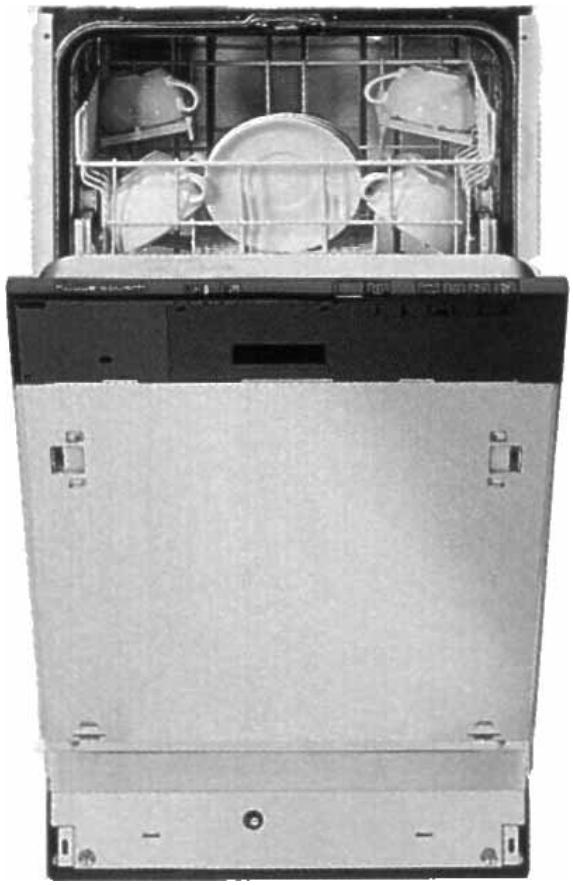


New range of dishwashers

IGV 645.0

(with base aeration)

IGV 645.1

(without base aeration)

Küppersbusch

THE HEART OF A GOOD KITCHEN

GB

Service Manual: H7-410-14-01

Responsible:	D. Rutz	KÜPPERSBUSCH HAUSGERÄTE AG
Email:	dieter.rutz@kueppersbusch.de	
Tel.:	(0209) 401-733	Kundendienst
Fax:	(0209) 401-743	Postfach 100 132
Date:	08.04.2003	45801 Gelsenkirchen

Contents

Brief description of the dishwasher

- Fully-electronic dishwasher for twelve standard place settings and with four different programmes and four temperatures.
- The dishwasher can be fully integrated into a kitchen unit, i.e. it is possible to add a kitchen unit door which reaches from the base to under the worktop.
- The controls are located on the top part of the door.
- The dishwasher is operated by means of pop-out buttons. It is only possible to select a programme and commence operation when the door is open.
- The programme selected can be seen on LEDs when the door is open.
- An acoustic signal indicates the end of a programme.
- Customers and the customer service are informed of any fault which occurs by means of an error indication code.
- All dishwashers are equipped with a special service test programme. A flashing start LED indicates a fault.
- The door system is self-regulating with a release lock.
- For further details, refer to the “Technical data”.

1. Component parts and operating systems

1.1 Housing

The housing comprises two removable side parts, a back wall and a base.
The parts are all made of metal.

The dishwasher is fixed by means of two butt straps, attached either direct onto the worktop or onto the adjacent cupboard.

Worktop: Built-in dishwashers have no worktop and should not be used as free-standing appliances (do not additionally equip the dishwasher with a worktop).
Reason: Built-in dishwashers do not have any weight for counterbalancing, which means that, on loading, the weight of the loaded baskets which are still pulled out may cause the dishwasher to tilt forwards.

Base pan: A base pan made of metal is installed on the bottom of the dishwasher (inserted at the back and fixed with two screws at the front). In the case of a leak, the water is collected in the base pan. A float switch installed on the base pan is actuated and switches on the discharge pump. At the same time the switch for the inflow valve is disconnected.

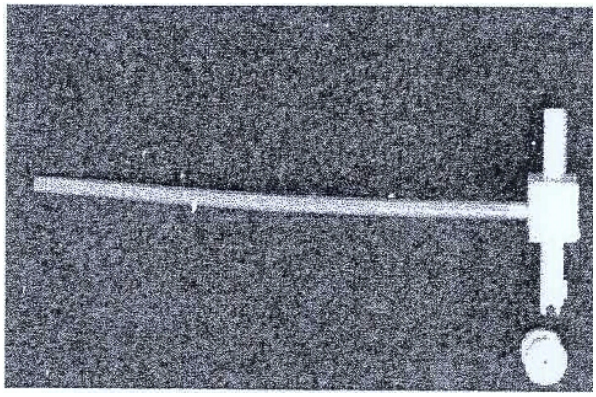
1.2 Container / Frame

Container: The container is made of 18/10 stainless steel and is attached by means of a tox system to two U-frames (toxed/connected). The tox connection is extremely sturdy and ensures that the dishwasher has a high degree of stability. Should the container need to be replaced, the new container is supplied with a tox-mounted frame and sound insulation (coated with bitumen).

In the case of built-in appliances the front feet in the frame and the side walls as well as the front of the base are set back.

Feet: The feet are screwed onto the bottom longitudinal frame with M 8 screws.

Built-in models have two long feet at the front and only one adjustable foot at the back, in the middle. This back foot can be adjusted from the front at the base, thus enabling the height of the dishwasher to be adjusted to 870 mm to comply with the height of the worktop.



Centre back foot, adjustable from the front. The roller (supplied in the cutlery basket) is only required if the height of the worktop is 870 mm. The foot at the centre back is adjustable from the front by means of a screw driver.

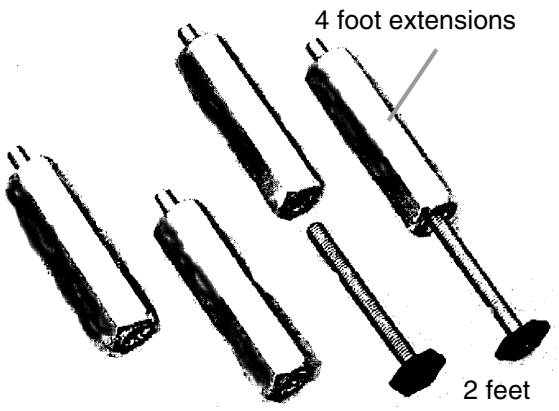
Attention: Do not push the dishwasher into the unit with the back foot screwed out. Only screw out the back foot once the dishwasher is in the unit.

Dishwasher back wall: Key for adjusting the front feet.

Attention: Must be removed prior to installation. Noises!

Dishwasher top: Vapour protection (steam protection for the worktop).

Foot extension: In the case of a built-in height exceeding 870 mm, a foot extension set comprising four elements and 2 feet for the rear with which the upper edge of the dishwasher can be extended to a height of max. 985 mm is available (Spare parts No. not yet available)

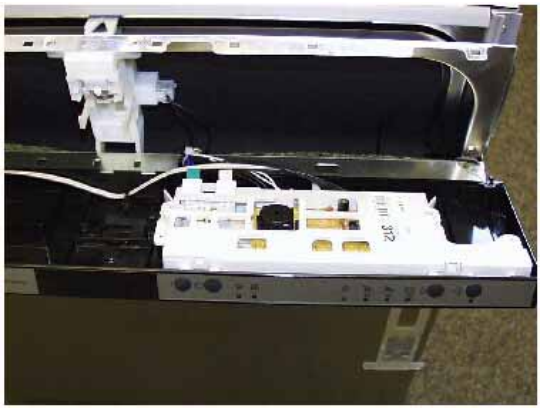


1.3 Door

Outer door: The outer door is fixed from the interior with 8 screws. The door is narrower than the housing, and when opened, the bottom of the door pivots between the two side walls. The wooden door must never be longer than the pivot radius.

Inner door: The inner door is made of stainless steel (18/10). The lower door sealing is inserted into the bottom of the inner door with a fold. The lower door sealing is therefore easy to replace. The dispenser for the detergent and the rinse-aid is attached to the inner door with six screws.

Control panel: The control panel is suspended into the top of the inner door and is fastened from the inner door with only two screws. The control panel does not have a metal strip for screwing onto the electronic boards, which are either screwed direct onto the back wall from the control panel or are clipped.



In the case of built-in models, the wooden door is attached to the outer door by means of two plastic hinge plates. A standard kitchen unit door can be attached to the dishwasher.

For dimensions and possible weights of a fascia or a kitchen unit door, see “Technical data”.

Elements for fixing the wooden door onto the outer door

Interior of the outer door:

Plastic hinge plate attachment principle:

The plastic clamps for the wooden door are pushed into the metal brackets.

On tightening the second and the fourth screws on the inner door, the metal bracket is pressed down, thus holding the plastic clamp firmly in position.

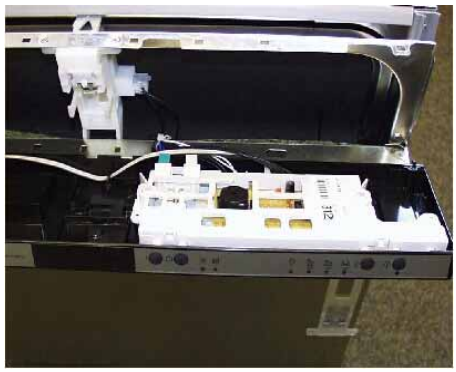
Door fastening: The door fastening is attached to the top of the inner door. The switch which disconnects the power supply voltage when the door is open is located on the door fastening.

Door balance

Suspension in the uppermost position.

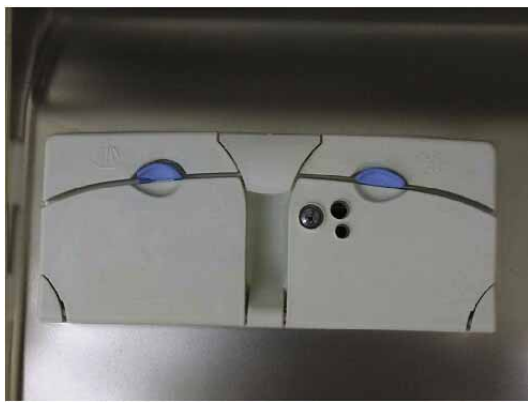
Grease the hinge at the suspension point on the hinge plate.

Do not allow any grease to get onto the hinge plate or the brake.



Door balance: The door balance has two brake elements and two door springs, on the left-hand side and on the right-hand side respectively. Various door springs are available for built-in models. In the case of full door appliances, the door springs are suspended in the highest position.

1.4 Detergent and dispenser device



Left chamber for the main detergent or for tabs, the middle chamber for the pre-rinsing agent and right chamber for the rinse-aid.

A levered mechanism reliably ensures that the detergent and the rinse-aid are only released at the appropriate time. The detergent and dispenser device function by means of a solenoid.

1.5 Internal cable connecting system

The connections comprise coded block switches, ensured against mix-ups. It is therefore hardly possible, on connecting a component, to mount a plug incorrently.

2. Electronics system

The controls of all appliances are fully electronic.

Fault indication service test programme: All appliances have a fault indicator visible to the customer as well as a special service test programme.

The electronics system comprises two components:

- a user display board (UB),
- and a control board (CB).

User boards: Full door appliances (IGV 645.0) have a separate START button as well as a separate ON/OFF button.

Subsequent to pressing the start button, the programmes and options previously selected are stored and electronically interlocked.

