Check the drain valve for leaks and replace if necessary.
Poor rinsing results in the bottom basket for zeolite dishwashers.	Spray arm blockage on the blow-out cap of the zeolite container.	Check that the cap is securely in place. It must be locked until it stops.

9.3 Noises

Error	Cause	Rectifying errors
Noises in operation too loud.	A styrofoam plate was installed on the right-hand side of some of the dishwashers in order to avoid transport damage. This is no longer required with FD 8809.	None. Claims concerning the occurence of noise are the same as for dishwashers without a styrofoam plate.

9.4 Electrical Errors

Error	Cause	Rectifying errors
Piezo electronics cannot be operated.	Switching procedure is not recognised by the electronics unit.	Replace the control panel with piezo controls
Residual current circuit breaker trips, info light flickers. Ground contact through build-up of condensate on the info light.	Ground contact through build-up of condensate on the info light.	Replace the info light and cut out the insulation mat
Salt refill display lights up permanently.	• Tolerances in the sensor switching values. • Salt tabs used.	• Replace the salt refill sensor. The switching values were changed. • Advise the customer: do not use salt tabs.
No function.	Main switch mechanically defect.	Replace the main switch.

9.5 Mechanical Errors

Error	Cause	Rectifying errors
Bottom dishwasher basket falls into the dishwasher.	Tolerances.	Replace the bottom basket.
Door cannot be closed.	Catch on the door lock snapped back.	Shut the door firmly until the catch functions normally again.

9.6 Error Codes

Error code	Cause	Rectifying errors
E:00		No error.
E:01	Pump activation defect.	Replace the power module.
E:02	Heater work relay defect.	Replace the power module.
E:03	Heater work relay / safety relay defect.	Replace the power module.
E:04	No active error code.	Reserved.
E:05	Triac water diverter motor defect.	Replace the power module.
E:06	Door contact sensor not recognised.	Check the leads and the plug connections between the power module and the Hall sensor; check the voltage on the hall sensor.
E:07	Additional heater (zeolith) faulty, heating power circuits interrupted, fan defect, additional electronics unit defect, leads interrupted.	Check components (only applies for dishwashers with additional drying systems).
E:08	Not enough water in the pump cavity during the heating up phase.	Start a test program and observe the filling procedure.
E:09	Heating power circuits interrupted.	Check the leads and plug connections between the power module and the heater; measure the heater.
E:10	Heater does not give off enough heat due to deposits.	Descale / clean the dishwasher; check water hardness; advise customer. Replace the heater pump if the error persists.

E:11	NTC error.	Check the leads and plug connections between the power module and the heater; check both NTCs.
E:12	No active error code.	Reserved.
E:13	Appliance recognises a water temperature of > 75°C and switches the heater off.	No appliance error, only a safety measure. Check the water intake temperature and the connection conditions.
E:14	Electronics unit does not get pulses from the impeller metre even though water is taken in. The circulation pump recognises the load change.	Check the leads and plug connections between the power module and the impeller metre.
E:15	Water in the base pan.	Determine the cause.
E:16	Appliance recognises pulses from the impeller metre even when the water intake is not activated.	Check the water inflow valve.
E:17	The impeller metre recognises an excessive water flow rate.	Check the flow governor in the water inflow valve.
E:18	The impeller metre recognises an intake of too little / no water. 1. filling step when a programme is started: water tap LED lights up, a buzzer may sound; the circulation pump operates; waits for water intake. 2. filling steps in the current programme: programme abortion and pumping water off.	Check the water intake.
E:19	No active error code.	Reserved.
E:20	Incorrect resistance readings for the circulation pump.	Check the leads and plug connections between the power module and the circulation pump; measure the windings.

E:21	Circulation pump mechanically blocked.	Remove the pump, check for blockage and replace if necessary.
E:22	No active error code.	Reserved.
E:23	Incorrect discharge pump resistance readings.	Check the leads and plug connections between the power module and the discharge pump; measure the windings.
E:24	Discharge pump operates. Water cannot be pumped off.	Check the water discharge. Kinked hose or dirt in the leads; excessive delivery height; check the cover of the discharge pump.
E:25	Discharge pump mechanically blocked.	Remove the foreign matter and check the discharge pump cover to ensure that it has been correctly installed.
E:26	Water diverter motor is activated, but the water diverter switch does not return any pulses.	Measure the power supply on the water diverter motor; check the leads of the water diverter and the water diverter switch.
E:27	No active error code.	Reserved.
E:28	Calibration error or dishwasher without an aqua sensor.	Check the leads. Is the dishwasher fitted with an aqua sensor ? Dirt in the aqua sensor.
E:29	No active error code.	Reserved.
E:30	Excessive voltage.	Only for in-plant analysis.
E:31	Circulation pump overload.	Only for in-plant analysis.
E:32	Discharge pump overload.	Only for in-plant analysis.

9.7 Checking the Water Hardness in the Dishwasher when Error Messages are Displayed

Some errors require a check of the water hardness level in the dishwasher. To be clarified beforehand:

- Is regenerating salt used?
- Has regenerating salt been filled in?
- Has the water softening equipment been switched on?
- Has the right hardness level been set?
- Does the customer use tabs (which)?

9.7.1 Check for active softening equipment

1. Start a test program and let the appliance fill up until the first break with a visual inspection.

2. Determine the water hardness in the dishwasher in a water hardness test.

The reading should be approx. 5° to 7°dH if the softening equipment is intact and the regeneration cycles are properly set.

If the reading is far higher than this the softening equipment will need to be checked.

9.7.2 Operation with the softening equipment switched off

When the softening equipment is deactivated detergent tabs with salt substitutes should be used. Observe the instructions on the packaging.

The chemical substances in multi-function tabs bind the calcium content of the water themselves. They are effective up to approx. 21° dH. The manufacturer's product specification must be observed.

1. Test the water hardness of the inflowing water.

2. Advise the customer

- If the water hardness level is higher than the level at which the tabs used effectively soften the water, the customer should be advised to use the regeneration system with regenerating salt.
- If the customer uses tabs without any salt substitutes, the use of special salt should be pointed out.

3. Make the correct appliance settings.