Service instructions

MEIKO – Dishwashing machine model K-Tronic

MEIKO Maschinenbau GmbH & Co. KG, Postfach 2040, D-77652 Offenburg, Tel.: +49/781/203-0, Fax: +49/781/203-1174

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1 Introduction and general information

To the authorised customer service technician,

Please first read the Installation Instructions, the Operating Instructions and these Service Instructions carefully.

These instructions will familiarise you with
- The installation
- The operating methods
- Its use
- The safety instructions and
- the maintenance

of this cleaning and disinfection appliance.

In the event of any damage caused by non-observance of these operating instructions, any guarantee claims are invalid. We accept no liability for any consequential loss or damage arising as a result.

MEIKO is constantly working on the further development of all its models. We would therefore ask you to understand that because of this, we must reserve the right to make modifications at any time to any items covered by the contract in terms of their shape, fittings and technical characteristics.

No claims may therefore be based on the details, the images or the descriptions contained in these operating instructions.

You receive this Service Instruction free of charge. Further copies may be made available against the payment of a fee.

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1.1 Explanation of the safety symbols used

The following safety symbols will appear throughout these service instructions.

 **ATTENTION!**	This symbol warns that there is danger to human life and health.
	Warning of dangerous electrical current!
	Warning of possible hand injuries!
	Beware of hot water / (hot surfaces)
 **DANGER!**	This symbol warns that there is danger to the installation, to the material or to the environment.
	Do not spray with a hose or a high pressure cleaner!
	Use protective gloves!
	Use safety glasses or goggles!
	This symbol denotes information that helps you to understand the installation's operation.

1.2 Authorized users of this documentation

The works described in these Service Instructions may only be carried out by specialists of the manufacturer, the responsible agency or an authorized dealer.

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2 General safety instructions

2.1 Operator's duty of care

Measures to ensure the safe operation of the machine:
The operator must ensure in particular that ...

... … in order to preserve the operational and safety guarantees, whenever required, only original parts supplied by the manufacturer are used.

…the user will lose the right to any possible claims if the appliance is modified using any parts other than original parts.


ATTENTION!

..... a functional test on all safety systems of the machine is carried out during every regular maintenance.

Be careful when closing the wash-chamber door. **Do not catch your hand!**


ATTENTION!

You must not make **any alterations** after the assembly, commissioning and the hand-over of the machine to the customer/operator (e. g. electrical connection, supply of water, steam, connection to waste water or position). Modifications of the appliance, especially technical modifications without the written approval of the manufacturer and from non-authorized persons lead to the total **loss of the right to claim under the guarantee** and invalidate our product liability.

2.2 Fundamental safety measures


ATTENTION!

Danger can arise from the improper use of the cleaning and disinfection machine or if it is used for purposes for which it was not intended.

Parts carrying electric current as well as moving or rotating parts can cause
- Dangers to the user's life and limb and
- Material damage

The machine operates with hot water.
Avoid all contact with the rinse water. There exists therefore the **danger of scalding.** As a result, the dishes etc being washed are at high temperature. Take suitable precautions. Observe all the instructions posted on the machine.

WARNING!
When electrical equipment is in operation, it is inevitable that certain parts carry a dangerous current.
ALL current to the whole machine MUST be switched off before the machine's cladding or electrical equipment is opened.
PLACE THE MAIN SWITCH IN THE "OFF" POSITION and install suitable security measures to prevent the switch from being switched on.
Work on and rectification of malfunctions on the electrical portion of the appliance must only be carried out by specialists who have been trained and authorised by MEIKO. The Health and Safety Regulations must be observed.

The machine, switch cabinets and other electrical components must NOT be sprayed with a hose or a high pressure cleaner.


ATTENTION!

Repairs and maintenance on the cleaning and disinfection appliance must only be carried out by specialists who have been trained and authorised by MEIKO.
Work and malfunction rectification on the steam installation must only be carried out by specialists.

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Use safety glasses or goggles!
Always wear safety glasses or goggles when working on the dosing system.

WE ACCEPT <u>NO LIABILITY</u> FOR DAMAGE OR INJURY ARISING FROM FAILURE TO OBSERVE AND ABIDE BY THESE SAFETY INSTRUCTIONS.

2.2.1 Working on electrical equipment

ATTENTION!

Any repair work and repairs to the power supply on the installation's electrical equipment may only be carried out by a qualified electrician trained and authorized by MEIKO.

Check the electrical equipment regularly!
Tighten any loose connections!
Replace any damaged leads/cables immediately!

Always keep the switch cabinets locked! Access is only allowed to qualified persons.

2.3 Connection to the electricity supply

Work on the electrical part of the machine may only be undertaken by specialist personnel.

ATTENTION!

The wiring diagram is located in the switch cabinet. This wiring diagram is part of the machine and therefore must not be removed.

The manufacturer's plate with the connected electrical loads is located inside the switch cabinet.
General Electrical Regulations must be observed when connecting the machine to the power supply.

<u>Attention:</u>
The fuses on site must be selected to suit the local conditions and the appliance's nominal current in such a way that back-up protection is guaranteed (Germany: VDE 0100).
The mains supply cables must be provided with fuses in accordance with regulations and must have a main switch (accessible on site or inside the appliance for operating personnel). If the neutral conductor (N) is not grounded, a 4 phase main switch must be used. Cables connecting to the main power supply must be oil-resistant and sheathed and must not be lighter than an H 07 RN-F cable. The potential equalisation connection must be carried out in accordance with the requirements of the local electricity supply company and all applicable local regulations (in Germany VDE 0100 Part 540 must be observed).
Where VDE 0160 / EN 50178 applies, there is a requirement that in areas of electrical equipment where line-side residual current protective circuit breakers (FI) are planned or installed, an FI type B device sensitive to all types of currents must be installed before the FI type A.
For the supply connection use a 5-pole terminal strip (L1, L2, L3, N, PE).

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The electrical connection data, voltage, type of current, output can be seen on the manufacturers' plates on the machine.

Please check the voltage.

All electrical connections must be made inside the electrical switch cabinet by means of marked screwed cable glands as in the circuit diagram and connected to the terminals and the fuses provided.

Every time that electrical components are replaced, repaired or connected and disconnected, a safety test must be conducted on at least the relevant component!

2.4 Connection to energy optimisation units

The following points must be observed if the appliance is connected to an energy optimisation unit:

1. Because of the voltage drop, the cable to the heating system contactor which is to be used for the switching operation must be limited to a length of 100 metres in the case of 1.5 mm^2 cross-section.
2. The disconnection period must not exceed 10 seconds per minute. Ensure that the programs are extended by the disconnection period.

3 Commissioning

In order to avoid damage to the installation and the injury and death of persons when commissioning the installation, the following points must be observed without fail:

Any necessary initial tests to parts supplied by sub-suppliers, such as heat pumps or other equipment, must be carried out. More detailed information, if required, can be found in the relevant Instructions for Use.

ATTENTION!

- The installation may only be commissioned by suitably qualified persons observing the safety instructions.
- Before initial startup, check that any tools and parts not belonging to the installation have been removed.
- Check whether any escaping liquid is removed.
- Activate all the safety systems and door switches before commissioning.
- Check that all screw connections are tight.
- Please also read the chapter on "General safety instructions ".

Commissioning and instructions will be provided by technicians specially trained by Meiko. After these processes are complete, the installation will be handed over to the authorized person who will sign for it. The appliance may only be used after the instruction has been completed.

4 Instructions for commissioning

4.1 Works to be carried out before commissioning

All the points in this section must be observed before initial commissioning.

Water pipes

All pipes must be thoroughly flushed out. The heating system must not be switched on when this is being done (remove the fuses) in order to prevent the heating elements from operating when the system is dry. All dirt collectors must be cleaned afterwards.

Steam pipes

All pipes must be thoroughly flushed out. When doing so, all control valves must be fully open and all condensate traps removed. All dirt collectors must be cleaned afterwards.

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Connection to the electricity supply

- Tighten all electrical terminals in the switch cabinet; check that electrical plugs/jacks are firmly in position.
- All motors must be checked for the correct direction of rotation.
- Carry out a visual check on all electrical equipment (e.g. switches, cables, housings, covers).
- Carry out functional tests on all electrical switches.

Internal regions of the machine
Ensure that there are no foreign bodies inside the machine (e.g. cleaning rags, loose bolts/washers/nuts, tools, packaging materials etc.).

Important !!!
Ensure that friction cannot occur where moving parts pass close to fixed parts. (e.g. rails, water deflectors and others).

Ensure that all wash pipes, wash systems, rinse arms, screens and filters, tank covers, waste pipes, waste screens and swing valves on the entry and discharge section are installed. Ensure that all the parts are correctly installed.

4.2 Chemical product settings

The correct settings for the quantity of detergent and rinse agent depend on the product used. The relevant chemical supplier can install the correct setting.

5 Brief description of the controls

The controls consist of the following components:

CPU circuit board, MIKE2-CPU2 circuit board
The clear text display (LCD display with 4 x 20 characters), the micro-processor, an EPROM and an EEPROM are on the CPU circuit board. The control software is located in the EPROM and the EEPROM. The CPU circuit board communicates with the I/O circuit board via the CAN-bus.

Power pack, MIKE2-NET1 circuit board
A primary pulsed switching power pack with an input voltage range of 180 to 265 V (50 – 60 Hz) is used. The output side consists of 12 V DC and 24 V DC with a maximum output of 50 W.

Input/output MIKE2-E/A1 circuit board
On the basis of the modular concept (CAN bus), different system configurations can be realized depending on the requirement.
Depending on the stage of development, one or more E/A3 circuit boards are used for recording/controlling the periphery in addition to the E/A1 circuit board.

The so-called tank circuit boards TP) are connected in parallel to the E/A3 circuit board via a ribbon cable.
Up to max. 6 of these tank circuit boards are recorded by an E/A3 circuit board. These tank circuit boards are mounted externally on the individual circulation tanks (apart from KV) and indicate the *Min. filling level*, the *Max filling level* at the tank furthest away from the main wash tank (WT1), a group signal *DOOR CLOSED* and max. 4 tank temperatures to the CPU via the E/A3 circuit board.

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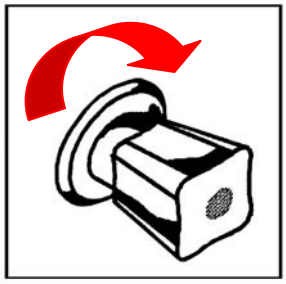
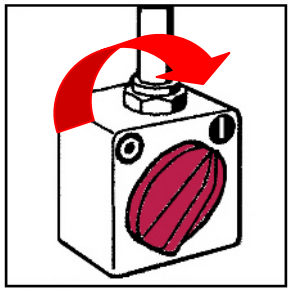
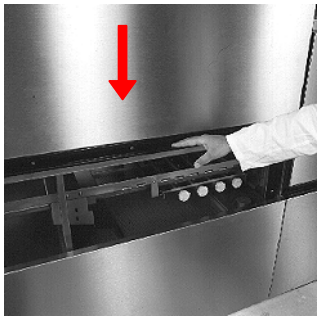
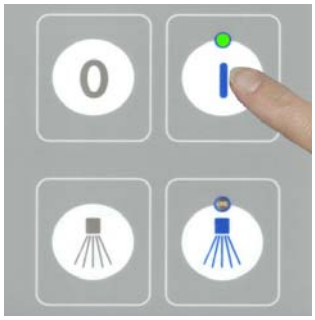
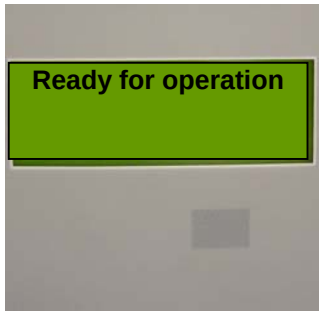
6 Operating level

6.1 Operation

<table>
<tr>
<td>  </td>
<td>  </td>
<td rowspan="2">Ensure that all wash pipes, wash systems, rinse arms, screens and filters, tank covers, waste pipes, waste screens and swing valves on the inlet and waste pipes are installed.
Ensure that all the parts are correctly installed!</td>
</tr>
<tr>
<td>Open the stop valve in the water pipe.</td>
<td>Switch on the power supply from the building.</td>
</tr>
<tr>
<td>  </td>
<td> 
</td>
<td> 
</td>
</tr>
<tr>
<td>Close the doors.</td>
<td>The wash tanks can be automatically filled and heated by means of the ”Fill/Heat“ button.</td>
<td>Once the wash tanks are filled and have been heated to the washing temperature, the display will show: “Ready for operation”</td>
</tr>
<tr>
<td>  </td>
<td colspan="2" rowspan="2">Once the wash tanks are filled and have been heated to washing temperature, the machine is started with the ”Start“ button. The conveyor and the wash pumps now operate so that the washing process can begin. The machine is normally equipped with rinse water conservation; in other words the rinse process is not in operation continuously.

All other functions, e.g. temperature monitoring or wash tank water level checks are performed by the machine control; thus no other manual operations or checks are needed.</td>
</tr>
<tr>
<td>Press the start button to start the dishwasher</td>
</tr>
</table>

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6.2 Information output

Information output from Eprom version V0.9N uses the following tree structure so as to improve the structure of the information.

Information output
- Temperatures
  - Temperature VA
  - Temperature WT6
  - Temperature ...
  - Temperature WT1
  - Temperature PKSP
  - Temperature KSP1
  - Temperature KSP2
  - Temperature TR
- Operating times (incl. date of reset)
  - Next maintenance
  - Total operating time
  - Wash pump operating time
  - Drying fan operating time
  - Basket counter
- Consumption (incl. date of reset)
  - Water consumption KSP1
  - Act. flow KSP1
  - Water consumption KSP1
  - Act. flow KSP2
  - Water consumption (filling water)
- General
  - AU no.
  - Serial number
- Heat pump
  - Status heat pump (hot gas bypass)
- Operation diary
  - View operation diary
  - Water change?
  - Basic cleaning?
  - Repair?
  - Rinse agent change?
  - Detergent change?

Certain information (described in the following table) can be called up irrespective of the process status of the appliance by pressing the arrow key ▲ or ▼.
Pressing the arrow button moves you onto the next or the previous line. The output of information is ended in the last line by pressing ▼, or (if you are in the 1st line) by pressing ▲.
If the arrow is not pressed for a defined time, the information output phase is automatically left. (Information output is released only in the operating level, and not during the paramterise).

The date of the last re-set will be shown as well as the value that was captured.

Some more details on each item:

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Information output	Note
Next maintenance in	Operating hours till next maintenance
Total Operation time	Counting up in the operating conditions Filling/Heating/Ready for op./Operation
Running time Wash pumps	Counting up while WP ON; Applies as reference for maintenance!
Running time Drying fan	Counting up while fan ON;
Number of baskets	If basket counter available;
FR water consumption	Display with one decimal place
FR water flow	Current actual value
FR2 water consump.	Display with 1 decimal place (Only if available)
FR2 water flow	Current actual value (Only if available)
Water consumption filling valve	Only if water meter available (see separate parameter)
Temperature PW	Actual temperature prewash tank (PW) (Only if available)
Temperature WT6	Actual temperature wash tank 6 (WT6) (Only if available)
Temperature WT5	Actual temperature wash tank 5 (WT5) (Only if available)
Temperature WT4	Actual temperature wash tank 4 (WT4) (Only if available)
Temperature WT3	Actual temperature wash tank 3 (WT3) (Only if available)
Temperature WT2	Actual temperature wash tank 2 (WT2) (Only if available)
Temperature WT1	Actual temperature wash tank 1 (WT1) (Only if available)
Temperature PAR	Actual temperature pump final rinse (PAR) (Only if available)
Temperature FR	Actual temperature final rinse 1 (FR)
Temperature FR2	Actual temperature final rinse 2 (FR2) (Only if available)
Temperature Drying	Actual temperature drying (Only if available)
Serial number	Option for calling up works parameters
Order number	Option for calling up works parameters
Heat pump deactivated or Defrosting in operation or Power regulation in operation Or Defrosting / Power regulation in operation or Hot gas by-pass OFF	Only if a heat pump is available Output depending on the status of the entries *low pressure switch* *defrosting* or *high pressure switch* *power regulation*

6.3 I/O Status OUTPUT

When the machine is in the operating conditions *Machine Off, Fill/Heat, Ready for Operation, Operating* and *Pumping out,* it is possible (option) to obtain information on the status of digital inputs and outputs and the temperatures of an I/O module in the 1st, 3rd and 4th lines (the 2nd column continues to display the operating condition).

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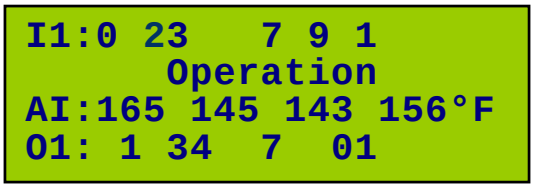
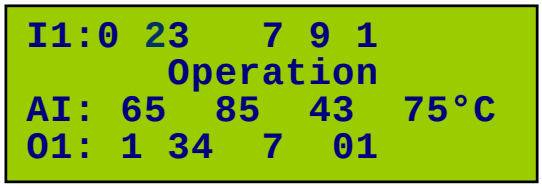
It is helpful to obtain detailed information without having to look elsewhere when servicing and commissioning machines (e.g. connect notebook).

If the information display is not in current use, status information on the inputs/outputs from the individual I/O circuit boards can be called up at the same time as the process (but not when in parameterising mode) provided that the function is available (see service level parameter P128).

By pressing the arrow key ➔ or ← (depending on the process status of the appliance) current status information on the inputs/outputs can be called up as described in the examples below. Each touch of the key moves you onto the next or the previous available input/output circuit board address. The I/O status display is ended by pressing the ➔ key on reaching the last address or pressing the ← key on reaching the first address. If no arrow key is pressed for a specific period (4 minutes), the input/output status output is automatically left.

If the option “display input / output status“ has been activated, the LCD display appears as follows (time, date, etc is therefore removed and only the information from an input / output component can be displayed. The selection function is available):





The 1st line shows the status of the following inputs (activated display of the number means that current can flow (status 1)):
From the left: 0, 1, 2, ..., 7 Digital inputs as in the circuit diagram
8, 9, 0, 1 Condition of the conductivity inputs/digital inputs as in the circuit diagram (only for I/O1 circuit board)
(the above example indicates that I1.0, I1.2, I1.3, I1.7, I1.9, I1.11 are active)

The outputs are arranged as follows in line 4 (activated display of the number means that the corresponding output has just been switched on):
From the left: O1: 0, 1, 2, ..., 9, 0, 1 outputs 0 .. 11 as in the circuit diagram
(the above example indicates that O1.1, O1.3, O1.4, O1.7, O1.10, O1.11 are active)

The temperatures of the sensors connected to the corresponding I/O circuit board are shown in line 3:

From left: Temperature 1
Temperature 2
Temperature 3 (only I/O3 circuit board)
Temperature 4 (only I/O3 circuit board)

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7 PARAMETERISE

The following describes how the user can set and adjust process parameters at a later date. Different **user access levels** have been realized:

Operating level -> All users (see chapture operating level)

- Operating the machine
- Acknowledging faults
- Reading out counter statuses (see information output)

User level (level 1) -> "Specialist distributors"
Access by entering a code (5 figures)
10000 read
10001 edit

Several sub-menus:
- View / amend list of configuration parameters
- Conveyor backwards (only as long as the button is activated)
- Set date + time

Technician level (level 2) -> Official Meiko works representatives:
Access by entering a code (5 figures)
20000 read
20022 edit

The user parameter list will be extended depending on the user level!

Further sub-menus (including user level):
- View / Control outputs (see “Manual Operation“)
- Rinse water manual measuring (1 min.)
- Refilling cycles (option)

Modification depending on the access level:
- view / amend transport (including I/O allocation)
- view / amend KV resp. CSS Top (including I/O allocation KV)
- view / amend PW (including I/O allocation PW)
- view / amend WT 1 .. 7 (including I/O allocation WT)
- view / amend PAR (including I/O allocation PAR)
- view / amend FR 1.2 (including I/O allocation WT)
- view / amend drying (including I/O allocation Drying)
- view / amend heat pump (including I/O allocation heat pump)
- view / amend global I/O allocation
- view / amend wash programs 1 .. 20

Generally is valid:

The following 6 buttons are used for dialogue in the parameter levels:
Arrow keys  or  - Browse the parameter list, change values (up / down)
Arrow keys  or  - Change to variable following to the left or right of the actual value
 key - Accept value or selection (see *Return);*
- or changeover from view mode to edit mode

 key - Leave the menu item (cf. the ESC key); in the edit mode you will be asked if the amendment you have just entered should be deleted and not saved. (Exception for the operation diary: Key )

The corresponding feedback responses are realized via the LCD module.
(The membrane key-pad LEDs are dark in parameterization mode).

If the  or  key (change value) is pressed for a longer period (e. g. 1 second) an auto-repeat function is activated; in other words, the list of possible values will be shown

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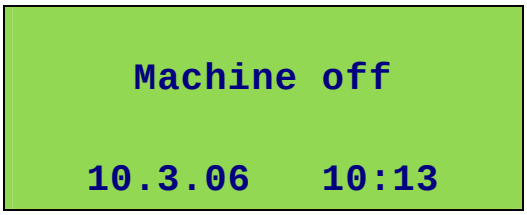
in quick succession (e.g. 5 values per second) until the key is released.

When in editing mode, the present parameter value flashes slowly to indicate the current parameter setting. If no key is pressed for a specific period, the parameter level is automatically left and the appliance reverts to "*Machine OFF*" status. All the other functions of the appliance are blocked while this dialogue is shown.

7.1 Access to the parameter setting level

Note on the code entry:
The code entered is compared with an internal code table after complete entry. The corresponding selection menu items are enabled, depending on the code entered.
2 access codes are stored for each user level; the first is for restricted access, i.e. it is not possible to change the parameters (view mode), the second enables the complete functional scope (changing values).
The access code for the technician level incorporates the user level.

Starting point: *Machine OFF*

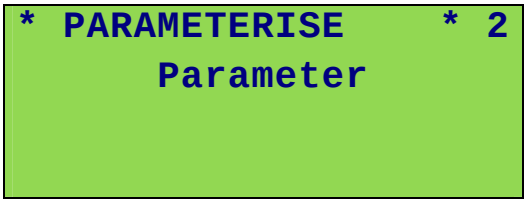


1. Access: Press the key for 2 seconds. You will then be asked to enter the access code:

2. Enter the access code (5 figures):
The cursor appears at the 1st figure (0 appears and flashes)
Use the or keys to move the first figure to the required value.

Use the and keys to move to the next position. Code entry is concluded by pressing the . key after entering all the required figures.

In the following the user level is indicated on the top right showing the corresponding number of the level.



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3. You can move through different sub-menus by using the arrow keys or .
The last displayed menu item is confirmed by pressing .
Selection:

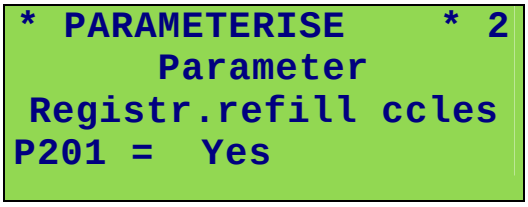
- View / amend parameter list

or

- Reverse conveyor

- etc.

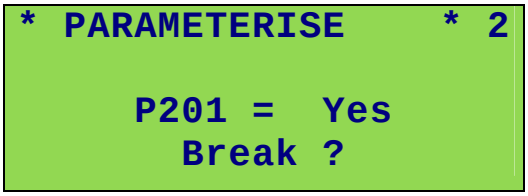
4. The first parameter in the list appears with its current value. You can move through the list by using the arrow keys and . It is possible to *edit* the value by pressing .



The value now flashes and can be amended within the appropriate range by pressing / .

The required value is confirmed / stored by pressing .

5. By pressing the key the editing can be aborted if an already modified value is not to be stored. However, in the edit mode you will be asked if the amendment you have just entered



should really be deleted and not saved. Consequently, the operator can correct the action in case the key has been activated erroneously. Confirmation by pressing or return by pressing .

7.2 User level 1 - User

7.2.1 User parameter

Par. No.	Text in LCD display	Description
108	Temperature in °F	LCD display: Standard (0): °C Option (1): °F Conversion: F = 9/5 * C + 32 or C = 5/9 * (F –32)
111	Time display	0: Time not displayed 1: displayed as 24 hour clock 2: displayed as 12 hour clock (am/pm) (Note: P110 has priority)
112	Date display	0: date not displayed 1: Format day.month.year (standard) 2: Format year.month.day 3: Format month.day.year (Note: P110 has priority)

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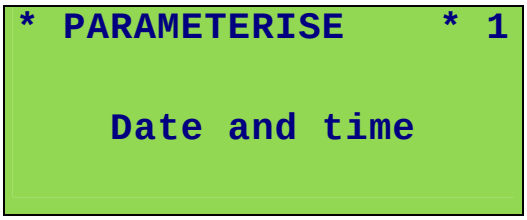
Par. No.	Text in LCD display	Description
113	Time selection poss	Option available ? (Automatic switch-on filling/heating)
114	Language	Collecting language EEprom contents
115	LCD contrast	0 .. 15 steps
116	LCD backlighting	0 .. 15 brightness steps
117	Flow rate in gall./h	Flow rate displayed in the following units: 0 : rate in litres / hour (l/h) 1 : rate in gallons / hour (g/h) here: US: 1 gal = 3.7854 L (UK: 1 gal = 4.5461 L))
129	Approve IR	Activate infrared interface

7.2.2 Set date and time



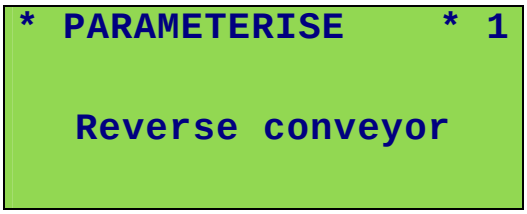
1. Scroll to the display "Set date and time".

Press the key -> Edit mode

2. The cursor is in the *sec.* field and is flashing: the arrow key or is used to correct the figure.
3. Use the arrow keys or to move to the next positions.
4. key -> Displayed settings are confirmed and edit mode is left.

7.2.3 Conveyor backwards (Option)

The conveyor is activated to move backwards as long as the key is released.



7.3 User level 2 - Technician

7.3.1 Other parameters

Par. No.	Text in LCD display	Unit	Description (0: no; 1: yes)
101	Reset maintn.counter		0: no; 1: yes Reset maintenance counter (When quitting the parameter level the reset is carried out)
102	Reset operation time		0: no; 1: yes Reset operation time (se operation diary)
103	Reset water consumpt.		0: no; 1: yes Reset water consumption, reset refilling cycles (se operation diary)
104	Wash program I		Allocation of a program number to button I
105	Wash program II		Allocation of a program number to button II
106	Wash program III		Allocation of a program number to button III
107	Default wash program		Preset definition

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			Program Selection button after reaching ready for operation
109	Temp.3rd line on/off		Display temperature according to P126 (3rd line) if: 0: no 1: Filling/heating 2: Ready for operation 3: Operation 4: always (1, 2 and 3)
110	Temp.4th line on/off		Display temperature according to P125 or P127 (1st or 4th line) if: 0: no 1: Filling/heating 2: Ready for operation 3: Operation 4: always (1, 2 and 3)
125	Temperature 1st line		Definition temperatures to be displayed per line Determination (2 temp. per line possible): 0: no display 1: Temp. PW 2: Temp. WT7 .. 8: Temp. WT1 9: Temp. PAR 10: Temp. FR 11: Temp. FR2 12: Temp. Drying Example: 8 10 WT1 FR
126	Temperature 3rd line		see P125
127	Temperature 4th line		see P125
128	I/O display active		Enable I/O status: 0: no 1: yes
201	Registr.refill ccles		Log refilling cycles; Activate monitoring ?
202	Error behaviour		Individual determinations: (Bit 7 ..... Bit 0) Bit 0: All pumps OFF and conveyor OFF if pump error Bit 1: All pumps OFF and conveyor OFF if fan error Bit 2: Conveyor stop in case of min. temp. WT Bit 3: Conveyor stop in case of min. temp FR1/2 Bit 4: Conveyor stop in case of low flow in FR Bit 5: Bit 6: Bit 7:
203	Starting condition	-	Define the criteria (temperature) for reaching "ready for operation": 0: set temperature of WT1 1: set temperature of PKSP 2: set temperature WT1 + P302 3: set temperature PKSP + P302 The actual temperature in WT1 and

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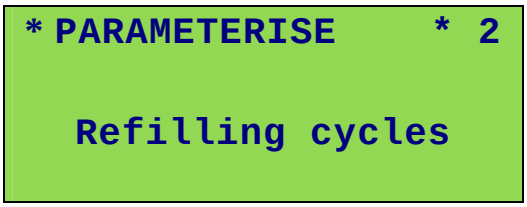
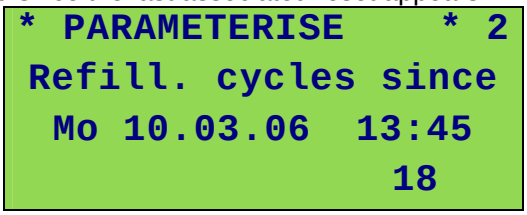
			PKSP must comply with the above conditions on one occasion.
204	All min lev for heat	-	Require all minimum queries (tank level) to be a condition for heating the tank.
205	Demo mode	sec.	0 : Normal operation Other: Demo mode with cycle time At start fill/heat, min 1, min 2 and max are simulated in turn in order to be able to demonstrate the machine without water (display..)
217	Running direction L>R		Only for visualization purposes 0: R -> L; 1: L -> R
218	Maintenance cycle		Number of operating hours to maintenance (in steps of 100);
220	Load setting param.		Possibility of loading works parameters
302	Offset tank temp	K	During filling/heating or in 'ready for operation' and operation (as long as the WP is not running) the tank temperature set value is increased by this offset
303	Pause time mix	Sek.	Waiting time till start of the recirculation pumps for mixing in filling/heating or in 'ready for operation' Precondition: MIN available, door CLOSED, wash pump OFF)
304	Circulation time	0,1 Sek.	Waiting time till start of the recirculation pumps for mixing in filling/heating or in 'ready for operation' (Precondition: Heating ON, door CLOSED, wash pump OFF)
306	Refill time	Sek.	Tank filling extension after reaching of all MIN. (only if MIN value fallen below)
307	Filling monitoring	Min.	Filling monitoring for reaching MIN query or MAX query (per tank)

7.3.2 View refilling cycles (Option)



On selection, the number of cycles entered since the last associated reset appears.



7.3.3 Rinse water manual measuring

On selection during 1 minute the mains

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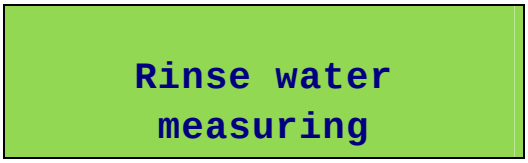
separation pump and the filling valve of FR/FR2 is activated.



7.3.4 Small pre-wash (KV)

Text in LCD display	Unit	Description
Overfill time	Sec.	Filling extension of the tanks after reaching MAX (only in filling/heating)

7.3.5 Pre-wash tank (PW)

Text in LCD display	Unit	Description
Set temperature	° C	Also a corrective valve in the rinse program (reduction)
Calibration sensor	K	Adjustment option
Drain Pump after-run	Min.	Wash-water pump after-run time after falling below MIN in VA
Deactiv. delay Refilling	Sec.	Deactivation delay if the water falls below the MIN level (only start re-filling after this time)

7.3.6 Wash tank 1-.. 7 (WT 1 .. 7)

Text in LCD display	Unit	Description
Set temperature	° C	Also a corrective valve in the rinse program (reduction)
Calibration sensor	K	Adjustment option
Drain Pump after-run	Min.	Wash-water pump after-run time after falling below MIN in VA
Deactiv. delay Refilling	Sec.	Deactivation delay if the water falls below the MIN level (only start re-filling after this time)

7.3.7 Pump final rinse (PAR)

Text in LCD display	Unit	Description
Set temperature	° C	Also a corrective valve in the rinse program (reduction)
Calibration sensor	K	Adjustment option
Drain Pump after-run	Min.	Wash-water pump after-run time after falling below MIN in VA
Deactiv. delay Refilling	Sec.	Deactivation delay if the water falls below the MIN level (only start re-filling after this time)

7.3.8 Final rinse 1 / 2 (FR / FR2)

Text in LCD display	Unit	Description
Set temperature	° C	Definition for controller and monitoring; Also a corrective valve in the rinse program (reduction)
Calibration sensor	K	Adjustment option

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7.3.9 Drying (BD)

Text in LCD display	Unit	Description
Set temperature	° C	Definition for controller and monitoring;
Calibration sensor	K	Adjustment option

7.3.10 Heat pump (HP)

Text in LCD display	Description
Deactivate heat pump	Instead of the heat pump functionality (compressor, fan, pump), additional heating is now activated in the FR (heating 3 parallel with heating 1) and the heating regulation enabled by WT1 (was not activated at all, or only activated to a limited extent, see cold water filling)

7.3.11 Transport (TRSP)

Text in LCD display	Description
Impulse switch mode	Activate system units depending on present crockery (in wash operation)? 0: NO 1: Impulse switching only for PAR and FRx (Clean water conservation unit) 2: Impulse switching without transport stop (impulse switching for all systems except transport) 3: Impulse switching with transport stop (impulse switching for all systems)
Imps. till trsp.stop	Effect only on transport controls (if impulse switch mode=3)
Imps. till KV start	Evaluate shift register (KV)
Impulses duration KV	After-run extension KV
Imps. till PW start	Evaluate shift register (PW)
Impulses duration PW	After-run extension PW
Imps.till WT7 start	Evaluate shift register (WT7)
Impulses duration WT7	After-run extension WT7
.....	.....
Imps. till WT1 start	Evaluate shift register (WT1)
Impulses duration WT1	After-run extension WT1
Imps. till PAR start	Evaluate shift register (PAR)
Impulses duration PAR	After-run extension PAR
Imps. till FR start	Setup shift register (FR)
Impulses duration FR	After-run extension FR
Imps. till FR2 start	Evaluate shift register
Impulses duration FR2	After-run extension FR2
Imps.till BD start	Evaluate shift register (BD)
Impulses duration BD	After-run extension BD
Conv on after delay	The conveyor is switched on again with a time delay after the conveyor switch is released.

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8 Error indication, Information and Instructions

8.1 Error indication, no wash process possible

Err. No.	Display	Note / Possible causes	Possible measures
		System	
1	External EEPROM	EEPROM not available, no data	Plug in EEPROM or re-define (download with M-Commander)
2	Internal EEPROM	Hardware defect; change CPU circuit board Download language set	Change CPU circuit board Download language set.
3	System error SW	Software system error or electromagnetic compatibility problems Defect or damp in the membrane key-pad	Test with a new membrane key-pad
4	EEPROM language	Hardware defect	Change input/output circuit board
5	I/O-board defective	RAM, ROM, PROG test defective;	Replacing I/O circuit boards in succession
8	Program-number not defined	Wash program (speed etc.) not defined	Allocate an available program to the key (see parameter P104 - P106)
		General information	
101	Emergency stop act.	Emergency stop switch has been activated	
		Tank	
201	Timeout on filling	Set level in tank not reached at right time (P307); Water supply from the mains inadequate; Inlet valve does not open (correctly) mechanical / electrical; Cable broken in wiring to the valve; Level sensor defective	Release the emergency stop
202	Refill error	Set level in tanks not reached at right time (P307); Water supply from the mains inadequate; Inlet valve does not open (correctly) mechanical / electrical; Cable broken in wiring to the valve; Level sensor defective	Float hanging, check tank circuit board position
		Conveyor system	
701	Conveyor overload	Blockage Motor protection switch triggered Overload detected Frequency converter	Remove blockage, (reverse conveyor if necessary). Measure voltage / power consumption. Adjust overload system. Check parameters.

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Err. No.	Display	Note / Possible causes	Possible measures
		CAN communication	
801	Communication with CAN-bus address 1	Communication cable not connected; CAN address switch wrongly set. No power supply to I/O circuit board; I/O circuit board defective.	Connect. Settings as in the circuit diagram Ensure power available Replace I/O circuit board Switch main switch off and back on
802	Communication with CAN-bus address 2	See above	
803	Communication with CAN-bus address 3	See above	
804	Communication with CAN-bus address 4	See above	
805	Communication with CAN-bus address 5	See above	
806	Communication with CAN-bus address 6	See above	
807	Communication with CAN-bus address 7	See above	
808			
809	Undefined bus address recognized	Undefined bus users recognized (CAN address switch wrongly set).	Check address switch; correct parameter set
900	No I/O type defined	Wrong parameterization (P310,311,..,323=0)	Correct parameter set
901	IO type on bus addr.1 incompatible	Wrong I/O type (P310) with CAN addr. 1 Faults through light sources with infrared component -> deactivate the infrared communication via P129 for testing	Check I/O type; Correct parameter set
902	IO type on bus addr.2 incompatible	Wrong I/O type (P311) with CAN addr. 2	Check I/O type; Correct parameter set
903	IO type on bus addr.3 incompatible	Wrong I/O type (P312) with CAN addr. 3	Check I/O type; Correct parameter set
904	IO type on bus addr.4 incompatible	Wrong I/O type (P313) with CAN addr. 4	Check I/O type; Correct parameter set
905	IO type on bus addr.5 incompatible	Wrong I/O type (P314) with CAN addr. 5	Check I/O type; Correct parameter set
906	IO type on bus addr.6 incompatible	Wrong I/O type (P315) with CAN addr. 6	Check I/O type; Correct parameter set
907	IO type on bus addr.7 incompatible	Wrong I/O type (P316) with CAN addr. 7	Check I/O type; Correct parameter set

8.2 Error indication, restricted wash process possible

Info No.	Display	Note / Possible causes	Possible measures
		System	
10	Water change completed	Only manual entry possible (Operation diary)	
11	Basic cleaning completed	Only manual entry possible (Operation diary)	
12	Repair OK	Only manual entry possible (Operation diary)	
13	Maintenance OK	Automatic entry on reset of maintenance counter (see parameter P101)	

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Info No.	Display	Note / Possible causes	Possible measures
14	Rinse agent changed	Only manual entry possible (Operation diary)	
15	Detergent changed	Only manual entry possible (Operation diary)	
		General information	
110	Maintenance needed	Maintenance is needed	After maintenance being carried out the maintenance counter must be reset on configuration level (parameter P101)
111	Door open	Close door Door switch (reed contact) incorrectly set or defective; cable broken, contact on door switch; Input to the I/O circuit board defective	
112	Password wrong	Entry code not available in internal table	Correct entry code
113	Setting parameters activated	The power supply must be interrupted to release the factory setting parameters (switch off main electrical power switch) P130, P220 or P327 activated	
114	EEPROM emerg.setting	Emergency strategy EEPROM problems active, i.e. the device can also be operated without an EEPROM in certain circumstances	Supply EEPROM with data via replacement parts service and put on CPU2
115	EEPROM was empty. Re-initialise	EEPROM was empty or incomplete -> Data was been copied from the internal EEPROM to the plug-in EEPROM Message is automatically deactivated on program (only devised as information, as the complete extent of the program is not available)	Supply EEPROM with data via replacement parts service and put on CPU2 Transfer parameter set by M-Commander again
117	High Limit Switch temp. exceeded	Safety temperature monitoring for heating element indicates alarm Lighting for heating defective.	Ascertaining the cause (heating circuit) and possible component replacement
118	Battery empty	If a voltage interruption occurs, the date and time are not defined	Replace battery
119	Err. real time clock	Error with real-time on CPU2 Date and time cannot be used	Replace CPU2
		Wash tanks	
210	Temperature in pre-wash too high	Actual temperature in the NDV too high (maximum exceeded)) Setpoint temperature too low; No water feed.	
211	Tank temperature not reached	Tank temperature not reached at the right time Tank heating element defective; Contactor defective; STP has triggered	
212	Tank temperature too high	Actual temperature in tank too high Contactor sticking; temperature sensor defective; Plug contact temperature sensor with high resistance	
213	Tank temperature sensor shortcut	Short circuit tank temperature sensor. Short circuit in the wiring; damp in the connector.	

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Info No.	Display	Note / Possible causes	Possible measures
214	Tank temperature sensor break	Cable to tank temperature sensor broken. Connector incorrectly connected; crimp connection inadequate	
215	Pre-wash temperature sensor shortcut	Short circuit pre-wash temperature sensor. Short circuit in the wiring; damp in the connector.	
216	Pre-wash temperature sensor break	Cable to pre-wash temperature sensor broken. Connector incorrectly connected; crimp connection inadequate	
217	Wash tank low temp	Wash tank low temperature heating element defective; Water transfer; Insufficient heating capacity; Temperature sensor wrongly installed	
218	Circ pump error	Signal "circulation pump error" pending Motor overload switch triggered	
219	Low temperature PKSP	Heating element defective; Insufficient heating capacity; Temperature sensor wrongly installed; Water transfer; Refilling; Suction too strong	
220	Excessive temperature PKSP	Actual temperature in tank too high; Contactor sticking; Relay on I/O circuit board sticking; Temperature sensor defective; Plug contact temperature sensor with high resistance	
221	Malfunction pump KV	Signal "circulation pump error of KV" pending Motor overload switch triggered	
222	Malfunction pump VA	Signal "circulation pump error of VA" pending Motor overload switch triggered	
223	Malfunction pump WT7	Signal "circulation pump error of WT7" pending Motor overload switch triggered	
224	Malfunction pump WT6	Signal "circulation pump error of WT6" pending Motor overload switch triggered	
225	Malfunction pump WT5	Signal "circulation pump error of WT5" pending Motor overload switch triggered	
226	Malfunction pump WT4	Signal "circulation pump error of WT4" pending Motor overload switch triggered	
227	Malfunction pump WT3	Signal "circulation pump error of WT3" pending Motor overload switch triggered	
228	Malfunction pump WT2	Signal "circulation pump error of WT2" pending Motor overload switch triggered	
229	Malfunction pump WT1	Signal "circulation pump error of WT1" pending Motor overload switch triggered	

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FR1/2			
310	Temperature FR too high	Actual temperature in FR too high (maximum exceeded) Contactor sticking; temperature sensor defective; Plug contact temperature sensor with high resistance	
311	Temperature FR too low	Required temperature permanently too low Heating element defective; Water transfer; Insufficient heating capacity	
312	FR sensor shortcut	Short circuit FR temperature sensor Short circuit in the wiring; Damp in the connector.	
313	FR sensor break	Cable to FR temperature sensor broken. Connector incorrectly connected; Crimp connection inadequate	
314	FR sensor shortcut	Short circuit FR2 temperature sensor Short circuit in the wiring; Damp in the connector.	
315	FR2 sensor break	Cable to FR2 temperature sensor broken. Connector incorrectly connected; Crimp connection inadequate	
316	FR: flow too low	Volume flow too low (no water) Mains separation pump; Filling valve	
317	FR2: flow too low	Volume flow too low (no water) Mains separation pump; filling valve	
318	Temperature FR2 too high	Actual temperature in FR2 too high (maximum exceeded) Contactor sticking; temperature sensor defective; Plug contact temperature sensor with high resistance	
319	Temperature FR12 too low	Required temperature permanently too low Heating element defective; Water transfer; Insufficient heating capacity	
320	Malfunction pump PKSP	Signal "circulation pump error of PKSP " pending Motor overload switch triggered	
321	Malfunction pump KSP1	Signal "circulation pump error of KSP1" pending Motor overload switch triggered	
322	Malfunction pump KSP2	Signal "circulation pump error of KSP2" pending Motor overload switch triggered	
Heat pump			
510	Overload compressor	Motor overload switch compressor	
511	Heat pump exhaust air fan	Motor overload switch exhaust air fan	
512	Heat pump tank water circulation pump	Motor overload switch Tank water circulation pump	
513	Heat pump low pressure	Low pressure switch has caused disconnection	
514	Heat pump overpressure	Overpressure switch has caused disconnection	

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515	Thermal contact compressor	Thermal contact on compressor has triggered	Find cause for raised temperature Malfunction must also be acknowledged in addition
		Drying	
610	Low temperature drying zone	Tolerance range exceeded	
611	Drying temp. sensor short cut	Short circuit drying temperature sensor. Short circuit in the wiring; damp in the connector.	
612	Drying temp. sensor break	Cable to drying temperature sensor broken. Connector incorrectly connected; crimp connection inadequate	
613	Drying fan error	Motor overload switch fan triggered	
614	Excessive temperature Drying	Permissible maximum exceeded	
615	Suction fan malfunction	Suction fan power switch triggered	
		Conveyor system	
710	End switch activated	Crockery at the conveyor end	Remove crockery
711	Error impulse transmitter transport	If the impulse switch mode is PARAMETERISE d and the transport activated, a cycle impulse must be received for each time unit; in the event of an error, the units are switched to continuous running Reed switch defective; Magnet on rotary disk incorrectly positioned	
713	Malfunction rinse agent	Rinse agent empty?	
714	Malfunction detergent	Detergent empty?	
715	Malfunction gas module	See gas module description	
716	External water treatm. malfunction	See description of the water treatment equipment	
717	External conveyor	see circuit diagram description	
		CAN communication	
815	KMM connection interrupted	CAN connection interrupted; KMM (communication module) does not respond	

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8.3 Other possible malfunctions

Situation	Result / Reaction	Possible causes	Possible measures
Nothing works, everything dark, buzzer off	LED on the circuit board not ON	12V power supply (power pack) not available; overload due to short circuit in the low tension area	Check function of power-pack
Nothing works, no text on LCD, background illumination on, buzzer on	LED on the circuit board not ON	EPROM missing or wrongly connected	Check EPROM and correct if necessary.
LCD dark and dots missing; otherwise normal function.		LCD defective	Change CPU
Infra-red communication not possible.		Membrane key-pad dirty; Parameterisation error	Test communication by RS232. Change EEPROM if necessary and change CPU.
CPU is reset during course of program.	Display dark for a short time; the controls are then initialised.	Overload on the switching mode power supply, short circuit in consumer; power failure to the building	Identify cause by disconnecting individual consumers.
CPU continually initialised.	Not possible to start the program	IrDa interface overloaded	Interrupt communication
All LEDs activated (flashing).	Not possible to operate the machine	Short circuit caused by damp in the membrane key-pad or in the connecting plug/jack	Disconnect membrane key-pad connecting plug/jack and test program start by external button; change membrane key-pad. Test the button; change membrane key-pad
Membrane key-pad not working correctly.	Allocation of the program selected and the reaction do not coincide	The membrane key-pad is not properly plugged into the CPU	Connect the connector correctly.
No reaction to any key on the membrane key-pad	Machine cannot be used	The membrane key-pad is not connected to the CPU	Check the plug connector

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9 Corrosion signs

The cleaning and disinfection machine is made from high-quality stainless steel. Nevertheless, under special circumstances, corrosion may occur. The following points must be observed:

- Ensure that no steel particles enter the appliance via the local fresh water supply pipes. The same applies to the entry of other metal particles such as copper filings or turnings.
- Corrosion may occur if unsuitable detergents are used.

10 Final decommissioning / Disposal of the appliance

Completely empty the hydraulic system and the dosing systems in the appliance.

Use the remains of the dosing agents elsewhere or dispose of them properly.

The appliance must be completely disconnected from the power supply by placing the main switch supplying power from the building in the OFF position or removing the main fuse in the building.

To avoid any accidents, shutdown machine must be made unusable **immediately,** e.g. by cutting the cable loom.

When you dispose of the installation (dismantling/scrapping), the parts and their corresponding materials should preferably be re-used.

Here is a list of the materials that most frequently occur when dismantling:

- Stainless steel
- Brass
- Electrical and electronic parts
- PP and other plastics

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Gruppe
Group
Groupe

Das Programm auf einen Blick	Our product range	Notre gamme de production
1 **Spülautomaten mit stationärem Waschverfahren** Geschirr- und Gläserspülautomaten; Topf- und Behälterspülautomaten; Salat- und Gemüsewaschautomaten	**Automatic dishwashing machines** with fixed washing system	**Lave-vaisselle à procéder de lavage stationnaire** Automates de lavage
2 **Spülautomaten mit Durchlaufsystem** Geschirrspülautomaten mit Bandtransport-, Korbtransport- oder Umlaufsystem	**Belt conveyor and rack transport machines** for continuous throughput operations	**Lave-vaisselle automatiques à passage continu** Lave-vaisselle automatiques à conveyeur et à transport de paniers
3 **Spezialspülanlagen** Vollautomatische Spülanlagen für Geschirr, Tabletts und Besteck; Flight-Catering-Anlagen; Industriespülautomaten; Trolley-, Behälter- und Transportwagenspülanlagen	**Special purpose warewashing solutions** such as semi and fully automatic systems, designed for the catering industry in general	**Lave-vaisselle spéciaux** Installations de lavage entièrement automatiques et semi-automatiques, lave-vaisselle industriels
4 **Förderanlagen** Tablett- und Geschirrtransportbänder, Geschirrsortier- und Stapeleinrichtungen	**Conveying systems** for vertical and horizontal transport of trays and dishes	**Installations de transport** pour le transport vertical et horizontal de plateaux
5 **Speisereste-Behandlungsanlagen** Maschinen und Anlagen zur Aufbereitung von Speiseresten für eine umweltgerechte Entsorgung	**Food waste treatment systems** Water conditioning appliances	**Installations de traitement de déchets alimentaires** ainsi que des installations de traitement d'eau
6 **Großkücheneinrichtungen** Geräte und Mobiliar für Relais- und Stationsküchen; Transportwagen; Tablett- und Tellerstapler; Tische, Schränke und Regale aus Edelstahl; diverse Organisationsmittel	**Central wash-up equipment** Tables, cabinets, tray and plate stackers	**Installations pour grandes cuisines** Tables, empileurs de plateaux et d'assiettes
7 **Sanitäreinrichtungen für Krankenhäuser und Heime** Reinigungs- und Desinfektionsautomaten für Steckbecken und andere Pflegegeschirre; Pflegekombinationen; Komplettausstattung für Unreine Arbeitsräume	**Sanitary appliances for healthcare establishments** Automatic cleaning and disinfection appliances for bedpans and other care utensils	**Installations sanitaires pour hôpitaux et maisons de soins** Automates de nettoyage et de désinfection, combinés de soins

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Commissioning

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Miscalleneous

1.1 Wash result poor

1.2 Rinse result poor

1.3 Residues from detergent

1.4 Residues from rinsing agent

1.5 Starch deposits

1.6 Lime deposits

1.7 Salt deposits

1.8 Lather formation

Defective components!

Cause	Remedy
Wash arms missing	Insert wash arms
Wash pump direction of rotation	Check direction of rotation, change power connection poles if necessary
Detergent dosage device defective	Check function, change dosage hose or device if necessary

Solid deposits on washed items!

Cause	Remedy
Conveyor speed too high	Select lower conveyor speed
Basket unsuitable	Use suitable inserts
Incorrect sorting of dishes in basket, Spray marks	See operating instructions
Detergent unsuitable	Detergent must be adjusted to the water quality, the items to be washed and the kind of soiling ask chemicals supplier if necessary
Detergent dosage too small	See sheet 1.3.1 adjust detergent dosage see operating instructions
Tank temperature too low	Check tank heating, change if necessary adjust tank temperature

meikolon RF 80

Dosage:		
hard-ness area	water hardness °d	RF 80 g per liter of water
1	up to 7°d (soft)	1-2
2	7°-14°d (medium)	3-4
3	14°-21°d (hard)	5-6
4	more than 21°d (very	more than 6

1 ml = ca. 1,30 g

Defective components!

Cause	Remedy
Rinsing water quantity too low	Clean dirt trap
Rinsing arms missing / incorrectly installed	Insert / install rinsing arms correctly
Rinsing nozzles missing	Insert nozzles
Rinsing nozzles set at wrong angle	Set rinsing nozzles at correct angle
Rinsing nozzles blocked	Clean nozzles
Boost pump defective	Check pump, change if necessary Check power supply, repair if necessary
Rinsing dosage device defective	Check function, change dosage hose or device if necessary

Loose deposits on washed items!

Cause	Remedy
Rinsing water quantity too low	Increase rinsing water quantity
Basket unsuitable	Use suitable inserts
Incorrect sorting of dishes in basket, spray marks	See operating instructions
Tank water too heavily polluted	Filter system missing or damaged Pre-clearing insufficient

Residues / marks on the dish-ware, unsatisfactory result after drying

Unsuitable rinse agent	Rinse agent must be suitable for the water quality and the dish-ware/cutlery. Ask your chemical supplier for advice
Rinse agent quantity too low	Adjust the rinse agent dosing. See Operating Instructions
Rinse temperature too low	Check the boiler heating element. Replace if necessary. Set the boiler temperature. See the Operating Instructions

Cause	Remedy
Detergent concentration too high	See sheet 1.3.1 Adjust detergent dosage See operating instructions Detergent must be adjusted to the water quality, the items to be washed and the kind of soiling ask chemicals supplier if necessary Detergent detection with pH paper See sheet 1.3.2 Detergent detection with fluid pH See sheet 1.3.3
Rinsing water quantity too low	Increase rinsing time
Rinsing nozzles blocked up	Clean nozzles
Boost pump defective	Check pump, change if necessary Check power supply, repair if necessary
Boiler, pipes, nozzles clogged	Decalcifier See sheet 1.6.1 Lime detection See sheet 1.6.2
Basket unsuitable	Use suitable inserts
Incorrect sorting of dishes in basket Spray marks	See operating instructions
Low temperature in tank detergent saponificates and does not dissolve completely	Check tank heating, change if necessary Adjust tank temperature See operating instructions

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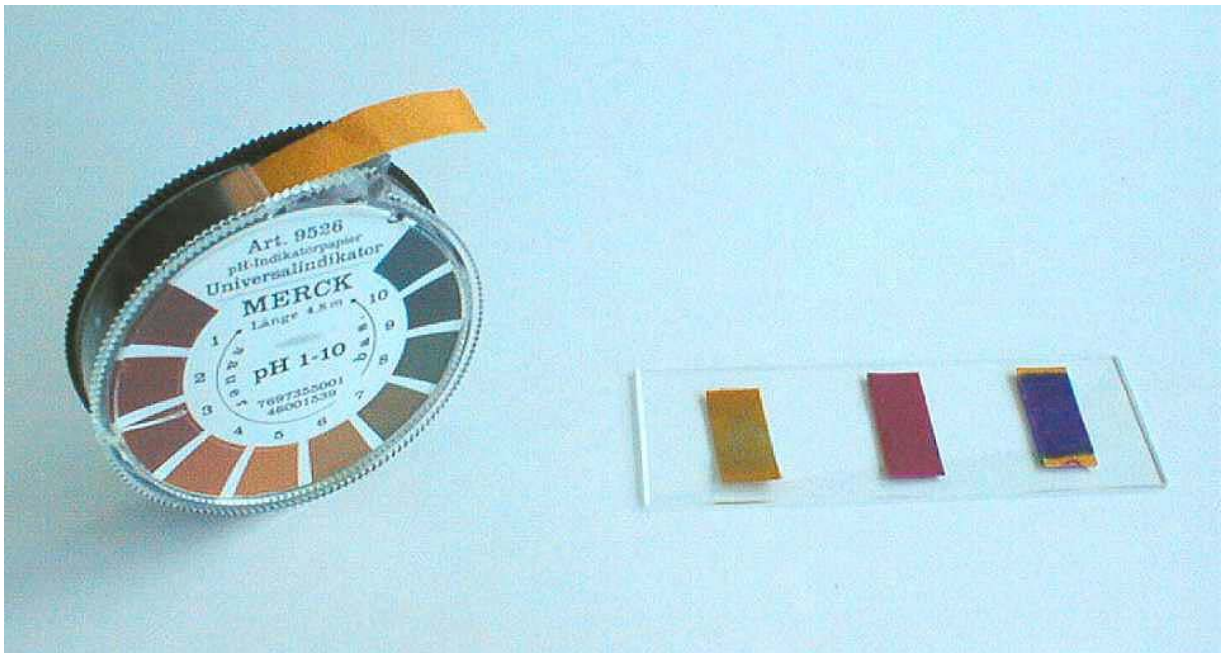
Dosage:		
hard-ness area	water hardness °d	RF 80 g per liter of water
1	up to 7°d (soft)	1-2
2	7°-14°d (medium)	3-4
3	14°-21°d (hard)	5-6
4	more than 21°d (very	more than 6

1 ml = ca. 1,30 g

Detergent detection
using pH paper

1.3.2



Carrying out:

Tear off short strips of pH indicator paper

- dip the pH indicator paper into the remaining fluid on the washed items
- analysis based on the provided color scale
  pH value: 1 - <7 = acid; 7 = neutral; >7 - 14 = alkaline

Note:

- detergent disperses under running water
- with detergent containing chlorine = chlorine odor

Carrying out:

- Put a few drops of the indicator solution 3 (phenolphthalein) on the surface to be proofed
- If it clearly turns red, soapy water residue is present (pH > 7)

Important:

Softened water occasionally leads to a slight reddening.
This does not mean that soapy water residue is present.

Note:

- Detergent dissolves under flowing water
- In case of detergent containing chlorine = chlorine odor

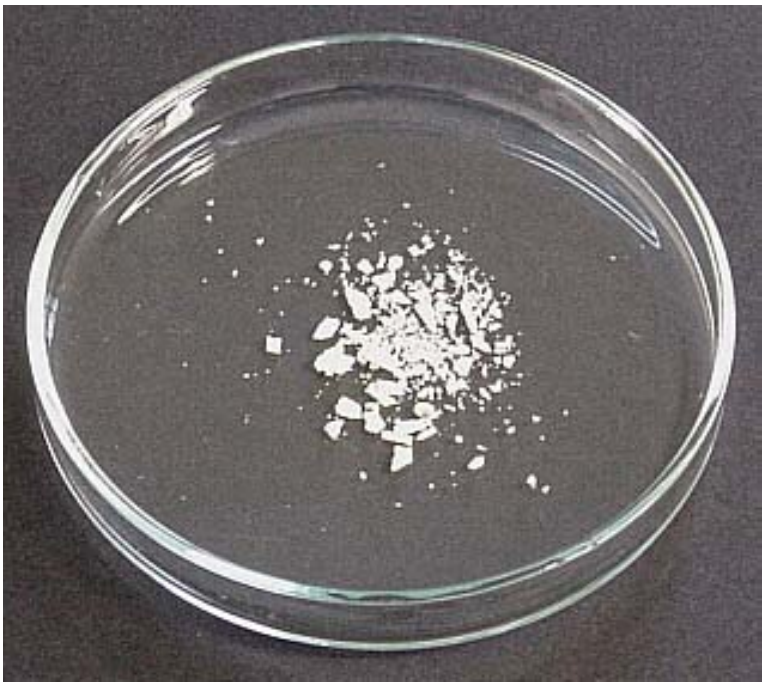
Decalcifier

Dosage:

30-50 g/l water
at 50-60 °C
reaction time = 20 min
several program cycles

After decalcifying:

re-fill the dishwasher
run the program
drain the water
rinse thoroughly



furring

acid moistened:
lather formation

Note:

- Lime does not dissolve under running water
- Removal with decalcifier

Residues from rinsing agent

Cause	Remedy
Rinsing agent concentration too high (cloudy marks, smears, surface sticky and greasy, formation of bubbles)	See sheet 1.4.1 Adjust rinsing agent dosage Rinsing agent must be adjusted to the water quality and the items to be washed Ask chemicals supplier if necessary Rinsing agent proofing using pH paper See sheet 1.4.2

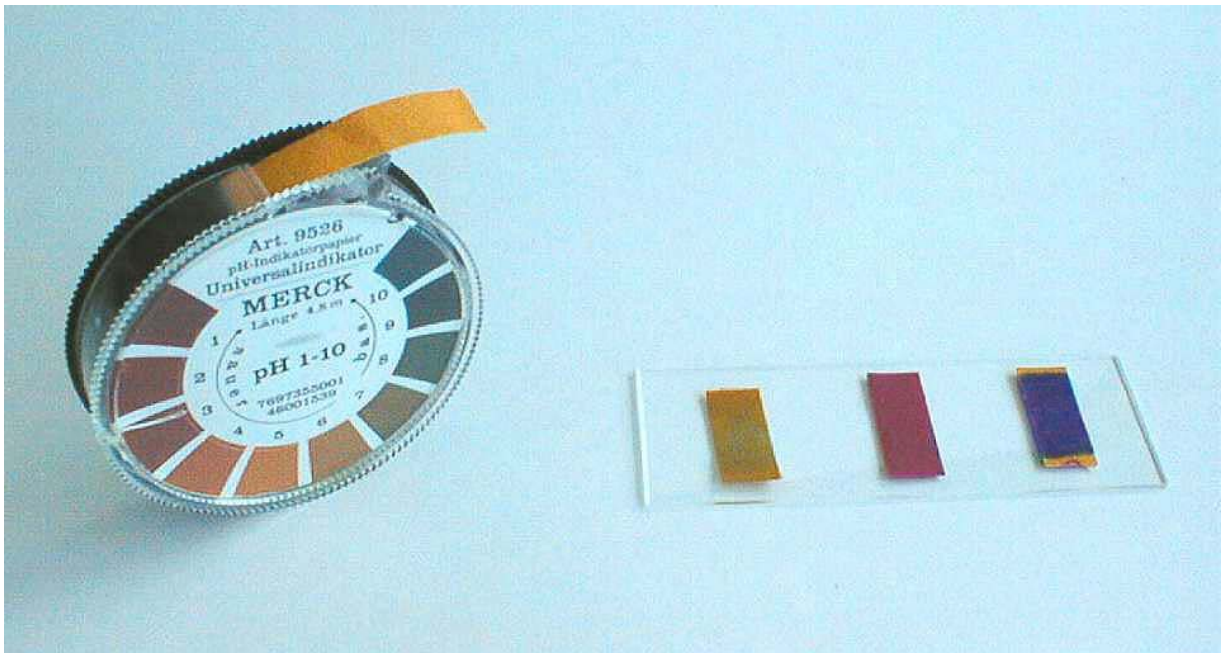
Dosage:

0,2-0,7 g/l corresponding to water quality and items to be washed
1 ml = 1 g approx.

Rinsing agent dosage rule:

optimal dosage	- water film
low dosage	- formation of drops
over dosage	- formation of stripes

Rinsing agent detection
using pH paper



Carrying out:

tear of short strips of pH indicating paper

- dip the pH indicating paper into the remaining fluid on the washed items
- analysis based on the provided color scale
  pH value 1 - <7 = acid; 7 = neutral; >7 – 14 = alkaline

Advice:

- rinsing agent disperses under running water
- sticky residue often present

Cause	Remedy
Conveyor speed too high	Select lower conveyor speed
Incorrect sorting of dishes in basket Spray marks	See operating instructions
Detergent unsuitable	Detergent must be suitable for starch removal Ask chemicals supplier, if necessary
Detergent concentration too low	See sheet 1.3.1 Adjust detergent dosage See operating instructions
Tank temperature too low	Check tank heating, change if necessary Adjust tank temperature See operating instructions

Hint:

Starch detection with iodine, see sheet 1.5.1

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Dosage:		
hard-ness area	water hardness °d	RF 80 g per liter of water
1	up to 7°d (soft)	1-2
2	7°-14°d (medium)	3-4
3	14°-21°d (hard)	5-6
4	more than 21°d (very	more than 6

1 ml = ca. 1,30 g

Carrying out:

- put drops of indicator solution 2 (iodine) on the surface to be proofed
- in case of black-blue coloration, starch residues detected

Advice:

- cannot be removed within a short time under running water
- removal with dipping detergent/starch remover

Cause	Remedy
Water hardness too high	Water treatment is necessary over 3 °dH . The following measures can be taken depending on the water quality, the items to be washed and the operator's requirements: 1. Fit a water softener into the water supply or into the washer (not possible for all machines). 2. Complete reverse osmosis equipment for the production of chemically pure water
Water hardness too high in spite of added water treatment equipment	To 1.: Check operation. Check water inlet pipe, and if necessary clean/change filter and dosage regulator. Refill salt, initiate regeneration process. To 2.: Check reverse osmosis equipment
Detergent concentration too low	See sheet 1.3.1 Adjust detergent dosage See operating instructions
Detergent not suitable for the hardness level	Detergent must be suitable for the hardness level Ask chemicals supplier, if necessary

Hint:

Decalcifier, see sheet 1.6.1
Lime detection, see sheet 1.6.2

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Dosage:		
hard-ness area	water hardness °d	RF 80 g per liter of water
1	up to 7°d (soft)	1-2
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1 ml = ca. 1,30 g

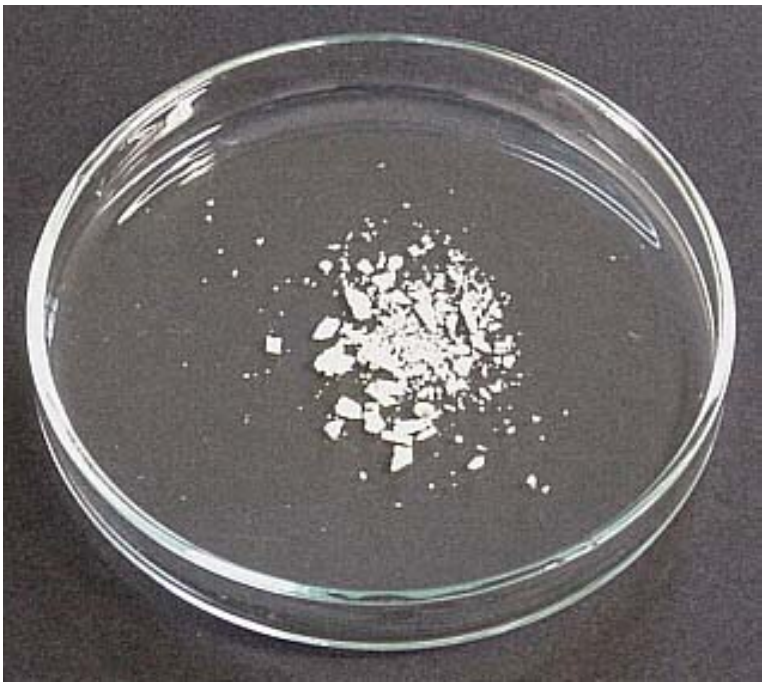
Decalcifier

Dosage:

30-50 g/l water
at 50-60 °C
reaction time = 20 min
several program cycles

After decalcifying:

re-fill the dishwasher
run the program
drain the water
rinse thoroughly



furring

acid moistened:
lather formation

Note:

- Lime does not dissolve under running water
- Removal with decalcifier

Cause	Remedy
Salt content of water too high	Water treatment is necessary if salt content is excessive. The following measures can be taken depending on the water quality, the items to be washed and the operator's requirements: 1. Partial softening to remove carbonate hardness salts 2. Complete softening or reverse osmosis equipment for the production of chemically pure water
Salt content too high in spite of added partial/complete demineralisation equipment	Check if cartridge is exhausted. If necessary change for a regenerated cartridge
Salt content too high after regeneration of water softener	Check operation of water softener. Check water inlet pipe, and if necessary clean/change filer and dosage regulator

Hint:

For salt content as measured by electrical conductivity, see sheet 1.7.1

conductivity measuring equipment

Conductivity – maximum values (untreated water) for an acceptable result after dishwashing:

dishes	400 µS/cm
glasses	100 µS/cm
cutlery	80 µS/cm

Note:

- Salts dissolve under running water

Cause	Remedy
Tank temperature too low	Check tank heating, change if necessary Adjust tank temperature See service instructions
Rinsing temperature too low	Check boiler heating, change if necessary Adjust boiler temperature See operating instructions Standard settings: Dishes = 80–83 °C Glasses = 65 °C approx.
Cold water rinsing with rinsing agent	Adjust boiler temperature as mentioned above
Hand washing agent chemical agents, such as gelatine	Even traces of hand washing agents and a variety of chemical agents create lather formation. Avoid such agents on dishes etc placed in the machine
Condensed milk	Ensure there are no more than small quantities on dishes etc placed in the machine

2.1 Dishwasher cannot be switched on

2.2 Dishwasher does not fill

2.3 Dishwasher overfilling

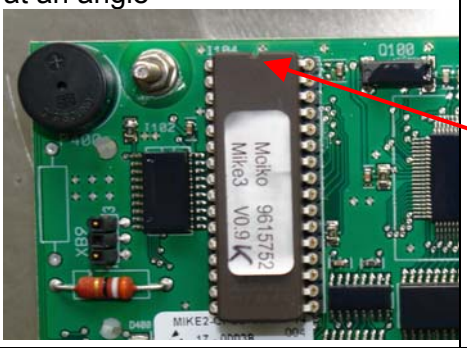
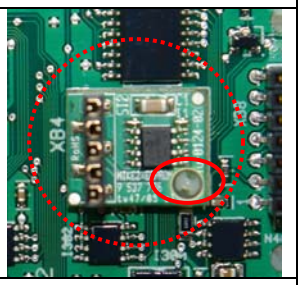
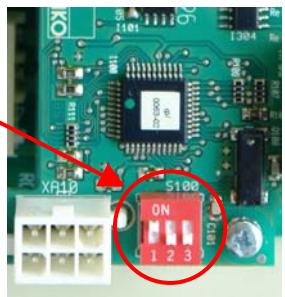
2.4 Dishwasher does not heat up

2.5 Wash pump problems

2.6 Fresh water rinsing does not rinse

2.7 No dosage

Dishwasher cannot be switched on

Cause	Remedy
No mains supply	Connect to mains
Control fuse set off	Switch on control fuse
Data and power supply lines loose or defective (operating LED's do not light up)	Check plug connection, change if necessary
Membrane key-pad does not function or defective	Check plugs/jacks Change membrane key-pad
Control defective	Check power supply (operating LED must light up), change if necessary Check input/output circuit board (operating LED must light up), change if necessary, Check CPU (operating LED must light up), change if necessary
Eprom missing, loose or inserted at an angle 	Check Eprom for correct insertion (notch pointing outwards - illustration)
Eprom defective	Change Eprom
EEprom missing, loose or inserted at an angle	Check EEprom for correct insertion 
Eeprom defective	Change EEprom
Input/output circuit board wrongly coded	Code S100 DIP switch as in the circuit diagram 

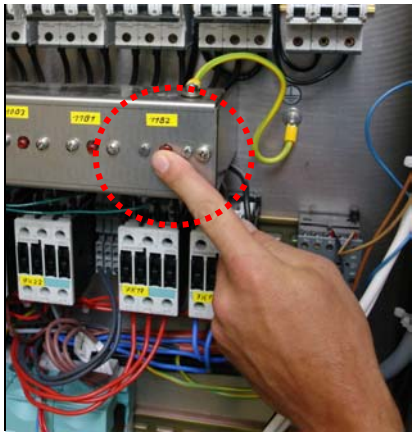
Tank not filling!

Cause	Remedy
Shutoff valve closed	Open shutoff valve
Water inlet dirt filter dirty	Clean dirt filter
Water inlet valve does not open	Check mains supply/plug connection
Tank level data collection defective	Check level control; check that float is clean and moves easily. Replace defective parts if necessary

Tank overfilling!

Cause	Remedy
Tank level data collection defective	Check level control; check that float is clean and moves easily. Replace defective parts if necessary
Water supply valve does not close	Check activation and replace if necessary. Check mechanical function of water inlet valve.

Tank water does not heat up!

Cause	Remedy
Tank heating element defective	Check electrical circuits of tank heating element, replace if necessary
Tank heating contactor defective	Check electrical circuits of tank heating contactor, replace if necessary
Safety temperature limiter (STB) for tank heating has triggered	Establish the cause: • Float switch defective, sticking or wrongly positioned • Level circuit board defective • Contactor sticking • STB damaged (capillary tube defective) Acknowledge the STB after rectifying the fault: 
Tank temperature sensor defective	Check electrical circuits of tank temperature sensor (1000 Ω at 25°C) replace if necessary
Incorrect temperature measurement	Tank temperature sensor loose or not properly inserted
Target temperature incorrectly set	Check electrical circuits of tank temperature sensor (1000 Ω at 25°C) replace if necessary
Motor safety switch / Automatic circuit-breaker activated or defective	Check setting, adjust if necessary, and switch on again (see electrical diagram) or replace
Minimum tank level not reached	See chapter "dishwasher does not fill “

Tank water does not heat up!

Cause	Remedy
Tank heating element defective	Check electrical circuits of tank heating element, replace if necessary
Tank heating contactor defective	Check electrical circuits of tank heating contactor, replace if necessary
High limit switch for tank heating has triggered	Establish the cause: • Float switch defective, sticking or wrongly positioned • Level circuit board defective • Contactor sticking • High limit switch damaged (capillary tube defective) 
Tank temperature sensor defective	Check electrical circuits of tank temperature sensor (1000 Ω at 25°C) replace if necessary
Incorrect temperature measurement	Tank temperature sensor loose or not properly inserted
Target temperature incorrectly set	Check electrical circuits of tank temperature sensor (1000 Ω at 25°C) replace if necessary
Motor safety switch / Automatic circuit-breaker activated or defective	Check setting, adjust if necessary, and switch on again (see electrical diagram) or replace
Minimum tank level not reached	See chapter "dishwasher does not fill “

Wash pump sucking in air!

Cause	Remedy
Power switch has tripped	Establish the cause: • Check the phases • Check motor power consumption • Measure resistance of the windings • Check connections
Motor contactor does not operate	Measure motor contactor, change if necessary
Motor contactor not activated	Check relay output for motor contactor in the I/O circuit board
No relay output on the I/O circuit board	Check relay output for motor contactor in the I/O circuit board
Tank water level too low	Clean tank cover sieve.
Tank level regulation defective	Check water levels.
Cover sieve blocked up	Clean cover sieve
Excessive foam production	Do not use a foaming detergent for dishwashing by hand for pre-cleaning close to the dishwasher. Check tank temperature (too low?)

Fresh water rinsing does not rinse

Cause	Remedy
Rinsing nozzles blocked	Remove and clean rinsing nozzles, clean / remove lime deposits from boiler, if necessary
Booster pump for the fresh water air gap not running	Power switch has tripped Motor contactor does not operate Motor contactor not activated No relay output on the I/O circuit board (See section “Wash Pump Malfunctions”)
No water supply from the building	Open the stop-cock Clean the dirt filter Check fresh water inlet pipe; if necessary re-lay it so it is free from kinks Check power supply / plugs (jacks).

No rinsing dosage!

Cause	Remedy
Rinsing dosage system not watertight	Check that hose connections are watertight
Rinsing dosage device not watertight	Replace dosing device hose, clean leak pan
Dosage point blocked	Clean injection point
Suction sieve soiled	Clean suction sieve
Hose kinked	Position hose without kinks
Other causes / malfunctions	See Operating Instructions / Service Instructions. Call chemical supplier

No detergent dosage!

Cause	Remedy
Detergent dosage system not watertight	Check that hose connections are watertight
Detergent dosage device not watertight	Replace dosing device hose, clean leak pan
Dosage point blocked	Clean injection point
Suction sieve soiled	Clean suction sieve
Hose kinked	Position hose without kinks
Other causes / malfunctions	See Operating Instructions / Service Instructions. Call chemical supplier