SERVICE INSTRUCTIONS

Washer-disinfector
46-2, 46-4, 46-5

Mfg. no. SEV0440130-5019675-00
Service documentation
The 46 series

We reserve the right to change our design and material specifications without prior notice.
Safety regulations

This machine is designed with a number of built-in safety devices. To avoid injury, it is very important that these safety devices are not bypassed and thus disabled.

General safety regulations

- Take care when handling the chemical detergent used in the machine. Read the details on the container or contact the manufacturer:
  - if detergent comes into contact with operator’s eyes or skin or if the vapours are breathed in, etc.
  - about storing the detergent and disposing of empty containers.
- The machine must be connected in accordance with the installation instructions.
- The machine must only be operated by adults.
- Installation and service work must be done by personnel trained for this machine.
- Never bypass the door switch of the machine.
- Leakage in the system, for example at a worn door seal, must be repaired immediately.
- Before repair or servicing work is done, the personnel concerned must study the relevant manuals.
- Before welding begins on or close to the machine, all wiring connected by plugs and sockets must be disconnected from all circuit boards in the machine.
- The machine must not be hosed down with water.
- Take care when using corrosive detergents.
- Precautionary measures for hot water and steam.
- Run a process before starting servicing. If this is not possible, disinfect the machine with disinfectant before starting servicing.

Product liability

Modifications to the equipment made without the approval of the manufacturer, or incorrect use, invalidate the manufacturer’s product liability.

Isolating device

The machine must always be fitted with a separate isolating device in the power supply, mounted in an easily accessible position on the wall.

Attention symbols

Some of the warnings, instructions and advice in this manual are so important that we used the following special symbols to draw attention to them. The symbols and designs used are:

⚠️ This symbol indicates a warning in the text of the manual. Injury or even death may result if you do not heed it.

It also highlights warnings to avoid damage to equipment.

⚠️ This symbol highlights a warning in the text of the manual dealing with the handling of components sensitive to ESD. The hazard that it warns about may result in damage to hardware and/or circuit boards.
Technical data

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## Technical data

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### Chamber Size

- **Machine 46-2, 46-4**
  - H=590mm, W=550mm, D=620mm
  - Operational volume: 201 litres
  - Total volume: 280 litres

- **Machine 46-5**
  - H=660mm, W=550mm, D=620mm
  - Operational volume: 225 litres
  - Total volume: 305 litres

### Environmental Requirements

- **Air humidity**: max 80% at 31 °C
- **Room temperature**: 5 - 40 °C
- **Water consumption**: approx 15 litres/phase
- **Cold water**
  - Connection: 15 (1/2") mm
  - Pressure: 100-800 kPa
  - Flow rate: min 20 l/min
- **Hot water**
  - Temperature: 45-60 °C
  - Connection: 15 (1/2") mm
  - Pressure: 100-800 kPa
  - Flow rate: min 20 l/min
- **Dist./de-ion. water**
  - Connection: 20 (3/4") mm
  - Pressure: 50-900 kPa (if the pressure is below 50 kPa a separate feed pump must be connected)
  - Flow rate: min 20 l/min
- **Steam**
  - Connection: 15 (1/2") mm
  - Pressure: 300-500 kPa
  - Consumption: 0.5 kg/min at 300 kPa
- **Waste, water**
  - Connection: ø 50 mm
  - Capacity: 30 l/min
- **Waste, air**
  - Connection: ø 63 mm
  - Capacity: 125-150 m³/h at 35°C, Humidity 100% 40 sec ≤ 40% after 2 min.
- **Max outside temperature**: 50 °C
- **Sound level**: 60 dB (A)

### Service instructions

See Alternative connection
Alternative connection arrangements

46-5 Electric heater
- 415V 3N-PE, 50Hz 10,8kW 15,9A, FUSE 3x16A,
- 400V 3N-PE, 50Hz 10,1kW 15,4A, FUSE 3x16A,
- 380V 3N-PE, 50/60Hz 9,2kW 14,7A, FUSE 3x16A,
- 230V 3-P, 50Hz 10,1kW 26,8A, FUSE 3x32A,
- 220V 3-P, 50Hz 9,2kW 27A, FUSE 3x32A,
- 200V 3-P, 50/60Hz 8,6kW 26,2A, FUSE 3x32A,

46-4 Electric heater
- 415V 3N-PE, 50Hz 10,4kW 15,2A, FUSE 3x16A,
- 400V 3N-PE, 50Hz 9,8kW 14,7A, FUSE 3x16A,
- 380V 3N-PE, 50/60Hz 9,0kW 14A, FUSE 3x16A,
- 240V 3-P, 50Hz 8,3kW 20,6A, FUSE 3x32A,
- 230V 3-P, 50Hz 8,0kW 25,4A, FUSE 3x32A,
- 208V 3-P, 50Hz 7,9kW 24,5A, FUSE 3x32A,
- 200V 3-P, 50Hz 8,0kW 24A, FUSE 3x32A,

46-2 Electric heater
- 415V 3N-PE, 50Hz 10,1kW 15,6A, FUSE 3x16A,
- 400V 3N-PE, 50Hz 9,5kW 14,1A, FUSE 3x16A,
- 380V 3N-PE, 50/60Hz 8,6kW 13,4A, FUSE 3x16A,
- 240V 3-P, 50Hz 8,0kW 19,7A, FUSE 3x20A,
- 230V 3-P, 50Hz 8,0kW 24,6A, FUSE 3x20A,
- 208V 3-P, 50Hz 7,9kW 24A, FUSE 3x20A,

46-5 Steam heater with dryer
- 415V 3N-PE, 50Hz 3,5kW 5,1A, FUSE 3x10A,
- 400V 3N-PE, 50Hz 3,5kW 5,1A, FUSE 3x10A,
- 380V 3N-PE, 50/60Hz 3,5kW 5,1A, FUSE 3x10A,
- 240V 3-P, 50Hz 3,5kW 9,7A, FUSE 3x15A,
- 230V 3-P, 50Hz 3,5kW 10,1A, FUSE 3x15A,
- 208V 3-P, 50Hz 3,5kW 11,2A, FUSE 3x15A,
- 200V 3-P, 50Hz 3,5kW 11,7A, FUSE 3x15A,

46-4 Steam heater with dryer
- 415V 3N-PE, 50Hz 3,5kW 5,1A, FUSE 3x10A,
- 400V 3N-PE, 50Hz 3,5kW 5,1A, FUSE 3x10A,
- 380V 3N-PE, 50/60Hz 3,5kW 5,1A, FUSE 3x10A,
- 240V 3-P, 50Hz 3,5kW 9,7A, FUSE 3x10A,
- 230V 3-P, 50Hz 3,5kW 10,1A, FUSE 3x10A,
- 208V 3-P, 50Hz 3,5kW 11,2A, FUSE 3x10A,
- 200V 3-P, 50Hz 3,5kW 11,7A, FUSE 3x10A,

46-5 Steam heater without dryer
- 415V 3N-PE, 50Hz 1,1kW 2,4A, FUSE 3x10A,
- 400V 3N-PE, 50Hz 1,1kW 2,4A, FUSE 3x10A,
- 380V 3N-PE, 50/60Hz 1,1kW 2,4A, FUSE 3x10A,
- 240V 3-P, 50Hz 1,1kW 4,8A, FUSE 3x10A,
- 230V 3-P, 50Hz 1,1kW 4,2A, FUSE 3x10A,
- 208V 3-P, 50Hz 1,1kW 4,5A, FUSE 3x10A,
- 200V 3-P, 50Hz 1,1kW 4,8A, FUSE 3x10A,

46-4 Steam heater without dryer
- 415V 3N-PE, 50Hz 0,8kW 1,7A, FUSE 3x10A,
- 400V 3N-PE, 50Hz 0,8kW 1,7A, FUSE 3x10A,
- 380V 3N-PE, 50/60Hz 0,8kW 1,7A, FUSE 3x10A,
General

The Getinge 46-Series are large capacity Washer Disinfectors for cleaning, disinfection and drying of moisture and temperature stable Surgical Instruments (rigid and tubular), Hollow ware, Glass ware, Baby bottles, Suction bottles, Wash bowls, Containers and for 46-4 and 46-5 also Anesthetic accessories.