In order to alter the programme set, or terminate it, the start button must be pressed again for approx. 1.5 seconds (break by customer) until the START indicator lamp goes off.

A new programme can then be selected or the dishwasher can be switched off.

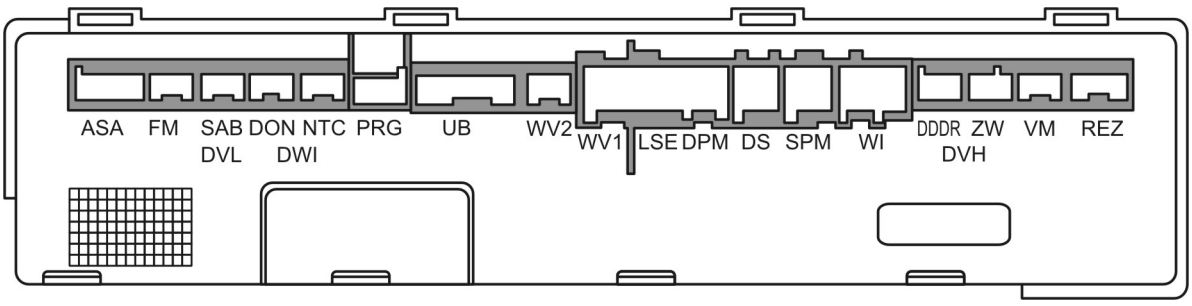
Merely switching off the dishwasher, paying out the power supply plug or disconnecting from the mains will not alter the programme set. In this case all of the parameters are stored and frozen. The programme continues from the point at which it was interrupted (exception: the drying cycle).

A new programme can only be stored once the current programme has finished. During the drying cycle, should the programme be interrupted, the main switch be switched off, or the door opened, the programme will be terminated immediately.

Every programme ends with a discharge pump cycle lasting approximately 30 seconds.

Control board: The control board is located behind the base. It is the dishwasher's “data bank”. The programme data, options and possible errors are stored in this board.

If a fault is recognised while a programme is running, the programme will stop and a fault will be indicated to the customer and to the the customer service technician. For more details see “IGV 645 test programmes for customer service”.

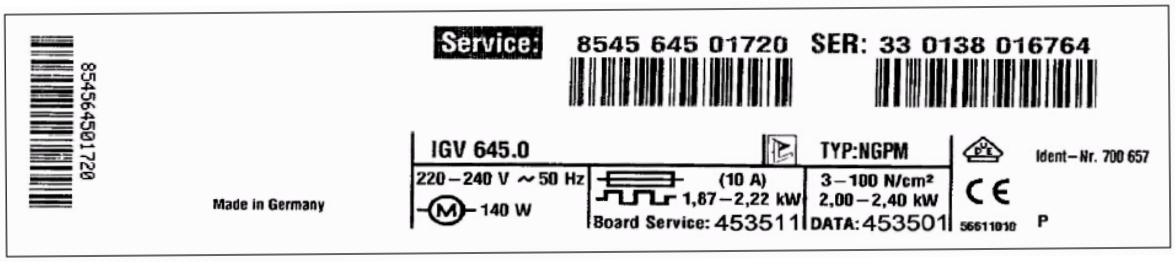


All connections from the external 230 V AC functional components, such as the inlet valve, motor, heater, combined dispensing device as well as the 5V switches for the user board and all of the 5V sensors, are plugged in. All of the plugs are coded. Should the door be opened while a programme is running, the programme stops and continues from the point of interruption once the door has been closed.

All of the electronics components including a plastic box are supplied as a spare part and must be installed into the dishwasher as a complete element in the case of repairs.

Programming: The programming data are filed in the factory code (this is not the service spare parts number!). “Service” and “data” are on the rating plate on the right-hand side of the inner door.

Küppersbusch rating plate and service plate



Example: IGV 645.0 “Service 453511 Data 453501”

This information is also to be found on the replacement boards for the service. Should, subsequent to replacing the original board, any problem arise, please compare the issue number (on the rating plate on the inner door) with the number on the replacement board.
Please do not remove the electronics components from the plastic box and touch them!

For more details, such as which electronic boards are applicable for which respective model, or for details on the functioning of the test programme, please refer to the respective service manual.

Attention: Electronic parts are extremely sensitive to short circuiting. On replacing the electronics components or when testing the points of the electrical operating parts, please remove the mains plug beforehand!

3. Water supply

Electrical water inlet stop hose with a valve

The electrical water inlet stop hose with a valve is **not** a service spare part.

Left: Water inlet stop hose with a valve; 2 m (model fitting)

Right: Water inlet stop hose with two valves; 3.8 m (ZUB 487)

Electrical water inlet stop hose with two valves

Only this water inlet stop **hose** is supplied as a spare part.

Specialist knowledge is required to replace this hose. Customers should not replace the hose themselves.

3.1 Water gauging system

Flow meter

The inflow of water is not gauged with a pressure switch, but with a flow meter. The flow meter is integrated in the regeneration dispenser

Right:

The flow meter is integrated in the regeneration dispenser:

Magnet on the turbine, wheel and Reed switch in the casing.

Gauging is carried out by means of electrical impulses generated by the Reed switch and sent to the control board (208 impulses = 1 liter of water). The control board counts the impulses. The number of impulses required for the individual programme cycles is stored in the EE-PROM of the control board.

The inlet valve closes once the correct number of impulses has been determined. This system gauges far more precisely than a pressostat/pressure switch. It still functions correctly if the water pressure is low (up to < 0.3 bar).

The flow meter is monitored throughout the entire programme operation.

Water indicator (WI)

The mechanical or optical water indicator (which is installed on the sump) indicates to the control board whether there is water in the container or not. This information is essential during the filling, rinsing and discharge cycles.

Water quantities/levels are indicated in the corresponding service manuals.

Water indicator (WI). When the sump contains approximately 1.1 liters of water, a membrane presses onto a mechanical switch. The switch indicates to the electronics system whether there is water in the container or not.

3.2 Water softener

Water softener with a lid, sealings and a securing ring.

Water softener with a regeneration dispenser.
Red: Reed contact for salt indicator. Behind this there is a float which reacts on the density of salt.
Grey (below): channels salt water to the softener.

The water softening system comprises a water softener and a regeneration dispenser.

The regenration dispenser stores the water required for regeneration (approx. 300 ccm). Both the regeneration dispenser and the water softener are connected by means of O-ring sealings. The regeneration procedure itself (channels salt water to the softener) is carried out during the drying cycle.

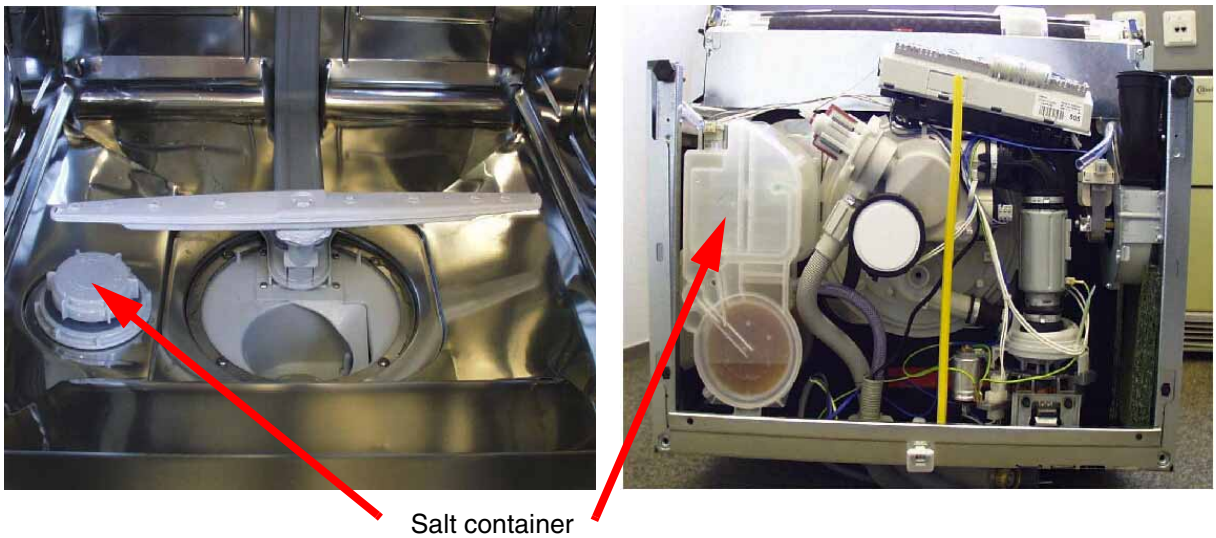
Setting the degree of water hardness

The degree of water hardness can be adjusted by means of a potentiometer, which is installed on the upper left hand side of the front of the inner door.

Depending on how hard the water is, setting can be done in seven stages, from 1 to 6. Regeneration will not take place after every cycle. This will depend on the degree of water hardness set. For example, in the case of a water hardening setting of 21°, regeneration takes place during every fourth or fifth cycle (depending on the through flow of water). Back-rinsing is then carried out after the nearest following programme commencement.

3.3 Salt container

The salt container holds 2 kg of salt. A single regeneration cycle uses < 67 gr of salt, i.e. 2 kg of salt is suficient for 26 regeneration cycles.
Since in the case of 21° water hardness regeneration only takes place after every 4th to 5th programme, salt consumption per cycle comprises < 19 gr.
Indication of a lack of salt is carried out electronically (LED). As a spare part, customer service only uses a water softener with a Reed switch for electrical indication.



3.4 Filter systems

These comprise a coarse sieve, a fine sieve and a micro-fine filter.

The coarse sieve and the micro-fine filter are relatively large with respect to surface and diameter, resulting in a high degree of efficiency and convenient handling and cleaning.

The sieves must be checked at regular intervals. To open, turn the bayonet catch to the left.

1	Micro-fine filter
2	Coarse sieve
3	Upper spray arm
4	Lower spray arm
5	Flat fine sieve
6	Overhead spray rinse
7	Thermo-dry cover

3.5 Cleaning/rinsing system

The rinsing system works at three spraying levels, i.e. the lower spray arm, the upper spray arm and the overhead spray rinse.

The lower and the upper spray arms have two wings respectively.

The water supply to the upper spray arm and the overhead spray rinse comprises a double plastic pipe lying in the container.

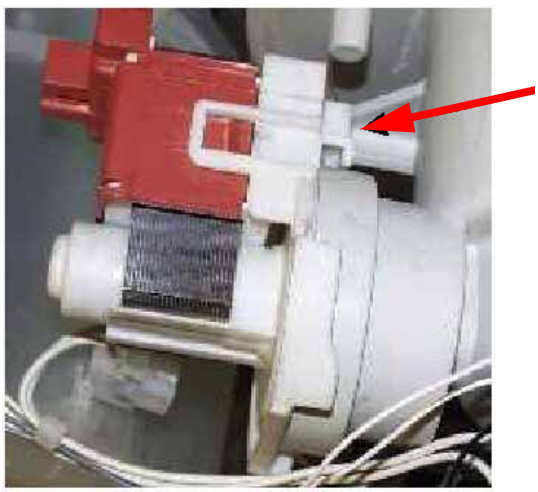
Docking station: The water supply to the upper spray arm is carried out by means of a docking station, i.e. on the inside of the container back there are two openings in the plastic pipe. Depending on the height of the upper basket, the upper opening or the lower opening are closed on the pipe counterpart.

