

Cascada™ Lab Water Systems



Operation Manual

Cascada IX and LS Lab Water Systems

100 to 240 VAC

50 to 60Hz

PN PAL-CAXXXLSM2

PN PAL-CAXXXIXM2



*IX-water
Model*



*LS-water
Model*

Foreword

This manual is provided to serve as the installation, operation, and maintenance guide for the Cascada™ Lab Water system models:

Cascada IX-water for general science applications

Cascada LS-water for life science applications

| <u>Part Number</u> | <u>Description</u> |
|--------------------|-------------------------|
| PAL-CAXXXIXM2 | Cascada IX-Water System |
| PAL-CAXXXLSM2 | Cascada LS-Water System |

The manual should be read before attempting any cycle of installation, operation, and maintenance. If the instructions in this manual are not followed, the performance of this product and/or the safety of the user may be compromised.

Unpack and inspect all items carefully to ensure they have not been damaged in transit.

Service support and consumable items are available from your local Pall office or distributor. Refer to customer service contact information on back cover.



Table of Contents


| | | | |
|--|----------|---|-----------|
| SAFETY INSTRUCTIONS | 1 | OPERATION | 19 |
| User's Responsibility | 1 | Intermittent or Continuous Recirculation | 19 |
| Electrical | 1 | Manual Dispense | 19 |
| Pressure | 1 | | |
| Ultraviolet (UV) Light | 2 | MAINTENANCE | 20 |
| Sanitization Chemicals | 2 | Replacing the Purification Pack | 20 |
| Control of Substances Hazardous to Health (COSHH) | 2 | Replacing the Ultrafilter (UF) Cartridge (PAL-C184) | 21 |
| | | Replacing the Ultraviolet (UV) Lamp (PAL-C151) | 23 |
| INTRODUCTION | 3 | Replacing the Point-of-Use (POU) Filter (PAL-C166) | 25 |
| Product Description | 3 | Cleaning the Inlet Strainer | 26 |
| Purification System Flow (IX-water) | 3 | | |
| Purification System Flow (LS-water) | 4 | SANITIZATION PROCEDURE | 27 |
| | | PAL-C100 Sanitization Tablet - Safety Information | 29 |
| TECHNICAL SPECIFICATIONS | 5 | | |
| | | TROUBLESHOOTING | 30 |
| CONTROLS | 7 | | |
| | | CONSUMABLES AND ACCESSORIES | 31 |
| INSTALLATION INSTRUCTIONS | 8 | | |
| Unpacking the Cascada™ Lab Water System | 8 | KEY TO CONTROL PANEL | 32 |
| Positioning the Cascada Lab Water System | 8 | Icons | 32 |
| Connecting the Cascada Lab Water System | 9 | Alarm Conditions | 32 |
| Initial Controller Set-Up | 11 | Replacement Timers | 33 |
| Setting Up Password/Resetting Replacement Timers | 14 | Quality Alarms | 33 |
| Initial Start Up | 16 | | |
| Point-of-Use (POU) Filter Installation (PAL-C166) – Optional Accessory | 18 | WARRANTY/CONDITIONS OF SALE | 34 |


User's Responsibility

Do not attempt to operate or maintain the system without first reading this manual.

The basic rules of safety set forth in this manual are intended as a guide for safe operation of Pall Corporation equipment. This general safety information, along with explicit service, maintenance, and operational materials for the specific machine, make up the complete instruction manual. All personnel who will operate, service, or be involved with this equipment in any way should be completely familiar with this information prior to start-up. It is the user's responsibility to make certain that the procedures set forth are followed.

Cascada™ Lab Water Systems have been designed to be safe, however, it is important that personnel working on these units understand any potential dangers. All safety information detailed in this manual is highlighted as **WARNING** and **CAUTION** instructions. These are used as follows:

WARNING!  **WARNINGS ARE GIVEN WHERE FAILURE TO OBSERVE THE INSTRUCTION COULD RESULT IN INJURY OR DEATH TO PERSONS.**

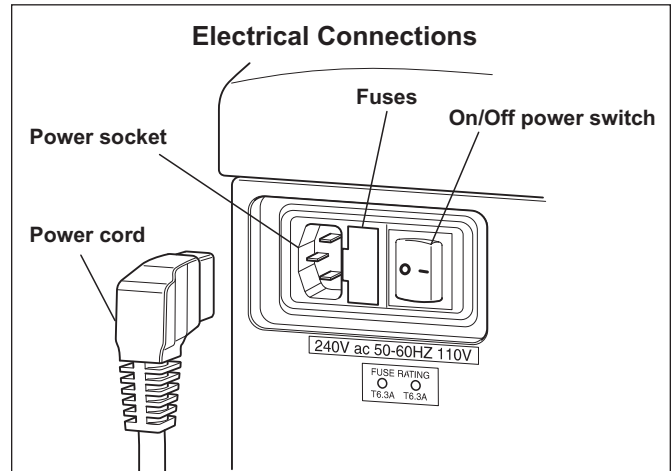
CAUTION!  **Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment, and processes.**

Electrical

It is essential that the power switch on the Cascada Lab Water system is turned off before any items are changed or maintenance work performed.


The On/Off switch is located at the left-hand side of the unit. The main power cord is located just behind the On/Off switch.

