Product Specification
WD 290 IQ

Belimed
Infection Control

Engineers of Confidence.

Application

For use in healthcare facilities such as CSSD, for processing reusable instruments, containers, and OR shoes and other thermostable objects that are used in hospitals as well as rigid endoscopes, eye instruments, and instruments used in the field of neurosurgery.

Description

The WD 290 IQ washer-disinfector was developed to ensure maximum quality through efficient washing, disinfecting, and drying of instruments, containers, and accessories while minimizing the consumption of natural resources and chemicals.

With a stainless-steel chamber and a unique high-volume/low-pressure water circulation system, up to 18 DIN trays can be reprocessed. Disinfection can be performed with A_0 > 3000, as per EN ISO 15883-1.

The WD 290 IQ is available with two automatically operated, vertical, full-glass sliding doors for visual monitoring during the entire reprocessing process.

Consistent process reliability is ensured because the machine monitors all relevant performance parameters using its independent process data monitoring system.

The WD 290 IQ washer-disinfector is distinguished by the following features:

- Ergonomic product design by Belimed with 2 intuitive touchscreens for easy operation
- Patented process status indicator
- Washing chamber with large capacity for up to 18 DIN trays
- Minimal footprint with a width of only 900 mm (35.4 in.)
- Resource savings of up to 30% thanks to Smart Fill
- Optional heat recovery with condenser, DI water preheating, and water storage tank
- Visual monitoring of the entire process through the two full-glass doors
- Independent Process Documentation
- Filling, draining, and heating in minimal time
- 3 cleaning agent pumps (silicone) with 3 flow meters and 3 empty-level indicators (optionally up to 5)
- Disinfection monitoring function, A_0 = 3000
- Optional built-in printer on loading side or unloading side
- Controller technology for data analysis on the WD 290 IQ
- USB port to import and export wash cycles parameters, wash cycles, and event statistics
- Optional automatic program recognition for 100 programs and internal memory for at least 1,000 wash cycles
- Highest throughput combined with automated solutions

Dimensions

Washing chamber:	H x W x D: 690 x 630 x 800 mm
	H x W x D: 27.1 x 24.8 x 31.5 in.
Washing chamber capacity (net):	350 liters (12.3 ft³)
Washing chamber capacity (gross):	442 liters (15.6 ft³)

External dimensions

Standard model:	H x W x D: 1,840 x 900 x 940 mm
	H x W x D: 72.4 x 35.4 x 37.0 in.
Model with tank (optional):	H x W x D: 2,210 x 900 x 940 mm
	H x W x D: 87.0 x 35.4 x 37.0 in.

Standard configuration and options

Standard configuration

- WD with drying system
- EN ISO 15883-1/-2 compliant
- Automatic full-glass doors, vertically running
- Operating panel with 10.4 in. touchscreen on the loading and unloading sides
- Integrated data storage for over 1,000 wash cycles and unlimited event list
- Smart Fill, including frequency-controlled washing pump
- Soft start
- Patented process status indicator illuminated washing chamber
- 3 water supply connections (warm/cold/DI)
- 4 potential-free contacts (K29–32)
- AISI 316L washing chamber drainage valve made of stainless steel
- Exhaust air connection with flap and condense drain H13 HEPA filter
- Independent Process Documentation IPD
- Validation nozzle for external measurement recording
- Water sampling port
- Disinfection monitoring, $A_0 = 3000$
- Ethernet and USB interfaces
- 3 dosing units (pump, flow meter, empty-level indicator)
- Movement stop switch (on both sides)
- Automatic program recognition (magnets)
- 15 pre-set programs

Options (ex-factory installation)

- Washing chamber heating system with steam heat exchanger
- Washing chamber heating system, electric/steam switch
- Washing chamber heating system and drying system with steam heat exchanger
- Interface steam connector floor/roof
- Vapor Condensor
- Storage tank
- DI-water pre-heater (400V, 200V, steam heated)
- Exhaust heat recovery unit (400V, 200V, steam heated
- WRC (Wash arm Rotation Control)
- RFID (for program recognition) for manual rack loading
- Automatic Rack drive set
- Automatic Rack drive set, incl. RFID (for program recognition)
- Barcode reader to record the batch
- Batch documentation printer loading/unloading side
- Control for pre-valve (loop valve)
- Conductivity monitoring unit
- Cool down set
- Sterile filter monitoring
- T-connector for additional IPD pressure sensor
- Connection socket for SISO loading/unloading or unloading only
- Interface automation WA 290
- Interface automation WA 290 SO
- Dosing pump set 24V Silicone or Viton