Filters: The water sprayed is filtered through a new, large filter system (comprising a large coarse sieve, a fine sieve and a large micro-fine filter, which are all locked by means of a bayonet catch).

Permanent rinsing system: The rinsing system is a permanent spraying system, which means that both of the spray arms as well as the overhead spray rinse always coordinate in operation.

3.6 Discharge system

The discharge pump is screwed onto the left side of the cavity with a bayonet. The pump casing is integrated in the cavity.



In order to remove the pump motor, firstly lift up the clamping device on the top of the motor and then turn the motor anti-clockwise (at the base).

The non-return valve is installed behind the pump on the pressure side. The discharge pipe is also installed here. The discharge cycle is monitored by the electronics system. If the water indicator has not indicated “empty” at the latest four minutes after the start of the rinse water pump a, a fault will be indicated.

4. Safety systems

If the electronics system recognises a fault, the water will be pumped off immediately and a fault will then be indicated. The dishwasher will switch off and can only be re-started once the fault has been rectified.

4.1 Child safety device

Once the programme has been started, it is locked (frozen) and a child will only be able to switch the dishwasher off. It is not possible for a child to select a new programme.

4.2 Water level control

4.2.1 Too little water

The flow meter and the water indicator monitor the level of water during the entire programme.
If there is not enough water in the dishwasher, the circulating pump becomes instable and this is signalled to the electronics system by means of the water indicator. Both this and a loss of water result in a fault indication and the machine will come to a standstill.

4.2.2 Too much water

The electronics system counts the flow meter signals. Should there be more signals than pre-set, the inflow valve closes and the dishwasher switches to the fault modus.
Should this system also fail, the overflowing water will be channelled to the base pan, where the float switch will switch off the valve and switch on the rinse water pump.

4.3 Overheating

The temperature is measured by means of an NTC (installed in the sump). The NTC is dually controlled throughout the entire heating-up phase:

- If resistance is too great or if it is insufficient, a fault will be indicated and the machine will come to a standstill.
- Should the data concerning the rise in temperature during the heating-up phase not be correct, the heater will no longer be switched on and the fault will be indicated after approx. 25 min.
  (Normal in the case of 2050 W heating = 1.8 °C/min)

A safety thermostat and a safety fuse have been installed in the heater in order to make it safe. If the water temperature in the heater rises excessively (> 85 °C), the safety thermostat switches the heater off.

Once the water has cooled down, the safety thermostat automatically switches on once again and the heating cycle re-commences. The continuous flow heater and the safety thermostat are only available as one complete spare part.

4.4 Leakage

Float and float switch

In the case of a leak, the water will run into the base pan, which is equipped with a float and a float switch, which switches off the inflow water valve and switches on the discharge pump by means of the electronics system. This, of course, functions only when the appliance is switched on.

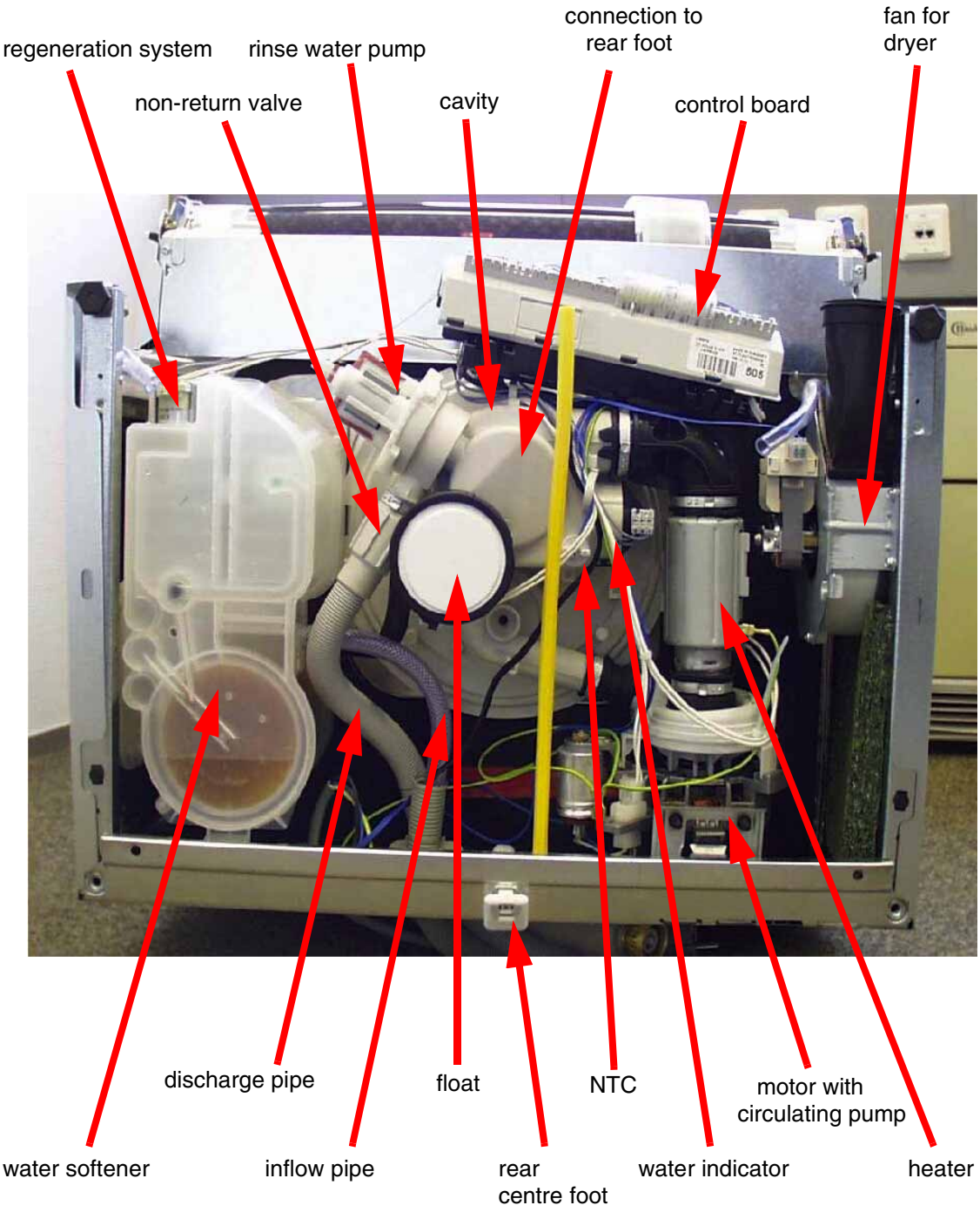
4.5 Water stop system

This comprises a water inlet stop hose with a single inflow valve on the tap, a hose in the hose system and a float and a float switch in the base pan.

Aqua Safe

comprising a single inflow valve in the appliance with a conventional inflow hose. Aqua Safe and water stop have a float and a float switch in the base pan, which, in the case of a leak, close the inflow valve and switch on the discharge pump.

5. Overview of the motor cavity



6. Brief instructions

Buttons

On button

Off button

Programme selection button

Start button
Indicator lamp lights up on operation, flashes in the case of a fault and switches off at the end of a programme.

Indicators

Refill rinse-aid

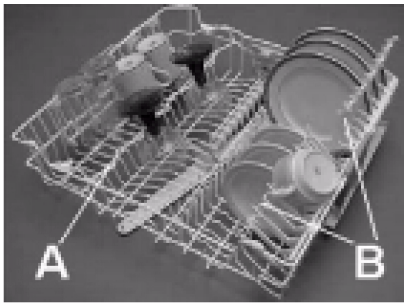
Refill regeneration salt
but only immediately prior to starting a wash programme.

Programme chart				Detergent[2]		Consumption[3]		
Programmes			Loading instructions	A	B	Litres	kWh	Minutes
	Pre-rinse	cold	Dishes to be washed later.	-	-	5.0	0.02	10
	Quick wash	40°C	Lightly-soiled dishes, without dried on leftovers.	X	-	13.0	0.70	30
	Bio normal[1]	50°C	Normally-soiled dishes.	X	X	16.0	1.05	120
	Intensive	70°C	Heavily-soiled dishes, particularly pots and pans.	X	X	22.0	2.15	125

[1] Energy-label programm EN 50242;
[2] Refer to "Operating the dishwasher";
[3] Deviations may occur in daily use, for example, as a result of diverse loading, various water inflow temperatures (higher/lower than 15°C), water hardness and mains voltage, etc.

7. Loading instructions and basket arrrangement

Upper basket



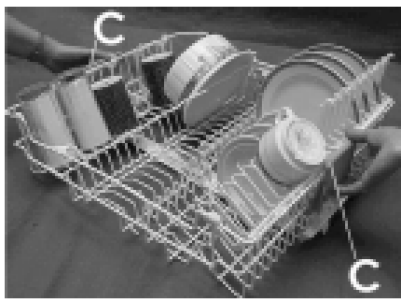
Fold-down glass holder (A):

For example, for small or long-stemmed glasses, depending on the position.

Crockery holders (B):

For example, for plates, cups and long-stemmed glasses, depending on the position.

Height adjustment (also when loaded)



Lower position:

Pull **the two** basket handles outwards **(C)** and lower the basket.

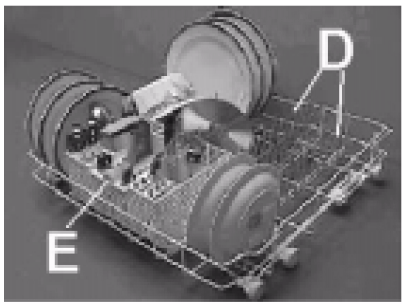
Upper position:

Pull **the two** basket handles **(C)** upwards until the basket clicks into place (as supplied).

The two basket handles must be level.

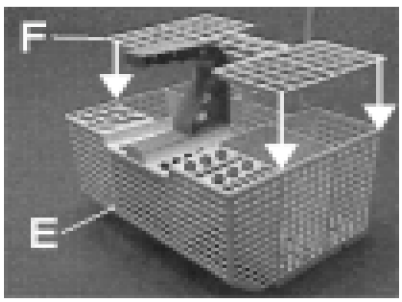
Lower basket

Plate holders **(D**).



Cutlery basket (E)

A grid **(F)** which can be inserted to keep cutlery items separated is included.



Items which may cause injury should be placed in the cutlery basket with the handles pointing upwards.

Do not use the dishwasher for unsuitable items, for example, items made of wood, aluminium or tin, or hand-decorated crockery or silver cutlery.

8. What to do if ...

Should your dishwasher develop a fault, please check up on the following before contacting our customer service (*see, too, the relevant section in the instructions for use).

Problem	Cause	Remedy
The appliance fails to commence operation	• No water supply.	• Open the tap.
	• Insufficient water supply.	• Clean the tap filter. • Ensure that there are no kinks in the water supply hose.
	• No power supply.	• Insert the plug into the mains. • Press the START button. • Close the door. • Check the respective fuse.
Dishes do not dry	• Insufficient rinse-aid. • Residual water in hollow.	• Increase the dosage*. • Load the dishes at an angle.
Dishes are not clean	• The water jet does not reach the dishes. • Insufficient detergent. • Unsuitable programme selected. Spray arms blocked. • Spray arm nozzles clogged. • Detergent is not suitable or is too old.	• Arrange dishes so that they do not touch other dishes. Load the dishes upside down. • Use detergent according to manufacturer's recommendations. • Select a more intensive programme. • The spray arms must be able to rotate freely. • Remove any soiling*. Use a good brand-name detergent.
Sandy and grainy residue	• Clogged filters.	• Check the filters regularly and clean if necessary*. • Filters incorrectly positioned. • Insert the filter correctly and secure*.