The machine has spray arms and dockings:
- 46-2 has three spray arms and one docking:
- 46-4 has two spray arms and two dockings:
- 46-5 has two spray arms and three dockings:

The machine can be equipped with several different accessories for different cleaning requirements. These accessories are presented in a special accessories catalogue.

There are several possible ways of installing and equipping the machine depending on its field of application:
- 46-2 has electrical heating. 46-4 and 46-5 have electric or steam heating.
- 46-2 is fitted with a single door. 46-4 and 46-5 are fitted with a single or double door.
- Connection of distilled or de-ionised water.
- Extra dosing pumps which allow chemical disinfection of heat-sensitive goods.
- With or without built-in drying system.
- Audible signal on process complete, fault code, etc.

The washer-disinfector has been tested and approved to ISO 15883.
**Safe and simple**

The disinfector is controlled by a microprocessor. This has several advantages:
- the built-in service program makes troubleshooting and servicing far easier
- safety and reliability can be kept high by continuous monitoring of the process
- the dosing of detergent, the temperature and the disinfection time can all be altered with great precision to suit different conditions.

The programs can be adapted precisely to suit the needs of each user. Existing programs can be re-programmed via a PC. As standard, the washer-disinfector has two to six programs.

The door and wash chamber are well insulated, so that the washer-disinfector is energy-efficient and silent in operation.

Operation is simple and the control buttons are few and clearly marked.

**Simple service and installation**

Valves and electrical equipment are easily accessible from the front for inspection and service.

**Door function**

46-2 is fitted with a single door. 46-4 and 46-5 are fitted either with a single door or with double doors.

Machines with double doors have a system of interlocks to ensure that only one door can be opened at a time. This means that the clean-side door must be closed before the dirty-side door can be opened.

When is pressed, the door is locked and a yellow lamp (process running) flashes for about 10 seconds. If you press again during this “cancel time”, the dirty-side door is unlocked and the door can be opened.

When the program is complete, a green lamp lights up on both sides (if there are double doors) and the clean-side door is unlocked. When the door has been opened manually, the green lamp goes out. With double doors, the clean-side door must be closed before the dirty-side door can be unlocked.
**Dosing system**

In standard form, the machine has two dosing systems. One is for alkaline detergent and one is for rinse-aid or acid detergent. The dosing amount can be set individually for each program.

The machine cannot be started until detergent has been added. If the detergent bottle is empty "ADD DETERGENT" appears on the display.

A third and a fourth dosing system for chemical disinfection of heat-sensitive goods or instrument milk, for example, can be installed.
**Drying** *(option 46-4, -5)*

- Heat exchangers
- Fan
- Pressure switch
- Check valve
- Differential pressure switch

**Single drying** *(option 46-2)*

- Fan
- Check valve
The machine has an electronically programmable control system which can hold up to 10-15 programs. Six of these programs can be started with the program selection buttons. With you can choose up to six programs. If the control system has more programs, the subsequent ones are chosen from a scrollable list. You can reach the list of available programs (from standby mode), by pressing twice and choosing a program with or . Confirm the chosen program with .

The machine comes with a number of standard programs in the programmer (see the appendix for Standard programs). Parameters in these programs can be modified to suit the needs of individual users. Individual programs can be created with a PC. An entire standard program or parts of one can be used as a starting point for programming.

Programming may only be done by an authorised service technician.

Programs are chosen with the program selection buttons and the process is started with (starting of a process is indicated by the yellow lamp at flashing for ten seconds and then going out).

When the process is complete, the green lamp at lights up and the door can be opened manually (on a machine with manual door). With an automatic door, the door opens automatically when the process is complete.

The illustration on the next page shows the program sequence in the OP-D program.
Abort at start of process

A started program can be aborted within ten seconds of the door locking. To abort a started process, press [\]. During the period when the program can be aborted, a yellow lamp flashes at [\]. The door is unlocked and opened automatically and the machine can be restarted in the usual way.

Abort an ongoing process

During a process, the machine can also be stopped with the main switch. If the power is switched on within 60 seconds, the program continues until the end. If the power is switched on after more than 60 seconds, error code [F00 POWER FAIL] is displayed. Press [\] to silence the alarm signal. Pressing [\] again drained liquid from the machine, and the dirty side door goes down.
**Fast-stepping a program**

All safety functions are disabled for fast stepping.

Fast stepping must only be used during servicing.

Never stop fast stepping in a heating phase. If you do, the machine may be damaged.

An ongoing program can be fast-stepped phase by phase. Fast stepping can be chosen during an ongoing process.

1. Fast stepping is chosen in the service program; see tab 5 Software description and setting, under DIP switches display (1.4.2.4).
2. Set DS02 STEP in STATUS to 1 and press \( S \). Exit the service program.
3. Fast-step with \( U \).
4. Reset DS02 STEP STATUS to 0 and press \( S \). Exit the service program.

Reset DS02 STEP STATUS to 0 after completion of fast stepping.
Software description and settings

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Menu tree: Appendix
Description

This section describes the PACS 300 control and monitoring system. PACS 300 is an electronic system that is used to control the various functions of the washer-disinfector. The letters PACS stand for Programmable Autoclave Control System.

The purpose of the control system is to issue orders and send them to the executive components of the washer-disinfector so that a number of process steps can be performed in accordance with a predetermined template. The order signals are worked out by the computer program of the control unit in conjunction with measurements of actual parameter values for the current program. These are usually times, temperatures and pressures.

Several different pieces of equipment can be connected to the control unit for programming, monitoring and documenting the disinfection processes.

The operator communicates with the control unit via a control panel or an ordinary PC.

All operator panels can be used to monitor the processes, since they display all the set parameter values as well as actual values on request. All relevant data associated with a given process, such as batch number, operator number, date, etc., can be entered by the operator.

Programs, system definitions and process data can be documented by connecting a printer to the unit. A host computer can also be connected directly to the CPU of the control system.

When the need arises, a measuring and monitoring system entirely independent of the control system can be set up by connecting a PACS SUPERVISOR system, consisting of CPU, operator panel and connections to the control unit CPU. The measurements of the SUPERVISOR are made by its own separate temperature and pressure sensors.

The computer contains programs for automatic calibration of the temperature and pressure sensors. Where alternative correction constants are known, they can be entered manually. The testing functions include means of activating analog and digital outputs and for monitoring analog and digital inputs.
The control panel

The buttons on the control panel are used to choose programs, navigate the menu tree, acknowledge error codes, etc.

Display

The screen has two lines, each with a capacity of 20 characters.

P01 OP-SHORT-D
47.0 °C

Information or error messages appear on the bottom line and replace the text that would otherwise appear here.

Program selection buttons

With P1 - P6 you can choose up to six programs. If the control system has more programs, the subsequent ones are chosen from a scrollable list. You can reach the list of available programs (from standby mode), by pressing twice and choosing a program with or . Confirm the chosen program with .
Buttons for menu tree navigation

The are five buttons for navigating the panel. These fixed buttons are four arrow buttons that control the cursor (I, K, J and H) and S.

- Used to go back one step (up one level) in menus. If the button is held down for a little longer, you are returned to the main menu.
- Not used in menus and lists.
- Shows the next object in the list.
- Shows the previous object in the list.
- Goes to the chosen object in the list or opens a field for editing if there is an editable field.

Scroll in menus and lists

You can use I, K, J and H to scroll through menus and lists. You can scroll either line by line or two lines at a time, depending on what is displayed. The top line of the list may look like the example below.

>PRINT LAST CYCLE
SYSTEM V

The angle bracket “>” to the left of the top line shows which object will be chosen if you press . Bottom right there is a “v” indicating that there are more objects in the list which are displayed if you press $.

This is what you see if you are in a list. The “arrows” to the right show that there are objects both above and below the displayed line.

SYSTEM
ABOUT

When you reach the end of the object list, only one up-arrow appears at the right edge of the display. Menus and lists are “endless”; you can reach the top of the list by pressing $ at the end of the list.