Options (on-site installation)

- Drain pump set
- Empty level control for 10 liters or 25–30 liters canister
- Base pan with leakage sensor
- Seismic anchor kit WD 290 IQ
- Machine connection set
- Casings for single and multiple machines

Upgrade kits (for installed base)

- DI water pre-heater (electric)
- Exhaust air heat recovery (electric)
- Storage tank
- Rack drive set (RFID)
- Docking interface SISO loading and unloading or unloading (only)
- Interface automation WA 290
- Docking interface WA 290 SO (WA 290 on loading; (SI)SO on unloading side
- Dosing pump set 24V silicone or Viton
- Conductivity control unit
- Sterile filter monitoring
- Barcode reader to record the batch
- Casing DI-tank/condenser
- Options circuit board

Additional options (paneling)

- Base panel
- Side paneling set, complete
- Side paneling set, complete, with widening extension (50 mm) incl. base paneling in the case of steam supply from above and/or water supply from below without condenser/DI water pre-heating
- Intermediate & base paneling, 50 mm, for systems without waste steam condenser/DI water pre-heating
- Intermediate & base paneling, 50 mm, for systems with waste steam condenser/DI water pre-heating
- Intermediate and base paneling, 100 mm, for systems without waste steam condenser/DI water pre-heating
- Intermediate and base paneling, 100 mm, for systems with waste steam condenser/DI water pre-heating
- Paneling for waste steam condenser/DI water pre-heating system
- Paneling for waste steam condenser/DI water pre-heating system in the case of steam supply from above and/or water supply from below

Racks and carts

- Instrument rack, 1 level
- Instrument rack, 2 levels
- Instrument rack, 3 levels
- Instrument rack, 4 levels
- Instrument rack, 5 levels
- Instrument rack, 6 levels
- Anesthesia rack
- da Vinci rack
- MIS rack
- Container rack
- Baby bottle rack
- Dental rack
- LAB rack
- Transport cart

etc. (for the latest rack portfolio: please see www.belimed.com)

Standards*

Area	Standard
Directive concerning medical devices	93/42/EEC
Safety	IEC/EN 61010-1, IEC/EN 61010-2-040
EMC	IEC 61326-1
Drinking water	EN 1717
Cleaning performance	EN ISO 15883-1, -2, certified by HygCen GmbH, Schwerin

*Only those standards that are listed in the current declaration of conformity apply.

Standard configuration: construction and functions

Washing chamber
Stainless steel, type 1.4404 (AISI 316L). The washing chamber and the pump sump have a self-draining design. The hygienic and flow-optimized construction reduces the residual water that would otherwise have to be evaporated in the drying process. Cross contamination can be precluded thanks to the intelligent construction.

Washing chamber lighting
The washing chamber is illuminated by 2 long-lasting, low-energy LED lamps. The illumination of the washing chamber enables the operator to visually monitor the wash process.

External material
Stainless steel, type 1.4301 (AISI 304), combined with a HiMacs® cover

Door construction/insulating safety glass
The doors are vertically operated, fully automatic sliding doors. They are moved up and down using toothed belts installed on both sides. The door frame is pressed against the washing chamber frame at the top by means of a linear motor. The WD 290 IQ is equipped with 2 doors, enabling clear separation of the clean and unclean sides.

Safety switch actuator
The upper side of the door is equipped with a safety switch actuator to prevent closure of the door when objects are located within the closure area of the door.

Washing chamber sealing
Circumferential silicone seal, which requires very little maintenance thanks to the intelligent door construction design with vertical compression. A drip tray on the inside prevents water from dripping down even when the doors are open.

Wash arms
One wash arm is located at the top of the washing chamber and another at the bottom. Additional wash arms are located on each level of the racks. They have extra-large spray openings for maximum wetting. This results in a high water flow and highly effective cleaning. All wash arms can be efficiently dismantled and completely cleaned.

Backflow interrupter
To avoid any contamination of the water network in the hospital in the event of a machine fault, the machine is equipped with a physical water supply interrupter. The design conforms to the currently valid drinking water protection standard.

Automatic water inlet temperature control
If a precise water inlet temperature is required, the controller mixes cold and warm water to meet the temperature set point.