Problem	Cause	Remedy
Discoloured plastic items	• Tomato/carrot juice,...	• Depending on the material, it may be necessary to use a detergent with more bleaching power.
Deposits on the dishes • removable	• Marks on the dishes and on glasses. • Streaks on glasses. • Salt deposits on dishes and on glasses.	• Increase the rinse-aid dosage*. • Reduce the rinse-aid dosage*. • Close the salt container lid properly*.
• not removable	• Insufficient water softener, calcium deposits.	• Adjust the water hardness setting and, if necessary, top up salt*.
Glasses cloudy and dull	• Not suitable for dishwashers.	• Use suitable glasses.
Rust on cutlery	• Not sufficiently rust-resistant.	• Use suitable cutlery.
Identifying appliance faults	• The START indicator lamp flashes.	• Ensure that the filter system is not clogged and clean if necessary*. • Re-start the programme. Press the START button for 2 seconds, until the START indicator lamp switches off. Select a new programme and press the START button again.

9. Technical data

9.1 IGV 645.0

Dimensions

Height	82.0 – 87.0 cm
Width	59.7 cm
Depth	55.5 cm
Weight	53 kg
Wooden door	
Thickness	min. 16 mm
Thickness	max. 20 mm
Width	min. 592 mm
Width	max. 595 mm
Height	min. 620 mm
Height	max. 718 mm
Weight	max. 6.5 kg
Pivot range	max. 92 mm
Base height	min. 93 mm

Electronics system

Service electronics	see list of spare parts
Series electronics	see board imprint
UB	4619 720 96432
CB, programmed	453511
Data set	453501
Basis board	see board imprint
not programmed	4619 724 17441

Programme procedure

Programmes	see operating chart
Programme sequence	P1a - P3a - P5a - P7a

Energy label data

Reference programme	P5a
Energy category	A
Washing performance	B
Drying performance	B

Alarm

Rinse-aid indicator

Salt indicator

Programme information

End – acoustic signal

All programmes are interlocked subsequent to the start of a programme. In order to change or terminate a programme, press the START button for longer than 1.5 seconds.

In the case of programme interruptions, the programme will continue from where it was stopped.

Exception: programmes interrupted during the drying cycle will end.

Volumes (permanent rinse system)

Water	Content	Height
Back rinse 3x	1.0 l	60 mm
Pre-rinse	4.8 l	120 mm
Main rinse	4.2 l	118 mm
Intermediate rinse 1	4.2 l	118 mm
Intermediate rinse 2	4.2 l	118 mm
Rinse with a rinse-aid	4.2 l	118 mm
Safety level	8.5 l	141 mm

Measuring

Remove the coarse sieve, insert a measuring stick instead and read the level of the water.

Detergent max.

Pre-wash	10 cm^3
Main wash	40 cm^3
Rinse-aid	max. 135 cm^3
6 lines	1 - 6 ml

Water softener

Salt container	2 kg
Resin container	900 cm^3
Regeneration dispenser	300 cm^3

Water pressure

Supply pressure	0.3 - 10 bar
Circulation pump pressure	0.3 bar

Number of revolutions

Circulation pump motor	2800 rpm
Rinse water pump motor	3000 rpm
Lower spray arm	30 - 40 rpm
Upper spray arm	30 - 40 rpm
Ventilator	2500 rpm

Rate of flow

Water meter (at 0.3 bar = volume 1.1 l/min)	208 imp/l
Circulation pump	45 - 65 l/min
Rinse water pump	16 l/min
Pump height	max. 1.1 m
Supply valve	4 l/min
Lower spray arm	~ 33 l/min
Upper spray arm	~ 27 l/min
Overhead spray rinse	~ 8 l/min
Ventilator	
Total output	900 l/min
Primary output	210 l/min
Secondary output	780 l/min

Electrical data

Basic data

Voltage	220/230 V
Frequency	50 Hz
Connected load	2.0 – 2.2 kW
Fusing	10 A

Motors

Circulation pump motor

Voltage	220/240 V
Connected load	145 W
HI	69 ohms
HA	48 ohms
Condenser	4 µF

Rinse water pump motor

Voltage	220/240 V
Connected load	30 W
Resistance	146 ohms

Ventilator

Voltage	220/240 V
Resistance	141 ohms

Heater

Single-circuit system

Voltage	220/230 V
Connected load	1.87/2.04 kW
Resistance	24.5 ohms
Heating velocity	~ 2.0 °C/min
Surface temperature	~ 115 °C
Single safety thermostat self reconnecting	
Internal water temperature	85 °C
Safety mechanism	206 °C

Potentiometer

Measuring points: between 1 (black) and 2 (centre)

Position 0	0 k/ohms
Position 1	0.5 k/ohms
Position 2	1.0 k/ohms
Position 3	1.4 k/ohms
Position 4	1.8 k/ohms
Position 5	2.3 k/ohms
Position 6	2.6 k/ohms

Single supply valve

Voltage	220/240 V
Frequency	50/60 Hz
Resistance	3.76 k/ohms

Regeneration valve

Voltage	220/240 V
Frequency	50/60 Hz
Resistance	3.13 k/ohms

Coil for the combined dispenser

Voltage	220/240 V
Frequency	50/60 Hz
Resistance	1.3 k/ohms

Reed contacts

Water meter
Salt indicator
Rinse-aid indicator

NTC

20 °C	58.1 k/ohms
25 °C	47.1 k/ohms
30 °C	38.2 k/ohms
40 °C	25.4 k/ohms
50 °C	17.2 k/ohms
60 °C	11.8 k/ohms
70 °C	8.3 k/ohms
80 °C	6 k/ohms
85 °C	4 k/ohms

Regeneration

Volume	300 cm^3
Position 0	
After washing cycles	12
Water hardness	0 - 5 °dh
	0 - 0.9 mmol/l
	0 - 9 °Fh
Position 1	
After washing cycles	10
Water hardness	6 - 10 °dh
	1 - 1.8 mmol/l
	10 - 18 °Fh
Position 2	
After washing cycles	7
Water hardness	11 - 15 °dh
	1.9 - 2.7 mmol/l
	19 - 27 °Fh
Position 3	
After washing cycles	5
Water hardness	16 - 21 °dh
	2.8 - 3.7 mmol/l
	28 - 37 °Fh
Position 4	
After washing cycles	3
Water hardness	22 - 28 °dh
	3.8 - 5.0 mmol/l
	38 - 50 °Fh
Position 5	
After washing cycles	2
Water hardness	29 - 35 °dh
	5.1- 6.3 mmol/l
	51 - 63 °Fh
Position 6	
After washing cycles	1
Water hardness	36 - 60 °dh
	6.4 - 10.7 mmol/l
	64 - 107 °Fh
Salt consumption for regeneration	77 g
Number of rinse cycles with 2 kg of salt	26

9.2 Technical differences IGV 645.1

Programme procedure

Programme sequence A1a - A3a - A5c - A7a

Energy label data

Reference programme	A5c

Water	**Content**	**Hight**
Pre-wash	3.9 l	116 mm
Main wash	3.2 l	112 mm
Rinse-aid 1	3.2 l	112 mm
Intermediate rinse 2	3.2 l	112 mm
Rinse with rinse aid	3.2 l	112 mm

Circulation pump motor

Connection	125 W
HI	79 Ω
HA	60 Ω

Single supply valve

Voltage	220/240 V
Frequency	50/60 Hz
Resistance	3.76 kΩ

Spray arm movements (alterning wash system)

Start always with lower spray arm

Pre-wash	lower spray arm	- 3 min.
	upper spray arm	- 1 min.
Main wash	lower spray arm	- 3 min.
	upper spray arm	- 5 min.
Intermediate rinse	lower spray arm	- 2 min.
	upper spray arm	- 2 min.
Rinse with rinse aid	lower spray arm	- 2 min.
	upper spray arm	- 2 min.
Test programme	lower spray arm	- 30 sec.
	upper spray arm	- 30 sec.

Note: After programme interruption in the test programme the spray arms rotate again in the rhytm of the main wash (5/3 min.).

Important: For ending the test programme pre- the start key has to be pressed for more than 1.5 seconds.

After the ending of the test programme (LED end on and/or LED start off) the appliance has to be switched off; otherwise in the next washing the spray arms will continue to rotate in the rhythm of the test programme (30/30 sec.).

10. IGV 645 test programmes for customer service

Attention:

- **Risk of short-circuiting! Short circuits can destroy the controls (CB).**
- Do not switch the dishwasher on if the electronics system is damp.
- Re-connect the appliance to the mains in order to check it.
- Faults which occur during programme operation are recognised, indicated and stored. Any errors are immediately recognised once again on switching on the dishwasher, and are indicated by means of a flashing start LED.
  It is only possible to delete faults which have been stored by pressing the start button for more than 1.5 seconds.
- It is not possible to delete the faults F1 (NTC defect), F2 (water in the base pan) and F9 (constant water supply), so these faults have to be rectified before starting the active test programme, which would otherwise not be able to run.
- The electrical components are supplied with voltage by means of a triac. Should it be necessary to gauge the voltage supply of a component part, this may only be carried out parallel to the connected component part. Should the applied voltage of a retracted plug be measured, this voltage may be reduced as a result of a lack of component part resistance, thus causing the result to be incorrect.
- Once a programme has been started, it is automatically interlocked. This means that the programme selected cannot be changed, not by means of setting another programme neither by switching off the appliance and nor by paying out the appliance.
- It is only possible to change the programme by pressing the START button once again for longer than 1.5 seconds.
- In the case of dishwashers with a separate on/off switch, the programme used last is stored. If the customers wishes to use the same programme after switching on the appliance once again, only the main switch and the START button must be pressed.

Attention: The service controls (CB) supplied always start initially with the service test programme. This test programme is run without flushing back! There is a risk of overfilling the appliance if it is not empty. It is only when the test programme is started for the second time or another programme is started that a back wash is carried out as usual.

For fully-integrated appliances (full door) there is a

- **passive test programme**, which indicates faults stored. In the absence of a fault, the programme runs normally. Faults are indicated by means of a flashing START LED or indication of error codes in the display and an acoustic signal.
- **active test programme**, which is started subsequent to the passive test programme. This programme runs until the error position is reached, and stops, indicating a fault or, in the absence of a fault, the programme will run until completion.

Activating the passive test programme:

1. Open the door.
2. Select the 1st programme (1st programme from the left), should this programme not already have been pre-set.
3. Switch off the main switch.
4. Press the START button and keep it pressed.
5. Switch on the main switch.
6. Let the START button go when the start LED flashes.
7. A fault is indicated.
8. Rectify the fault.
9. Delete the fault by pressing the START button for longer than 1.5 seconds.
10. Re-start the passive test programme. If no fault is indicated, test all of the LEDs and then select programme 1 again.
11. End the passive test programme by pressing the START button once again.
12. Close the door. An acoustic signal will sound.
13. The active test programme commences.