Field editing

Opens the chosen field for editing. The content of the field is changed with or $. These arrow keys scroll in an endless list containing numbers. When a field is opened for editing, the first character is highlighted. To move the cursor use or $.

Entered values are saved when you press $. On saving, the system checks that the value is in the permitted range.
Passwords

There are five passwords with different levels of authorisation in the system program. The operator password has the lowest authority; the programming password has full authority.

The password levels are as follows:

- Operator – code 558387.
- Parameter – contact service for code.
- Supervisor – contact service for code.
- Service – contact service for code.
- Programming – contact service for code.

**NOTE: In the menu tree where the password must be entered there is a letter code (between PW: A-K) which refers to the function for which the relevant password is authorised.**

When a password is entered, the top line shows “ENTER PASSWORD”. Press $\rightarrow$ to open the entry field for editing. Each digit can be changed with $\downarrow$ and $\uparrow$. $\leftarrow$ and $\rightarrow$ toggle between the digits. Press $\rightarrow$ to confirm the entered password.

If the wrong password is entered, “WRONG PASSWORD” appears on the first line. Press $\rightarrow$ to return to the display showing “ENTER PASSWORD”

**NOTE: The password cannot be changed.**

Operator

Code in Authority to change menu tree
A Parameters of type A and to see parameters of type I.

Parameter

Code in Authority to change menu tree
A Parameters of type A and to see parameters of type I.
H Process-critical configurations, parameters of type P.

Supervisor

Code in Authority to change menu tree
A Parameters.
B Calendar (time and date)
H Process-critical configurations, parameters of type P.
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There are 4 main menus on the top level.

Main menu 1 (Program name) selects cycle and change parameters. (1.1)

Main menu 2 (Machine name) shows information about machine name and the current phase in the cycle. (1.2)

Main menu 3 (Cycle counter) shows a selectable variable. (1.3)

Main menu 4 (Setup) machine related setup. (1.4)
Main menu 1, Program name (1.1)

In standby mode, the display shows in top row the last selected cycle name and in the second row two pre-selected variables, normally the temperature in the washer and cycle counter. The main purpose of the menu is to select a washing cycle and be able to change any changeable parameters.

There are two sub-menus in this section.

Select cycle. (1.1.1)
Change parameters. (1.1.2)

Select cycle (1.1.1)

In main menu 1 press enter to move to “SELECT PROGRAM” menu and then press enter again to the cycle list menu. Use the up/down buttons to mark the cycle and select the cycle by pressing the enter button. The cycles are pre-configured in the program and cannot be changed by the operator.
**Change parameters (1.1.2)**

In main menu 1 press enter to move to “SELECT PROGRAM” menu then press down button to activate “CHANGE PARAMETERS” Press enter again to select.

Each cycle has a set of parameters that are pre-configured. When a cycle has been selected, explained in the previous section, the parameters will be showed in the display. The number of parameters displayed depends on the how the cycle was configured when it was created in the program.

The parameters that have an “A” indication on the right lower side are adjustable. By pressing enter button the value can be changed with password level A. If the indication is an “I” the parameter is only information. P parameters can be changed if password level A+H.

**Main menu 2, Machine name (1.2)**

Main menu 2 shows information about machine and the current phase. The information is not changeable.

**Machine information (1.2)**

The top row displays the disinfections name/ID and the lower row shows the current phase.
Main menu 3, Cycle counter (1.3)

In this menu a selectable variable can be displayed. The top row displays the variable name and the lower row displays the value.

Variable list (1.3.1…)

There are a configured number of variables available for each cycle. This list is for information only. To select a variable to display scroll down/up and then press enter to select the variable.
Main menu 4, Setup (1.4)

Main menu 4 is the machine set-up menu. The set-up menu has 3 sub-menus.

Print last selected cycle parameters. (1.4.1)
System configuration menus. (1.4.2)
About the system. (1.4.3)

Print selected cycles parameters (1.4.1)

When a cycle is selected, in main menu 1, the cycle’s parameters can be printed to the printer.

Press down the button three times to get to the set-up menu, then press the enter button to select set-up. By pressing enter one more time the confirmation screen for printout opens. Use the left/right buttons to select “YES” or “NO” to start printing or exit without printing the parameters for the selected cycle.

System display (1.4.2)

In the system configuration menu there are six sub-menus.
Calendar where time and date can be entered. (1.4.2.1)
Calibration of analogy input values. (1.4.2.2)
Configuration to set units, printer, alarm clocks and node address. (1.4.2.3)
DIP switches. (1.4.2.4)
Service menu with error log, service message and diagnostics. (1.4.2.5)
Save ram to flash. (1.4.2.6)

Calendar display (1.4.2.1)

The time and date can be set in this menu. There is one sub-menu for each function.
Set time. (1.4.2.1.1)
Set date. (1.4.2.1.2)
Time display (1.4.2.1.1)

To set the time follow the path in the figure, enter the password and press enter when calendar menu is selected. To edit the time press the enter button. Change the time by pressing the up/down buttons for the value and using the left/right buttons to select the different fields. When the time is correct press the enter button to confirm the change.

Date display (1.4.2.1.2)

To set the date follow the path in the figure, enter the password and press enter when calendar menu is selected. To edit the date press the enter button. Change the date by pressing the up/down buttons for the value and using the left/right buttons to select the different fields. When the date is correct press the enter button to confirm the change.
Calibration display (1.4.2.2)

Calibration menu is used to calibrate analogy input values. There are three sub-menus in the calibration.

Manual calibration. (1.4.2.2.1)

Automatic calibration. (1.4.2.2.2)

Adjust the compensation table. N/A.(1.4.2.2.3)

Manual calibration display (1.4.2.2.1)

In manual calibration the two (2) values for offset and span can be manually entered. To get to the manual calibrations follow the path in the figure below. Change the value by pressing the up/down buttons and using the left/right buttons to select the different fields. When the value is correct press the enter button to confirm the changes.
Automatic calibration display (1.4.2.2.2)

This menu has two sub-menus.
Continue. (1.4.2.2.2.1)
Select sensor. (1.4.2.2.2.2)

In automatic calibration a sensor has to be selected for calibration. This is done in the select sensor menu. When a sensor(s) is/are selected for calibration the continue menu indicates the number of sensors selected and an arrow appears in the right side of the display. When leaving the calibration menu all selected sensors are disabled.

Calibrate selected sensor (1.4.2.2.2.1)

When one or more similar sensor(s) is/are selected (see 1.4.2.2.2.2) is this indicated with an arrow at the right side of the display beside the continue word on the first row. By pressing enter to reference value is displayed. When the value is stable the value is entered and confirmed by pressing enter. Now the high reference display appears and when this value is stable the value is entered followed by the enter button. It is now possible to print the calibration value by setting the cursor at “YES” and pressing the enter button or “NO” to reject the printing.
Select sensor (1.4.2.2.2)

Press the enter button on the sensor list to select for automatic calibration. Then press confirm by setting the cursor on “YES” and press enter again. The sensor is now selected. Note that several sensors can be selected at the same time. If more then one sensor is selected they have to be of similar type.
Compensation table display (1.4.2.2.3)

This menu is not applicable on this machine.

Configuration display (1.4.2.3)

The configuration display is used to set the language, unit format. Also the printer is configured. Alarm clock setting and finally the PACS address. There are four sub-menus.

Language. (1.4.2.3.1)
Date format. (1.4.2.3.2)
Pressure units. (1.4.2.3.3)
Temperature units. (1.4.2.3.4)

Language display (1.4.2.3.1)

The language for the different displays is set in this display. To select the different languages press enter and select the appropriate language. Confirm the selection by pressing the enter button.
Date format display (1.4.2.3.2)

The date format is selected from a list in this display. There are three different formats. To change the unit press the enter button to display the different format and select the appropriate format. Confirm the selection by pressing the enter button.