Filtering
The water used is filtered through two screens (2 mm mesh width). Both filters can be removed and cleaned from the loading side. Thanks to the smart and hygienic design, no additional screens are needed, which makes the recommended maintenance easy to perform.

Heating system
The WD 290 IQ can be configured with an electric heating system for the washing chamber (21.5 kW) and the dryer (10.5 kW). In machines equipped with steam and electric heating, the controller automatically switches over to electric heating.

Standard: · Electric heating system
Optional: · Steam heating system for washing chamber (dryer electric)
· Steam heating system for washing chamber and dryer
· Steam/electric washing chamber heating system with automatic switch-over
· Steam connection set from above
· Steam connection set from below

Bi-Turbo drying
The high-volume drying system uses two powerful ventilators (each adjustable between 136–600 m^3/h), which generate a heating performance of 10.5 kW. The brushless motors operate without carbon abrasion. This prevents contamination of the air filters and the heating elements. The drying temperature can be adjusted to the customer's requirements (from room temperature up to 120°C). The room air is passed through an H13 HEPA filter (with a retention rate of 99.95%).

Exhaust air flap with condensate drain
The bypass air flap prevents the escape of warm process air from the chamber, while enabling air intake from the ambient air. It is automatically operated when there is excess pressure in the chamber.

The condensate drain reliably prevents backflow of condensate into the machine and instead leads from the exhaust air pipe directly into the drain.

Microprocessor controller
The modern microprocessor is responsible for controlling all system functions and monitoring all operating processes. The control system was developed specifically for cleaning applications. Up to 100 freely definable programs can be accessed using the touch operating unit. Only released programs are visible to the user. Entering new cycles is supported by a program library with pre-defined and adaptable programs.

A self-diagnosis system performs test routines on a regular basis to identify potential errors as early as possible. The various input signals are monitored, and possible deviations from the target values are indicated by visual and acoustic signals.

Integrated memory

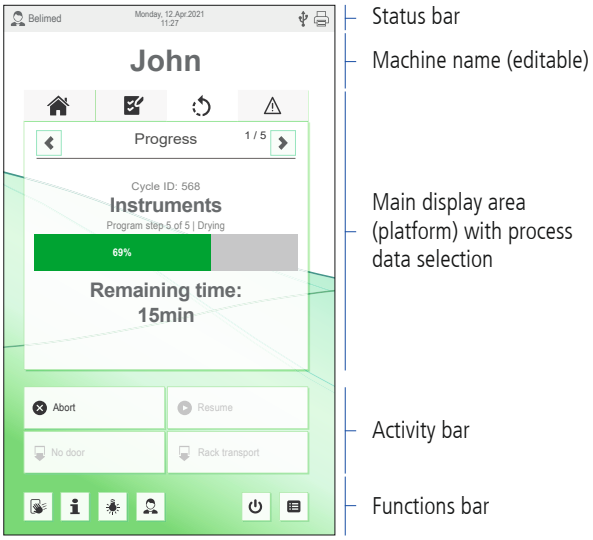
An integrated memory enables storage of approx. 1,000 wash cycles. Additionally, all warnings, alarms, possible malfunctions, and all user interactions are stored. These data can be read out by the CSSD or shift management to identify indications for preventive maintenance and provide information about incorrect operation and additional training measures.

Potential-free contacts

4 potential-free contacts are available and can be easily accessed from the top of the WD.

Operating panel (independently operated on loading and unloading side)

10.4 in. touchscreen, comprising the following:



- Status bar — General information incl. time and date, logged-in person, error messages as well as connected printer and USB port.
- Machine name — Customer-specific machine identification. Configurable through Belimed Service.
- Process data display — Dynamic display area shows current machine data. The menu is split into four tabs:
  – Home: current machine status
  – Cycle: "prepare cycle" menus
  – Progress: progress status, current cycle information with graphs, sensor information
  – Alarms and warnings
  The menus can be accessed directly or by swiping (page by page).
- Activity bar — Various commands, such as "choose program", "start process", etc. are displayed here. If an error is pending on the loading side, or the next loading process is pending, then this is additionally indicated on the unloading side.
- Functions bar — Various functions, such as temporary deactivation of the screen for cleaning purposes, operator log on/log off, light on/off, etc. are located here.