Attention: Should it not be possible to start the active test programme (the start button does not flash), it generally means that one of the F1, F2 or F9 errors has occurred.
These errors must firstly be rectified before the active test programme can be started.
The fault must subsequently always be “quit” (deleted).

Attention: Should other LEDs flash in the test programme, or should they flash in any order which is not indicated on the “fault indication” sheet, and/or should an acoustic signal follow, the cause may be one of the following:

While the fault was being indicated

- **the zone washing button was pressed (START + zone washing LEDs light up),**
- **the dishwasher was switched off for a short time during the test programme, or the door was closed briefly and then opened again.**

Keep the START button pressed for longer than 1.5 seconds (resetting the electronics system). Close the door after you hear the acoustic signal. Re-start the passive test programme

Activating the active test programme:

- Start
- Back rinse only when the test programme is started for the second time.
- Inflow valve1 on
- After 3.4 litres circulation pump motor on
- Circulation pump motor off for 3 seconds
- Circulation pump motor on
- Dispensing magnet detergent/rinse on for 3 seconds.
- After 5 seconds heater relay on to 65 °C
  It is only in this position that it is possible to switch to the next position manually by means of pressing the START button with the door open.
  Acoustic signal after closing the door.
- Circulation pump motor off
- Inflow valve 2 on
- Rinse water pump on until water indicator switches back
- Ventilator drying on
- Inflow valve 2 off
  Rinse water pump off
  Ventilator drying off
- End

Attention: In order to exit the test programme keep the START button pressed for longer than 1.5 seconds.

A lack of both salt and of rinse-aid are only indicated, the dishwasher does not stop.

Attention: Once the test programme has been completed (normal end or termination by means of pressing the start button for at least 1.5 seconds), the start lamp goes off and the end LED goes on.

10.1 Fault indications and possible causes

F1 - NTC fault

Temperature is beyond the numerically evaluable range (-3°C to +85°C).

Possible cause:

- Inner temperature exceeds +85°C.
- NTC defect (short circuit or interruption).
- Temperature below -3°C (railway transport in winter).

In the case of temperatures below -3°C in the appliance, fill in a cup of warm water prior to starting in order to warm it up.

F2 - leakage

Water in the base pan.

Possible cause:

- Float switch LS6 switches off the inflow valve 1. The electronics system switches the rinse water pump on until the water indicator indicates that the dishwasher is empty.

F3 - Heating fault

Indication only appears after approx. 11 - 25 Min. (1^{st} enquiry after 5 min., after which two further enquiries are carried out before the fault is reported).

Heating velocity < 1.5 °C in 3 - 10 min.

Possible cause:

- Heating HEW defect.
- Heating relay 2 on the controls (CB) defect.
- NTC resistance fluctuations.

F4 - Discharge pumping error

Rinse water pump starts and after 4 minutes the water indicator has still not switched back.

Possible cause:

- Rinse water pump defect.
- Discharge pipe blocked (connection to siphon, siphon blocked).
- Controls (CB) defect.

F6 - Water tap closed

(is only shown after the start of the active test programme)

Inlet valve selected, but the flow meter (water meter) FM does not send out any impulses (< 10 impulses in 10 sec.) and WI is set at empty.

Possible causes:

- Tap closed.
- Water inlet blocked.
- Wasser inflow valve 1 is defect.
- Flow meter (water meter) FM is defect (changes to F 7 after a short time).
- Inflow pipe is blocked.

F7 - Flow meter error (water meter error)

Inflow valve WV1 is selected and WI is connected.

- Flow meter (water meter) FM is sending fewer than 10 impulses in 10 seconds.
- Water tap is closed during inflow.
- Inflow valve 1 develops a defect during inflow.
- Flow meter (water meter) FM defect.

F8 - Water level error

Mechanical water indicator:
FA fault is indicated if the circulation pump motor is in operation and the water indicator switch WI switches back more than 20 times in 20 min.

Optical water indicator OWI:
Every time there is no OWI signal subsequent to water flowing, the consuming devices are switched off for at east 5 seconds. If there is still no OWI signal after 5 seconds, indicator F8 follows. If, after the 5 second period, there is an OWI signal, water is filled in up to a max of 6 litres, and the consuming devices are switched on again. Should there subsequently be no OWI signal for the 2nd time, fault indication F8 will follow.

Possible cause:

- Water indicator defect (should switch after approx. 1 litre).
- Filters clogged.
- Foam in the rinse mixture.
- A bowl has turned over and is filled with rinse water.
- No stable circulation pump pressure.

F9 - Constant inflow of water

Inflow valve WV1 is not being targeted by the electronics system. The water indicator WI indicates water in the container, and the flow meter (water meter) sends out more than 10 impulses in 10 sec. to the electronics system.

Reaction: Interval 30 seconds rinse water pump on, 20 seconds rinse water pump off.

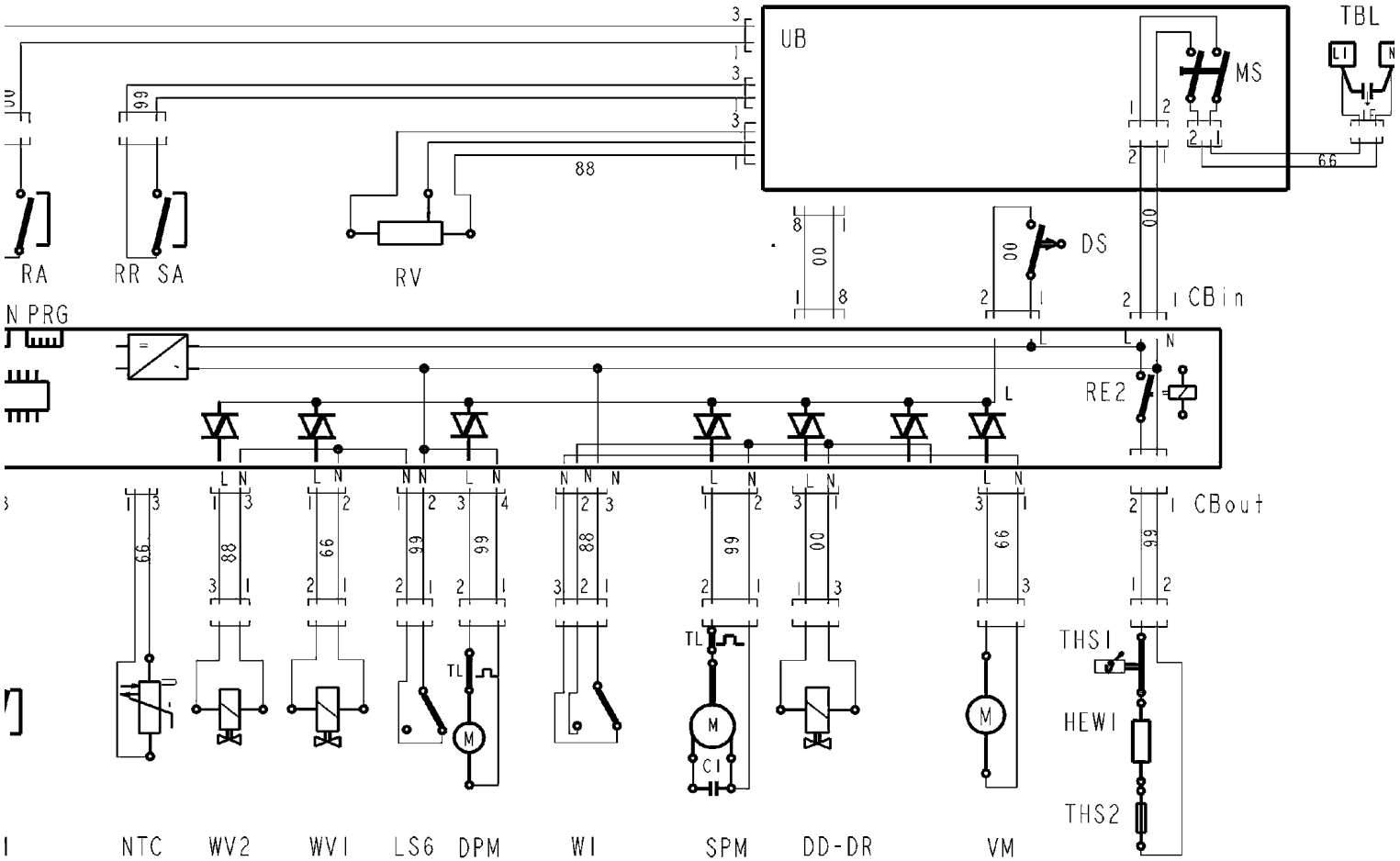
Possible cause:

- Inflow valve 1 is not closed mechanically.
- Triac on the CB is constantly targeted (short circuit).

10.2 Fault indication point – full door

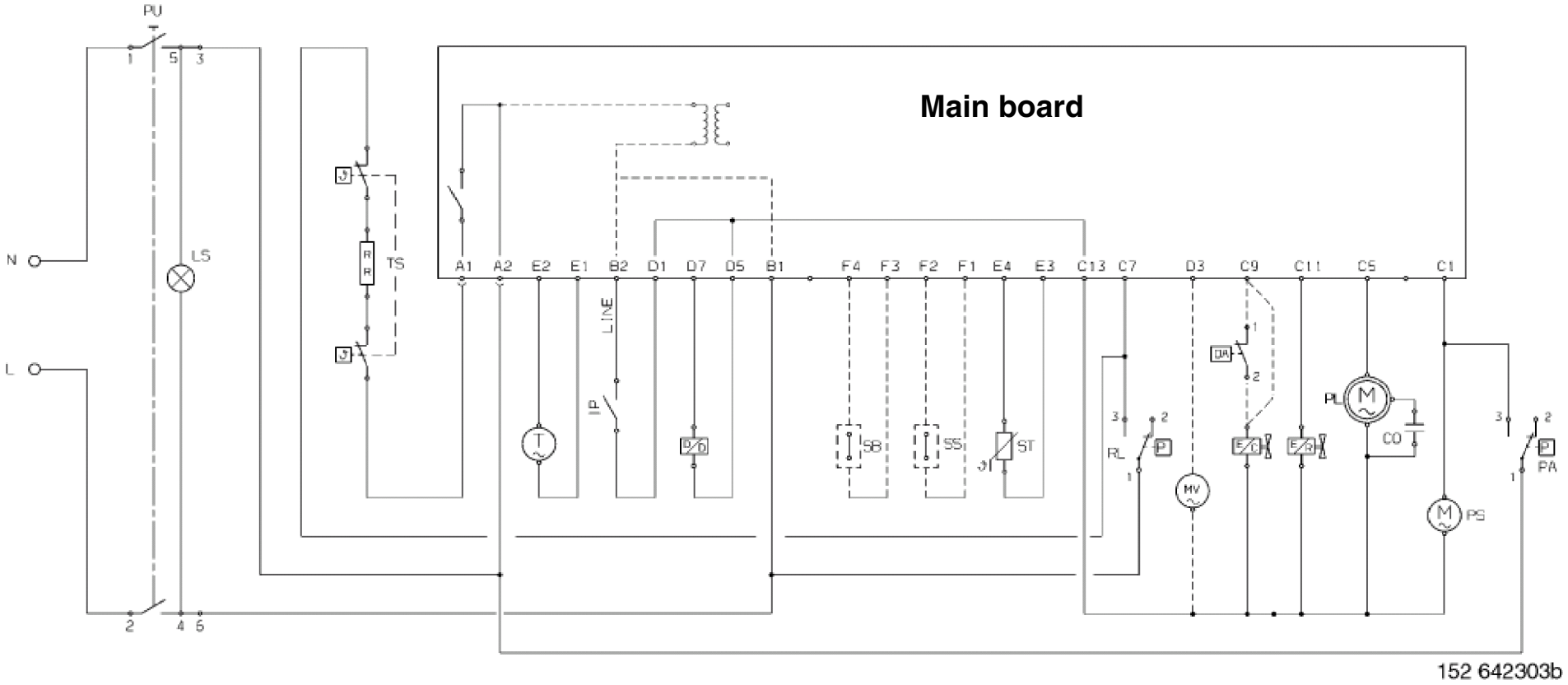
		Without 7 segmental indicator	
Alarm / Error code		Indicator not in test programme	Indicator in test programme
F1	NTC fault	F1 appears START LED flashes 1x, 1 sec interval; long acoustic signal, door closed	START LED flashes 1x, 1 sec. interval
F2	Leakage indicator	F2 appears START LED flashes 1x, 1 sec. interval; long acoustic signal, door closed	START LED flashes 2x, 1 sec. interval
F3	Fault in the heating system	F3 appears START LED flashes 1x, 1 sec. interval; long acoustic signal, door closed	START LED flashes 3x, 1 sec. interval
F4	Discharge pump fault	F4 appears START LED flashes 1x, 1 sec. interval; long acoustig signal, door closed	START LED flashes 4x, 1 sec. interval
F6	Tap closed (alarm signal)	F6 appears START LED flashes 1x, 1 sec. interval; long acoustic signal, door closed	START LED flashes 6x, 1 sec. interval
F7	Flow meter fault	F7 appears START LED flashes 1x, 1 sec. interval; long acoustic signal, door closed	START LED flashes 7x, 1 sec. interval
F8	Water level fault	F8 appears START LED flashes 1x, 1 sec. interval; long acoustic signal, door closed	START LED flashes 8x, 1 sec. interval;
F9	Constant inflow of water	F9 appears START LED flashes 1x, 1 sec. interval; long acoustic signal, door closed	START LED flashes 9x, 1 sec. interval;