YYYY/MM/DD.  (1.4.2.3.2.1)
MM/DD/YYYY.  (1.4.2.3.2.2)
DD/MM/YYYY.  (1.4.2.3.2.3)
Pressure unit display (1.4.2.3.1.3)

Three different pressure units are available. To change the unit press enter to display the different units and select the appropriate unit. Confirm the selection by pressing the enter button. Note. This is only to display the appropriate units, the value will not be recalculated.

BAR.  (1.4.2.3.1.3.1)

KPA.  (1.4.2.3.1.3.2)

PSI.  (1.4.2.3.1.3.3)
Temperature unit display (1.4.2.3.1.4)

Two different units can be displayed. To change the unit press enter to display the different units and select the appropriate unit. Confirm the selection by pressing enter. Note. This is only to display the appropriate units, the value will not be recalculated.

Celsius. (1.4.2.3.1.4.1)

Fahrenheit. (1.4.2.3.1.4.2)
Printer display (1.4.2.3.2)

All settings for printer and logging are made in this section. There are 4 sub-menus:

- Printer mode N/A. (1.4.2.3.2.1)
- Slow interval. (1.4.2.3.2.2)
- Fast interval. (1.4.2.3.2.3)
- Baud rate for printer. (1.4.2.3.2.4)

Printing mode display (1.4.2.3.2.1)

This menu only have mode 1. Only process values printed.
Slow interval display (1.4.2.3.2.2)

This is the slow interval-logging time rate. Which phases are using this time rate is pre-configured in the program for each phase.
Fast interval display (1.4.2.3.2.3)

This is the fast interval-logging time rate. Which phases are using this time rate is pre-configured in the program for each phase.
Printer baud rate display (1.4.2.3.2.4)

The baud rate for the printer is selected in this menu. There are seven different baud rates.

- 1200. (1.4.2.3.2.4.1)
- 2400. (1.4.2.3.2.4.2)
- 4800. (1.4.2.3.2.4.3)
- 9600. (1.4.2.3.2.4.4)
- 19200. (1.4.2.3.2.4.5)
- 38400. (1.4.2.3.2.4.6)
- 57600. (1.4.2.3.2.4.7)

Alarm clock display (1.4.2.3.3)

This is not applicable on this machine.
PACS address display (1.4.2.3.4)

The node address for the PACS is entered in this display.
Communication setup COM0 (1.4.2.3.5.1)

The protocol type and communication mode is entered in this display.
Communication setup COM1 (1.4.2.3.5.2)

The protocol type is entered in this display.
Communication mode setup COM1 (1.4.2.3.5.3)

The communication mode is entered in this display.
DIP switches display (1.4.2.4)

Dipswitches are used to enable/disable different options. The different options are pre-configured in the program. There are 16 dipswitches as total. See section **Fel! Hittar inte referenskälla.**
Service display (1.4.2.5)

In the service menu the different error messages, service messages and diagnostic are displayed.

Error log (1.4.2.5.1)

Service messages (1.4.2.5.2)

Diagnostic (1.4.2.5.3)

Error log display (1.4.2.5.1)

The last 20 error messages are displayed. The errors are acknowledge by the acknowledge buttons on the PACS. Error messages see section 3.
Service message display (1.4.2.5)

Service messages are used to notify the operator that something has to be done. Service messages se section 3.

Diagnostics display (1.4.2.5.3)

The diagnostic menu is for testing inputs/outputs and flags. There are eight different sub-menus.

Test analogue input. (1.4.2.5.3.1)
Test analogue outputs. (1.4.2.5.3.2)
Test digital inputs. (1.4.2.5.3.3)
Test digital outputs. (1.4.2.5.3.4)
Test user flags. (1.4.2.5.3.5)
Test system flags. (1.4.2.5.3.6)
Test printer. (1.4.2.5.3.7)
Test LED/Buzzer. (1.4.2.5.3.8)
Test analogue input display (1.4.2.5.3.1)

These values are read-only. The state of each input is displayed. The different inputs are pre-configured in the program. Analogue inputs see section 4.
Test analogue output display (1.4.2.5.3.2)

These values are read-write. The state of each output is displayed. Each output can also be set in a manual mode and a value entered to the output. The different outputs are pre-configured in the program. Analogue outputs see section 4.
Test digital input display (1.4.2.5.3.3)

These values are read-only. The state of each input is displayed. The different inputs are pre-configured in the program. Digital inputs see section 4.
Test digital output display (1.4.2.5.3.4)

These values are read-write. The state of each input is displayed. Each output can also be set in a manual mode and the state can be toggled on/off. The different outputs are pre-configured in the program. Digital outputs see section 4.
Test user flag display (1.4.2.5.3.5)

These values are read-only. The state of each flag is displayed. The different flags are pre-configured in the program. User flags see SwDS.
Test system flag display (1.4.2.5.3.6)

These values are read-only. The state of each flag is displayed. The different flags are pre-configured in the program. System flags see SwDS.
**Test printer (1.4.2.5.3.7)**

When the printer is tested the printer writes characters on the paper.
Test LED/buzzer display (1.4.2.5.3.8)

All LED's and the buzzer is turned on during the test.
Save ram to flash display (1.4.2.6)

The ram has battery backup, but during a could start the Pac's reads from the flash memory to ram and all changed done after the last save will be lost.

About display (1.4.3)

This displays the version of the different program parts in the PACS.
Preventive maintenance

Contents

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Periodic maintenance ........................................... 3
Function check ...................................................... 4
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  Flush system ...................................................... 5
  Temperature check ............................................. 5
  Dryer .................................................................. 5
  Printer (extra equipment) ..................................... 5
## General

The required maintenance interval will depend largely on the quality of the incoming water and how often the machine is used. The maintenance interval will have to be determined in each individual case. We recommend that the stated maintenance operations are done at the specified intervals. We also recommend that a function check is done once or twice a year. For repairs or adjustments, see under Repair and adjustment.

### Periodic maintenance

⚠️ *This may only be done by authorised personnel.*

⚠️ *The machine is connected to the electric power supply and voltage is present on certain components.*

<table>
<thead>
<tr>
<th>Component</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door seal</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Hoses between dosing pump and detergent container</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Hose between dosing pump and machine</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Filter in incoming media</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Overheat protection</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Hose in hose pump</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Spray arm wings</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Sterile filter in dryer</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Hoses to dryer</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Check valve in dryer</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Check valve in waste outlet</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Fan to dryer</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Ink ribbon for printer</td>
<td><img src="image" alt=" " /> <img src="image" alt=" " /></td>
</tr>
<tr>
<td>Spring on door closing</td>
<td><img src="image" alt=" " /></td>
</tr>
<tr>
<td>Dampers on door closing</td>
<td><img src="image" alt=" " /></td>
</tr>
</tbody>
</table>
Function check

This must only be done by authorised personnel.

The machine is connected to the electric power supply and voltage is present on certain components.

Instructions, cable, switch

- Check that a goods placing sign has been put up on the wall behind the disinfector.
- Check that the isolator switch on the wall is working and that the connecting cable is undamaged and free from defects.

Filter and valves

- Check that level switches and manual shutoff valves are working properly.
- Check the filters in the supply line (see under Cleaning the filters in the supply line). Clean when necessary.
- Check all pipe couplings. Tighten and seal if necessary.

Controls

- The machine is operated with the buttons on the control panel.
- Check that the control buttons are working. If the buttons are working, a beep will be heard.
- While a program is running check that the yellow lamp at \( \square \) is lit. When the program is complete, the green lamp at \( \bigcirc \) should light up.

Insert for goods

- Check that the inserts for the machine dock properly with the water outlets.
- Check that spray arms (if fitted) rotate and are not clogged.
- Check that the goods to be cleaned are retained in the insert.
Preventive maintenance

Door

Check that the door seal closes tight and is undamaged and that there is no leakage while a program is running. Clean or replace the seal if necessary.

Detergent dosing

Check that the suction hose and pump are full of detergent or rinse-aid before running a program. When the pre-programmed amount of detergent is changed, the consumption must be checked with a measuring glass.

Flush system

All supply lines must be closed when working on the pipe system.

- Check that the spray arms can rotate freely.
- Check that the holes in the washing arms are not blocked. Clean when necessary.
- Check that the coarse strainer in the bottom of the washing chamber is correctly installed. Clean when necessary.
- Check that all couplings connecting the washing system to the pump and chamber are leaktight. Tighten and seal if necessary.

Temperature check

- Check the temperature during a program run. Compare time and temperature with the program sheet. Time and temperature are especially important in the disinfection phase.

  The measuring equipment must be capable of registering temperature and time continuously. High-performance equipment is essential for reliable measuring results, because of the relatively rapid temperature changes.

  Only one measuring point in the centre of the machine is need for the function check.

  Note:
  Washer-disinfectors that have been shown not to meet the requirements in terms of temperature, sequence, washing system and safety must not be used until the faults have been corrected.

Dryer

- Check seals and hoses for leaks once a year.
- Replace the sterile filter if necessary or in the event of an alarm.

Printer (extra equipment)

- Check ink ribbon cartridge
- Check the printout quality.
Fault indications and troubleshooting

Contents

Fault indications ________________________________________ 3
   A red lamp lights up ___________________________________ 3
   Messages ____________________________________________ 3
   Fault codes __________________________________________ 4
   Acknowledging a fault code ______________________________ 4
Troubleshooting __________________________________________ 5
Fault indications

Messages appear in plain text on the display. The machine cannot be started until the fault has been put right. The following messages can be displayed:

<table>
<thead>
<tr>
<th>Fault Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose 1 low level</td>
<td>Empty container alarm 1. If detergent 1 is finished, a handling code is generated. The alarm is reset automatically when detergent is added.</td>
</tr>
<tr>
<td>Dose 2 low level</td>
<td>Empty container alarm 2. If detergent 2 is finished, a handling code is generated. Reset av larm sker automatiskt när medel fylls på.</td>
</tr>
<tr>
<td>Dose 3 low level</td>
<td>Empty container alarm 3. If detergent 3 is finished, an operation code is generated. The alarm is reset automatically when detergent is added.</td>
</tr>
<tr>
<td>Dose 4 low level</td>
<td>Empty container alarm 4. If detergent 4 is finished, an operation code is generated. The alarm is reset automatically when detergent is added.</td>
</tr>
</tbody>
</table>

Note:
The last process had access to detergent. A message is displayed for future processes.

A red lamp lights up

If the red lamp at 
lights up, the process has been aborted because of a fault. If a handling alarm is given, see below for the action to take. For other alarms, call service personnel.

Handling alarms

Messages appear in plain text on the display. The machine cannot be started until the fault has been put right.
Fault indications and troubleshooting

Error codes

Fault codes indicate that a serious fault has occurred in the washing process. The fault must be put right by an authorised service technician.

Acknowledging a fault code

Reset the fault code by:

1. pressing \( \text{U} \). The alarm signal is silenced.
2. Correct the fault.
3. The machine is still locked but the current process has been aborted. Pressing \( \text{V} \) again drains liquid from the machine and the dirty side door goes down.

Note:
If the draining pump is faulty, the water is not drained from the machine.

NOTE:
The goods in the machine are not clean. Start a new process.
Fault indications and troubleshooting

**Troubleshooting**

The table below describes the fault codes that may be generated and a possible action for each fault code.

⚠️ *This may only be done by authorised personnel.*

⚠️ *The machine is connected to the electric power supply and voltage is present on certain components.*

<table>
<thead>
<tr>
<th>Fault code</th>
<th>Fault</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>F00</td>
<td>Power failure</td>
<td>If the power failure lasts for more than 59 seconds, the process is aborted. The fault code is generated when the power returns.</td>
</tr>
<tr>
<td>F01</td>
<td>The motor cutout has tripped</td>
<td>The motor cutout (–F01) for the circulation pump has tripped.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Possible action:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Check that there is power on all phases from the circulation pump.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Check that the motor cutout is correctly set (see electrical diagram).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Check that the pump impeller rotates easily.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Check the direction of rotation (see installation instructions).</td>
</tr>
<tr>
<td>F02</td>
<td>Water filling too slow</td>
<td>The water level sensor (–B11) is not activated within ten minutes of filling starting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Possible action:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Check that the shutoff valves are open and that water is reaching the machine.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Check that the solenoid valves open and that their filters are not clogged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Check that the strainer in the machine is not clogged.</td>
</tr>
<tr>
<td>F03</td>
<td>Emptying time too long</td>
<td>Emptying takes longer than five minutes or the water level sensor (–B11) is still activated when the emptying phase is complete.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Possible action:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Check that the waste pump pumps out water.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Check that the pressure switch changes over.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Check that the solenoid valve closes (water does not leak in).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Check that the strainer in the machine is not clogged.</td>
</tr>
<tr>
<td>F04</td>
<td>Water leakage in the dryer</td>
<td>Switch to water level sensor (–B12) open.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Possible action:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Check that the check valves to the drying connection close.</td>
</tr>
<tr>
<td>F05</td>
<td>Fault door, dirty side</td>
<td>Door does not lock (–S02) within 10 seconds or opens while a program is running.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Possible action:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Check whether the microswitch (–S02) for the “door locked” limit position has been activated within 10 seconds on door locking.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Check that the motor (–M16) and the switch (–S03) for door locking are working.</td>
</tr>
</tbody>
</table>
### Fault indications and troubleshooting

<table>
<thead>
<tr>
<th>Fault code</th>
<th>Fault Description</th>
<th>Comment</th>
</tr>
</thead>
</table>
| F06        | Door fault, dirty side | The door does not unlock (-S02) within 10 seconds. Possible action:  
   a. Check whether the microswitch (-S02) for the “door locked” limit position has been activated within 10 seconds on door locking.  
   b. Check that the motor (-M16) and the switch (-S02) for door unlocking are working. |
| F09        | Faulty door, dirty side | Door does not lock (-S05) within 10 seconds or opens while a program is running. Possible action:  
   a. Check whether the microswitch (-S05) for the “door locked” limit position has been activated within 10 seconds on door locking.  
   b. Check that the motor (-M17) and the switch (-S07) for door locking are working. |
| F10        | Faulty door, dirty side | The door does not unlock (-S05) within 10 seconds. Possible action:  
   a. Check whether the microswitch (-S05) for the “door locked” limit position has been activated within 10 seconds on door locking.  
   b. Check that the motor (-M17) and the switch (-S05) for door unlocking are working. |
| F15        | Flowmeter, dosing 1 | Not enough detergent 1 dosed (-B16). Possible action:  
   a. Check operation of the dosing pump.  
   b. Check that there is detergent in the container.  
   c. Check whether an empty container alarm has occurred.  
   d. Check that there is no air in the flowmeter and that it is rotating.  
   e. Check that the hoses are not blocked. |
| F16        | Flowmeter, dosing 2 | Not enough detergent 2 dosed (-B17) Possible action:  
   a. Check operation of the dosing pump.  
   b. Check that there is detergent in the container.  
   c. Check whether an empty container alarm has occurred.  
   d. Check that there is no air in the flowmeter and that it is rotating.  
   e. Check that the hoses are not blocked. |
| F19        | Flowmeter, dosing 3 | Not enough detergent 3 dosed (-B20) Possible action:  
   a. Check operation of the dosing pump.  
   b. Check that there is detergent in the container.  
   c. Check whether an empty container alarm has occurred.  
   d. Check that there is no air in the flowmeter and that it is rotating. |
## Fault indications and troubleshooting

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<td>Possible action:</td>
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<td>c. Check whether an empty container alarm has occurred.</td>
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<td>d. Check that there is no air in the flowmeter and that it is rotating.</td>
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<td></td>
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<td>Possible action:</td>
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<td>Possible action:</td>
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<td>Possible action:</td>
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<td>Possible action:</td>
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| F31        | Faulty temperature sensor in washing chamber | Independent. The temperature (-B07) is \(<0 \, ^\circ\text{C} \text{ or } >130 \, ^\circ\text{C}.\)  
Possible action:  
a. Check the temperature sensor (for open-circuit or short-circuit) |
| F32        | Faulty temperature sensor in dryer | The temperature (-B05) is \(<0 \, ^\circ\text{C} \text{ or } >130 \, ^\circ\text{C}.\)  
Possible action:  
a. Check the temperature sensor (for open-circuit or short-circuit) |
| F33        | Incorrect temperature in washing chamber | Wash temperature (-B07) has not risen by at least 10 degrees C after eight minutes' washing.  
Possible action for electrically heated machine:  
a. Check that there is power on all phases up to the elements.  
b. Check the overheat protection of the elements.  
Possible action for steam heated machine:  
a. Check the steam valve.  
b. Check that the ball valve is open and that the filter in the incoming steam is clean.  
c. Check steam pressure (see installation instructions).  
d. Check condensate drain.  
e. Check that there is no back pressure in the condensate drain. |
| F34        | Faulty temperature sensor in washing chamber | Wash temperature (-B07) dependent and independent differs by more than \(\pm3 \, ^\circ\text{C}.\)  
Possible action:  
a. Check the calibration of the temperature sensor (see Calibration under Repair and adjustment)  
b. Check the temperature sensor. |
| F36        | Error message from independent monitoring system | |

---

**Service instructions**

Edition 0410
# Repair and adjustment

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**Connecting a PC**

An RS-232 cable is needed to connect a PC to the washer-disinfector.

Proceed as follows:

1. Connect a cable between the PC and port X24 or X25 as shown below.
   - X24 is mainly used for a PC and (for example) a scanner.
   - X25 is used mainly for T-doc (RS485) and printer (RS232 or RS485).

2. Set type of communication. The communication settings are done in the service program; see under tab 5 Software description and settings. Proceed as follows if the PC is:

   **connected to port X24**
   - Go into Communication setup COM 0 (1.4.2.3.5.1); see tab 5 Software description and settings.
   - Choose COMLI PROTOCOL and press S. Exit the service program.

   **connected to port X25**
   - Go into Communication setup COM 1 (1.4.2.3.5.2); see tab 5 Software description and settings.
   - Choose COMLI PROTOCOL and press .
   - Go into Communication setup COM 1 (1.4.2.3.5.3); see tab 5 Software description and settings.
   - Depending on the distance between the computer and the washer-disinfector, choose communication speed RS232 (<5 m) or RS485 (>5 m) and press . Exit the service program.
Loading a program to flash memory

The flash memory can be loaded with new wash programs or new system programs. Loading new wash programs requires the CS-1000 program, which can be purchased from Getinge. Instructions are supplied with CS-1000. System programs and language versions are loaded with Flashloader.

Load system program

*Note:* Always make a backup copy before starting work on updating system programs.

1. Connect a PC to the machine; see under Connecting a PC.
2. Check that the machine is in STANDBY mode.
3. Make a backup copy by starting CS 1000 and choosing Tools/PACS RAM/Upload To File...
4. Save the *.prm file in your chosen location.
   The program will report an error during conversion. Disregard this. To check that conversion was successful, check the size of the *.prm file. The size of the file should be 84416 bytes.
5. Switch off the power to the machine with the main switch.
6. Change the jumper (X29) on the board for the PACS 300 control system from Normal to Test.
7. Switch on the power to the machine with the main switch. The display should now show:

GETINGE
Ram OK

or

GETINGE PACS 300
Version X.XX (XXXX)

8. Start Flashloader from PC.

9. Set up as shown.

10. Start loading by pressing Program !. The following image appears.
11. When loading is complete, the following image appears. Press OK.

![Information]

12. Now the display shows:

```
SW Update 0x2497
Updating CRC....
```

A beep is heard and the display shows:

```
SW Update 0x2497
CRC OK
```

13. Check that the battery jumper (X30) is set to ON.
14. Switch off the power to the machine with the main switch.
15. Change the jumper (X29) to Normal.
16. Switch on the power to the machine with the main switch. The display should now show:

```
P00
```

17. Close Flashloader.
18. Start CS-1000 and load wash programs; see instructions for CS-1000.

**Load language files**

*Note:*

**Always make a backup copy before starting work on updating system programs.**

1. Connect a PC to the machine; see under Connecting a PC.
2. Check that the machine is in STANDBY mode.
3. Make a backup copy by starting CS 1000 and choosing Tools/PACS RAM/Upload To File...
4. Save the *.prm file in your chosen location.

The program will report an error during conversion. Disregard this. To check that conversion was successful, check the size of the *.prm file. The size of the file should be 84416 bytes.
5. Switch off the power to the machine with the main switch.
6. Change the jumper (X29) on the board for the PACS 300 control system from Normal to Test.

7. Set up as shown.

- **Filename**: Choose the right program file (*.a37).
- **Com Port**: The port to which you connected the data cable to your PC.
- **Baudrate**: Choose 57600
- **All Sectors** and **Verbose** must be checked (=selected).
8. Choose the Language tab.

9. Choose the relevant files:
   - Language support file,
   - Language file for PACS database.

10. Set Flash Sector for Language to 8 and 10 (as shown).
11. Check (select) Transfer.
12. Click Transfer->. The language files are now transferred to PACS 300.
**Cold start**

Do a cold start when the machine has hung and you cannot proceed with the program.

1. Switch off the power to the machine.
2. Move the battery jumper (X30) to Off.
3. Move the programming jumper (X29) from Normal to Cold.
4. Switch on the power.
5. Wait until CRC OK appears on the display.
6. Move the battery jumper (X30) back to On. **Note:** The power is still on.
7. Switch off the power.
8. Move the programming jumper (X29) from Cold to Normal.
9. Switch on the power.
10. Set the doors to the home position using the service program (tab 5 Software description and settings, Test digital output display (1.4.2.5.3.4) or CS1000).

**Home position for the doors:**
- Soiled side = door unlocked and open
- Clean side = door closed and locked
**Calibration**

**Conductivity meter**

*Check the output signal from conductivity meter*

To check the output signal, proceed as follows.

2. Enter code 22 with [*] and [-].
3. Press [E]. Setup 1 appears.
4. Choose Output with [*] and [-].
5. Press [E]. Sel. Type appears on the lower line.
6. Choose with [*] and [-]. Lin appears on the top line.
7. Press [E].
8. Choose 4-20 mA with [*] and [-].
9. Press [E].
10. Set with [*] and [-] so that 0/4 mA = 0.000 µS/cm.
11. Press [E].
12. Set with [*] and [-] so that 20 mA = 200 µS/cm.
13. Press [E].
14. Press [*] and [-] at the same time to log out.

*Set the cell constant*

To set the cell constant, proceed as follows:

1. Press [E].
2. Enter code 22 with [*] and [-].
3. Press [E]. Setup 1 appears.
4. Press [E] until the display shows Cellconst.
5. With [*] and [-], set the relevant cell constant; see the calibration certificate.
6. Press [E].
7. Press [*] and [-] at the same time to log out.
Calibration

To calibrate the conductivity meter, proceed as follows.

1. Connect a PC with the CS 1000 program installed to the disinfecter.


3. Enter code 22 with [button] and [button].

4. Press [button]. Setup 1 appears.

5. Choose Output with [button] and [button].

6. Press [button]. Sel. Type appears.

7. Choose SIM with [button] and [button].

8. Press [button].

9. Choose to 0…22 mA with [button] and [button].

10. Set 4 mA.

11. Start CS 1000 and choose Settings/Calibration/Analog Input Automatic...
12. Click Conductivity (A) and then Calibrate (B).

13. Enter the value 0 (A) and click Set Low.
14. Set 20 mA on the conductivity meter with \( \text{+} \) and \( \text{-} \).

15. Enter 200 (A) in CS 1000 and click Set High.

16. Check that the value (B) rises to 200.

17. Log off CS 1000.

18. Press \( \text{+} \) and \( \text{-} \) at the same time. Output appears on the display.

19. Press \( \text{E} \). Sel. Type appears.

20. Choose Lin. with \( \text{-} \).

21. Press \( \text{E} \).

22. Press \( \text{+} \) and \( \text{-} \) at the same time twice to log out of the conductivity meter.
Pressure sensor for circulation pump

To calibrate the pressure sensor for the circulation pump, proceed as follows.

1. Connect a PC with the CS 1000 program installed to the disinfecter.
2. Connect a process simulator to A01-X2:
   - + to 2
   - - to 5.
3. Set the process simulator to 4 mA.
4. Start CS 1000 and choose Settings/Calibration/Analog Input Automatic...
5. Click Pump pressure (A) and then Calibrate (B).
6. Enter the value 0 (A) and click Set Low.

7. Set the process simulator to 20 mA.

8. Enter 160 (A) in CS 1000 and click SetHigh.

9. Check that the value (B) rises to 160.

10. Log off CS 1000.
Temperature sensor – with resistor

Proceed as follows to calibrate the temperature sensors with the aid of resistors:

1. Connect a PC with the CS 1000 program installed to the disinfector.
2. Insert resistors for 20 °C at the following places:
   - A01-X7 Chamber temperature (two sensors)
   - A01-X6 Booster tank
   - A01-X5 Dryer
3. Start CS 1000 and choose Settings/Calibration/Analog Input Automatic...
4. Click Temp booster, Temp chamber and Temp chamb indep(A), then click Calibrate (B).
5 Enter the value 20 (A) and click Set Low.

6 Check that the value (B) rises to 20.

7 Replace resistors for 20 °C with resistors for 90 °C.

8 Enter 90 (A) in CS 1000 and click Set High.

9 Check that the value (B) rises to 90.

10 Log off CS 1000.

11 Remove the resistors and reinstate the temperature sensors.
Temperature sensors – with ice bath and oil bath

Proceed as follows to calibrate the temperature sensors with the aid of resistors:

1. Connect a PC with the CS 1000 program installed to the disinfector.
2. Prepare an ice bath and an oil bath.
   
   The ice bath must consist of crushed ice in a bowl of cold water. The bath must stand for at least 20 minutes so that the temperature can stabilise.
   
   The oil bath must be switched on for at least 45 minutes at the set temperature (100 ºC) to stabilise the temperature.
3. Remove the temperature sensors from the disinfector. Tape the sensors together.
4. Lower the temperature sensors into the ice bath together with an external thermometer.
5. Start CS 1000 and choose Settings/Calibration/Analog Input Automatic...

6. Click Temp booster, Temp chamber and Temp chamb indep(A), then click Calibrate (B).
7 Check that the reading of the external thermometer stabilises. Enter the reading of the external thermometer (A) and click Set Low.

8 Check that the value (B) rises to the set value.

9 Move the temperature sensors and the external thermometer to the oil bath. Check that the reading of the external thermometer stabilises. Enter the reading of the external thermometer (A) and click Set High.

10 Check that the value (B) rises to the set value.

11 Log off CS 1000.

12 Re-instate the temperature sensors.
Differential pressure gauge for drying unit

To calibrate the differential pressure gauge for the dryer, proceed as follows.

1. Connect a PC with the CS 1000 program installed to the disinfector.
2. Close the machine doors.
3. Connect an external differential pressure gauge in parallel with the existing gauge on the machine. Zero the external differential pressure gauge.
4. Start CS 1000 and choose Settings/Calibration/Analog Input Automatic...

5. Click Dryer pressure (A) and then Calibrate (B).
6. Enter the value 0 (A) and click Set Low.

7. Start the machine fan manually as follows:

>SETUP
Scroll to SETUP with J. Press S.

>SYSTEM
ABOUT
Scroll to SYSTEM with J. Press S.

>ENTER PASSWORD
Enter password. Press S.

>SERVICE
SAVE TO RAM FLASH
Scroll to SERVICE with J. Press S.

SERVICE MESSAGES
>DIAGNOSTICS
Scroll to DIAGNOSTICS with J. Press S.

>TEST ANALOG OUT
TEST DIGITAL IN
Scroll to TEST ANALOG OUT with J. Press S.
Scroll to 01 FAN SPEED with J. Press S.

Change AUT to MAN with K. Set fan speed to 75%.

8. Check the reading of the external differential pressure gauge. Enter the reading of gauge (A) in CS 1000 and click Set High.

The reading should be between 200 and 300 Pa.
If it is too high, the filter may be clogged; if it is too low, there may be a hole in the filter.

9. Check that the value (B) rises to the reading of the external differential pressure gauge.

10. Log off CS 1000.

11. Reinstate the fan.

Set fan speed to 0%. Change MAN to AUT with K. Press S.

12. Log out.

13. Reinstate the differential pressure gauge.
Replacing a temperature sensor

⚠️ This must only be done by authorised personnel.

⚠️ The machine is connected to the electric power supply and voltage is present on certain components.

In wash chamber and dryer

- Remove the old temperature sensor by pulling it out of the seal.
- Push the new sensor in through the seal. The temperature sensor must be inserted 22 mm into the machine.

⚠️ It is important that the sensor does not penetrate too far into the chamber, since it may be damaged in service.
Door

Position and operation, door switches

⚠️ This must only be done by authorised personnel.

⚠️ Before starting work, make sure that the machine is isolated from the electric power supply.

The pictures show the door switches on the machine.
Remove panel

- Unscrew screw
- Lift upwards.

- Put in service position.


Remove side panel

- Open all doors fully into the chamber.
- Unscrew screw.
- Lift upwards.
- If necessary, use a screwdriver to come across screw heads to door tensioner.
**Door switch**

*Replacing a door switch*

**Warning:**

*This may only be done by authorised personnel.*

**Warning:**

*Before starting work, make sure that the machine is isolated from the electric power supply.*

- Turn off the isolator switch.
- Remove the panel.
- Unscrew the nuts that secure the holder and pull the holder upwards.
- Replace the door switch and put it in position.
- Tighten the nuts.

---

**Adjusting door switches**

- Turn off the isolator switch.
- Remove the panel. Unscrew the fixing screws that secure the holder and pull the holder upwards. Alternatively, remove the side panel and adjust the switch in place.
- If the door switch does not break properly, the adjusting screws must be loosened and the door switch adjusted.
- The door switch arm must be about 1 mm from the lug.
Replacing the door seal

⚠️ This may only be done by authorised personnel.

- Open the door and pull off the old seal.
- The groove in the seal (see picture) must be at the bottom in the middle of the machine, facing upwards.
- Press the seal firmly into place.
Adjusting the closing pressure

This may only be done by authorised personnel.

- Remove the side panel.
- Unscrew screws A and B; see picture below.
  To tighten: unscrew screw C
  Too loosen: screw in screw C
- Tighten screws A and B and check the adjustment.
- Refit the side panel.
Removing the door

This must only be done by authorised personnel.

- Open all doors.
- Remove side panels.
- Remove springs and dampers.
- Remove stop screw.
- Pull out hinge spindle.

NOTE: After this, the door is hanging only on the door stays.
- Unscrew the door stay screw.

Separating the door (inner/outer door)

- Unscrew screws.
- Carefully lift off the outer door.
Diagonal adjustment of the machine

⚠️ This may only be done by authorised personnel.

⚠️ Before starting work, make sure that the machine is isolated from the electric power supply.

- Check that the door and the two side plates are parallel.

If not:
- Open the lower door and adjust the machine.
- To adjust the machine to the left, turn the nuts to the left; to adjust the machine to the right, turn the nuts to the right.
Adjustment of docking to the wash trolley

This may only be done by authorised personnel.

Check that the wash trolley docks properly. If not:

- Unscrew the screws that hold the tensioning spring in the oval holes and push the spring inwards or alternatively outwards.
Resetting the overheat cutout

This may only be done by authorised personnel.

- When the element gives off too much heat, the overheat cutout operates and trips the motor protection circuit-breaker F02.
- Never reset the overheat cutout without finding out why it tripped.
- Wait a while for the element to cool down so that the motor circuit-breaker can be reset.
- If the motor circuit-breaker cannot be reset even though the element has cooled down, the overheat cutout has failed and must be replaced.
Cleaning the filter for incoming water.

⚠️ This may only be done by authorised personnel.

⚠️ The machine is connected to the electric power supply and voltage is present on certain components.

The filters in the solenoid valves should be regularly checked and cleaned if necessary.

- Close the incoming water valve.
- Disconnect the incoming water connection at the solenoid valve.
- If necessary, release the solenoid attachment by pulling the solenoid upwards.
- Pull out the filter at the inlet of the valve.
- Clean the filter.
- Re-fit.

Flow limiter

Filter
Dryer

⚠️ This may only be done by authorised personnel.

⚠️ The machine is connected to the electric power supply and voltage is present on certain components.

- Check seals and hoses for leaks once a year.
- Change the dryer fan after 1000 hours’ drying time.
- After fault code F12, the sterile filter must be checked and replaced if it is damp.
Setting detergent and rinse-aid quantities

⚠️ This may only be done by authorised personnel.

⚠️ The machine is connected to the electric power supply and voltage is present on certain components.

- Dispense 100 ml of the relevant substance into a measuring beaker. Check that the suction hose and pump are full before the check.
- Push the suction hose down into the beaker and measure the consumption during an entire cleaning program. Adjust if necessary, and repeat the measurement until the amount of detergent conforms to the manufacturer’s recommendations.

**NOTE:** The maximum amount per dosing is 199 ml.

Printer

Replacing the paper roll

- Open the front door of the printer.
- Remove any paper residue.
- Remove the ink ribbon by pressing gently on the left-hand side of the ribbon cassette.
- Cut the end of the new roll at the angle shown in the illustration below. This makes it easier to thread the paper into the mechanism.
- Insert the tip of the paper into the opening of the print mechanism and press the button on the printer. The small friction wheel feeds the tip of the paper through the opening.
- Replace the ribbon cassette. The printer is now ready to use again.
**Ribbon cassette replacement**
- Open the front door of the printer.
- Remove the ink ribbon by pressing gently on the left-hand side of the ribbon cassette.
- Insert the new ribbon cassette. The printer is now ready to use again.

**Shutting down the printer**
- Press for about 5 seconds.

**Activating the printer**
- Press for about 5 seconds.
Jumpering an expansion card

The reason for jumpering expansion cards is to enable the processor to identify which card is which. Jumpering may be necessary when changing a card or when installing additional equipment. Jumpering is done as shown in the illustration.
Replacing a hose to a hose pump

⚠️ This may only be done by authorised personnel.

⚠️ Before starting work, make sure that the machine is isolated from the electric power supply.

- Remove the cover (3) by unscrewing screw A.
- Disconnect the hoses at connections B and C.
- Take out the entire unit including hose (2) (a complete spare parts kit).
- Install the new unit.
- Refit the cover.
Conductivity measurement

Conductivity is measured with equipment from Endress+Hauser.

⚠️ This may only be done by authorised personnel.

Function in washing process

The conductivity meter monitors the quality of the final rinse water, regardless of the process control.

If the conductivity at the end of the final rinse is higher than the preset value, the machine is emptied with the phase Emptying 2, in other words the machine is emptied with the simultaneous addition of DW/WFI water and the final rinse is repeated automatically.

If after three repetitions the conductivity is still above the preset value, the process is stopped and Fault code 11 appears on the display.

Measuring range

The normal measuring range is 0-20 μS/cm

Calibration

See manual: Liquisys CLM 223, from Endress+Hauser.

The conductivity equipment is calibrated at the factory by specifying an exact cell constant; see next page.

Removing the measuring cell

For easy access to the measuring cell, slacken the two screws holding the electrical cabinet in place. Remove the right-hand screw. Move the electrical cabinet to the left and swing it forward. Unscrew the measuring cell. The cable is long enough to allow the measuring cell to be immersed in a container of calibration liquid.
Calibrating the conductivity equipment

See the Endress+Hauser user guide.

7.1 Default

7.2 Default

7.3 Set SP1 Limit 15 \mu S/cm*

Set Hi= Max. contact
Rest default

*The user chooses a value in conjunction with process validation.

7.4 Default

7.5 Set 20 \mu S/cm
Rest default

7.6 Default

7.7 Set cell constant to the value in the certificate 98.7%**
Rest default

**The value is taken from the certificate for the measuring cell.
List of components
### Repair and Adjustment

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<td>Pressure sensor, circulation pump *</td>
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<td>Temperature sensor, chamber / independent (two in one sensor)</td>
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| S03  | Limit switch, closed SS                         |
| S05  | Limit switch, door, CS                         *
| S07  | Limit switch, door closed, CS*                 *
| T01  | Transformer*                                    |
| T02  | Transformer, lighting                           |
| U01  | Conductivity meter *                            |
| U03  | DC power supply unit, printer, 5 V *            |
| Y01  | Solenoid valve, cold water                      |
| Y02  | Solenoid valve, hot water                       |
| Y03  | Solenoid valve DW/WFI water                     |
| Y06  | Solenoid valve, waste cooling                   |
| Y11  | Solenoid valve, tank heating, steam             |
| Z01  | Filter, control                                 |
| Z02  | Filter, dryer fans *                            |

* Optional extra equipment
Program printout

An example of a program printout is shown below. In the example the program P02 OP-D programmed on program selection button [P2].

PROGRAM: P2 OP-D
DATE: 13/04/2004
PROCESS START: 13:44:46
MACHINE NAME: 46-4
MACHINE NO: 1
CYCLE COUNTER: 1

PARAMETER
WASH DOS TEMP 35.0 C
WASH DOS 1 00:01:00
WASH TEMP. 60.0 C
WASH TIME 00:03:00
FINAL R DOS TEMP 80.0 C
FINAL R DOS 3 00:00:21
DISINF TIME 00:01:00
DISINF TEMP 90.0 C
DRYING TEMP 0.0 C
DRYING TIME 00:18:00

SIGNALS
A107 TEMP INDEP. CHAMB
A107 PROGTIME

PH1-START
00:00:00 30.8

PH2-DRAINING 10 s
00:00:00 31.2

PH220-PRE RINSE CW
00:00:10 31.0

PH20-DRAINING 40 s
00:02:42 16.2

PH25-WASHING
00:03:51 18.1
00:05:52 35.2

DOS START
00:06:53 39.9

DOS STOP
00:11:17 60.0
00:12:17 608
00:13:17 61.9
00:14:17 61.5

PH20-DRAINING 40 s
00:14:18 61.5

PH330-RINSE 1
00:15:29 61.5

PH20-DRAINING 40 s
00:17:39 55.1

PH360-RINSE 2
00:18:46 55.5

PH20-DRAINING 40 s
00:20:55 53.2

PH440-FINAL RINSE
00:22:03 53.5
00:27:53 80.1

DOS START
00:28:15 81.5

DOS STOP
00:30:26 90.0

PH450-DISINFECTION
00:30:27 90.1
00:31:26 92.3

PH20-DRAINING 40 s
00:31:28 92.3

PH900-DRYING
00:32:36 91.7
00:51:27 80.8

PH1000-ENDING
00:52:43 81.1

SIGNATURE: ........
Appendix 2

Electrical diagram
## ELECTRICAL DOCUMENTATION

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380 V, 3N+PE, ELECTRICAL 46-2
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KABLARIA STANDARD

Kablar och strängar märks med ledningsnomprenumer som
informeras i varje inlägg. Strängarna där markeringen
finns. Max 12,5 mm mellan varje sträps och 50 mm från
varje kontakt där anslutningsares
ALLA KOMPONETER SKA VARA ENKLT UL-STYLE 105.

VARIANT +00 TILL +09 380 - 400V,
VARIANT +04 TILL +09 220 - 240V,
VARIANT +08 TILL -15 415 V.
CIRCUIT DIAGRAM
415V, 3N+PE, STEAM
46-4
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CIRCUIT DIAGRAM
240 V, 3+PE, STEAM
46-5
CONTROL VOLTAGE
MANOEVERING
STEERING AVALABLE

CIRCUIT DIAGRAM
CONTROL VOLTAGE, 230V, 3N4PN
46-5
## Appendix 3

### Service report

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Curve produced during function check to be «pasted» here.

Note: Time axis and temperature axis.

Test point defined.
This product is manufactured by:
GETINGE DISINFECTION AB, Ljungadalsgatan 11, Box 1505, 351 15 Växjö, Sweden