The following functions are integrated

- Program selection and program start
- Process status indicator
- Error messages/notice texts in plain text
- Maintenance information
- Wash cycle data history as summary and detailed
- Event history (messages, warnings, and failures) both as summary and detailed descriptions
- Wash cycle database and stage blocks for easy compilation of wash cycles
- Display and configuration of the system data
- Display of the process data measured
- Diagnostic functions
- Authorization and authentication management
- Program intervention
- Servicing functions

Operating software and work methodology

The WD 290 IQ features an ingenious operating system. Thanks to clear authentication and authorization logic, the controller enables creation of customer-specific wash programs. Only released and validated programs are displayed for the user.

Patented process status indicator

Important process information, such as the remaining run time, readiness for loading and unloading, and malfunctions, is displayed as a clock progress indicator on the process status indicator, which can be clearly seen at a distance.

If the remaining run time is still over 60 minutes, then this is indicated by a rapidly moving cursor. If the remaining run time is less than 60 minutes, a clock that builds up successively is displayed.

The end of the process is indicated by a full flashing clock being displayed. The status indicator is turned off when the door is opened.

An error in the process is indicated by a complete clock that flashes red:

Smart Fill water intake

The machine adjusts the volume of water required to the actual quantity of items to be washed (rack and items to be washed). This unique function enables the lowest water consumption without making any compromises in terms of hygiene and process reliability. With Smart Fill, up to 30% resource savings per cycle are possible.

Through the additional use of a frequency-controlled circulation pump, it is even possible to fill in a different volume of water for each step in the wash process.

Thermal disinfection based on the A_0 principle

The WD 290 IQ is equipped with A_0 value calculation. The system can thereby continuously calculate the heat volume for the respective A0 value above 65°C. This already takes place while the DI is being heated up. The thermal disinfection process is terminated according to the A_0 selected (3000, 600, etc.). The operator can decide whether the process is to be discontinued after the A_0 has been reached or whether the disinfection process is to be continued up to a higher A_0 value. The current A_0 value is continuously displayed on the screen and saved. It is also possible to define a certain time for a specific holding temperature for the thermal disinfection.

Independent Process Data monitoring (IPD)

All relevant parameters are continuously monitored by independent sensors. Discrepancies between actual values and target values generate an error message and/or the immediate termination of the program.

Fully draining, frequency-controlled circulation pump

The stainless-steel circulation pump can circulate 950 liters (250 gallons) per minute. To prevent residual water in the pump, it drains completely between cycles. This reduces the risk of residual bacteria and prevents cross-contamination.

The frequency-controlled circulation pump allows the water pressure and the volume of water required to be adjusted specifically to the load and the specific wash cycle step.

Soft start of the circulation pump

To minimize the physical water impact that occurs when the circulation pump is started, the WD 290 IQ is equipped with a soft start function. The circulation pump is accelerated harmonically until it reaches its maximum rotational speed. This greatly minimizes the water impact and ensures gentle reprocessing of materials.

Dosing pumps

Up to 5 pumps (3 included in the base model) can be installed for dosing cleaning and lubrication agents. Flow monitoring is ensured by the flow meters. The monitoring method is impulse controlled.

Chemicals empty-level indicator

The WD 290 IQ can be connected either to a central chemicals supply, or directly to chemical canisters. Each of these canisters can be equipped with an empty-level indicator that sends a signal to the controller when the level of chemical is too low. This signal is displayed to the user on the screen. The empty-level indicator is available for 10 liter and 25–30 liter canisters.

Dosing of chemicals

Based on the amount of water in the washing chamber and the recommended concentration, the controller calculates the required amount of chemicals. The dosing system with the flow meters and the peristaltic pumps enables precise dosing.

Foam control

If excessive foam is detected in the pre-rinsing step, then the pre-rinsing step is automatically repeated without prior indication.

Interfaces

Two interfaces, Ethernet and USB, are available.

Data and machine parameters can be imported or exported anytime using the USB interface.

The Ethernet interface enables data to be transferred for the optional Belimed cycle documentation system.

Servicing access

Servicing access is at the lower front of the chamber as well as through a drawer that enables easy access to the controller and the electronics.

Main power switch

The machine allows easy access to the main switch power to turn off the entire machine. Access is located on the loading side.

Movement stop switch

The WD 290 IQ can be stopped immediately by activating the movement stop switch.

Cycle documentation

The built-in printer documents important measurement parameters during the washing and disinfection process. The complete cycle can be printed out either at the end of reprocessing or as needed, depending on desired configuration. The printout includes washing cycle step, pressure and temperature indicators, start time, date, logged-in user, name of employee that released the cycle, WD and washing cycle number, and all errors that occurred during the process.

Rack docking device

A central docking device for the rack is located on the washing chamber floor. The docking device is pressed against the rack with a positive fit generated by water pressure, enabling optimal water distribution as well as minimizing pressure loss and water loss. As soon as the circulation pump is switched off, the docking device releases.

Automatic Cycle start

The WD 290 IQ automatically recognizes the loaded rack and starts the dedicated wash cycle. The rack recognition works with magnets, which are placed at various locations on the rack. Rack recognition enables coding for each rack so that the WD 290 IQ starts the correct wash cycle.

Automatic maintenance message

The controller can recommend the next servicing date with an advance notification on the screen. This ensures high availability of the WD 290 IQ while minimizing the risk of unexpected outages.

Options: construction and functions

Exhaust air vapor condenser

In the exhaust air waste steam condenser, the exhaust air is cooled down and dehumidified via a heat exchanger. Thanks to cooling and dehumidification of the exhaust air with fresh water or cooling water from a closed cooling system, the exhaust air can be passed into the building exhaust air system without any problems.

DI water pre-heater (electric/steam)

This option enables pre-heating of the DI water to 93°C for thermal disinfection while the wash process is still in progress. Using this option can shorten the cycle time by up to 14 minutes compared to operation without this option. The DI water tank can be drained completely, is optimally designed in terms of hygiene, and can be heated either electrically or with steam.

Exhaust air heat recovery (electric/steam)

During the drying process, the exhaust air heat is used to pre-heat the DI water via a heat exchanger. The DI water is used in parallel and at the same time to cool and condense the exhaust air. In this way, the exhaust air can be fed into the building ventilation system. The heated DI water (ΔT 27°C) is transported into the DI water pre-heating tank. This exhaust air heat recovery enables savings of up to 1.4 kWh of energy, a reduction in the cycle time of up to 14 minutes and savings of up to 35 liters of fresh water. The exhaust air heat recovery system can be heated either electrically or with steam.

Storage tank

The optional storage tank enables storage of the thermal disinfection water. This stored water can be used for the rinse step in the next wash process, reducing water consumption by almost 25%.

To lower operating costs, the storage tank is not kept at a constant temperature. After a pre-set minimum temperature in the range of 40–80°C has been reached, the stored water is discarded.

T-connector for additional IPD pressure sensor

If an additional pressure measurement upstream of the wash arms is required for validation purposes, then an additional pressure sensor can be connected using this option. The T-piece is located at the end of the riser pipe immediately next to the water inlet into the upper wash arm.

Automatic transport

To enable automatic loading, the rollers in the WD 290 IQ must be moved as well as the accessories for automation. An additional drive motor, which is designed for loads of up to 120 kg/264 lbs, is installed for this purpose.

WRC (Wash arm Rotation Control)

The wash arm rotation control function checks whether the wash arms rotate properly during the wash process. If a wash arm does not rotate, the current program is terminated with an error message. To rectify the problem, the operator can open the door on the loading side by entering a password.

Drain pump

If physical drainage below the machine is not possible, a drain pump can be installed.

Base pan with leakage sensor

To protect the installation site from water damage, a base pan with a leakage sensor is recommended. Should water leak from the building connections or if damage to the WD 290 IQ causes water leaks, then this is detected by the float switch in the base pan. This switch automatically closes the inlet valves and switches off the circulation pump of the WD 290 IQ.

Sterile-filter monitoring system

To ensure proper function of the HEPA filter, a differential pressure system can optionally be installed. This system monitors the pressure drop via the HEPA filter and displays an error message on the controller if a limit value is exceeded. An improperly installed HEPA filter is also detected.

Scanner

User identification, documentation, and command inputs can be facilitated by the use of a scanner. The scanner can be installed on the loading and unloading side. The scanner can be inserted into the USB port on the machine front.

Pre shut-off valve activation

Belimed recommends a securing device for the water supply line in the building (cold, warm, and DI water). If such a device is not possible, the pre shut-off valve activation option can be installed. This can activate an individual pre shut-off valve. The option does not include a valve but can activate a valve.

SISO connection base

If the SISO (Straight-In/Straight-Out) system is to be connected to the WD 290 IQ, then this option is required. The connection base can be connected individually for the loading and unloading side.

WA 290 automation connection

If a fully automated transport system is to be used, the machine can be equipped with an additional connection for the WA 290. With this option, it is possible to operate up to 6 WD 290 IQs with the WA 290 (up to12 WD 290 IQs if 2 WA 290 systems are installed).

WA 290 SO-connection

The combination of WA 290 on the loading side and "SO" (straight out modules) on the unloading side.

Steam connection set from above/from below

The steam can be connected from above or below to have full planning flexibility in the building. Both connection sets are available as option. If several machines are installed side by side, Belimed recommends the use of spacer plates with this option.

Additional dosing pumps (Pharmed®/Viton®)

The base model of the WD 290 IQ already includes 3 dosing systems (incl. dosing pump, flow meter, and empty-level indicator). Two additional dosing systems can be added. The peristaltic pumps are equipped with silicone tubes by default. Other materials (Pharmed®/Viton®) can optionally be ordered for coordinated compatibility with the chemicals used.

RFID automatic rack and program recognition

The WD 290 IQ is equipped with a rack recognition system. The load is identified when it is introduced into the machine, and the correct washing cycle is thereby automatically started. This prevents incorrect operation by the operator. In connection with the wash arm rotation control function, the load can be allocated one-to-one to the rack and thus also to the washing cycle. The RFID antenna is installed on the loading side and reads the RFID tag on the rack.

Conductivity control unit

Some applications require monitoring of the wastewater quality after rinsing to ensure that no chemicals are carried over. This is accomplished using a conductivity sensor in the drain. If contamination is detected, the WD 290 IQ automatically starts the rinsing process again.

Self-disinfection of the machine

If the device is not in operation for a certain period, a self-disinfection process can be automatically started or proposed. The purpose of this is to ensure that the entire system is disinfected before being taken into operation again and before instruments are reprocessed.

Process validation

The aim is to achieve a high level of reliability when reprocessing medical devices to afford operators and patients the greatest protection possible. For this purpose, installation qualification and process validation are offered at installation.

Automation

The degree of automation of the WD 290 IQ can be flexibly adjusted. Either loading and unloading as a whole or only one of the two areas can be automated. In addition, flexible extension options, such as manual or automatic return transport lines and sluices for racks, are possible.

The WA 290 is a novel, intelligent system for fully automatic loading and unloading of several single-chamber washers (up to 12 machines side by side).

The racks can be delivered centrally to the automation system via a feed line. The modular transport system conveys the rack via a shuttle straight to the next machine that becomes available and loads this machine automatically. Different system configurations enable flexible adjustment to the customer's spatial constraints.

Ergonomics

The WD 290 IQ features an ergonomic loading height for perfect loading and unloading of the items to be washed and a user-friendly, intuitive operating system that guides even unsure users through the process in clear manner.

Easy installation

The WD 290 IQ is easy to install. Apart from water, DI water, wastewater, and exhaust air pipes and power supply lines (and optional steam supply lines), no further connections are required. Furthermore, those options that mean the machine is taller than a standard door can be dismantled in a minimum of time and set up again on site. Replacing or newly installing machines is reduced to a minimum.

Belimed Connect (SmartHub)

SmartHub is on-site software that ensures all relevant data are captured in real time from any Belimed machine to be further processed either by an Instrument Tracking System or in the form of an easy-to-read PDF file. The next level of transparency for your machine data is provided in an on-site dashboard that shows the duration and progress of the washing programs and their stages.

Cleaning agents and disinfectants

The Belimed Protect™ product portfolio was developed and validated for the WDs from Belimed to meet the requirements of ISO 15883. Belimed offers a complete integrated solution for automatic reprocessing that guarantees compliance with standards and reduces costs incurred due to HAI (healthcare-associated infections).

Contact your local Belimed partner for more information on the Belimed Protect™ product range: enzymatic cleaner, alkaline cleaners, neutralizer, instrument lubricants, final rinsing aids and drying aids.

Preventive maintenance

Belimed recommends preventive maintenance on a regular basis to ensure the proper functioning of the device. Belimed has a nationwide network of trained service technicians who perform these maintenance tasks on site.

Connections/electrical connection values

See installation drawings and Technical Manual.

Disclaimer

Do not use this product description for installation of the machine. The product description can be updated without notice and is only updated periodically.