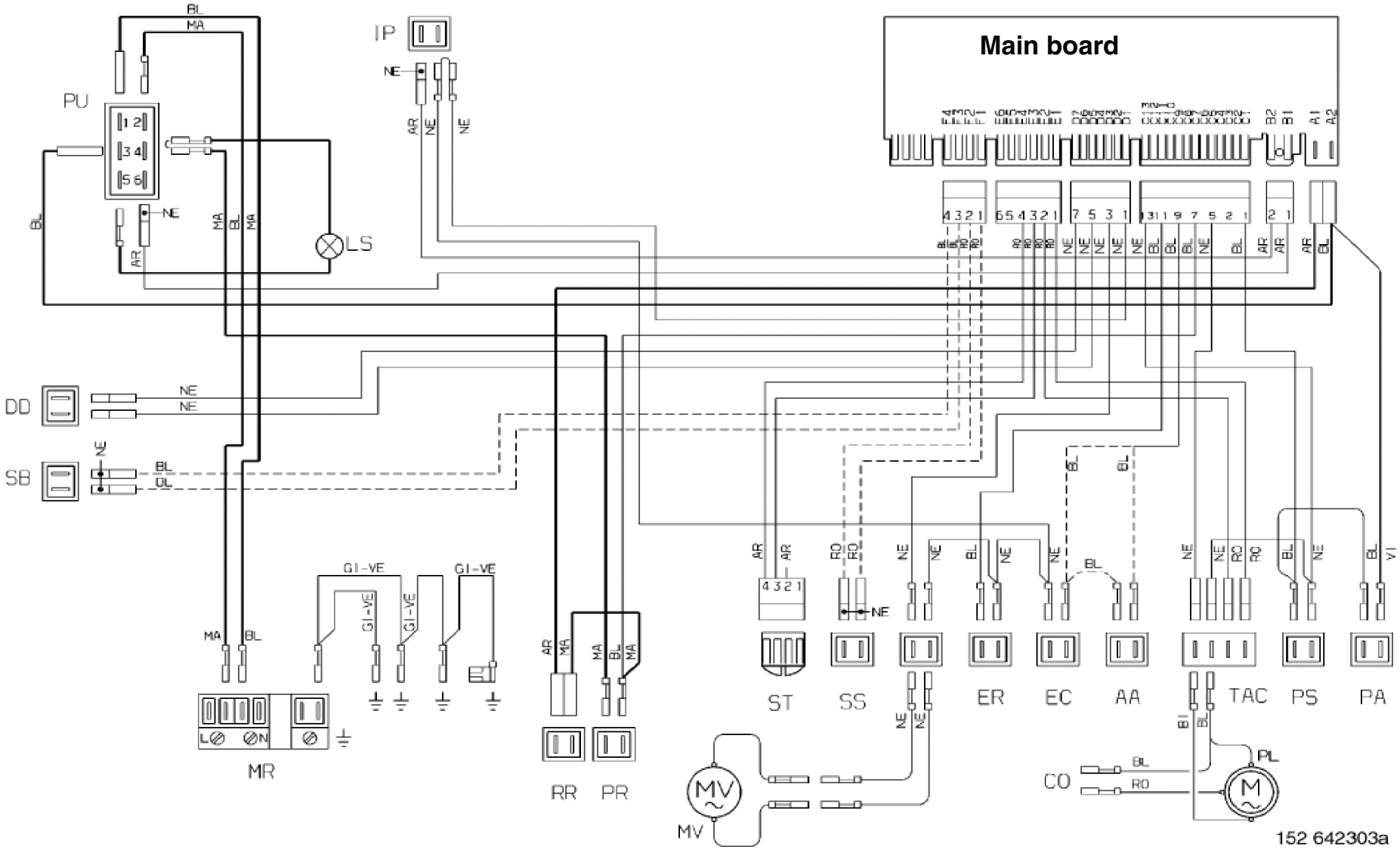
11. Circuit diagram IGV 645.0



4619 724 5352

12. Circuit and connection diagams IGV 645.1

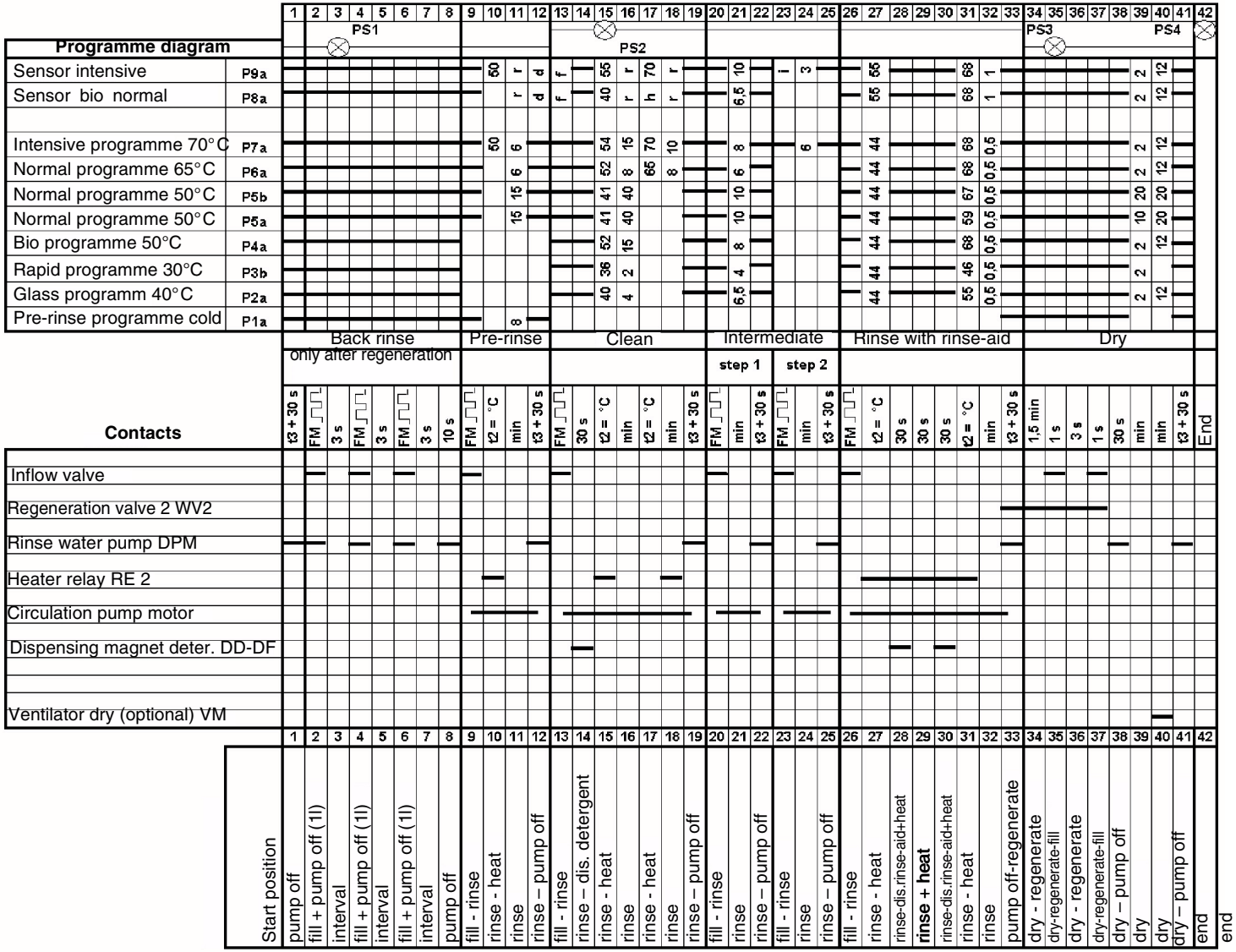



Main board
PU
IP
LS
DD
SB
MR
RR
PR
MV
ST
SS
ER
EC
AA
TAC
PS
PA
CO
BL
MA
NE
AR
RO
GI-VE
PL
VI
152 642303a

Circuit diagrams - legend

ASA/	Automatic salt adjustment
WHS	Water hardener sensor
C1	Condenser
CB	Controls
CULCD	LCD control unit
DB	Display board
UB	User board
DLB	Delay timer
DPM	Rinse water pump
DD	Detergent dispenser
DON	Clouding sensor
DR	Rinse-aid dispenser
DS	Door switch
DVH	Diverter valve high
DVL	Diverter valve low
FM	Water meter
HEWI	Heater
IF	Spark intrusion filter
LS6	Float switch base pan
L	Cable
M	Motor
MS	Main switch
NTC	NTC temperature gauge
N	Neutral
OWI	Optical water indicator
PRG	Programming plug
RE2	Heater relay
RR SA	Reed contact salt
RR RA	Reed contact rinse-aid
RV	Water hardness switch
SAB	Spray arm sensor
SPM	Circulation pump motor
TBL	Connector block
THS1	Safety thermostat
THS2	Thermostat fuse
TL	Motor protection
UB	Input electronics
VM	Fan
WI	Water indicator / membrane switch
WV1	Inflow valve
WV2	Regeneration valve
ZW	Zone wash valve
00	Black
66	Blue
88	Grey
99	White

Closing plan IGV 645.0



d: Discharge depending on how dirty the water is

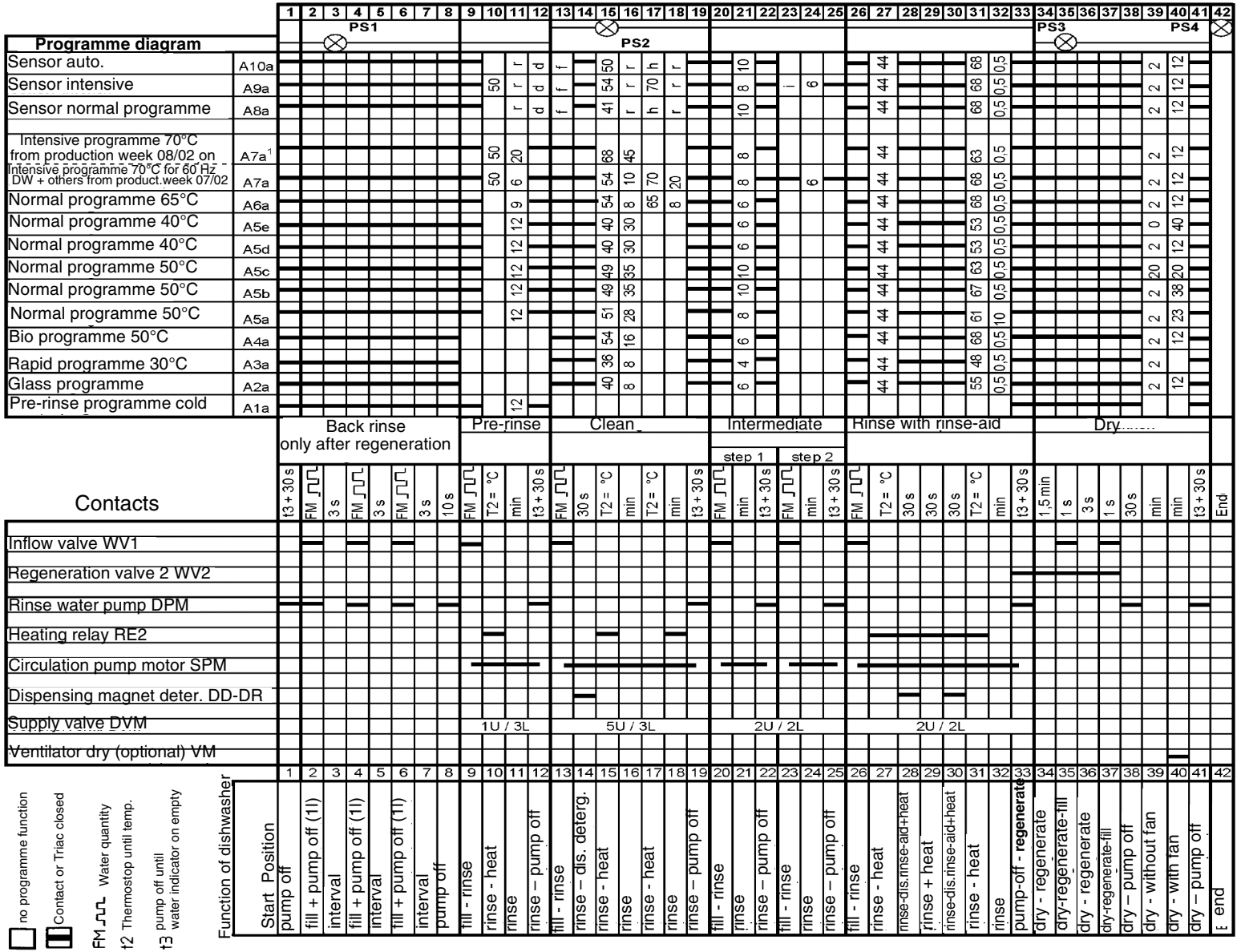
f: Water inlet only if previously emptied (see d).

h: Heater (40°C to 70°C) depending on how dirty the water is

r: Rinse 0-12 min. depending on how dirty the water is

i: 2. intermediate rinse depending on how dirty the water is

Closing plan IGV 645.1



d: Discharge depending on how dirty the water is

f: Water inlet only if previously emptied (see d).

h: Heater (40 °C to 70 °C) depending on how dirty the water is

r: Rinse 0-12 min. depending on how dirty the water is

i: 2. intermediate rinse depending on how dirty the water is

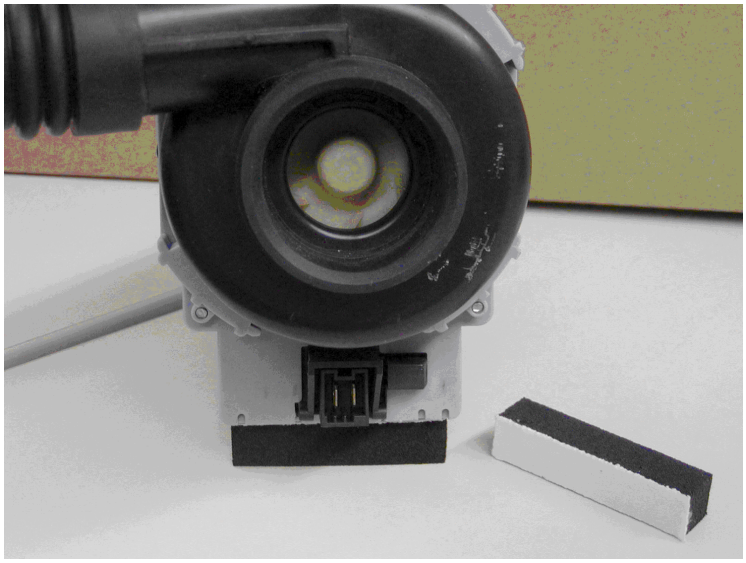
13. Engineering change

13.1 Discharge pump - Noises and vibrations - IGV 645.0/.1

It may sometimes happen that the discharge pump touches the drip tray thus causing undesirable vibrations and noises.

From calendar week 35 onwards, the motor will be turned though 90° in production in order to increase the distance between the motor and the drip tray.

Until that time a foam rubber element (spare part No. 435 368) can be inserted as illustrated in the picture.

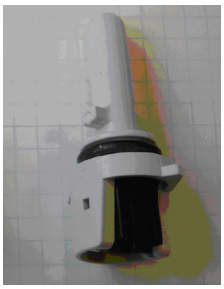


13.2 NTC IGV 645.0/.1

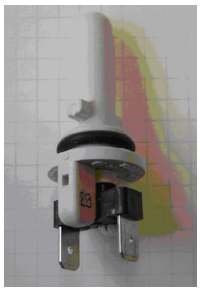
New NTC kit for IGV 645.0/.1 with integrated control board

At present the dishwashers with a control board behind the base have an NTC with a connector with 2.5 mm contact pins (A), the appliances with an integrated control board an NTC with a plug-in connector (B)

A



B



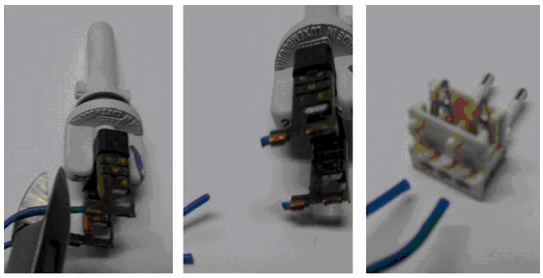
The new NTC kit comprises:

- NTC with connector with 2.5 mm contact pins
- Cabling for both sides
- Additional plug-in connector

Replacement in appliances with an integrated control board

The door need **not** be dismantled!

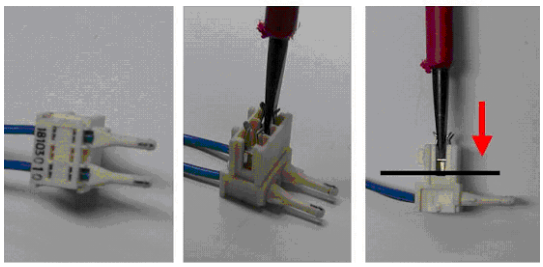
1. Cut off the NTC wires on the plug-in connector.
2. Connect connector with 2.5 mm contact pins.
3. Connect NTC.

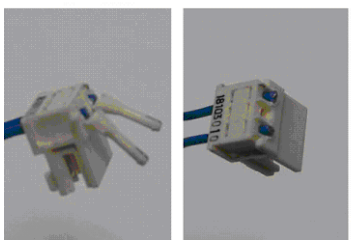


Replacement in appliances with control board behind the base

1. Use the cabling provided as the new connection between the control board and the new NTC kit.

   The NTC kit is also available as a spare part under the spare part No. 434 738.





14. Instructions for mounting – Long water inlet hose with security

Before starting work, check that kit contains:

1 x water inlet hose with security
depending on the indications given on the package: valve type 1 or 2

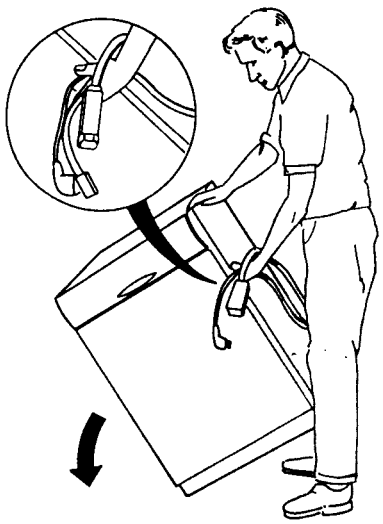
1 x hose clamp

cable clamps

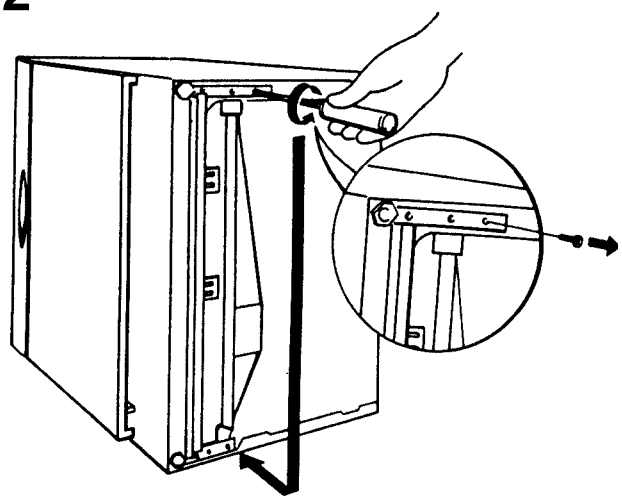
Mounting:

1. Before beginning the mounting read the following instructions carefully!
   Mounting must only be performed by qualified electricians.
2. Remove the plug from the socket: there must be no current to the appliance.
   Close the tap and detach the water supply pipe from the dishwasher.
3. Follow the instructions.

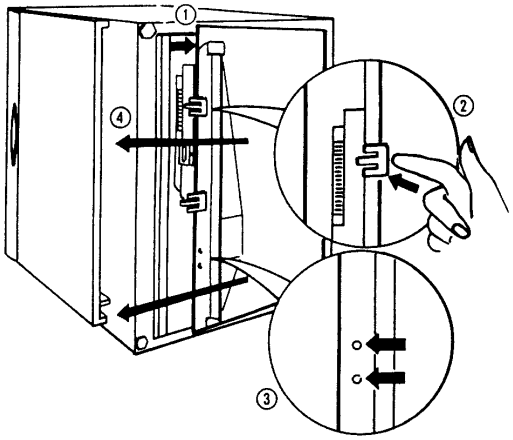
1



2

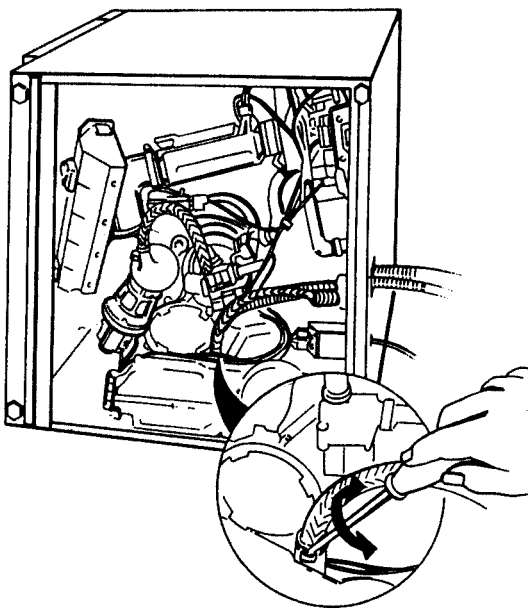


3



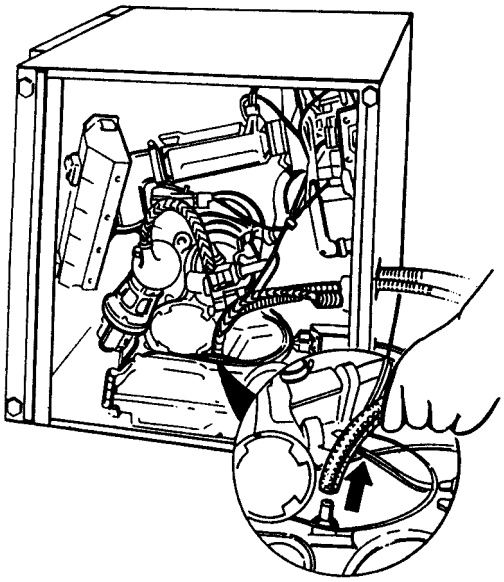
①	②	③	④
Ⓓ Bodenwanne leicht nach vorne klappen.	Elektronikgehäuse aushängen.	Klipse hineindrücken.	Bodenwanne nach vorne hinausziehen.
Ⓖ Lift the bottom tray front slightly.	Unhook and remove the electronic control box.	Press the spring stops.	Withdraw the bottom tray from the front.
Ⓕ Soulever légèrement le bac de récupération inférieur vers l'avant.	Décliper et enlever le boîtier électronique.	Pousser le clips vers l'intérieur.	Sortier le bac, en le tirant vers l'avant.
Ⓝ Klap de bodemkuip iets naar voren.	Hang de elektrische doos uit de bodemkuip.	Klemmen indrukken.	Bodemkuip van voren verwijderen.
Ⓔ Levantar ligeramente el fondo hacia delante.	Desprender y sacar la caja de mandos electrónicos.	Presionar los topes de muelle.	Extraer el fondo por la parte anterior.
Ⓟ Levante levemente o fundo para a frente.	Desenganche e retire a caixa dos comandos electrónicos.	Carregue nas peças de bloquear em mola.	Faça deslizar o fundo da parte anterior.

4



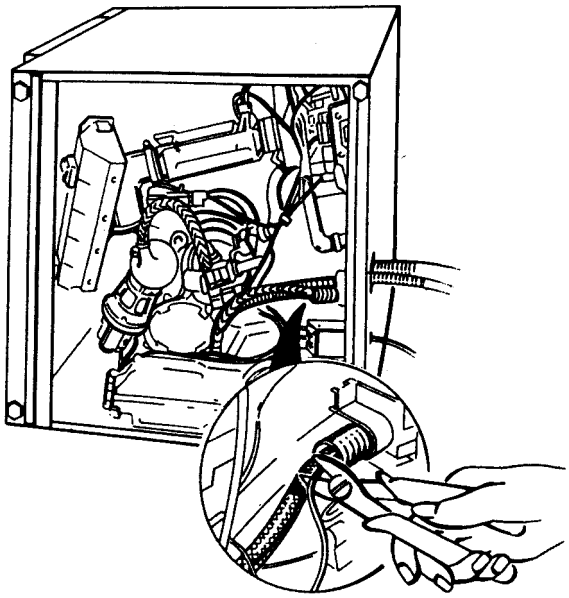
Ⓓ Schelle mit Schraubendreher lockern.
Ⓖ Slacken the hose clamp using a screwdriver.
Ⓕ Ouvrir le collier à l'aide d'un tournevis.
Ⓝ Draai de klamp vast met een schroevedraaier.
Ⓔ Aflojar el collarín utilizando un destornillador.
Ⓟ Afrouxe a faixa com a ajuda de uma chave de fendas.
Ⓘ Allentare la fascetta utilizzando un cacciavite.

5

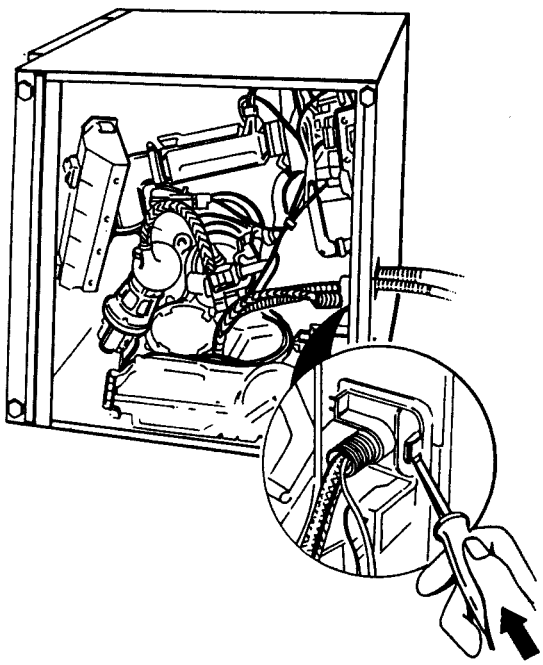


Ⓓ Hinweis: Alte Schelle entfernen!
Ⓖ N.B.: remove the old clamp.
Ⓕ Note: Enlever le vieux collier.
Ⓝ Opgelet: Verwijder de oude klamp!
Ⓔ Cuidado: sacar el collarin viejo.
Ⓟ Atenção: retire a faixa velha.
Ⓘ Attenzione: togliere la fascetta vecchia.

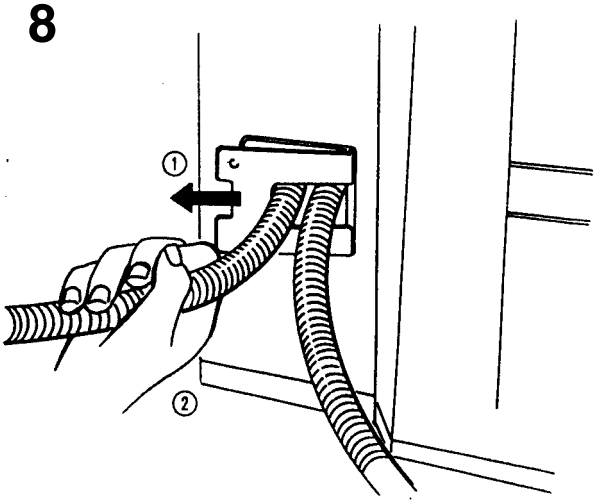
6



7



8



②

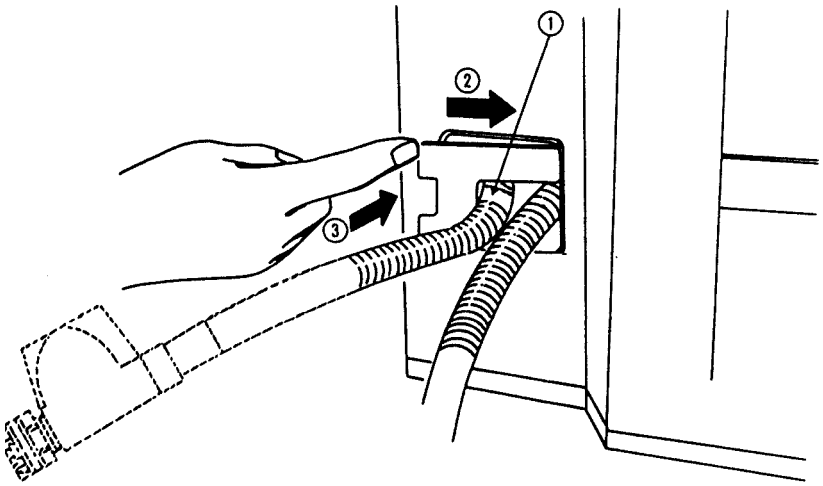
Ⓓ Kurzen Wasserstopschlauch entfernen.
Ⓖ Remove the short water inlet hose with security.
Ⓕ Retirer le tuyau d'alimentation d'eau court avec sécurité.
Ⓝ Verwijder de korte slang met waterstop.
Ⓔ Sacar el tubo corto largo dotado de dispositivo acqua-stop.
Ⓟ Retire o tubo dotado de dispositivo de „water stop".
Ⓘ Togliere il tubo di alimentazione corto con dispositivo di sicurezza.

9

Ⓓ Langen Wasserstopschlauch einsetzen.
Ⓖ Insert the long water inlet hose with security.
Ⓕ Introduire le tuyau d'alimentation d'eau long avec sécurité.
Ⓝ Breng de lange slang aan.
Ⓔ Introducir el tubo largo dotado de dispositivo acqua-stop.
Ⓟ Introduza o tubo comprido dotado de dispositivo de „water stop".
Ⓘ Inserire il tubo di alimentazione acqua lungo dotato di dispositivo di sicurezza.

①

Ⓓ Markierung beachten!
Ⓖ Make sure that the marked points correspond!
Ⓕ S'assurer que les repères correspondent!
Ⓝ LEt op de aanduiding!
Ⓔ Cuidado: los untos marcados tienen que corresponder!
Ⓟ Atencão para que os pontos indicados correspondam!
Ⓘ Assicurarsi che i punti contrassegnati corrispondano!



③

Ⓓ Schnapphaken muß einrasten: Klick!
Prüfen: Schläuche müssen gegen Herausziehen gesichert sein!
Ⓖ The press closing device must click!
N.B.: the hoses must be so fixed that they cannot come out of their seat.
Ⓕ Encliqueter le presse-tuyau jusqu'au déclic.
Note: S'assurer que les tuyaux soient bien fixés et ne peuvent sortir.
Ⓝ De haak moet vastklikken (dat is te horen)!
Controleer of de slangen stevig vast zitten!
Ⓔ Tiene que quedar unido el dipositivo de cierre a saltos.
Cuidado: los tubos tienen que estar fijados de modo que no puedan salir de sus asientos.
Ⓟ O dispositivo de fecho de tranqueta será introduzido.
Atenção: os tubos terão de ser fixados por forma a que os mesmos não possam sair.
Ⓘ Chiudere lo stringitubo fino allo scatto.
Attenzione: assicurarsi che i tubi siano ben fissati e non possano uscire dalla loro sede.

10

11