WARNING!  **THIS APPLIANCE MUST BE GROUNDED. PLUG INTO A PROPERLY GROUNDED (GFI) WALL OUTLET.**




Pressure

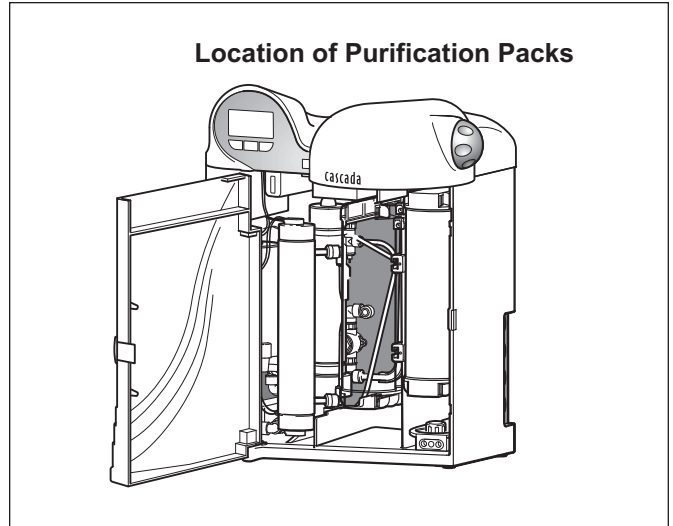
The main water supply valve should be turned off and residual pressure released prior to removal of any cartridges or carrying out work on the unit.

CAUTION!  **Switching off the electrical power will isolate the source of pressure, but pressure trapped within the unit should be released.**

Ultraviolet (UV) Light

WARNING!  **UNDER NO CIRCUMSTANCES SHOULD THE LAMP BE CONNECTED AND ACTIVATED WHEN OUTSIDE THE HOUSING.**

The Cascade™ LS-water unit is fitted with a UV lamp that is enclosed in a stainless steel chamber ensuring that the operator will not be exposed to UV light.



Sanitization Chemicals

During the sanitization cycle, a PAL-C100 sanitization tablet is used and relevant safety information is included in this manual. A safety data sheet conforming to COSHH and/or OSHA regulations is also provided with the tablets and should be read before a tablet is used.

Control of Substances Hazardous to Health (COSHH)

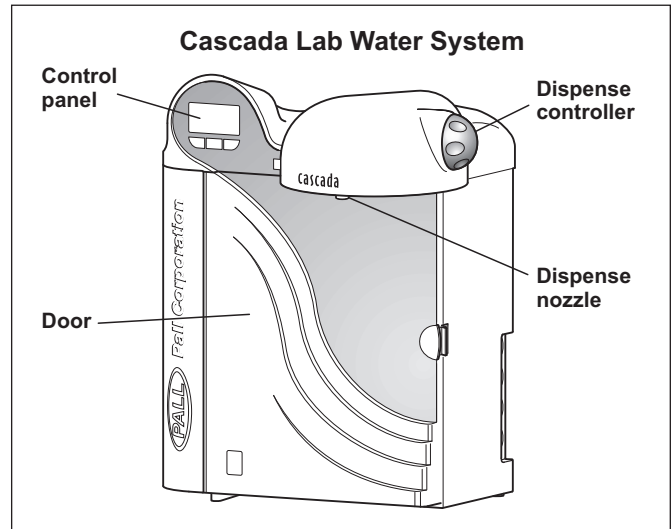
Material safety data sheets covering the various replaceable Purification Packs are available upon request. Contact your local Pall supplier or distributor.

Product Description

Pall's Cascada™ Lab Water purification unit is engineered to provide ultrapure water with extremely low levels of impurities for critical laboratory applications.

The system is designed for benchtop, under bench, or wall mounting with an optional wall mounting kit. A range of accessories are available to complement the unit. See Consumables and Accessories section for details (page 31).

The Cascada Lab Water System range of water purification units has been designed to provide the ultimate in high purity water for laboratory applications. The units must be fed with pre-treated water, typically from a reverse osmosis supply. They can be operated directly from a purification loop as point-of-use polishers, with or without local buffer storage, using a Docking Vessel or suitable reservoir. Alternatively, they can be supplied from a local pre-treatment/storage system, for example a Cascada RO-Water unit and Docking Vessel combination.



Purification System Flow

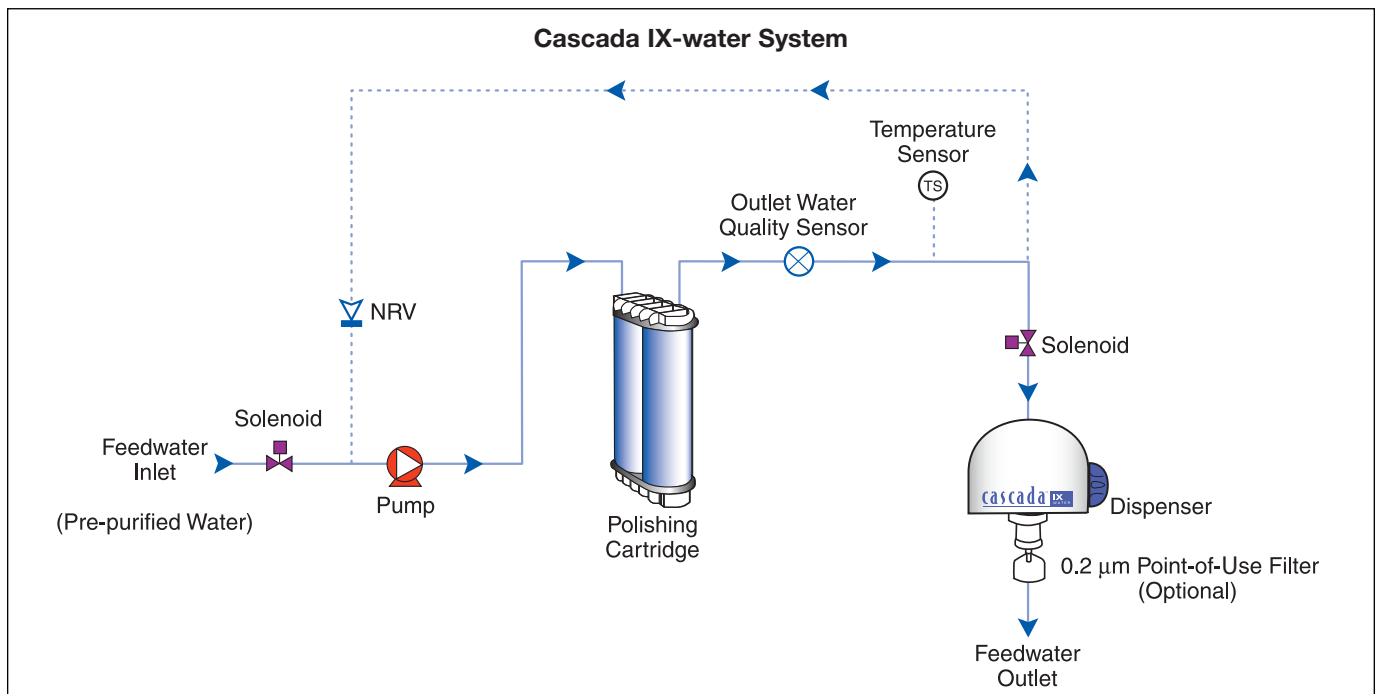
Cascada IX-water System

Pre-treated water enters via an inlet solenoid and is then pumped through the polishing purification pack and temperature and water quality sensors before being dispensed or recirculated through a non-return valve back to the pump inlet.

Ionic and organic impurities are removed by the polishing purification pack. Product water resistivity and temperature are measured before dispense and will indicate when the purification pack needs to be replaced.

The water within the unit is recirculated through the purification technologies to maintain purity. To reduce heat build up, the recirculation is at a reduced flow rate and is set to be intermittent (5 minutes every hour).

An optional Point-of-Use (POU) filter (Part No. PAL-C166) is available if required to protect the outlet from bacterial contamination.



Purification System Flow *(continued)*

Cascade™ LS-water System

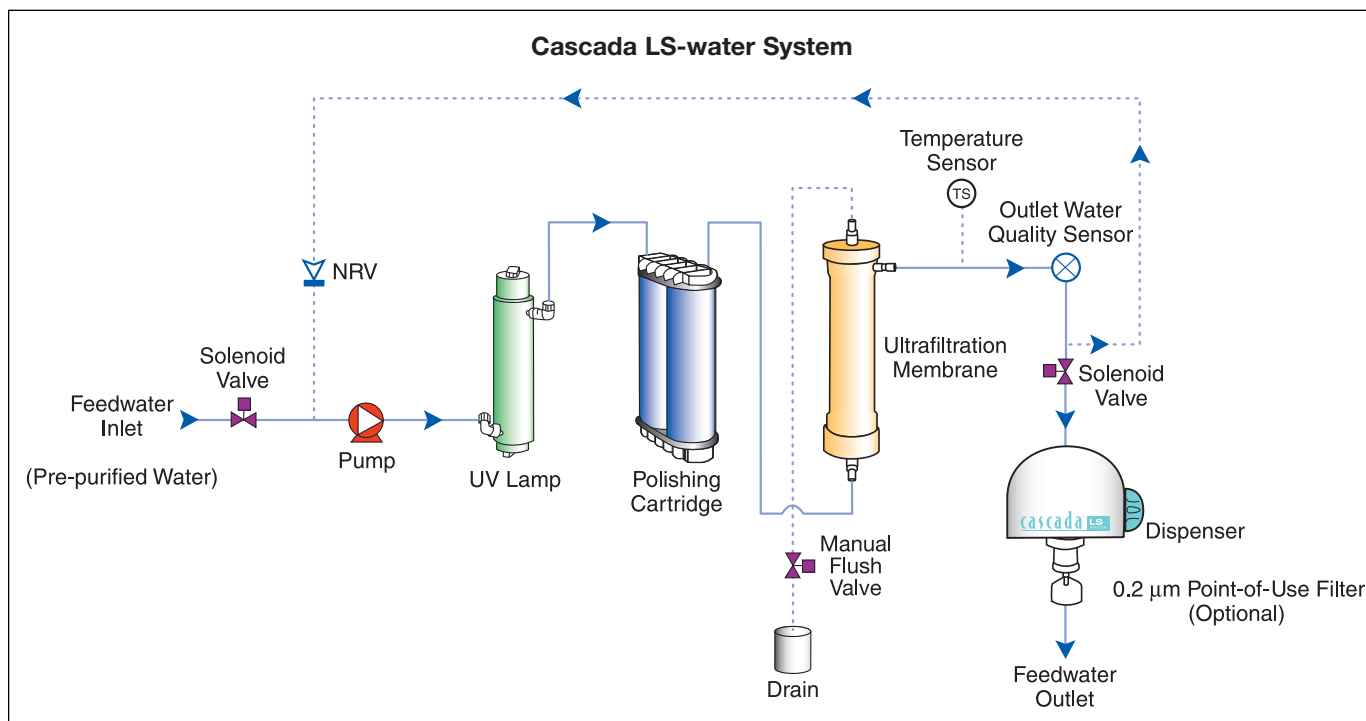
Pre-treated water enters via an inlet solenoid and is then pumped through the UV chamber, a polishing purification pack, an ultrafilter, and temperature and water quality sensors before being dispensed or recirculated through a non-return valve back to the pump inlet.

Purified water flows directly through the UV chamber where it is exposed to intense UV radiation at wavelengths of 254 nm and 185 nm to provide continuous bacterial control and the photo-oxidation of residual organic impurities.

Ionic and organic impurities are removed by the polishing purification pack. The ultrafilter removes pyrogens, bacteria, and other microbial impurities as well as particles. Product water resistivity and temperature are measured before dispense and will indicate when the purification pack needs to be replaced.

The water within the unit is recirculated through the purification technologies to maintain purity. To reduce heat build up, the recirculation is at a reduced flow rate and is set to be intermittent (5 minutes every hour).

An optional POU filter (Part No. PAL-C166) is available if required to protect the outlet from bacterial contamination.



Technical Specifications

Feed Water*

| Parameter | Limits |
|------------------------------------|--|
| Source - pre-treated potable water | Preferably reverse osmosis (RO), filtered service deionization (SDI), or distilled. Note: mixed bed or twin bed deionized supplies should be cation limited at exhaustion. |
| Fouling index (max) | 1 for all models. A 0.2 µm membrane prefilter is recommended for all non-RO feeds. |
| Service deionization (SDI) - Mv-cm | 1 Mv-cm minimum resistivity at exhaustion |
| Reverse osmosis (RO) - µS/cm | Recommended < 30 µS/cm |
| Free chlorine | ≤ 0.05 ppm |
| TOC | Recommended ≤ 50 ppb |
| Carbon dioxide | ≤ 30 ppm |
| Silica | ≤ 2 ppm |
| Particulates | Filtration down to 0.2 µm advisable to protect internal and/or point-of-use filters |

Temperature

1-40 °C (34-104 °F)
Recommended 10-15 °C (50-59 °F)

Flow Rate

| | |
|--|---------------|
| Maximum | 130 L/hr |
| Drain requirements (gravity fall with air gap), maximum during service | Up to 2 L/min |

Feed Water Pressure

0.07 bar (7 kPa, 1.0 psi) to
0.7 bar (70 kPa, 10 psi)

Note: Different system configurations are available for different feed water sources. See system set up.

Dimensions

| | |
|--------|-------------------|
| Height | 520 mm (20.5 in.) |
| Width | 460 mm (18.2 in.) |
| Depth | 375 mm (14.8 in.) |

Weight

| | |
|----------|---------------------|
| IX-water | 14.5 Kg (32 lbs.) |
| LS-water | 15.5 Kg (34.2 lbs.) |

Connections

| | |
|---------------------|---|
| Inlet-quick connect | 8 mm (5/16 in.) OD |
| Drain | 8 mm (5/16 in.) OD |
| Flush - LS-water | 8 mm (5/16 in.) OD |
| Positioning | Wall, bench, or under bench mounted |
| Environment | Indoor use only. Temp 5-40 °C (41-104 °F). Humidity ≤ 80% (non-condensing). |

Electrical Requirements

| | |
|--|------------------------------------|
| Electrical input | 100-240V AC, 50-60Hz all models |
| System voltage | 24V DC |
| Power consumption during recirculation | 60VA |
| Power consumption during dispense | 75VA |
| Fuses | 2 x T6.3 Amp |
| Reservoir level connection | Jack plug 3.5 mm |
| Noise level during recirculation | < 40 dBA |

Technical Specifications *(continued)*

User Interface

| | | |
|---------------------------|---|---|
| Display | Continuous graphical quality display | |
| | Graphical flow schematic on screen with mimic display | |
| | Intuitive icons | |
| Adjustable | Display viewing angle | Adjustable electronically |
| | Water quality units | Selectable (Mv-cm or $\mu\text{S/cm}$) |
| | Water quality alarm | Selectable alarm set points |
| | Date/time | Adjustable |
| | Auto restart after power failure | Selectable (On/Off) |
| | Audible alarm | Selectable (On/Off) |
| | Temperature control | Selectable alarm set points |
| | Reservoir | Selectable (On/Off) |
| Indicators | Product water quality | Resistivity or conductivity |
| | Temperature | Degrees centigrade |
| | Purification pack | Replacement date |
| | UV lamp** | Replacement date |
| | Filter* | Replacement date |
| Alarms-Audiovisual | Purified water purity | Below set point alarm |
| | Temperature | Above set point alarm |
| | UV lamp operation** | Imminent lamp failure or failure to start |
| | Purification pack | Change reminder |
| | UV lamp** | Change reminder |
| | Filter** | Change reminder |
| | Reservoir | Low level/level control disconnect alarm |
| Outputs | RS232 printer connection | |
| | RS232 remote display connection | |
| | Volt free contact-internal | |
| | Remote dispense | |

Features

| | |
|--------------------|---|
| Safety | Power fail safe |
| | Water temperature alarm |
| | Water quality alarm |
| | Purification pack interlock |
| | UV current monitoring |
| | Timeout of dispense |
| | Low operating voltage 24V |
| | Volt free contact alarm connection |
| | Visual alarms |
| Audible alarms | |
| Operational | Low noise levels – minimum intrusion |
| | Variable dispense flow rate |
| | Restart on power interrupt |
| | Optional printer kit to record operating parameters |
| | Optional remote display |

Purified Water Specification

| | IX-water | LS-water |
|--------------|--|--|
| Flow rate | 1.5 L/min maximum | 1.24 L/min maximum |
| Inorganic | Resistivity 18.2 Mv-cm (0.055 $\mu\text{S/cm}$) | Resistivity 18.2 Mv-cm (0.055 $\mu\text{S/cm}$) |
| TOC | < 15 ppb*** | < 3 ppb*** |
| Bacteria | < 1 cfu/mL | < 1 cfu/mL |
| Pyrogens | — | < 0.05 EU/mL |
| pH | Effectively neutral | Effectively neutral |
| Particles | 0.2 μm **** | Ultrafiltration |
| RNase-/DNase | — | — |

Conforms to ASTM Type 1, BS3978 Grade 1 Specification, USP 27, and EP (5th ed.).

*Contact technical support for advice on feed waters outside the range listed

**On Cascada LS-Water System models only.

***Dependant on feedwater — recommended RO feed < 50 ppb TOC.

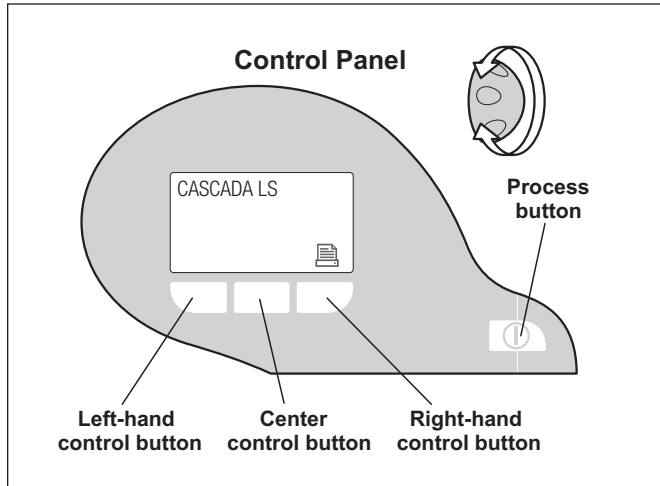
****With POU filter fitted.

As part of our commitment to continual improvement, we reserve the right to update the specifications given in this document.

Controls

The Cascada™ Lab Water System operates with a tactile membrane touch pad control panel. It has a graphics display window and four multi-purpose control buttons.

Details of how to use the controls will be given in the appropriate sections.



The Cascada Lab Water System control panel has a range of control icons as follows:

| Button | Icon | Function |
|---------|------|--------------------------|
| Process | ⏻ | Turns the process on/off |
| | ⏮ | Escape from any feature |
| Left | ☰ | Menu |
| | ↻ | Scroll |
| Center | ✓ | Accept |
| Right | 🚫 | Mute alarm |
| | 🖨 | Printer |

Unpacking the Cascada™ Lab Water System

The following items are supplied with your Cascada Lab Water System:

1. Cascada Lab Water unit.
2. One sanitization by-pass block PAL-A671 (fitted in unit).
3. 6 meters (19.6 ft.) of 8 mm (5/16 in.) O/D tube.
4. One pack of PAL-C100 tablets.
5. One strainer assembly.
6. Operation manual.
7. Power cord.
8. Reservoir level connecting lead.

Positioning the Cascada Lab Water System

Before installation and operation of the Cascada Lab Water unit, please read and observe the following points.

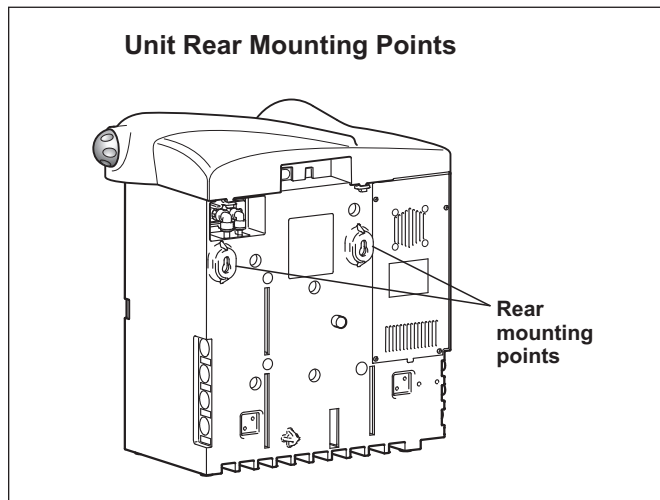
Environment

The unit should be installed on a flat, level surface in a clean, dry environment. The unit can also be wall mounted against a vertical wall capable of supporting the weight (use wall mounting kit Part No. PAL-A643 on substantial brick/concrete walls or PAL-A655 for stud partition walls).

WARNING! IF UNIT IS TO BE WALL MOUNTED, ENSURE IT IS MOUNTED USING THE CORRECT WALL MOUNTING KIT AND THAT THE WALL IS CAPABLE OF SUPPORTING THE OPERATING WEIGHT OF THE SYSTEM. CAREFULLY FOLLOW THE INSTRUCTIONS INCLUDED IN THE KIT.



Note: Refer to specifications on page 5 for unit weights.



The unit is designed to operate safely under the following conditions:

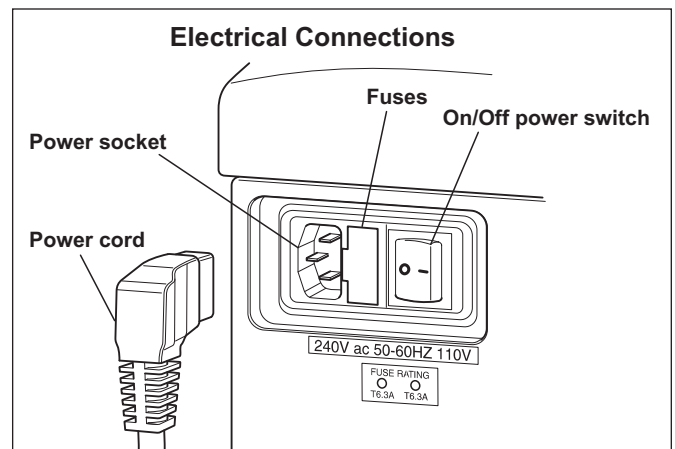
- Indoor use.
- Altitude up to 2,000 meters (6,561 ft.).
- Temperature range 5-40 °C (41-104 °F).
- Maximum relative humidity 80% @ 31 °C (88 °F) decreasing linearly to 50% @ 40 °C (104 °F), non-condensating.

The unit is in Installation Category II, Pollution Degree 2, as per IEC1010-1.

Electrical

The units can be connected universally to any electrical supply in the range of 100-240V and 50-60Hz. The power cord is supplied with a molded plug on one end and a molded connector to the unit on the other. **The unit should be connected to a grounded outlet.** The unit includes a battery, which will require changing on a periodic basis, typically every 3-5 years. (Contact your local Pall Service provider.)

WARNING! DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER (3 VOLTS, LITHIUM CR2032). DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.




Positioning the Cascada™ Lab Water System *(continued)*

Drain


A semi-rigid flexible connection to a sink or suitable drain capable of handling at least 2.0 L/min is required for the Cascada LS-water model. The drain point should have a gravity fall below the level of the unit and any connections direct to drain should have an air-break device fitted. A flexible tube should be temporarily connected to the dispense outlet and directed to drain during rinsing of purification packs and sanitization.

Feed Water

Use potable feed water pre-purified by reverse osmosis, deionization, or distillation. If using a supply other than reverse osmosis treated, it is strongly recommended that a 0.2 µm membrane filter is installed within the feed line to remove colloidal impurities. The feed water should enter the Cascada Lab Water unit via an 8 mm (5/16 in.) O/D semi-rigid tube, and should be in the temperature range of 1-40 °C (34-104 °F). To ensure optimum performance, it is recommended that the feed water temperature be between 10-15 °C (50-59 °F).

CAUTION!  **Operating with feed water temperatures outside the range of 1-40 °C (34-104 °F) will cause damage to the Cascada Lab Water unit.**

For pressurized feeds, the minimum direct inlet pressure needed is 0.07 bar (7 kPa, 1.0 psi) and maximum inlet pressure is 0.7 bar (70 kPa, 10 psi). Feed water pressures above 0.7 bar must be reduced using a pressure regulating valve. Feed pressure between 0.7 and 4.0 bar can be reduced with a pressure regulatory valve. (Part No. PAL-A500).

CAUTION!  **Failure to install a pressure regulator will cause damage to the Cascada Lab Water unit.**

Reservoir feeds to the Cascada Lab Water unit should be positioned at the same height, or above the unit, to provide a positive flooded inlet pressure.

Connecting the Cascada Lab Water System


Once the Cascada Lab Water unit has been positioned either on a wall or on a bench, it should be connected as follows:

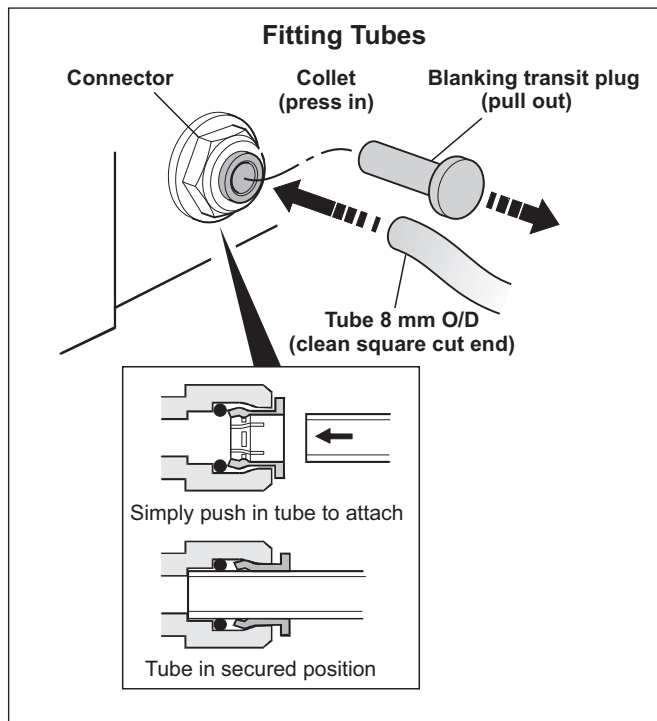
- Main water inlet tube
- Drain tube - to drain

Step 1 - Remove Transit Plugs

1. Push in collet on connector.
2. Pull out transit plug.
3. Cut a clean, square end on an 8 mm (5/16 in.) OD semi-rigid drain tube.
4. Push tube into connector.

CAUTION!  **Do not restrict drain line.**

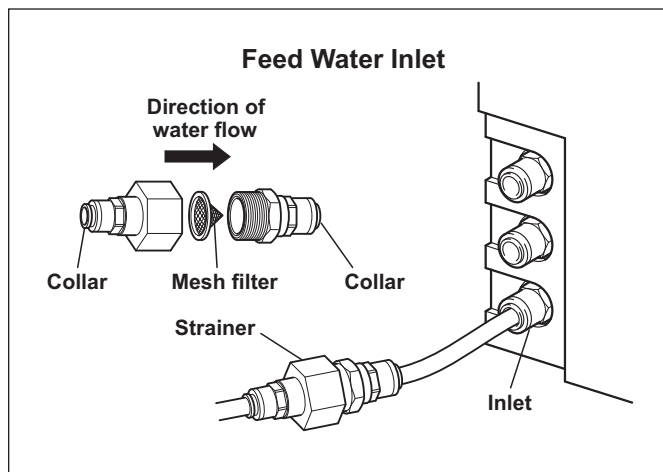
CAUTION!  **If the water supply is at a pressure greater than 2.0 bar (200 kPa, 30 psi), fit a pressure regulator (Part No. PAL-A500).**



Connecting the Cascada™ Lab Water Unit *(continued)*

Step 2 - Connect Water Inlet

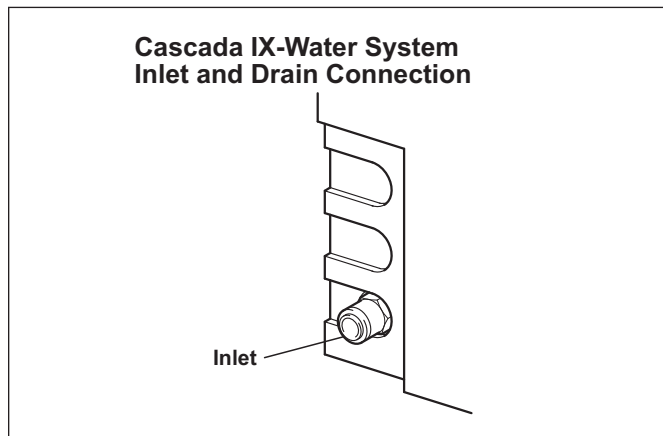
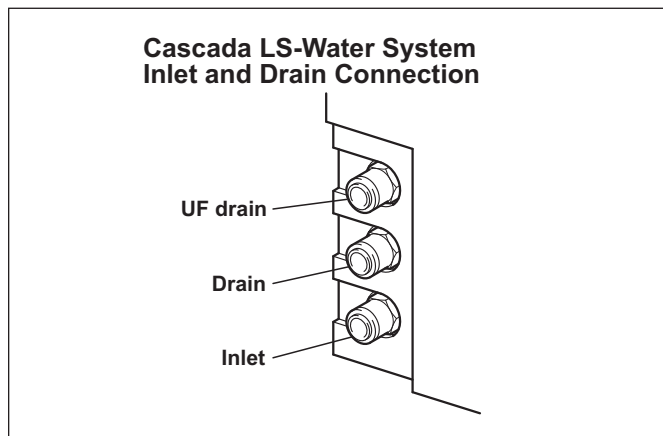
1. Connect 8 mm (5/16 in.) tube from the Cascada Lab Water unit inlet to the inlet strainer.
2. Connect the inlet strainer to the pre-purified water supply.



Step 3 - Connect Drains

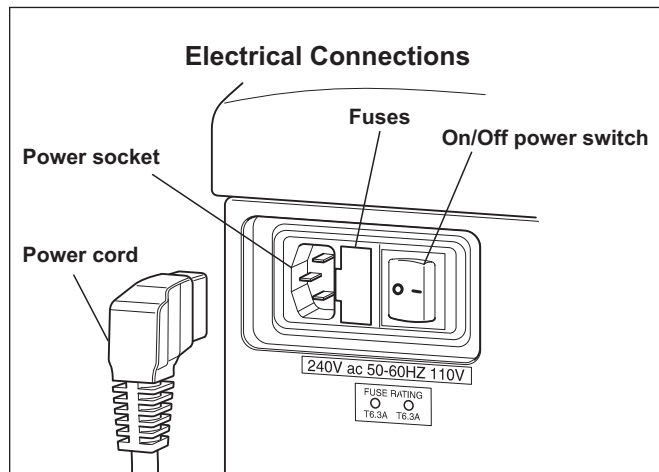
1. Connect 8 mm (5/16 in.) tube from the drain and UF drain (if fitted) and direct to a suitable drainage point.

CAUTION! The drain and flush lines should allow a gravity fall to drain with no restrictions.



Step 4 - Connect Electrical Supply

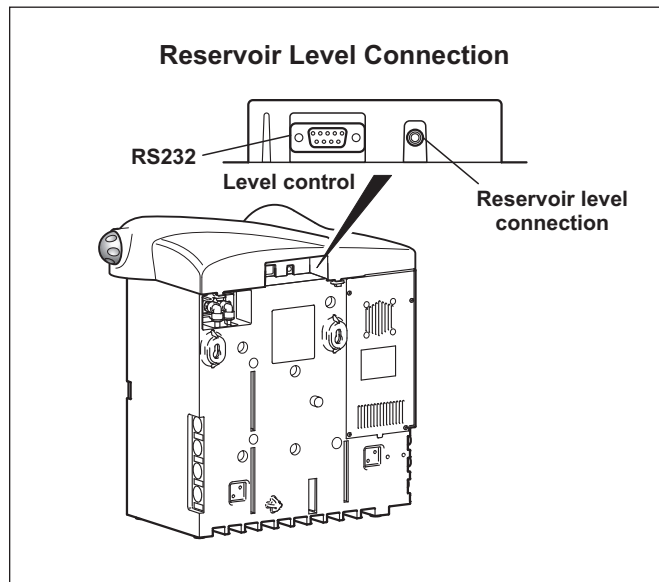
1. Plug power cord into the power socket on the left-hand side of the Cascada Lab Water unit.
2. Plug power cord into grounded electrical wall outlet.



Step 5 - Reservoir Level Connection


1. Insert jack plugs into the level control socket located at rear of unit and reservoir.

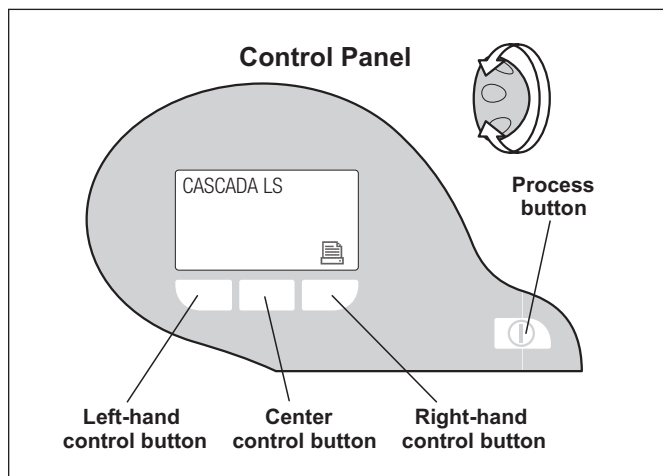
Note: If wall mounting the unit, it is recommended that the jack plug be inserted prior to hanging the unit on the wall mounting bracket.



Initial Controller Set-Up

The Cascada™ Lab Water unit control panel is fitted with four control buttons. These are:

1. The Process  button, which switches the purification process on and off.
2. Three software controlled touch pad buttons that are used to control set-up and process control functions.
3. A Dispense Knob is used for control set-up process.



When the Cascada Lab Water unit is started for the first time after installation, the following steps should be carried out to set up system preferences:




Step 1 - Setting Up Menu Options

1. Switch the power on to initialize the controller hardware set-up sequence.

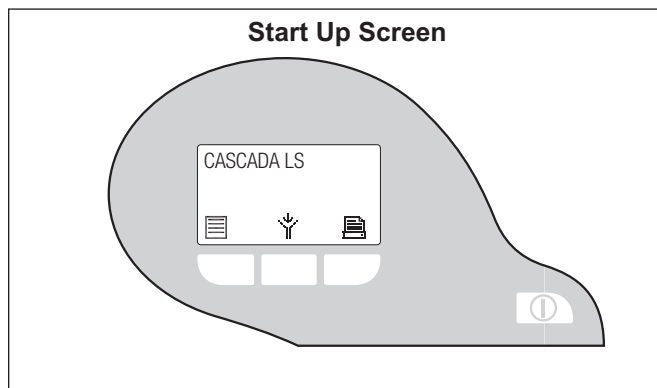
Note: Always allow the initialization process to complete. With the by-pass blocks in place, press the Process button to return to the initial power up screen.

2. Press menu button  to go to the next screen to activate the set-up menu sequence.

A series of set-up screens will now be displayed. Various control icons are used to allow you to step through the set-up instruction process. These icons include:


- A "scroll" icon indicated by an arrow .
- An "accept" icon indicated by a checkmark .
- A "selection" icon indicated by a left arrow .

At any stage during the Controller Set-up, the Process button can be pressed to escape back to the initial power-up screen.

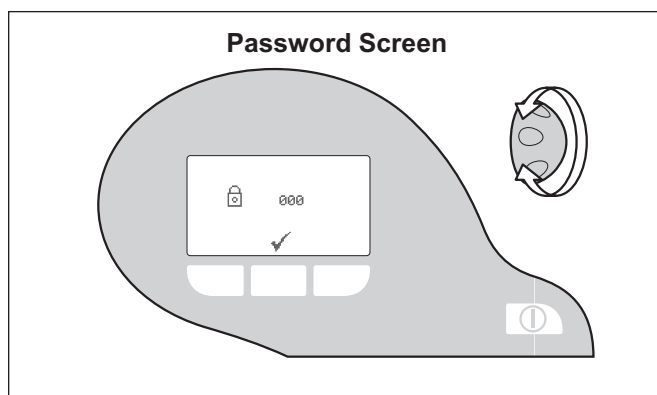


Step 2 - Password

Restricts access to set up menu sequence.


1. Rotate Dispense Controller to enter password code. The default password code is 000.
2. Press checkmark button  to accept.

Note: To reset password, refer to Resetting Password Section (page 14).

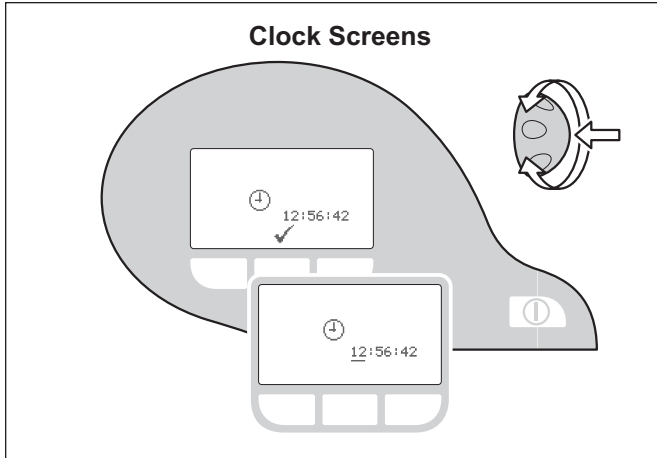


Step 3 - Clock

Set to display the current local time.

1. Press Dispense Controller once. A cursor will appear under hour.
2. Rotate Dispense Controller to increase or decrease hour.
3. Press Dispense Controller once to step cursor onto minute.
4. Rotate Dispense Controller to increase or decrease minute.
5. Press Dispense Controller once to accept the minute setting and set the seconds to 00.
6. Press checkmark button  to accept.

Initial Controller Set-Up (continued)

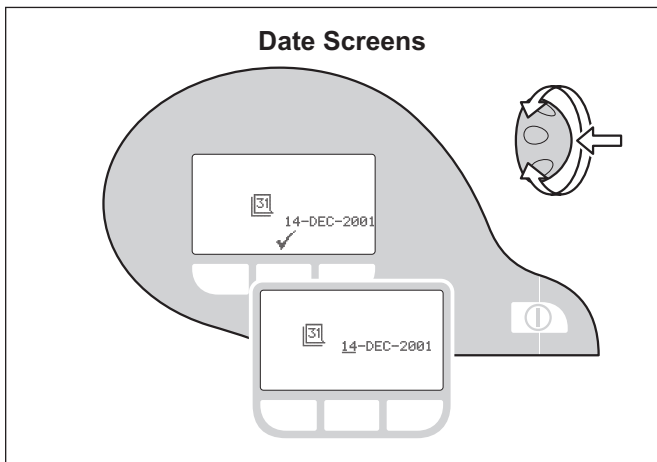


Step 4 - Date

Note: Confirm that the correct date has been entered before installing consumables or changing replacement dates.

The date is used to instigate change reminders. It will appear on printed records.

1. Press Dispense Controller once. A cursor will appear under day.
2. Rotate Dispense Controller to increase or decrease day.
3. