Operating Instructions

MEIKO - Trolley washing machine

Model BA 251 C - BA 252 C - BA 253 C

TRANSLATION OF THE "ORIGINAL OPERATING INSTRUCTIONS"
The original operating instructions can be downloaded from: https://partnernet.meiko.de

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1 Introduction and general information

Dear Customer,
We are delighted about the confidence you have shown in our products.
It is very important to us that you should obtain significant use from MEIKO products and that they should make your work easier.

If you follow the instructions in this document carefully, your Trolley washing machine will always give you total satisfaction and will have a long service life.

The Trolley washing machine has been assembled by us at the factory and has undergone a thorough inspection.

We would therefore ask you to read these operating instructions carefully before using the installation.

These operating instructions inform users of this installation about the installation, the operating methods, Its use,the safety instructions and Servicing.

This information will help you to get to know the installation fully and to use it properly. It will also enable you to avoid repairs and the concomitant loss of productive work.
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.

Should you require any further information, or in case any particular problems not dealt with in great detail in the operating instructions should arise, you may contact the relevant MEIKO branch to obtain the information you require.

We should also like to inform you that the contents of these instructions do not form part of or amend any earlier or existing agreement, statement, or legal position.

All MEIKO’s obligations arise from the relevant purchase contract which also contains the entire and only valid guarantee provisions.

These contractual guarantee rules shall be neither extended nor restricted as a result of any explanations given in the instructions.

The original operating instructions in Germany, and all operating instructions in all languages for EU countries can be downloaded from the following address: https://partnernet.meiko.de
The complete technical documentation is issued to you free of charge. Additional copies will be charged at cost.

These contractual guarantee rules shall be neither extended nor restricted as a result of any explanations given in the instructions.

The MEIKO Company very much hopes that you will enjoy our product and use it successfully.

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1.1 Storage

Always store the operating instructions close to the installation!
The operating instructions must always be kept within easy reach!

1.2 Name and address of manufacturer

Please address any queries, technical problems etc. directly to:

MEIKO USA, Inc.
1349 Heil Quaker Blvd.
Lavergne, TN 37086
Tel +615 399-6600
Fax +615 399-6620

or:

Name and address of the MEIKO branch, manufacturer's agent or dealer.

(Insert company stamp or address)

1.3 Description of the type of equipment

Please provide the following information on any query and/or when ordering spare parts:

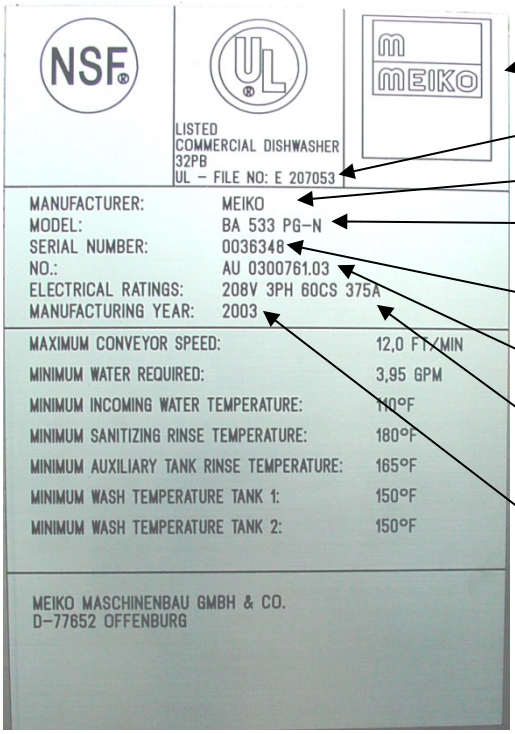
Type: .....

SN: .....

.....

These information can be found on the plate in the electrical switch cabinet

1.4 Data plate details



Manufacturer´s logo

UL-File number

Name of manufacturer

Model of dishwashing machine (Type)

Serial number of dishwashing machine (SN)

Order ref. number of dishwashing machine

Electrical ratings of dishwashing machine

Manufactering year ( )

2 Explanation of the safety symbols used

The following safety symbols will appear throughout these operating instructions. The purpose of these symbols is to draw the reader's attention to the text of the adjacent safety information.

ATTENTION!

This symbol warns that there is danger to human life and health.

DANGER!

This symbol warns that there is danger to the installation, to material or to the environment.

This symbol denotes information that helps you to understand the installation's operation.

Warning of dangerous electrical current!

Warning hand injury!

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3 General description and use for the purpose intended

3.1 General description

This machines is a pass-through Trolley washing machine with a conveyor belt. On the feeding side the dishware is automatically or manually placed onto the conveyor belt and is independently transported through the machine on the moving conveyor belt. The dishware is cleaned and, if applicable, dried. On the other side of the machine, the discharge side, the dishware is removed automatically or manually.

3.2 Intended use

DANGER!

The Trolley washing machine must be used only in accordance with regulations.

This Trolley washing machine is intended for washing trolleys.

Other special dishware is described in the job confirmation.
The items to be washed must be suitable for washing in dish-washing machines.

If in doubt with regard to suitability, consult Meiko about the size, version, essential suitability for warewashers ...) (info@meiko.de).
Kitchen utensils with electronic components must not be cleaned in the machine.

Any other use is not considered intended.

This dishwashing machine is intended solely for use in a commercial environment.

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4 General safety instructions

4.1 Operator's obligation for care


ATTENTION!

The Trolley washing machine has been constructed based on a risk analysis and after careful selection of the applicable harmonized standards, as well as additional technical specifications. It therefore corresponds to the latest technology and is guaranteed to provide maximum safety.
This level of safety can only be achieved in practice, however, if all the necessary measures are taken. The operator of the installation has an obligation of care to ensure that these measures are scheduled, and also to check that they are correctly executed.

Measures to ensure the safe machine operation

The operator must ensure in particular that ...


ATTENTION!

... the Trolley washing machine is only used in accordance with the regulations.
Should it be used in any other way, damage or danger may occur, for which we accept no liability (see the chapter on "Use in accordance with regulations").

… 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!

… Only appropriately qualified and authorized personnel use, maintain, and repair the installation.


ATTENTION!

... The relevant personnel is regularly trained in all questions relating to safety at work and environmental protection and, in particular, that they are familiar with the operating instructions as well as with the safety information provided in them.


ATTENTION!

... the Trolley washing machine is only operated in perfect, operationally efficient condition and, in particular, that the safety systems and switch elements are regularly checked for their operational efficiency.


ATTENTION!

…The required personal protective equipment is made available to maintenance and repair personnel, and is worn by them.


ATTENTION!

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


ATTENTION!

…The operating instructions are always kept in legible, complete condition at the place where the installation is installed, and are always at hand.


ATTENTION!

... all the safety, warning and operating instructions provided are not removed and are legible.


ATTENTION!

... 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!

Once the Trolley washing machine has been installed, put into service and handed over to the customer/operator, no modifications (electrical or location modifications, for example) may be made. Modifications to the Trolley washing machine, and in particular technical modifications carried out without the manufacturer's written authorization, or any modifications carried out by unauthorized persons, will lead to the complete loss of any guarantee claims and will invalidate any liability for the product.


ATTENTION!

... equipment for optimising energy consumption must not be used to reduce essential operating temperatures, as set out in DIN 10510, 10511 and 10512. If you, the client, install equipment for optimising energy consumption, any possible reduction in the quality of the wash and hygiene is your responsibility.

4.2 Basic safety measures


ATTENTION!

Danger can arise from the improper use of the Trolley washing 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.


ATTENTION!

The Trolley washing machine may only be operated by adequately qualified staff who have been trained by the operating company and who have been trained about the Hazard and Safety Instructions.
Qualified staff, as defined by the Operating Instructions, are persons:

- who are over 14 years of age,
- who have read and who observe the safety instructions,
- who have read and who observe the Operating Instructions (or the part applicable to the work to be carried out).


ATTENTION!

The machine operates with hot water. Avoid all contact with the rinse water Danger of scalding/burning! Danger of scalding as a result, the dishes etc being washed are at high temperature. Please observe appropriate protective measures.
Observe all the instructions posted on the Trolley washing 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.
Only specialist personnel may carry out repairs and rectification work on the electrical part of the machine. The Health and Safety Regulations must be observed.


ATTENTION!

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


ATTENTION!

The Trolley washing machine may only be operated under the supervision of trained personnel.


ATTENTION!

If you are unsure about the operation of the Trolley washing machine, the machine must not be used.


ATTENTION!

Doors and flaps MUST be closed.

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ATTENTION!

Because of the danger of entrapment by the conveyor and the dishes when the conveyor is in motion, operating staff must not wear tight-fitting clothing; they must also remove rings, bracelets and similar articles.


ATTENTION!

The tank heating elements may still be hot after the tank has been emptied. There is therefore the danger of burns when the machine is cleaned manually!


ATTENTION!

Rectification work and work of any kind on the steam installation must only be carried out by specialist staff.


ATTENTION!

Only detergents and rinse-aids suitable for the use in industrial dishwashers may be used.

Corresponding information is submitted by the manufacturers of such products.

Detergents and rinse agents can be injurious to health.

The manufacturers hazard instructions on the original packaging and in the safety data sheets must be observed.


ATTENTION!

The main switch must be turned off when operation has finished.

WE ACCEPT NO LIABILITY FOR DAMAGE OR INJURY ARISING FROM FAILURE TO OBSERVE AND ABIDE BY THESE SAFETY INSTRUCTIONS!!!

4.2.1 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!

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

Always keep the switch cabinets closed! Access is only allowed to qualified persons with the appropriate key / tool!

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5 Assembly instructions (for a partially completed machine)

These apply where the MEIKO product is a partially completed machine in the sense of the Machinery Directive (Directive 2006/42/EC).

Observe the following items when connecting MEIKO products to an existing installation:

- The components must be aligned with one another, connected in an appropriate manner, and fastened so that safe operation is assured. (Choose conditions and fasteners on site in line with this).
- Dangers (e.g: drawing in, crushing, shearing or cutting) that potentially arised due to the connection must be safeguarded appropriately.
- The electrical connection to the supply grid on site, and any necessary electrical connections must be implemented in line with the enclosed wiring diagram.
- During installation, make sure that you avoid damage, in particular to the electrical installation.
- After completing the works, check the system for damage.
- Safety and functional tests must be performed in the scope of testing the complete system at the latest.
- The system is supplied with slide rails to optimise the transition point where applicable.

Working on the electric fittings

⚠DANGER!

Risk of injury due to electric shock

Work or repairs to the electrical equipment of the system must be conducted by a qualified electrician!

The wiring diagram for the partially completed machine delivered contains all necessary operational shut-offs known to the manufacturer MEIKO, as well as other known, necessary shut-offs and electrical connections. The connectors are clearly indicated in the wiring diagram. Always make sure that these connections are implemented prior to commissioning the machine, and that they work reliably.

If any unknown sources of danger that are not described by MEIKO arise due to connecting system parts, you must eliminate them; this may potentially mean that you must operate the machine.

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6 Delivery, shipping, installation and assembly

6.1 Delivery

Check that the delivery is complete immediately after receiving it by comparing it to MEIKO's contract confirmation and/or the delivery note.

If necessary, complain about any missing parts immediately to the shipping company and notify MEIKO.

Check the entire installation for any damage that may have occurred during shipping.

Should you suspect any damage has occurred during shipping, you should inform:

- the shipping company,
- and MEIKO

in writing, and also send a photo of the damaged parts to MEIKO.

Important:
Horizontal adjustment of the machine by means of the vertically adjustable feet (spanner/wrench size 27) must be done with care to ensure that the weight of the machine is evenly distributed on the cleats. This is absolutely essential in order to avoid displacement or stresses caused by loading on one side. These stresses can cause, for example, the vertical doors to jam or can prevent them from being water-tight when closed.

- Please also read the chapter on "General safety instructions ".

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6.2 Installation and assembly

MEIKO has prepared an assembly diagram showing the machine dimensions and the connected loads in detail.

Assembly is completed by reference to the assembly diagram and, in general, by following the instructions of a trained MEIKO engineer.

ATTENTION!

The installation must only be connected by suitably qualified personnel.

We accept no liability for connections carried out by unqualified personnel.

After unpacking, position the appliance as indicated in the assembly diagram and as the dimensions allow.

After unpacking, position the appliance as indicated in the assembly diagram and as the dimensions allow.

If the machine is delivered divided in a number of parts, the joints must be thoroughly treated with P819 activator (MEIKO ordering no. 9503233) and sealed on the inside with silicone (Sista F 108 – MEIKO ordering no. 0870001 or M509, MEIKO ID no. 9518385; in paint shops Sikaflex 260 – MEIKO ordering no. 0870030).

			
Sista P 819 activator order no.: 9 503 233	Sista F 108 Special Silicon adhesive order no.: 0 870 001	Sista M 509 Special Silicon adhesive Order no.: 9 518 385	Sikaflex – 260 strong adhesive order no.: 0 870 030

A sealing strip must be applied to the exterior.

It should be recessed by about 1 mm and is intended to improve the optical appearance.

6.3 Instructions for the disposal of the packaging material

- The four-sided wooden frame consists of untreated, raw pine / spruce.
  Special country-specific import regulations may also stipulate the use of wood which has been treated against pests.
- The plastic sheeting (PE sheeting) may be recycled.
- The cardboard packaging material used to protect the edges can also be recycled.
- The steel tensioning strap made of strip steel may be recycled with the steel scrap.
- The plastic tensioning strap of plastic (PP) can be recycled.

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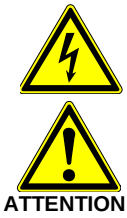
6.4 Connection to the electricity supply



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

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.

Important:
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).

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.

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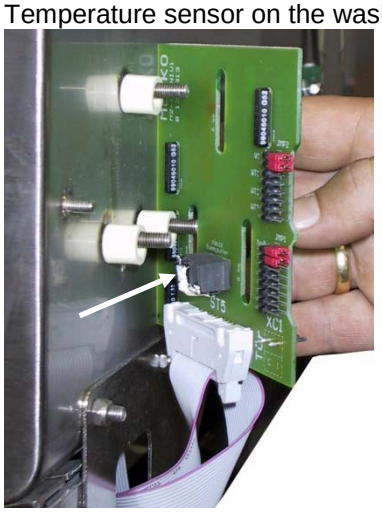
6.5 Temperature sensors / Temperature limit switches

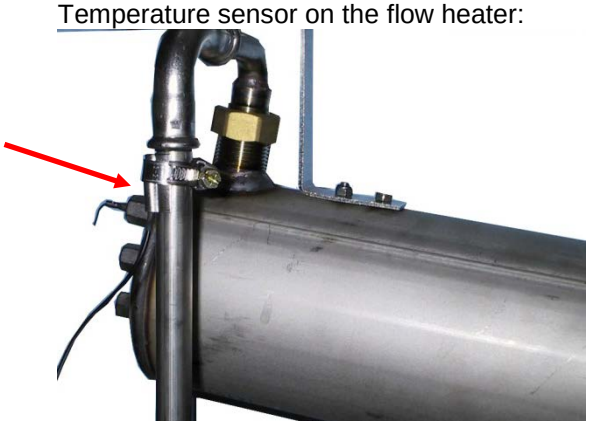
All temperature limit switches installed for safety purposes and temperature sensors which are loosely rolled up in the electrical switch cabinet must be installed in the electrical switch cabinet by means of marked screwed cable glands as in the circuit diagram and positioned in the relevant place marked.

Some possibilities for the positioning of the electronic sensors:

Temperature sensor on the wash tank:



Temperature sensor on the flow heater:

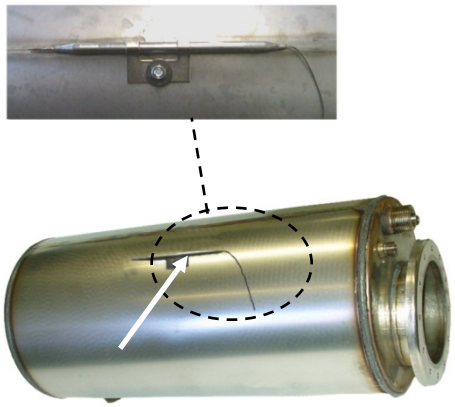


IMPORTANT: do not kink the sensor tube or the temperature sensor will be damaged and be unusable.

Some possibilities for the installation of the capillary temperature sensor:

Temperature sensor at the front of the wash tank and rinse tank:

Temperature sensor on the water heater:



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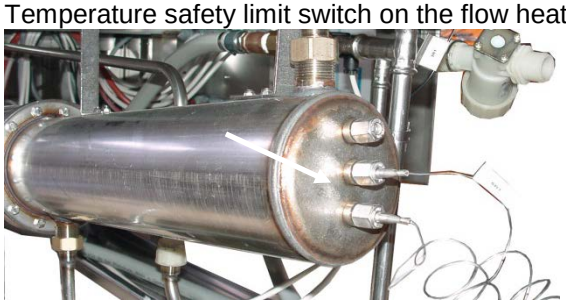
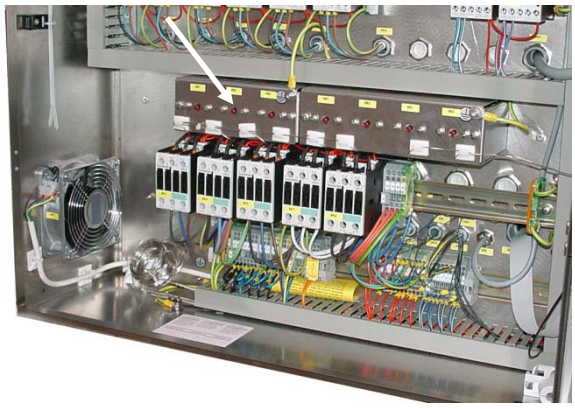
Temperature safety limit switch for machines with electric flow heaters:

Temperature safety limit switch on the flow heater:



Temperature safety limit switch on the drying heating register:

The temperature safety limit switch button



- The temperature safety limit switches switch off all phases and interrupt all connections carrying current to the relevant heating circuit when they switch off.
- They are intrinsically safe. That means that if the capillary tube is broken, the relevant heating circuit is switched off. Due to the internal construction of the thermostat it is possible that the thermostat switches off at a temperature under 0°C.
- After the temperature safety limit switch has operated it must be manually acknowledged. If a temperature safety limit switch has triggered during operation, the reason for its action must be found and eradicated. (In particular, the condition of the heater must be checked). The temperature safety limit switch may only be re-set after the defect has been rectified and the heating system has cooled down.

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6.6 Fresh water connection

The water-carrying pipes and components are not frost-proof.

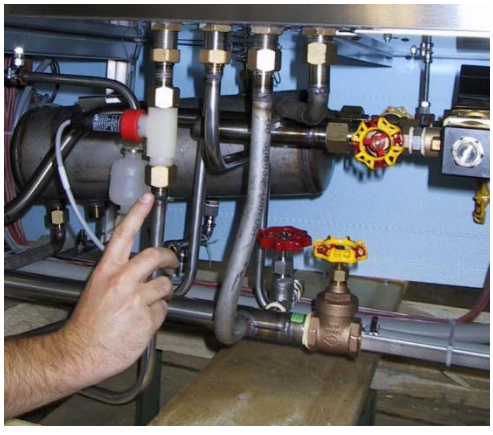
If the temperature of the place where the appliance has been installed can fall below 5°C, suitable precautions for protection against frost must be taken.

Information on nominal widths, cross sections etc. relate to the appliance.
Installations on site must be dimensioned to match local conditions (e. g. cable arrangements, access lengths).
The terminal positions of media and energy connections to the machine depend on the method of construction (normally at a distance from the connection points on site). The connections must be made by approved technicians.
All parameters for the media and energy supplies must be maintained at a constant level during all the operations.

Fresh water connections must be carried out in accordance with the requirements of the local regulations (e.g. Germany DIN 1988). A stop tap must be installed in all ingoing water supply pipes and must be accessible to operating personnel. A tap capable of isolating the appliance from the mains (in Germany in accordance with EN1717) installed.
Fresh water connections must be carried out in accordance with the requirements of the local regulations (e.g. Germany DIN 1986).

The water supply to the appliance is normally to be found under the discharge.

In order to avoid damage during transportation, water pipes may in certain circumstances be dismantled. These must be re-installed before commissioning.



Water-carrying pipes,
Connect water pipes e.g. to a water meter

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It is possible to clean the dirt screens without turning off the main water supply.
The water supply is automatically cut off when the lower component in which the screen is located is unscrewed. This enables the screen can be easily cleaned during maintenance.

(This cut-off function can also be used as a stop-cock when servicing the machine.)

Information on the water quantities, quality and temperatures needed can be found in the installation plan.

The water quality must also comply with the requirements of the Commercial Dish-Washing Association. (http://www.vgg-online.de)

Most appliances are equipped with heat regeneration or with a heat pump.
In order for this equipment to operate at optimum efficiency the inlet temperature of the rinse water supply must be maintained at a low a level as possible (ideally about 10°C). Fluctuant water supply temperatures (summer/winter) must be avoided.
Water supply at a higher temperature not only detracts from the efficiency of the heat regeneration and the heat pump, but also impairs conditions relating to the appliance's exhaust air.

If valves on the appliance are also controlled by fresh water, a minimum flow pressure is necessary. See "Regulations and Standard Values" for the necessary pressures and quantities.

6.7 Waste water connection

The waste water connection must be carried out in accordance with the requirements of DIN 1986 and all applicable local regulations.

All discharge pipes for water from the machine must be connected to the kitchen waste water system via an adequately dimensioned odour trap.

When selecting materials for pipes, sealants etc, you must bear in mind that the temperature of the water discharged from the machine can be 50 - 65° C. Furthermore, the pH values can lie between 3 and 12 depending on the nature and concentration of the detergent; in other words, the materials must be resistant to both acids and alkalis. Connect waste pipes on site in accordance with the instructions on the installation plan.

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6.8 Hot steam, hot water from the pumps

Pipes and components designed for the conveyance of steam and condensate are not frost-proof. If the temperature of the place where the appliance has been installed can fall below 5°C, suitable precautions for protection against frost must be taken.

The machine is installed ready for operation, i.e. only the cables and pipes need to be connected to the machine.

The machine's steam installation must be equipped with an un-pressurised sloping condensate return system on site.
All condensate traps needed for the operation of the machine are built into the machine.
Pipes into the condensate traps must not be insulated.
No further steam traps must be installed in the building's condensate pipes.
If, in exceptional circumstances, the condensate is to be removed in an upwards direction by pressure, this fact must be notified to MEIKO at the time of ordering. In this case the heating tubes will be modified. The modifications will include a condensate evacuator. When the machine cools, this condensate evacuator collects condensate which would otherwise fall onto the floor.

Maintenance of the condensate reservoir
Open the condensate tank.
Remove the heating element and, if necessary, the dirt filter.
The filter and housing may then be gently cleaned.
Carefully clean all sealing surfaces before re-installation.
Always use new seals.

Attention!

The installation of pipework and fittings is specially designed for a particular nominal pressure range. You must ensure that the operating pressure in the building does not exceed the permissible nominal pressure of the fittings and machine components (information on the latter can be found on the manufacturer's plate in the switch cabinet).

Information on nominal widths, cross sections etc relate to the appliance.
Installations on site must be dimensioned to match local conditions (e.g. cable arrangements, access lengths).

The terminal positions of media and energy connections to the machine depend on the method of construction (normally at a distance from the connection points on site). The connections must be made by approved technicians. The general instructions must be observed when connecting the steam pipes.

All parameters for the media and energy supplies must be maintained at a constant level during all the operations.

Connection to the main supply on site is from above and uses the latest techniques. All necessary shut-off and control components (including condensate reservoirs) have been built into the appliance. The pressure losses in the heating system inside the machine are 30 kPa for saturated steam and 100 kPa for hot water from the pumps.

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6.9 Exhaust air connection of the appliance

Air control equipment must be designed to comply with local regulations (for example, in Germany VDI 2052) and must in all cases be water-tight and corrosion resistant.

The values indicated for exhaust air temperature and humidity can increase under certain operating conditions (e.g. standby).

The discharge air connection must be connected into the building's exhaust air system as in the installation plan.

Attention!
The exhaust air connection must be made in such a way that the parts containing water are not damaged in frosty weather. If this is not possible, frost protection must be installed.

The hot, moist air from the machine must be removed from the washing-up kitchen. In order to achieve efficient extraction, you must ensure that the overpressure on the machine ducts or the negative pressure of the building is adequate.

6.10 Installation and connection of dosing units

When operating the Trolley washing machine it is necessary to use an industrial detergent and rinse agent. You may only use detergents and rinse agents approved by the relevant authority and which are also suitable for dish-washing appliances. The safety instructions relating to their handling, dosing, storing and use must be particularly observed.

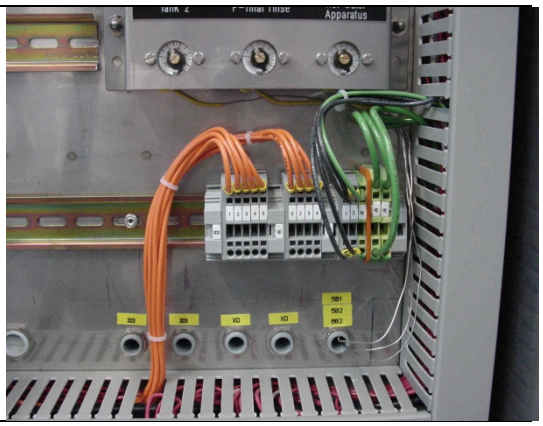
The dosing of the detergent and rinse agent should be done by a suitable piece of equipment; the relevant regulations must be observed when installing such equipment. Under no circumstances must detergent or rinse agent be allowed to enter the water mains.

Your chemical supplier knows all the relevant regulations and the injection points favoured by Meiko.

The terminal "XD" supplies the detergent dosing components with electrical power. (More detailed information can be obtained from the appliance's circuit diagram.)

Other connections must not be used.

Dosing units or other equipment must not be installed in the electrical switch cabinet.



As there is a very large range of dosing equipment available in the market, it is impossible for us to give here detailed instructions on their installation. Your detergent supplier knows the ideal installation method for his product.

A mixing chamber has been provided for the rinse agent connection. This is to be found in the clean water inlet for rinse water downstream from the boiler.

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The connection for the rinse agent supplier is provided in this mixing chamber.

The thread for the connection is R 1/8”.

7 Machine settings for initial commissioning by the service engineer

7.1 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. The operator may only use the installation after training has been provided.

7.2 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.

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7.3 Works to be carried out before initial commissioning

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

– Water-carrying pipes
All pipes must be thoroughly flushed out. The heating system must not be switched on when this is 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.

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

– 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 check 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 inlet and waste pipes are installed. Ensure that all the parts are correctly installed!

7.4 Setting the temperature of the wash tank, clean water rinsing, drying

7.4.1 Operating temperature in the wash tank

In the case of electronically controlled appliances the wash tank temperature is set using the operating display of the control system.
If the machine is not electronically controlled, the wash tank temperature is set using a separate temperature regulator (normally installed in the electrical switch cabinet).
The operating wash tank temperature needed is described in DIN 10510 and DIN 10512.
The temperature needed in the wash tank is also dependent on the chemicals used.

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7.4.2 Clean rinse water temperature

The heating capacity installed for heating the rinse water has been adjusted to suit the quantity of rinse water.
Therefore no method of regulating the temperature has been installed as standard. The heater has been designed to be switched on at all times.
An excess temperature cut-out has been installed as a protection against overheating.
In the case of electronically controlled appliances the excess temperature cut-out is set using the operating display of the control system.
If the machine is not electronically controlled, the excess temperature cut-outs are set using a separate temperature regulator (normally installed in the electrical switch cabinet).
The temperature necessary for rinsing is described in DIN 10510 and DIN 10512.
In the case of appliances heated by steam or pumped hot water (PHW), the flow rates of the steam or hot water can also be set.

If specially requested by the client, a GPR 1 can be installed to control the flow heater.
The GPR1 circuit board provides electronic control of the temperature of the clean rinse water when electric flow heaters (DE) are installed. This means that if the temperature of the incoming water varies, the heat output from the flow heater is automatically regulated so that the ideal rinse water temperature is maintained. For technical reasons the controller is installed upstream of the excess temperature cut-out mentioned above.
A sensor monitors the actual temperature, comparing it with the temperature setting. In the event of a deviation between these two temperatures the temperature of the rinse water from the flow heater (DE) is brought back to the set temperature by increasing or decreasing the length of the heating impulses.
The heating periods can be observed on the two diodes positioned above the terminals.
The control circuit is operating correctly when the diodes are almost constantly illuminated and interrupted only by short pauses.

- If the sensor cable is cut or if there is a short-circuit on the cable, the diodes will not light up and the heater will not operate.

- If the diodes are illuminated but the set temperature is not reached after a suitable time, the heat output is too low. This can be caused by a too great volume of water or by the excessively low temperature of the incoming water.

- If the diodes are illuminated but the set temperature is exceeded, the sensor might not be firmly fixed into position.

- If the diodes are illuminated but the set temperature is exceeded, the heat output is too great. The cause can be insufficient water; alternatively the heat output must be reduced by 3 or 6 kW.

- If the temperature of the rinse water fluctuates regularly, the heat output is too high and the excess temperature cut-out operates constantly to prevent over-heating.

- The heat output must be reduced by 3 or 6 kW or the water volume increased accordingly.
  The control circuit is defective if the diodes are constantly illuminated.

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7.4.3 Drying temperature

The heating capacity installed for heating the air used for drying has been adjusted to suit the quantity of air used.
Therefore no method of regulating the temperature has been installed as standard. The heater has been designed to be switched on at all times.
An excess temperature cut-out has been installed as a protection against overheating.
The temperature sensor is installed on the intake side of the drying fan. A temperature of 75°C measured on the intake side of the fan must not be exceeded otherwise the fan can be damaged.
In the case of electronically controlled appliances the excess temperature cut-out is set using the operating display of the control system.
If the machine is not electronically controlled, the excess temperature cut-outs are set using a separate temperature regulator (normally installed in the electrical switch cabinet).
The necessary operating temperature is not described in DIN 10510 and DIN 10512.
If the drying equipment is heated by steam or pumped hot water (PHW), the flow rates of the steam or hot water can also be set.

8 Preparation – Operation

8.1.1 Basic safety measures during normal operation

ATTENTION!

The Trolley washing machine may only be operated by trained and authorized persons who are familiar with the operating instructions and who are capable of working in accordance with them!

Before switching the installation on, check and ensure that

- only authorised and trained persons are in the machine's working area.
- niemand durch das Anlaufen der Anlage verletzt werden kann!

Before commissioning, each time

- Inspect the Trolley washing machine for any visible damage and ensure that it will only be operated in a perfect condition!
  Report any defects to the superior immediately!
- Remove any materials or objects not required for the operation of the installation from the installation's operating area!
  Remove any materials or objects not required for the operation of the installation from the installation's operating area!
- Check and ensure that all the safety equipment is operating perfectly!

8.1.2 Operation

Open the stop valve in the water pipe.

Switch on the power supply from the building.

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!

Close the doors.

The wash tanks can be automatically filled and heated by means of the "Fill/Heat" button.

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.

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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.

Washing can be temporarily interrupted with the “Pause“ button; the wash pumps and transport are switched off. However, the tank heating elements are not switched off with the result that the machine remains ready for operation and washing can recommence when the button “OPERATION” is pressed.

Mit der Taste “Gesamt-Aus“ wird die Maschine komplett außer Betrieb gesetzt.
(Important! Clean the machine after operation!)

9 Washing with the Trolley washing machine, button control

(example:)

1. Close the drain valve.

2. Überprüfen Sie die Waschrohre, Pumpenabsaugsiebe, Siebkörbe, Vorhänge und Einstellbleche der Bandmulde auf Vollständigkeit und richtige Lage.

3. Close the doors.

4. Öffnen Sie die Hauptabsperrventile für Wasser und falls vorhanden für Dampf oder Heißwasser. Entriegeln Sie den Not-Aus-Schalter.
   Schalten Sie den Hauptschalter am Steuertableau an.

5. Füllen der Maschine:

   Drücken Sie den Knopf **"FÜLLEN/HEIZEN"**. Die Maschine füllt automatisch bis zum maximalen Wasserstand der einzelnen Tanks.

   Die Tankheizung schaltet sich dann automatisch ein. Die Tanktemperatur wird durch ein Thermostat eingestellt und reguliert.

6. Check the level of the detergent and rinse agent container; replenish them if necessary in order to ensure that there is sufficient cleaning agent available.

   Nachdem die erforderlichen Tanktemperaturen erreicht sind :

7. Drücken Sie den Knopf **"Betrieb Ein"** (Pumpenmotoren/Gebläsemotoren und Transport.)

Now the machine is ready for operation, and the trays to be washed can be charged.

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10 Switching off the Trolley washing machine

This appliance must be shut down at the end of operations or if the premises in which it is located are not regularly under surveillance by staff!

Switch off the machine.

Clean the appliance; see the chapter headed “Cleaning”.

Switch the power supply from the building off.

The Trolley washing machine is now voltage free.

11 Cleaning

11.1 Safety instructions for cleaning

ATTENTION!

The tank heating elements may still be hot after the tank has been emptied. There is therefore the danger of burns when the machine is cleaned manually!

ATTENTION!

Electrical components, switch cupboards and other electrical components may not be sprayed with a water hose or high-pressure cleaner.

11.2 Cleaning after operation

It is recommended that you maintain the machine in good condition not only for reasons of hygiene but also to keep your Trolley washing machine in full working order and to be able to recognise damage more easily. Observe the following points after operation!

Clean and check that the machine is in working order:

- Pump suction sieve (suction side)
- Spray protection curtains
- Wash pipe jets
- Wash tanks
- Rinse arm jets
- Float valve housing of the water level monitoring

Any cladding panels removed to undertake this work must be replaced in their original position after completion of the work. Ensure that all the parts are correctly installed!

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11.3 Care of stainless steel surfaces

We recommend cleaning the stainless steel surfaces only when needed with cleaner and care products suitable for stainless steel.
Lightly soiled parts can be wiped with a (possibly damp) cloth or sponge.
Be sure to wipe dry after cleaning to avoid traces of scale. Use demineralised water if possible.

Do not use aggressive cleaning or scouring agents.
The care products must not attack the stainless steel, form deposits, or cause discoloration.
Never use cleaning agents that contain hydrochloric acid or bleaches based on chlorine.

Never use cleaning equipment that you have used previously by non-stainless steel to avoid external corrosion.

Aggressive external influences due to cleaning and care products that evaporate in the vicinity of the dish-washing machine, or caused by direct application, can lead to machine damage and put the material at risk (e.g., aggressive tile cleaners).

Caution!
Respect the safety rules of the manufacturers on the original packing as well as on the safety data sheets.

11.4 Check list after cleaning

After cleaning the Trolley washing machine ensure that all parts have been replaced correctly.
Check that the following parts are **present and in the correct position**:

- Outlet stand-pipe
- Rinse pipes
- Pump rinse pipes
- Pump suction side sieves
- Curtains
- Wash pipe jets auf freien Durchlass
- Nozzles of the rinse arms for free flow
- Check that the correct number of wash pipe end caps is present

Close the outlet valve.

Close the doors.

The Trolley washing machine is now ready for the next shift.

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IMPORTANT!!!

Do not use a foaming detergent for dish-washing by hand for pre-cleaning close to the dish-washer.

Foam can cause malfunctions in the dish-washer and a poor wash.

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12 General information on washing dishes in a machine

There are a number of basic principles which apply to machine-washing dishes irrespective of the Trolley washing machine manufacturer, type, model, design and construction of the dish-washer.

12.1 Washing and rinsing zones

From the point of view of washing techniques, two processes must be distinguished from each other and which are carried out in different locations in a conveyor machine:

- Cleaning the the items to be washed in the **main washing zone**
- Rinsing the items to be washed in the **clean water rinse zone**

Main washing zone
In the main wash zone (HWZ) the food particles etc. adhering to the items to be washed should be swilled off and dispersed from the plates and taken into the wash water. The wash water is sucked from the wash tank by means of a circulating pump and sprayed onto the items to be washed through a system of jets. The wash water flows back into the wash tank through a screen which retains the largest food particles and is then re-circulated by the pump. The wash water is therefore in a circulatory system.

The detergent is introduced into the wash tank (using a special dosing unit).

The purpose of the detergent is to remove the particles of grease and dirt adhering to the items to be washed and to hold them in suspension (to bind them) in such a way that they cannot re-contaminate the items to be washed. (Only suitable machine detergents must be used for this purpose!)
The concentration of detergent necessary in the wash tank depends on the degree of soiling and the water quality.

Depending on the chemical supplier, wash water temperatures of between 50 and 60° C are recommended to allow the detergent to develop its washing properties to the full.

Clean water rinse zone
After the items to be washed have passed through the main wash zone, the purpose of the clean water rinse zone is to remove all traces of the soiled wash water from the items to be washed.

Unlike the main wash zone (HWZ), this is not done by a circulatory system but by clean water from the outside water supply which is heated to about 80 - 85° C and which is sprayed onto the items to be washed in fine jets.

The cleaning process is complete after the clean water rinse zone.

Because of surface tension, clean water tends to form drops which do not run off the items to be washed and which vaporise only slowly. A rinse agent (sometimes called a wetting agent) is mixed with the clean hot water to reduce the undesirable effects of surface tension. It is the task of the rinse agent to remove water's property of forming drops. In other words, clean water to which a rinse agent has been added can easily and almost completely run off the items to be washed. Thus only the thinnest of films of water remains on the dishes; this film is easily vaporised by the residual heat of the items to be washed.

The different materials used to manufacture the items to be washed place different demands on the rinse agent. This factor must be considered when selecting a rinse agent or supplier.

The rinse agent is added in a special mixing chamber in the clean water pipe.

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12.2 Drying

Successful drying depends on a number of factors.

Firstly, on the rinse agent used (see above).

Secondly, on the heat absorbed by the items to be washed. The heat absorbed and stored by the dishes etc. during washing makes a significant contribution to the vaporisation of the water film (in other words, to the drying process). Heavy objects, such as metal cutlery and dishes made from ceramic materials, can absorb and store much more heat than a light plastic tray. This is the reason why a heavy stoneware plate dries much better than a plastic tray. If difficulties in drying are encountered, the right selection of drying agent can help.

The conveyor speed is also important for good drying.

The drying of the items to be washed is also significantly improved if the machine is fitted with an additional drying zone (TR). Heated air is blown over the items to be washed to induce rapid drying.

12.3 IInfluence of water quality (water hardness, salt content)

The water quality, which is determined by the nature and quantity of the substances dissolved in the water, for example gases and salts, can have a significant influence on the ability of the machine to operate and even on the length of its working life.

Water hardness, lime/chalk

Water containing lime reduces the operational efficiency of the machine in three ways:

The lime dissolved in the water precipitates out when the water is heated to temperatures of about 60°C and above and under certain circumstances can be deposited on the walls of the heat source, e.g. the heating elements. Excessive lime deposits on the heating elements inevitably lead to overheating and premature failure. We therefore recommend that the Trolley washing machine is operated with low levels of water hardness. It may be necessary to install a water softener.

The presence of dissolved lime also reduces the effectiveness of the detergent. Depending on the lime content, a greater or lesser proportion of the detergent is tied up by the lime and is therefore no longer available for cleaning. Thus a further result of hard water is the need for increased quantities of detergent.
Excessive salt content of the water (this includes magnesium, sodium and other salts as well as the calcium salts responsible for lime scale) causes spotting and marking on the the items to be washed.

As only the water can evaporate during the drying process, the salts previously dissolved on the water remain on the items to be washed etc. and form the undesirable spots and marks. If this occurs, relief can be provided by a water softener.
These salts which remain after evaporation are called evaporation residue and can create spots even at low concentrations.
((More detailed information including maximum acceptable values can be found in the Internet at http://www.vgg-online.de).

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12.4 Water softening

Softening means removing the lime-bearing components from the water.

It is necessary to soften the water if the lime content (i.e. the concentration of the calcium dissolved in the water) is too high, resulting in the danger of lime-scale deposits on the heating elements and other components of the machine.

Softening is usually achieved by what is called the “ion-exchange process“. The hard water is passed through granules which remove the calcium components, replacing them with sodium components which present no danger for the heating elements. The total salt content is not reduced by this process; all what happens is that the calcium ions are exchanged for sodium ions.
(More detailed information including maximum acceptable values can be found in the Internet at http://www.vgg-online.de).

12.5 Water demineralisation

Demineralisation (not to be confused with softening) means removing all the salts (calcium, sodium, magnesium etc.) dissolved in the water. Demineralisation can be necessary if white spots or marks are formed on dishes etc after drying; this occurs if the total salt content of the water is too high (only the water evaporates; the salts remain behind as spots and marks on the dishes etc. which is also called evaporation residue).

Demineralisation is carried out either by what is called a “two stage ion exchange process“ or a combined system or by reverse osmosis. As demineralised water is aggressive to metals, it should be diluted with untreated water. The conductance values given by the VGG (Commercial Dish-washing Association) should not be exceeded.
(More detailed information including maximum acceptable values can be found in the Internet at http://www.vgg-online.de).

12.6 Dosing of the detergent/rinse agent

The quantity of detergent needed to be added into the wash tank or wash tanks is the quantity of detergent that ensures that all trolleys etc leave the dish-washer in a clean condition.

It is impossible to give information on quantities here as the quantity depends on:

- the dosing system (liquid, powder, block, spray; etc.)
- the amount of soiling
- the drying time
- the quantity of starch present
- the water quality
- the type of detergent used (a disinfecting detergent or otherwise, etc.)

There can also be differences between one chemical supplier and another.

The quality of the finished items to be washed can also be influenced by the speed of the Trolley washing machine.

We recommend that you ask your chemical supplier to regulate the quantity settings on the machine.

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12.7 Dosing the rinse agent

The quantity of rinse agent needed to be added is the quantity which achieves the best results after drying.

It is impossible to give information on quantities here as the quantity and type of rinse agent depends on:

- the items to be washed
- the water quality

There can also be differences between one chemical supplier and another.

The quality of the drying can also be influenced by the speed of the Trolley washing machine.

We recommend that you ask your chemical supplier to regulate the quantity settings on the machine.

12.8 Descaling the machine

Rinsing with very hard water (for example caused by seasonal variations in water hardness or by improper maintenance) can cause ugly scale deposits in the machine which, apart from the unattractive appearance of the rough, white deposits, have almost no influence on the wash quality.

However, the lime-scale deposits on the wash tank heating elements and in the rinse water flow heater are much more serious. An excessively thick layer on the heating element acts as a thermal insulator and so prevents the transfer of heat from the heating element into the water. As a result the heating element overheats and burns out.

Lime-scale deposits can be removed with special scale removal products (ask your chemical supplier). However, these products contain acid and are very aggressive. They should therefore not be used too frequently and must on no account be used in a too high concentration as they can attack and destroy not just the lime-scale deposits but also other parts of the machine.

When carrying out this work the Instructions for Use and the Hazard Warnings for the lime-scale remover must be strictly observed.

After removing lime-scale, the machine MUST be thoroughly flushed out and emptied to ensure that all residues from the lime-scale remover have been neutralised. The machine should then be refilled and allowed to run for at least 15 minutes.

12.9 Discolouration on stainless steel and cutlery

Most of the instances of iridescent rainbow-like discolouration which can occur both on large surfaces of the machine as well as on cutlery are normally attributable to under-dosing with detergent. Increasing the amount of detergent or changing to another product will, in most cases, solve the problem.

Acid residues (fruit acids, vinegar, egg dishes, roughage etc.) in the food residues can also cause discolouration on cutlery. These can attack the stainless steel before they are washed. Dipping in water containing citric acid can help in such cases.

The reason for discolouration or an appearance which is less than perfect can, of course, lie in the fact that the cutlery, dishes etc have just not been properly washed. Even the thinnest of dirt films on cutlery looks unsightly. If this occurs, you must determine whether it is due to the trolley washing machine or whether it is due to under-dosing with detergent or whether you must switch to a different detergent.

Important! If powdered detergent is added by hand, you must ensure that the detergent is widely scattered to avoid excessive concentrations of detergent which can cause localised, discoloured spots.

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13 Tips for self-help in the case of faults

Fault:	Remedy
Machine does not fill!	• No water available • Dirt trap blocked • Level electrode / float valve soiled • Solenoid valve defective
Rinse water does not spray!	• No water available • Dirt trap blocked • Solenoid valve defective • If the appliance has automatic water conservation, the conservation grid switch / timing switch is defective • Pump for pumping water from the machine cistern broken down • Fresh water rinse system furred
Vapours drains!	• Extraction broke down • Curtains missing • Temperatures too high • Wash arms, drying nozzles, air guide plates bent or not correctly inserted
Stripes and smears on the trolley!	• Rinse water mineral content too high (see operating instructions) • Different water type depending on the waterworks • Unsuitable rinse aid products or wrong dosage quantity • Incorrectly fitted or missing curtains • Too fast conveyor speed
Formation of a significant amount of foam in the wash tank!	• Detergent for dish-washing by hand enters the wash tank because of pre-cleaning the dishes • Daily cleaning of the machine is carried out with foaming cleansing agents which afterwards enter the machine. • Improve pre-wash, as too much food residue is entering the tanks Alternatively, empty wash tanks between uses. Alternatively, empty wash tanks between uses. • Rinse water quantity too low • Detergent or rinse aid product not suitable • Temperatures too low < 40°C

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14 Staff training

Only trained and instructed personnel are allowed to work on the Trolley washing machine.

Staff responsibilities for the installation's operation, maintenance and repair must be clearly defined.

Any personnel undergoing training are only allowed to work on the Trolley washing machine installation under the supervision of an experienced person.

Persons / activity	Trained operating personnel	Trained in-house technician	Trained in-house technician or installation engineer
Installation and assembly			◆
Commissioning			◆
Operation, use	◆	◆	◆
Cleaning	◆	◆	◆
Checking safety devices	◆	◆	◆
Fault finding		◆	◆
Troubleshooting, mechanical		◆	◆
Troubleshooting, electrical			◆
Maintenance			◆
Repairs		◆	◆

Such training should be confirmed in writing.

15 Disposal of the installation

When you eventually dispose of the installation (dismantlement/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:

- Chrome-nickel-steel
- Aluminum
- Copper
- Brass
- Electrical and electronic parts
- PP and other synthetic materials

16 Noise level

See „Regulations and Standard Values“ for noise levels in the workplace.

17 Non-ionizing radiation

Non-ionizing radiation is not produced intentionally but unfortunately comes about due to electrical operating equipment (e.g. electrical motors, high-voltage cables and magnetic coils).
In addition the machine has no strong permanent magnet. There is a high possibility of eliminating the influence of active implants (e.g. pacers, defibrillators) by maintaining a safety distance of 30 cm (distance of the field source to the implant).

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18 Regulations and Standard Values

Standards referred to, important standards, regulations and Institutions:

DIN 10510	Commercial Dish-Washing With Multi-Tank Conveyor Dish-Washing Machines
DIIN 10512	Commercial Dish-Washing With Single Tank Dish-Washing Machines
DIN 1988	Technical Rules For Drinking Water Installations
DIN 1717	Protection Of Drinking Water Against Contamination – Safety Equipment
DIN 2052	Technical Equipment For Kitchen Atmospheres
DVGW	German Gas and Water Industry Association http://www.dvgw.de

VGG The Industrial Dish-Washing Association http:// www.vgg-online.de)

Water quality limits as determined by the Industrial Dish-washing Association

Total hardness:	up to 3 °dH
Chloride content	Max. 50 mg/l water (to avoid pitting corrosion in low alloy cutlery steels)
Heavy metals	0.1 mg iron and 0.05 mg manganese per litre of water should be regarded as the maximum. As little as 0.05 mg copper per litre of water can lead to discolouration of the Trolley washing machine.
Total salt content	Max. 400 µS/cm

Machine temperatures set out in DIN 10510 and DIN 10512

	Without disinfectants
Detergent circulation tank	50°C - 60°C
Clean water rinsing	80°C - 85°C

Control media for valves:

Pressures	Min. 3,5 bar, max. 8 bar
Usage of one control valve per switching operation	Approx. 0.01 litre at 3 bar

Noise level:
The acoustic power level from the acoustic pressure measurement was determined in accordance with the casing surface process on the basis of DIN EN ISO 3744 precision class 2

Noise level in the workplace	LpA ≤ 78dB (measurement uncertainty +/- 1.5 dB)

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19 Maintenance

Maintenance work may only be carried out when the Trolley washing machine is shut down. In addition, the Trolley washing machine main power switch must be in the OFF position and locked in this position.

Existing safety systems may not be removed!

A functional test on all safety systems of the machine / installation is carried out during every regular maintenance

We recommend that you take out a maintenance contract with our manufacturer's agent in order to ensure a long service life.

19.1 Basic safety measures during normal operation

Observe the maintenance periods prescribed in the operating instructions!
Observe the maintenance instructions given in these operating instructions for individual components!

Before carrying out any maintenance or repair work, prohibit access to the operating area to any unauthorized persons! Provide or display a sign drawing attention to the maintenance or repair work!

Before carrying out any maintenance and repair work, switch off the electrical power at the main electrical power switch and secure the switch with a padlock! The key for this lock must be kept in the hands of the person carrying out the maintenance and repair work! Failure to observe these precautions can result in severe physical injury or damage to property.

Before carrying out any maintenance and repair work, ensure that all the parts of the machine that may be touched have cooled down to room temperature!
Carefully dispose of any lubricating, cooling or cleaning products that could harm the environment!

19.1.1 Before putting back into operation following maintenance or repair work

Before starting operations following maintenance or repair work, all initial tests must be carried out as described
in "Machine Settings for Initial Commissioning by the Service Engineer".

19.1.2 Observe the environmental protection regulations

Legal obligations relating to the avoidance of waste materials and to their recycling/removal in accordance with applicable regulations must be observed!
In particular, during installation, repair and maintenance work, materials that could pollute water such as:

- Grease and oils
- Hydraulic oils
- Coolants
- Cleaning fluids containing solvents

must not pollute the ground or run into the sewerage system! These materials must be stored, shipped, collected and disposed of in suitable containers!

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20 Maintenance recommendation

	Service step ①	②	③	④
Maintenance	Cleaning works **Daily**	min. 1x **quarterly**	min. 1x **or twice a year** but **every 1000 h**	min. 1x **annually** but **every 2000 h**
PLEASE NOTE:	**Whenever any electrical components are disconnected and reconnected, replaced or repaired, a safety test must be conducted, at least on these components!!!**			

1. Allgemeine Reinigung				
Pump suction side sieves	◆			
Spray protection curtains	◆			
Wash- and rinse arm jets	◆			
Wash tanks	◆			
Float valve housing of the water level monitoring	◆			
2. Bandantriebe				
Check drive motor				
Check drive motor for exterior damage			◆	◆
Check drive motor for quiet running			◆	◆
Check current consumption (IN see wiring diagram)			◆	◆
Check ventilation grid for cleanliness			◆	◆
Check drive chain				
Check chain wheels, chain and chain adjuster for wear and tear			◆	◆
Check chain adjuster function			◆	◆
Check chain tension			◆	◆
Regrease chain if necessary (spray-on penetrating oil or silicone spray)			◆	◆
Check conveyor limit switch for correct disconnection				
Check switch for electrical function			◆	◆
Check limit switch for mechanical damage		◆	◆	◆
Check limit switch function with regard to the lag (the distance the conveyor runs after being switched off). The mechanical contact travel of the limit switch rocker must be greater than the conveyor lag.			◆	◆
Check conveyor overload switch for correct disconnection				
Check switch for electrical function			◆	◆
Check limit switch for mechanical damage		◆	◆	◆
Check switch function with regard to the overload disconnection.			◆	◆

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	Service step			
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3. Conveyor tension station				
Check conveyor tension. It must be possible to lift the conveyor belt by about 10 cm in the free entry or exit section		◆	◆	◆
Check conveyor diverter wheels and fixing rings for damage and correct position		◆	◆	◆
4. Conveyor				
Check conveyor split pins for wear or damage and that they are all present		◆	◆	◆
Check conveyor (belt fingers, roller, tension plates and belt rods) for wear or damage and that they are all present		◆	◆	◆
The conveyor must run without jolting: Check for uneven joints between the rails			◆	◆
5. Wash pumps				
Check pump motor				
Check motor for exterior damage			◆	◆
Check current consumption (IN see wiring diagram)			◆	◆
Check motor for quiet running (bearing damage)			◆	◆
Check ventilation grid for cleanliness			◆	◆
Check wash pump				
Check sliding ring seal for watertightness (external visual check)Check sliding ring seal for watertightness (external visual check)		◆	◆	◆
Replace sliding ring seal				Approx. every 2 years Approx. every 3000 h
Check pump impeller for damage				◆
Check pump housing for damage		◆	◆	◆
Pump suction sieve				
Check pump screen condition		◆	◆	◆
Thoroughly clean inside of pump screen				◆
Clean outside of pump screen	◆	◆	◆	◆

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6. Wash systems				
Check ascending pipe for watertightness				
- Pump / ascending pipe connection		◆	◆	◆
- Ascending pipe		◆	◆	◆
- Ascending pipe / wash system connection		◆	◆	◆
- Wash system seating		◆	◆	◆
Check wash system				
Check wash system for damage		◆	◆	◆
Check nozzles for cleanliness	◆	◆	◆	◆
Check that the correct number of wash pipe end caps is present	◆	◆	◆	◆
7. Clean water rinse system				
Check motor power switch (if present)				
Check motor for exterior damage			◆	◆
Check current consumption (IN see wiring diagram)			◆	◆
Check motor for quiet running (bearing damage)			◆	◆
Check ventilation grid for cleanliness			◆	◆
Check pump power switch (if present)				
Check sliding ring seal for watertightness (external visual check)Check sliding ring seal for watertightness (external visual check)		◆	◆	◆
Replace sliding ring seal				Approx. every 2 years Approx. every 3000h
Check pump impeller for damage				◆
Check pump housing for damage		◆	◆	◆
System				
Check the complete system for damage and watertightness		◆	◆	◆
Check nozzles for cleanliness	◆	◆	◆	◆
Check water quantity (use the water meter or measure manually)			◆	◆
Clean the inlet tank				◆
Check float switch function			◆	◆

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8. Drying				
Fan				
Check fan for exterior damage			◆	◆
Check current consumption (IN see wiring diagram)			◆	◆
Check fan for quiet running (bearing damage) (visual and noise check)			◆	◆
Check suction side grid for cleanliness			◆	◆
Damper register (steam or hot water)				
Check damper register for cleanliness			◆	◆
Clean damper register with hot water				◆
Check damper register for watertightness (heating medium)				◆
Blowing box				
Check fan system nozzles for damage.		◆	◆	◆
Function check				
The suction side temperature must not exceed $_{x1}$°C.				◆
Check internal drying chamber for cleanliness			◆	◆
Clean internal drying chamber with hot water (remove greases and oils)				◆
$_{x1}$ see later				
10. Heat recovery				
Exhaust fan				
Check fan for exterior damage			◆	◆
Check current consumption (IN see wiring diagram)			◆	◆
Check fan for bearing noise (damage to bearing)			◆	◆
Check protection grid for cleanliness			◆	◆
Heat exchanger				
Check heat exchanger for cleanliness			◆	◆
Clean heat exchanger with hot water				◆
Check heat exchanger watertightness				◆

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11. Machine housing and built-in components				
Check machine housing, tank, sheet metal body, door, sub-structure cladding, entry and discharge sections for watertightness			◆	◆
Check machine housing, tank, sheet metal body, door, sub-structure cladding, entry and discharge sections as well as flaps for damage and for correct position. Check that all are complete and correctly inserted.	◆	◆	◆	◆
Check the splash curtains for damage and correct position and if they are complete		◆	◆	◆
Check tank covering screens and screen box for damage and correct position and if they are complete		◆	◆	◆
Check door guide rails		◆	◆	◆
Check door roller springs (exchange all even if only one is defective)		◆	◆	◆
Check electrical door control switch function		◆	◆	◆
Check door control switch for mechanical damage		◆	◆	◆
12. Equipment area				
Checks on operating temperature and water consumption				
Measure tank water temperatures ($_{x2}$), rinse water temperatures ($_{x3}$) and drying temperatures ($_{x4}$) and compare with values in the documentation			◆	◆
$_{x2, x3, x4,}$ see later				
Heating system				
Check the complete system for watertightness				◆
Clean dirt trap			◆	◆
Check function of the valves			◆	◆
Clean water system				
Check the complete system for watertightness				◆
Clean dirt trap			◆	◆
Check function of the valves			◆	◆
Clean level control	◆	◆	◆	◆
Check level control function			◆	◆
Check water supply quality – water hardness (according to the installation plan)			◆	◆
Check machine and all components for lime-scale deposits. Descale, if necessary			◆	◆
Check water supply quality – temperatures (according to the installation plan)		◆	◆	◆
$_{x5}$ see later				

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13. Waste water equipment				
Check if outlet screens are present	◆	◆	◆	◆
Check outlet screens function (bayonette)		◆	◆	◆
Check drain cocks and standpipes for watertightness			◆	◆
14. Electrical installation				
Check power consumption of all heating elements(IN see wiring diagram)				◆
Tighten all screwed fuses and connections				◆
Check all switches for correct operation and damage (see electrical wiring diagram)				◆
Carry out a visual check on all electrical equipment (e.g. switches, cables, housings, covers).				◆
Check the switch cabinet ventilator entry and discharge filters (if present)			◆	◆
Ensure the operator is aware of the need for electrical safety checks. (According to BGVA 3: once at least every 4 years)				◆
15. Detergent dosing				
Check function (if possible, coordinate with chemical supplier)			◆	◆
16. Rinse agent dosage				
Check function (if possible, coordinate with chemical supplier)			◆	◆
17. Function test on the complete machine				
Check machines for the interaction of all functions			◆	◆
Dishwashing test Check cleaning results, drying results			◆	◆
if necessary take a view on the starch levels and discuss with the chef.			◆	◆
Air compressors (if present)				
Check oil level		◆	◆	◆
Remove condensation water from reservoir tank		◆	◆	◆
Observe the manufacturer's operating instructions in all cases				
Booster pump installation (if present)				
Check for watertightness			◆	◆
Check the admission pressure into the expansion chamber			◆	◆

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18. Visual check on the machine environment				
Foaming detergents must not be used close to the machine area and not in connection with the machine	◆	◆	◆	◆
Water treatment installation (if present)				
Reverse osmosis installation (visual check); inform customers on the necessity of installation maintenance			◆	◆
Demineralisation installation (visual check); inform customers on the necessity of installation maintenance.			◆	◆
Observe the manufacturer's operating instructions in all cases				

x1 Maximum suction temperature fan 0 550 056 75°C
Maximum suction temperature fan 0 550 056 75°C

x2 Detergent circulation tank temperature according to DIN 10510 55°C to 65°C

x3 Clean water rinse temperature according to DIN 10510 80°C to 85°C

x4 Dryin temper according to DIN 10510 not specified (see x1)

x5 Minimum water quality according to the VGG
Total salt content Max. 400 ±S/cm

The service steps ①-④ must be carried out by personnel trained for this purpose.

① trained operating personnel
② company tradesman after instruction
③ trained company tradesmen or installation engineers
④ installation engineers trained by MEIKO

You can document the completed maintenance work on the following pages. Meiko recommends that you enter the half-yearly service steps (③), and the annual service steps (④).

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Date:	Service step		Name: Execution Monteur	Name: Confirmation Customer
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MEIKO

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