

Operating instructions

UPster K

Racktype dishwashing machine

Translation of the "Original operating instructions"



EN

For the types of the series:

KF-S**N*-*.*
KF-S**N*-*.*AT65P
KF-M**N*-*.*
KF-M**N*-*.*AT65P
KF-L**N*-*.*
KF-L**N*-*.*AT65P



Read operating instructions before using the appliance!

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1 Introduction and general instructions

Dear customer,

we are delighted about the confidence you have shown in our products.

It is very important to us that you should obtain a great deal of pleasure and usefulness from MEIKO products and that they should make your work easier.

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

After assembly at our factory, this machine was put through a thorough inspection. This helps us make sure, and gives you the guarantee that you always receive a mature product.

We would therefore ask you to read these operating instructions carefully before using the installation. Any further related operating instructions for accessories and incorporated third-party products must be strictly observed!

These operating instructions are designed to familiarise the owner/operator of this system with its installation, modes of operation, use, safety instructions and servicing.

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 additional damage caused as a result.

MEIKO operates a policy of continuous development on all its appliances.

As a result of this, please understand that we thus reserve the right to make changes to the scope of supply concerning the design, equipment and technical features at any time.

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 should arise that are not dealt with in great detail in the operating instructions, you may contact the relevant MEIKO branch to obtain the information you require.

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 operating instructions must exist in the local language for each EU country. If this is not the case, the installation must not be commissioned.

The original operating instructions in German and all operating instructions in all languages for EU countries can be downloaded from the following address:
<https://partnernet.meiko.de>

You receive all this technical documentation free of charge. Any additional copies required are available for a nominal fee.

MEIKO wishes you much pleasure and success!

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1.1 Product identification

These operating instructions apply to the following machine types:

Racktype dishwashing machine UPster K (KF-series):

KF-S**N*-*
KF-S**N*-*AT65P
KF-M**N*-*
KF-M**N*-*AT65P
KF-L**N*-*
KF-L**N*-*AT65P

* see rating plate

1.2 Safe keeping

Keep this operating manual in the vicinity of the installation in a location that is easily accessible to all users.

1.3 Authorisation for service technicians of our service partners

MEIKO exclusively authorises authorised Service Partners for commissioning, inductions, repairs, maintenance, assembly and installation of the corresponding product groups within MEIKO devices.

The service instructions feature additional information for authorised partners on assembly, modifications and repairs of all optional modules for this dishwashing machine.

1.4 Related documents

In addition to these operating instructions, there are other documents that are available depending on the authorisation:

Operator (included in delivery contents)	Authorised service technician
EC/EU declaration of conformity	Dimension sheet
Short operating instructions	Service manual
Wiring diagram	Installation instructions for optional components
	External/supplied dosing unit

2 Explanations of the safety symbols used

The following safety symbols will appear throughout these operating instructions. These symbols are designed to draw the reader's attention to the text next to the safety instructions.

 DANGER
Refers to a dangerous situation which results in death or serious bodily injury.

 WARNING
Refers to a dangerous situation which can result in death or serious bodily injury.

NOTE
Refers to a situation which can result in damage to property.














Application information and other useful information

2.1 Graphic reference symbols

The following notes and risk symbols can occur wholly or in part in the operating manual and on the installation. These symbols (or symbols on the installation) must be observed without fail!

The symbols have the following functions:

 Caution! Electric shock!	 Caution! Hand injuries!	 Caution! Heavy loads!	 Caution! Hot surfaces!
 No splashing water!	 Access prohibited for persons with pacemakers!	 Caution! Non-potable water!	 Caution! Do not reach into the unit!
 Use protective gloves!	 Wear safety glasses!	 Equipotentiality	

3 General description and use for the purpose intended

3.1 General description

This machine is a rack type dishwashing machine for dishes, containers and common kitchen utensils.

Tables or conveyors can be put on the feeding or discharge side of the machine for loading and unloading dishware baskets.

The dishes to be cleaned are put into carrier baskets, preferably made of plastic, and transported through the dishwashing machine on transport equipment.

Wash ware is cleaned using a heated wash tank.

The dishes are finally rinsed using heated fresh water sprayed through fine nozzles.



3.2 Intended use

The dishwashing machine is intended for commercial use only and is designed to wash dishes, cutlery, glasses, kitchen utensils, baking trays and containers. The washware must be suitable for commercial dishwashing machines.

Operation of the dishwashing machine in a potentially explosive atmosphere is not in accordance with its intended use!

MEIKO does not accept any liability for damages resulting from improper use or incorrect operation. Any other use, conversions and modifications are not permitted and are dangerous.

3.3 Foreseeable use

- Washing washware outside the technical specification
- Washing kitchen utensils with electronic components
- Cleaning textiles, oven cloths or steel sponges
- Washing utensils made of iron or utensils that must not come into contact with foodstuffs (e.g. ashtrays, candlesticks, etc.)
- Cleaning living creatures
- Washing food for subsequent consumption
- Preparing foodstuffs in the machine

- Taking wash water to prepare food or for drinking
- Washing support grids of cooking hobs/gas hobs
- Introducing service water into the local waste water system
- Standing or sitting on machine parts
- Washing parts made of wood
- Washing plastic parts that are not heat and alkali-stable
- Washing parts made of aluminium (such as pots, containers or trays only with a suitable detergent to avoid black discolouration)

4 EC Declaration of Conformity

A Declaration of Incorporation is provided with the machine if it is not supplied in fully operational state, that is, as a partially completed machine pursuant to the Machine Directive.

An EC Declaration of Conformity is provided with the machine if it is supplied in fully operational state as a complete machine.

5 General safety rules



NOTE

The following safety instructions are for your protection as well as the protection of others and the dishwasher. Compliance with the instructions is therefore absolutely necessary.

5.1 Operator's duty of care

This machine has been constructed and designed based on a risk assessment and careful selection of the applicable harmonised standards, as well as additional technical specifications.

It is therefore state of the art and guaranteed to provide maximum safety. Safety can only be guaranteed during operation if all necessary measures are taken.

The operator of the installation has an obligation of care to ensure that these measures are planned for, and also to check that they are correctly implemented.



5.2 Measures to ensure safe system operation

The operator must ensure in particular that ...

- A main switch is installed on site. The main switch must be easily accessible and in the direct vicinity of the dishwashing machine.
- The following requirements must be fulfilled:
 - Load-break switch as per IEC 60947-3
 - Utilisation category AC23B
 - Lockable in OFF position
 - Protection class against water IPX5
 - The load-break switch must be installed in the direct vicinity of the machine and must be easily accessible at a height of 0.6 - 1.9m
 - Short-circuit breaking capacity $\geq 10\text{kA}$
 - Load-break switch rated operating current
 - \geq Machine's total current (type label) + 10%
 - Neutral conductor shutdown optional
- the dishwashing machine is used in accordance with the regulations only.
in case of other use or operation, damage or risks may arise for which we accept no liability (cf. chapter "Intended use").
- in order to preserve the operational and safety guarantees, whenever required, only original parts supplied by the manufacturer are used. Any potential claims by the user shall be rendered void if the system was altered using parts other than original spare parts.
- only appropriately qualified and authorized personnel use, maintain, and repair the installation.
- staff is regularly trained in all questions relating to occupational safety and environmental protection and, in particular, that staff is familiar with the operating instructions as well as with the safety instructions they provide.
- the dishwashing machine is only operated in a perfect, operationally efficient condition and, in particular, that the safety systems and switch elements are checked on a regular basis for their operational efficiency.
- the required personal protective equipment is made available to and used by maintenance and repair personnel.
- the main switch must be turned off for cleaning.
- a functional test on all safety systems of the installation is carried out during every regular maintenance.
- all the safety, warning and operating instructions provided are not removed and are legible.
- Regular checks on supply parts are carried out. If required, more detailed information can be found in the relevant operating instructions.
- there are no further modifications after assembly, commissioning and handover of the dishwashing machine to customers/operators (e.g. electrical modifications or location changes). modifications to the dishwashing 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.
- equipment for optimising energy consumption must not be used to reduce essential operating temperatures, as set out in DIN 10511, 10512 and 10522. If you, the client, install equipment for optimising energy consumption, any possible reduction in the quality of the wash and hygiene is your responsibility.

5.3 Basic safety measures



DANGER

Risk of injury due to electric shock, material damage.

Parts carrying electric current as well as moving or rotating parts can cause dangers to the user's life and limb and material damage.

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

The dishwashing machine may only be operated by adequately qualified personnel who have been trained by the operating company and who have been trained about the hazard and safety instructions.

When electrical devices are in operation, it is inevitable that some parts of these devices are live with dangerous voltage.

The entire dishwashing machine must be de-energised before opening the dishwashing machine housing parts or electrical equipment.

Set the main switch on site to the OFF position. Ensure appropriate measures are in place to prevent the switch from being turned on again.

Work and troubleshooting on electrical parts of the dishwashing machine must be performed by specialists only. Observe accident prevention regulations.

The operator must not restart the dishwashing machine until **all housing parts** have been replaced.

- **Qualified staff**, as defined by the Operating Instructions, are persons:
 - over 14 years of age
 - who have read and observe the safety instructions as well as the operating instruction,

NOTE

Damage to property

Do not spray the installation, switch cabinets and electronic components using a water hose or high-pressure cleaner!

Avoid flooding the base of the system to prevent damage to components from penetrating water!



Observe all the instructions posted on the installation.

The dishwashing machine may only be operated under the supervision of trained personnel. Do not use the dishwashing machine if you are unsure about system operation.



Do not reach into the machines when they are in operation.

Switch off the machine before opening doors/flaps.

Open doors/flaps slowly: avoid contact with splashing water containing detergent solution.



The water in the wash-up area is non-potable and must not be used for food preparation!

The dishwashing machine must not be used to transfer waste water from other sources into the drain.

Always keep hatches and cover panels closed!



The tank heating elements may still be hot after draining the tank. As a result, there is a risk of burns or scalding when cleaning the machine manually!

All work and troubleshooting must be carried out by qualified professionals.

Only use detergents, rinse aid and additives suitable for commercial dishwashing machines. Do not use said substances for any other purpose than their intended purpose. Please contact the manufacturers of these products für information. Detergent, rinse aid and additives may contain hazardous substances. Observe the manufacturers' hazard warnings on the original containers and safety data sheets. Observe the instructions of chemical product suppliers with regard to use and dosage.



Hazardous, chemical substances used to operate the machine may escape when changing packing.

Wear personal protective equipment!

The operator's organisational methods must be followed if an injuries is caused when using the appliance. Go to see a doctor if an infection progresses.

Please turn off the main switch at end of operations.



NOTE

Wear suitable work clothing

Loose clothing and jewellery increase the risk of being caught on protruding parts.

- Wear fitted work clothing. Wear full-length trousers or an apron.
- Do not wear rings, necklaces or other pieces of jewellery.
- Wear protective gloves.
- Wear sturdy, suitable shoes. (We recommend wearing safety shoes with slip-resistant soles.)



WE DO NOT ACCEPT NO LIABILITY FOR DAMAGE OR INJURY ARISING FROM FAILURE TO OBSERVE AND ABIDE BY THESE SAFETY INSTRUCTIONS!!!!

5.3.1 Working on the electric fittings



DANGER

Risk of injury due to electric shock!

Any repair work and troubleshooting on the system's electrical equipment must be carried out by a qualified electrician!

Before carrying out any maintenance and repair work, switch off the power supply at the main electrical power isolator 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 injury or damage to property.

Check the electrical equipment regularly!

Tighten any loose connections!

Replace any damaged leads/cables immediately!

Always keep the switch cabinet closed! Access for qualified persons only.

5.3.1 Water installation work



WARNING

Risk of injury, damage to property!

Risks from unauthorised modifications on the installation and high water pressure.

Shut off and lock the main water supply valve before performing maintenance and repair work on the water installation!

6 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 arise due to the connection must be prevented 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 function checks must be performed at the latest within the scope of overall system testing prior to commissioning/machine handover.

6.1 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. Connections have been illustrated on 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 not operate the machine.

7 Delivery, transport, installation and assembly

7.1 Delivery



NOTE

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.

In the event of any transport damage, please inform MEIKO immediately in writing, and also send a photo of the damaged parts to us.

7.2 Transport and installation



WARNING

Risk of injury caused by heavy loads!

In order to avoid damaging the machine and causing serious injury during transport, loading, unloading and transport must be carried out by qualified personnel as per locally applicable occupational safety instructions.

Read the chapter "General safety instructions".



- The machine must only be transported on the supplied wooden frame. The packing is specifically designed to allow the appliances to be moved safely and securely using a pallet jack or a sack truck.

- For safe transport, the machine is supported by a special square-timber frame.
- Open packaging using a suitable tool.
- Observe transport instructions on the packing.
- Handle with care.
- Unpack the machine.

7.3 Installation and assembly

MEIKO created an installation drawing featuring machine dimensions as well as connection and consumption values.

The system must be installed as per the information in the installation drawing. It **must** be installed by a licensed and authorised technician.

Assembly is completed by reference to the assembly diagram and, in general, by following the instructions of a trained MEIKO engineer. The machine must be installed and connected by an approved professional.

For Australia only:

The equipment must be installed in accordance to AS/NZS 3500.1.

We do not accept any liability for damage caused by unprofessionally implemented connection work.

System installation steps:

Position the unpacked machine according to the dimensions specified on the installation drawing.

Set up the machine so that it is correctly levelled and aligned.

Refer to the separate installation instructions for additional information on installation.

7.4 Floor load from the dishwashing machine

The floor load per leg (with a loaded area Ø=30 mm per leg) is approx. 220 kg

7.5 Requirements to the installation area

- Ensure that the storage and installation area is permanently frost free. If the system is installed in an area where the surrounding temperatures are below 5°C, the water freezing inside may damage the internal water components (pump, solenoid valve, etc.).
- Anti-slip floor coverings must be provided in the system's work area.

7.6 Requirements to the electrical connection



⚠ DANGER

Risk of injury due to electric shock!

Work on the electrical machine components may be undertaken by specialist electricians only.

General Electrical Regulations must be observed when connecting the machine to the power supply.

The electrical cabinet features the corresponding wiring diagram. This wiring diagram forms part of the machine and for this reason, it must not be removed.

There are two type plates indicating the electrical connected loads, one visible from the outside and one on the inside of the electrical cabinet.

When connecting the power supply line to the machine, observe the general electrical regulations

For USA/Canada only:

The dishwasher must be/is installed in accordance with local codes, or in the absence of local codes, installed in accordance with the applicable requirements in the National Electrical Code, NFPA 70, Canadian Electrical Code (CEC), Part 1, CSA C22.1, and Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, NFPA 96.

Attention:

The pre-fuse in the building must be chosen to meet local requirements and match the nominal machine current in order to provide backup protection (VDE 0100 for Germany).

The mains supply cable must be provided with fuses in accordance with regulations and must have a main switch (accessible on site or on the appliance for operating personnel). If the neutral line (N) is not earthed, you must use a 4-pin master switch. Mains connecting leads must be oil-resistant, shielded cables no 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).

Connect the machines to the building's equipotential bonding. The machine-side connection is located very close to the machine's central switch cabinet/unit sheet on the undercarriage in the form of a screw and is marked accordingly.

VDE 0160/EN 50178 specifies that within electrical equipment featuring/planning to use residual current de-vices on the grid side to install AC/DC sensitive type B FC frequency converters upstream/instead of the installed type A FC frequency converters.

A 5-pin terminal strip is provided for the mains connection (L1, L2, L3, N, PE).

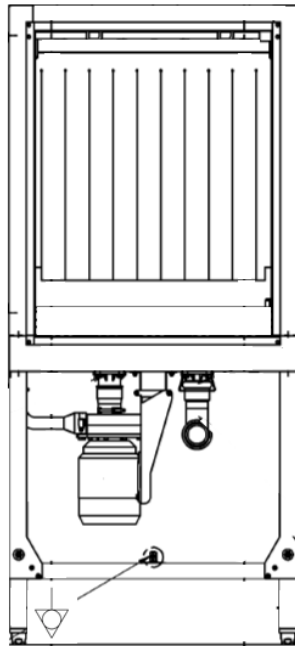
The dishwashing machine must be connected by a qualified electrician in accordance with the locally applicable standards and regulations.

The electrical connection data, voltage, type of current, current intensity and output, etc. can be seen on the rating plates. Check whether the on-site connection provides the required values.

Route all electrical cable connections through the marked cable gland in the electrical control cabinet according to the wiring diagram and connect to the intended terminals and contactors.

In order to connect the supply cable to the supply terminals, the installation instructions in the electrical control cabinet and on the supply terminals must be observed.

Protective equipotential bonding



The screw for the potential equalisation is located on the housing under the rinsing zone (view from the rear).

The potential equalisation bonding must be carried out in accordance with the requirements of the local electricity supply companies and all applicable local regulations (in Germany VDE 0100 Part 540). Incorporate the machine and any conductive substructures and table systems into the local potential equalisation system.

7.7 Temperature sensors/temperature limit switches

All safety temperature limiters and temperature sensors which have been loosely rolled must be positioned in their correspondingly highlighted location.



CAUTION:

Do not bend the capillary filling pipe, as otherwise the temperature probe could become damaged and unserviceable! Observe the instructions on installation and removal in the service instructions!

7.8 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, diameters, etc. relate to the connections on the machine.
- Installations on site must be dimensioned to match local conditions (e.g. cable arrangements, access lengths). Media and power connection of the machine are described in the service instructions.
- The connections must be made by approved professionals.
- 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).
- The owner/operator must install a shut-off device in each water supply pipe/hose; the device must be accessible to operating personnel.
- A backflow preventer is installed depending on the machine version. Refer to the service instructions for more detailed information.

- Waste water connections must be implemented in accordance with local regulations (for Germany e.g. DIN 1986).
- When using water softening devices, partial desalination or complete desalination cartridges, a local shut-off device, a local particulate filter, a local non-return device and a local vacuum breaker must be provided by the owner/operator.
- Unless stated to the contrary, a minimum flow pressure of 250 kPa (2.5 bar) on site and maximum pressure of 600 kPa (6 bar) must be guaranteed.



- 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 to be cleaned during maintenance. 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>.)

Keep the feed water temperature of the water line supplying the final rinse components to a minimum to achieve optimum results with potentially installed heat recovery components.

Inlet water for final rinse components with a higher temperature affects the 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. Refer to the service instructions for required pressure values and quantities.

7.9 Waste water connection

Connect the waste water line to the building's waste water network in compliance with local waste disposal regulations.

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



All water drains of the machine must be connected to the kitchen's waste water system via a sufficiently 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 70 - 75° 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.

7.10 Exhaust air connection of the appliance

Observe the following when connecting an extractor system to the machine:

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

The values stated in the order-specific documentation for the exhaust air temperature and moisture content may be higher in certain operating states (e.g. standby).

The machine exhaust air may contain slight amounts of aerosol; it may need to be dissipated by appropriate measures near the exhaust outlet.

When exhaust air is dissipated into the room, note that the specifications for the temperature and relative humidity and thus the load levels for the room apply to uninterrupted washing. Otherwise a temporary increase of the exhaust air temperature, relative humidity or load level in the room is possible, depending on the operational state.

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

The hot, moist air from the machine must be removed from the washing-up kitchen. Safeguard the locally available negative pressure (vacuum) is adequate to ensure optimum extraction. If applicable, the machine exhaust air may be directly extracted at the input/output.

7.11 Installing and connecting dosing equipment

When operating the dishwashing machine, it is necessary to use a commercial washing liquid and rinse aid. Use only detergents and rinse aid that are suitable for machine dishwashing appliances and approved by the responsible authority. The safety regulations relating to their handling, dosing, storage and use must be observed in all cases.

Use a suitable dosing system to dose the detergent and/or rinse aid. MEIKO recommends the use of a MEIKO dosing system with appropriate detergent and rinse aid. We do not recommend manual chemical dosing.

The dosing system must be installed by authorised, specialist personnel or by a qualified dosing system supplier.

As an exceptionally wide range of dosing equipment is available in the market, it is not possible for us to provide detailed instructions on its installation. Your chemical supplier will be familiar with the best installation position for their product.

The dosing system used must comply with current safety regulations and be suitable for use in commercial dishwashing machines. No major modifications may be made to the dishwashing machine.

Due to the hazards that highly-concentrated chemicals can present, specific precautions must be taken when using dosing systems from different chemical suppliers.

The operator must ensure that the safety of the dishwashing machine is not compromised by the retrofitting of a dosing system.

Precautions that prevent chemicals being sprayed when the dishwashing machine doors are opened may need to be taken here! There must be no danger to the operator at any time!

When the tank doors are opened, the dosing of the detergent is immediately interrupted. This must also be ensured when using third-party dosing technology.

Different chemical suppliers use systems from different manufacturers. MEIKO accepts no liability for damage caused by the use of unsuitable dosing technology.

7.12 Detergent and rinse aid

The chemical supplier selects suitable detergents and rinse aids according to the conditions on site. The machine is equipped with a rinse aid connection. Use only this connection!



⚠ Warning

Risk of injury from contact with chemicals

- Observe the safety data sheets and dosing recommendations of the chemical manufacturers.
- Use eye protection.
- Wear protective gloves.
- Do not mix different chemical products.

⚠ Caution

- Only use products that are suitable and approved for commercial dishwashing machines. MEIKO recommends MEIKO ACTIVE detergent and rinse aid. MEIKO ACTIVE products are optimally adapted to MEIKO dishwashing machines.

The dishwashing machine can be equipped by the manufacturer with dosing units for liquid or solid detergent/rinse aid. Manual dosing with powder cleaner is not intended.

Optionally, the dishwashing machine can be equipped with external dosing systems. Information on the electrical connection of the dosing units can be found on the wiring diagram and in the operating instructions for the dosing units.

7.12.1 Detergent

Detergents are alkaline (pH value should be > 7) and are needed to dissolve soiling from the washware.

The chemical supplier determines the necessary concentration depending on water quality, washware and degree of soiling. This setting is made during commissioning by a MEIKO authorised service technician or the chemical supplier.

Refer to the operating instructions for the dosing unit for information on how to set the dosing quantity.

7.12.2 Rinse aid

Rinse aids are acidic (pH value should be between 2 and 7) and accelerate the drying of the washware by reducing the surface tension of the water so that it can run off the washware quickly.

The correct dosage is achieved when the water drips evenly from the washware. It also depends on the available water quality on site. This setting is made during commissioning by a MEIKO authorised service technician or the chemical supplier.

Refer to the operating instructions for the dosing unit for information on how to set the dosing quantity.

7.12.3 Dosing units

The components of the dosing units are subject to high demands and must therefore be regularly maintained and, if necessary, replaced in accordance with the maintenance specification. When maintaining the dosing units, observe the dosing unit operating instructions. For example, when working on the equipment, the main switch on the machine must be turned off.

The service life of the dosing units and other components of the dishwashing machine depends on the use of suitable chemical products. MEIKO recommends MEIKO ACTIVE detergent and rinse aid. MEIKO ACTIVE products are optimally adapted to the dishwashing machine.

Electrical connection

Work and troubleshooting on the electrical installation of the machine must be performed only by qualified electricians. Observe accident prevention regulations.

The "XD" terminal strip supplies electrical power and controls the dosing systems. (More detailed information can be found on the machine's wiring diagram.)

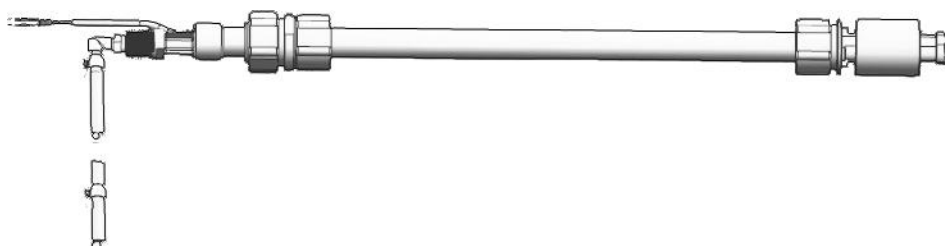
No other connections are permissible.

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

Water connection

When installing dosing units, it must be ensured that the water connection is made in accordance with the applicable local standards.

7.12.4 Suction lances



Suction lances from MEIKO with level monitoring for rinse aid and/or detergent

Suction lances ensure that the liquid chemical product is sucked in correctly. The suction lances used by MEIKO are inserted vertically into the canisters and are equipped with level monitoring. When using suction lances from other manufacturers, follow the manufacturer's instructions. When the canister is running low, a message will appear on the machine display.

7.12.5 Change of products

⚠ Caution

When changing the detergent product (even to a product from the same manufacturer), crystallisation may occur, which can lead to failure of the dosing system.

- When changing the detergent product, flush the dosing system with warm water.

Procedure for changing the detergent product:

In all cases, discuss the change of product with the chemical supplier and follow its instructions.

Recommission the dosing units in accordance with the dosing unit operating instructions.

8 Adjustment of the machines effected by authorised service technician during the first setting in operation

8.1 Commissioning



Commissioning and training will be handled and provided by MEIKO authorised service technician. The operator must not use the installation before completing training.

Perform any required initial checks on supplied parts, such as water treatment units or other units. More detailed information, if required, can be found in the relevant operating instructions.

To avoid damage or dangerous injuries during the setting in operation of the installation, please observe the following points:



WARNING

Risk of injury, damage to property!

As a result of unintended work on the system.

All persons involved in operation, maintenance or repair work must have read and understood the **General safety instructions** section.



DANGER

Risk of fatal electrical shock or fatal injuries caused by rotating parts!

All cladding must be intact before commissioning!

Check any escaped fluids have been removed.

Activate all the safety systems before commissioning.

Check that all screw connections are tight.

8.2 Chemical product settings

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

8.3 Work prior to initial commissioning

It is paramount to comply with the instructions in this section prior to initial commissioning.

Water carrying pipes

All pipes must be thoroughly flushed. In this process, the heating must be switched off (remove the fuses) to avoid dry-heating of the heating elements. Subsequently clean all dirt traps.

Steam pipes

All lines must be thoroughly flushed. In this process, all valves must be open and all condensation traps must have been removed. Subsequently clean all dirt traps.



Electrical connection

- Retighten all electrical terminals in the electrical cabinet; check that electrical plug-in connections are firmly seated.
- Check all motors for correct sense of direction.
- Carry out a visual check on all electrical equipment (e.g. switches, cables, housings, covers).
- Carry out functional tests on all electrical switches.

Machine interior

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

Caution!

Safeguard smooth transitions in areas where moving parts move past fixed parts
(e.g. guide rail, water guiding plate, etc.)

Make sure that all wash pipes, wash systems, final rinse arms, sieves, tank covers and drain filters as well as flaps have been connected to the input and output. Ensure that all the parts are correctly installed!

9 Operating the dishwashing machine

9.1 Basic safety measures for standard operation



CAUTION!

The installation 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!

Ensure the following before switching on the installation:

- Exclusively authorized and instructed persons are within the work zone of the installation.
- Nobody could be injured by setting the dishwashing machine into operation.

Before commissioning, each time

- Inspect the installation for any visible damage and ensure that it will only be operated in a perfect condition!
Report any defects to the foreman immediately!
Remove material/objects from the installation's work zone which are not required to operate the installation!
- Check and ensure that all the safety equipment is operating perfectly!

9.2 Switching on and working with the machine



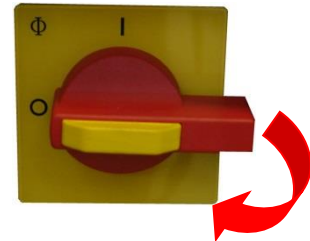
DANGER

Risk of fatal electrical shock or fatal injuries caused by rotating parts!

Operate the dishwashing machine with completely closed casing only. Before removing any cladding, the on-site mains electricity supply must be switched off and secured with a padlock to prevent it from being switched back on. Otherwise there's the risk of fatal injury!



Open the possibly existing stop valve in the water pipe.

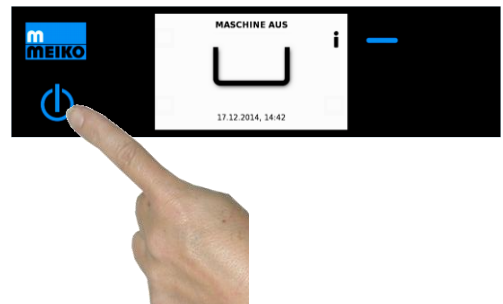


Switch on the locally available power supply.

Ensure that all wash pipes, wash systems, final rinse arms, sieves, tank outlet valves and drain filters as well as flaps have been installed on the input and output. Ensure that all the parts are correctly installed!



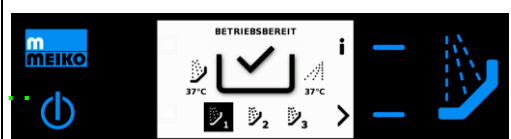
Close the door.



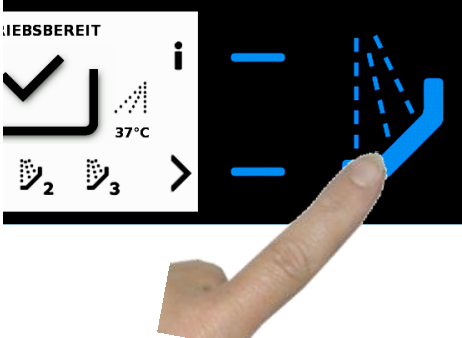
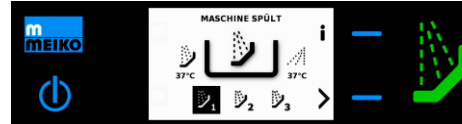
Press the "ON/OFF" button.



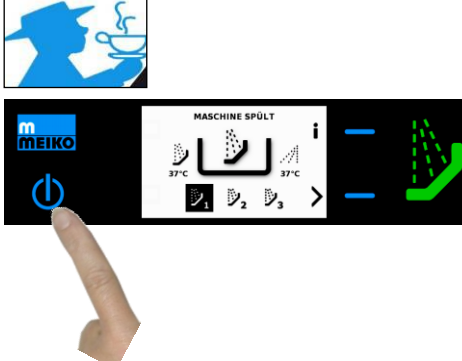
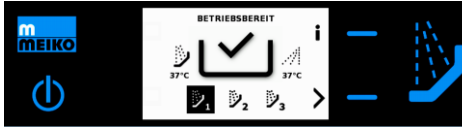
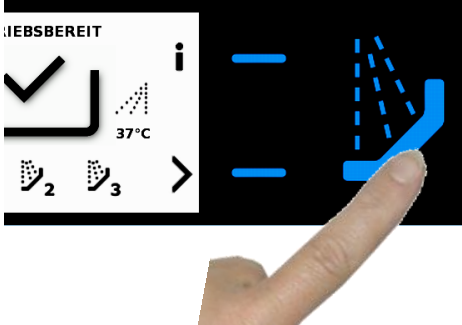
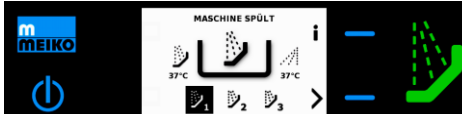
The green LED flashes. The wash tank is filled and heated up automatically.



The following message appears on the display once the wash tank has been filled and heated to the desired temperature:
"READY FOR OPERATION"

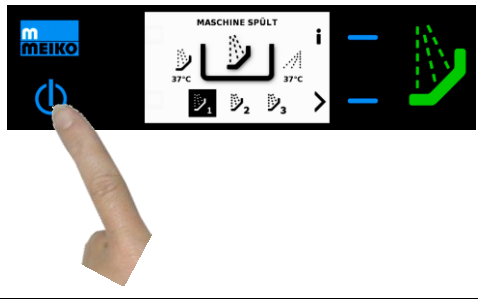


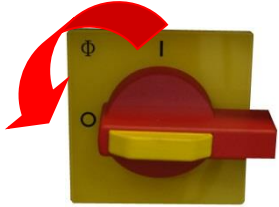
 <p>Press the blue "Dishwasher on" button to start the dishwasher.</p>	<p>Transport and the wash pump have now been started and the dishwashing process can begin. The machine is normally equipped with rinse water conservation; in other words the rinse process is not in operation continuously. All other 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.</p>
	<p>The dishwashing machine rinses and the "Dishwashing processes" button lights up green.</p>

9.3 Washing interruption

	<p>To interrupt the washing cycle temporarily, press the blue "washing cycle OFF" button</p>
	<p>Wash pump and transport are switched off. However the tank heating continues so that the machine remains "READY FOR OPERATION" and the display indicates this.</p>
	<p>Press the blue "Dishwasher on" button to start the dishwasher.</p>
	<p>The dishwashing machine rinses and the "Dishwashing processes" button lights up green.</p>

10 Shutting down the machine

The dishwashing machine must be shut down after use or if the installation area is not regularly monitored by personnel!

	<p>Press the "ON-OFF" button twice to completely switch off the dishwashing machine.</p>
	<p>After the procedure has completed, the display shows "MACHINE OFF".</p>
 <p>Close the possibly existing stop valve in the water pipe.</p>	 <p>Switch the locally available power supply off.</p>

The dishwashing machine is now disconnected from the power supply. Clean the appliance; see the "Cleaning" section.

In dishwashing machines with:

- automatic regeneration of water softeners
- frost protection
- integrated reverse osmosis equipment
- automatic wash tank filling and heating via "Fill with timer"

automatic operation may only be activated if the premises in which the appliance is located are under regular surveillance by staff.

11 Cleaning



WARNING

Material damage or severe injury!

Do not spray the system, switch cabinets and electronic components using a water hose or pressure washer!

Avoid flooding the base of the system to prevent damage to components from penetrating water!

Danger of scalding!

The tank heating elements may still be hot after the tank has been emptied. As a result, there is a risk of burns or scalding when the machine is cleaned manually!

11.1 Cleaning - daily



DANGER

Risk of injury due to electric shock! Damage to property!

Switch off the power supply using the locally available mains disconnecter prior to any cleaning or maintenance work and secure it 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 injury or damage to property.



Wear personal protective equipment during all cleaning processes.

Scalding may result from not using personal protective equipment.

11.2 Cleaning instructions – daily

 <p>Switch off the machine (press twice).</p>	 <p>Remove all spray protection curtains.</p>	 <p>Clean all spray protection curtains.</p>	 <p>Switch off the locally available power supply.</p>	 <p>Open the door.</p>
 <p>Spray the machine's internal chamber.</p>	 <p>Remove the top and bottom wash system. Hold the wash system in the middle.</p>	 <p>Remove the tank cover screen.</p>	 <p>Pull the stand pipe <u>with the handle only</u> and drain the tank.</p>	
 <p>Removing the pre-rinse arm (if available).</p>	 <p>Remove both sieves in the prewash zone (if available)</p>	 <p>Clean the inner chamber of the tank.</p>		
 <p>Remove all rinse arms and nozzles. Use a nylon brush to clean the nozzles. Check that the wash arms and end caps are complete and water-tight.</p>			 <p>Clean all tank cover screens.</p>	
			<p>When you have cleaned the machine, replace <u>all</u> the parts. Check that all parts are <u>present and in the correct</u> position! The machine must only be operated once it has been completely assembled (cover panels, splash curtains, safety device, sieve). Malfunctions may occur in the event of non-compliance. Non-compliance may also result in injury.</p>	
				
 <p>Do not spray the dishwashing machine, switch cabinets or other electronic components with a water hose or high-pressure cleaner!</p> 			<p>IMPORTANT!!! Ensure that all wash arms end caps are properly secured after having inserted the washing system! Check that all end caps are water-tight.</p>	

The dishwasher must be emptied every day!

12 Maintenance and care

12.1 Care, general

The installation has been designed to keep the need for cleaning, care and maintenance to a minimum.

However, for reliable, safe and long-term function of the installation, and in the interest of hygiene and cleanliness, correct care and maintenance is necessary.

12.2 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 system, or direct application, may lead to system damage and put the material at risk (e.g. aggressive tile cleaners).

Caution!

Observe the manufacturers' hazard warnings on the original containers and safety data sheets.

12.3 Check list after cleaning

Make sure you reinstall all parts correctly **after having cleaned the dishwashing machine.**

Check that the following parts are **present and in the correct position**:

- check the tank cover screens
- rinse pipes
- pump rinse pipes
- curtains
- wash systems at the top and bottom
- check the wash pipe end caps for completeness

The dishwashing machine is now ready for the next shift.

CAUTION!!!



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.

12.4 Descaling the machine

Using very hard water may cause unfavourable lime deposits within the machine. However, apart from this (white, rough coat), lime deposits do not influence the dishwashing results.

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 product 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.

Only use scale remover suitable for commercial warewashing machines. Do not use said substances for any other purpose than their intended purpose. Please contact the manufacturers of these products für information.

Scale remover may contain hazardous substances. Observe the manufacturers' hazard warnings on the original containers and safety data sheets. Observe the instructions by chemical product suppliers regarding dosing/use.



When performing any decalcification work, wear personal protective equipment in accordance with the manufacturer's specifications.

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.

13 Operating errors

Despite being expertly designed, the machine may develop minor faults which are usually easy to eliminate. This section explains a number of possible problems and how you can deal with them yourself.



DANGER

Risk of injury due to electric shock! Damage to property!

Always de-energise the system before carrying out work on the open system.

For this purpose, switch off the system power supply using the locally available mains disconnector and secure it using 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 injury or damage to property.

Should any of the operational faults described arise repeatedly, their cause must be established in each case.

13.1 Self-help in the event of malfunctions

Malfunction:	Remedy
Machine not filling	<ul style="list-style-type: none"> * No water present * Dirt trap clogged * Level system dirty * Solenoid valve defective * Main switch turned off
Final rinse not spraying	<ul style="list-style-type: none"> * No water present * Dirt trap clogged * Solenoid valve defective * If the machine has automatic water conservation, the conservation grid switch/timing switch is defective * Air gap pump not functioning * Limescale in final rinse system
Vapour escaping	<ul style="list-style-type: none"> * Curtains missing * Temperatures too high * Poor room air flow/draught through open door * Wash arms, drying nozzles, air guide plates bent or not fitted correctly
Poor cleaning result	<ul style="list-style-type: none"> * Washing temperature too low * Detergent dosing quantity too low * Wrong detergent * Washware not placed correctly in rack * Clogged nozzles * Conveyor speed too high * Dirt has dried onto washware due to standing for too long * Washware not suitable for machine warewashing
Stripes and smears on dishes	<ul style="list-style-type: none"> * Mineral content of final rinse water too high * If only found at certain times, check water softening unit with a view to regeneration. * Water pre-treatment unit defective * May also be different water, depending on the waterwork * Unsuitable rinse agent or incorrect dosing quantity * Incorrectly fitted or missing curtains * Oversize containers previously washed. This causes detergent to be transferred to rear tanks * Conveyor speed too high * Washware not suitable for machine warewashing
Strong foam formation in wash tank	<ul style="list-style-type: none"> * Foaming hand dishwashing detergent enters wash tank on pre-cleaned parts * Daily cleaning of the machine is carried out with foaming cleansing agents which subsequently enter the machine. * Improve pre-washing, as too much soiling is entering the tank. Alternatively, empty wash tanks between uses. * Final rinse water quantity too low * Unsuitable detergent or rinse aid * Temperatures too low < 40 °C
Poor drying result with drying available	<ul style="list-style-type: none"> * Conveyor speed too high * Wash tank temperatures too low * Washware not suitable for machine warewashing * Rinse aid product not adapted to washware material (porcelain/plastic). A compromise may have to be made here. * Plastic washware (new washware)

As a rule, faults that are not described herein require assistance from an authorised Service technician. Please contact your factory representative or authorised dealer.

14 Staff training

Only trained and instructed personnel is allowed to work at the dishwashing machine.

Staff responsibilities must be clearly defined in terms of operation, maintenance and repairs.

Personnel to be instructed must always work at the dishwashing machine under the supervision of an experienced person.

Persons	Trained operating personnel	Authorised trained persons	Authorised service technician
Activity			
Installation and assembly			◆
Commissioning			◆
Operation, use	◆	◆	◆
Cleaning	◆	◆	◆
Check safety devices		◆	◆
Troubleshooting		◆	◆
Remedies, mechanical		◆	◆
Remedies, electrical		◆ *	◆
Maintenance		◆	◆
Repair works		◆	◆

* trained electrician.

The instructions must be acknowledged in writing.

15 Maintenance, servicing

MEIKO recommends having the machine serviced by an authorised service technician at least once a year. As part of the maintenance, an electrical safety inspection is also carried out in accordance with DIN VDE 0701-0702 / DGUV Regulation 3. Wear parts are checked and replaced, if necessary, and the machine tested.

Regular maintenance is a prerequisite for the long-term reliable and safe operation of a warewashing machine. Maintenance which is neglected or improperly carried out increases the residual risk of unforeseen damage to property and persons, for which no liability will then be assumed.

We recommend you conclude a maintenance contract with our agency to guarantee a long service life of the system.

Observe the maintenance intervals prescribed in the operating instructions!
Observe the maintenance instructions for the individual components!

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

Lubricants, cooling or cleaning agents endangering the environment must be properly disposed of!

15.1 Basic safety measures during normal operation



DANGER

Risk of injury due to electric shock! Damage to property!

Switch off the power supply using the locally available mains disconnecter prior to any maintenance or repair work and secure it 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 injury or damage to property.



WARNING

Danger of injury from entering a danger zone

Unauthorised persons might be in or enter the danger zone during transport, assembly, commissioning, maintenance and repair work. This can lead to injuries.

- Only permit qualified persons to perform work at the machine.
- Remove unauthorised persons from the danger zone.
- Cordon off danger zone and signpost it for third parties.
- Never remove or disable safety devices on the machine.
- Always wear cut-resistant protective gloves when removing housing parts and when working inside the machine!



Danger of scalding!

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!

15.1.1 Before setting in operation - after maintenance and repair works

Legal requirements 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 must not pollute the ground or run into the sewerage system:

- grease and oils
- hydraulic oils
- coolant
- cleaning fluids containing solvents

These materials must be stored, shipped, collected and disposed of in suitable containers!

16 Maintenance manual



NOTE

Maintenance work should **only** be conducted by authorised MEIKO personnel.

Whenever any electrical components are disconnected and reconnected, replaced or repaired, a safety test must be conducted, at least on these components!!!

Maintenance work	CHECKED	CLEANED	REPLACED	<u>Maintenance requirement</u>
1. Electrical installation				
Retighten all screw connections (heating contactors, etc.)				at least once a year
Carry out a visual check on all electrical equipment (e.g. switches/cables/connector, etc.).				at least once a year
2. Wash pumps and pump final rinse				
Visual inspection of the motor and ventilation grid				at least once a year
Replace mechanical seal in the following tank modules (cross out components that are not applicable) WT 2 / WT 1 / PKSP				every 3000 h or 2 years
3. Wash tanks, wash systems and pump final rinse				
Functional and visual inspection of the wash systems and brackets				at least once a year
Visual inspection of rising pipes, wash systems				at least once a year
Clean air trap insert				at least once a year
Visual inspection of the stand pipe, rubber seal				at least once a year
Visual inspection of the sieves				at least once a year
Visual inspection of door hinges, door locks, door seals				at least once a year
4.- Heat recovery/air duct				
Check fan				at least once a year
Clean exhaust fan				at least once a year
Clean heat exchanger				at least once a year
5. Clean water rinsing system				
Visual inspection of nozzles, spray arms, spray arm locking devices				at least once a year
Replace sealing rubber rising pipe of the fresh water final rinse				at least once a year
Fresh water final rinse				
Visual inspection of the air-gap pump, ventilation grilles and check for leaks				at least once a year
Check minimum float switch in air-gap tank				at least once a year
Check float valve in air-gap tank				at least once a year
Clean dirt trap in fresh water rinse path				at least once a year
Visual inspection for leaks on the rinse aid dosing within the machine				at least once a year
6. Installation				
Clean dirt trap in fill path				at least once a year
Visual inspection for leaks				at least once a year
Check lines and connections are securely connected and there are no leaks				at least once a year
7. Transport				
Visual inspection of the gear motor and ventilation grid				at least once a year
Visual inspection that the transport catches are complete and move freely				at least once a year
Option:				
Check the transport system on the supply table				at least once a year
Check the roller conveyor at the discharge				at least once a year

Maintenance work	CHECKED	CLEANED	REPLACED	<u>Maintenance requirement</u>
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8. Checking the function of the overall system				
Check filling and heating until it is ready for operation				at least once a year
Check dishes' final switch-off				at least once a year
Visual inspection on the entire machine for leaks				at least once a year
Visual inspection of the cable routing under the machine				at least once a year
Check power consumption of all heating elements (IN see wiring diagram)				at least once a year
9. Conveyor system				
Check basket transport for fault-free operation				at least once a year
Check gear motor				at least once a year
Check mechanical overload cut-off				at least once a year
10. Water quality, temperature (record values)				
Untreated water °C °dH µS/cm	at least once a year
PKSP:°C / WT2:°C / WT1:°C				
KSP 1: °C L/h		at least once a year
11. Drying (option)				
Visual inspection of the motor and ventilation grid				at least once a year
Installation space of the heating register, blower wheel and blower wheel housing				at least once a year
Clean air nozzles and suction grid				at least once a year

.....
Place, Date:

.....
Authorized service technicians:

17 Dismantling and disposal

In addition to valuable raw materials and recyclable materials, the packaging and the old device may also contain substances that are harmful to health and the environment and were required for the function and safety of the old device.

Please do not dispose of your old device in residual waste. Instead, contact your dealer or the collection points set up in your community for information regarding the disposal of your old device.

17.1 Disposal of packaging materials

All the packaging materials are recyclable. The following materials are used:

- Square timber frame
- Plastic sheeting (PE film)
- Cardboard packaging (edge protection)
- Packaging strap (steel strip)
- Packaging strap (plastic (PP))



Note

The square timber frame consists of untreated raw pine / spruce. In order to guard against pests, country-specific import regulations may also stipulate the use of treated wood.

17.2 Dismantling and disposal of the old device

Warning



Risk of injury from contact with chemicals

Detergent and rinse aid result in damage to health if in contact with skin or eyes or if swallowed.

- Use eye protection.
- Wear protective gloves.
- Contact a physician immediately if chemicals or water containing chemicals (wash water) are swallowed.

- Where appropriate, rinse machine components, containers, dosing units and hoses with fresh water to remove chemical residues. Wear suitable clothes (gloves, safety glasses) for this.



The device is marked with this symbol. Please observe the local regulations for proper disposal of your old device.

The components should be separated by material for recycling.

18 Noise emission

Work place noise level: $L_{pA} \leq 80 \text{ dB(A)}$

The workplace level shall be determined in accordance with DIN EN ISO 11204 precision class 2, applying a measurement uncertainty of $\pm 2.5 \text{ dB}$.

Measurements shall take place at a height of 1.6 m over the ground and at a distance of 1 m in front of or behind the input/output tunnel.

All data shall relate to the emissions caused by the machine, additional emissions caused by handling the wash ware shall not be taken into account.

19 Non-ionising radiation



Non-ionising 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 installation has no strong permanent magnet. There is a high possibility of eliminating any influence on active implants (e.g. pacers, defibrillators) by maintaining a safety distance of 30 cm (distance of the field source to the implant).

20 Regulations and Standard Values

Standards referred to, important standards, regulations and institutions:

DIN 10510	Commercial Dish-Washing With Multi-Tank Conveyor Dish-Washing Machine
DIN 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
VDI 2052	Technical Equipment For Kitchen Atmospheres
DVGW	Deutsche Vereinigung des Gas- und Wasserfaches e.V. http://www.dvgw.de
VGG	The Industrial Dishwashing Association http://www.vgg-online.de

Water quality limits as determined by the Industrial Dishwashing Association

Total hardness	up to 3 °dH
Chloride content	max. 50 mg/l water (to prevent pitting corrosion with low-alloy cutlery steel)
Heavy metals	at maximum 0.1 mg iron and 0.05 mg manganese per litre of water. As little as 0.05 mg copper per litre of water can lead to discolouration of the dishes and the dish-washer.
Total salt content:	max. 400 µS/cm (in relation to porcelain (china) and opal glass) max. 100 µS/cm (related to glass) max. 80 µS/cm (in relation to stainless steel - measured using conductivity)

Machine temperatures set out in DIN 10510 and DIN 10512

	Without disinfectants	With disinfectants
Wash tank V	40°C - 50°C	
Detergent circulation tank	60°C - 65°C	55°C - 65°C
Pumped water rinsing	60°C - 70°C	
Clean water rinsing	80°C - 85°C	

Control media for valves:

Pressures	min. 3.5 bar, max. 8 bar (no pressure surges)
Usage of one control valve per switching operation	approx. 0.01 litre at 3 bar

21 Abbreviations

LpA	LpA denotes the emission sound pressure levels at the workplace
dB	Abbreviation denoting decibel, the so-called sound pressure level. This designates the so-called noise level.

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23 NOTES

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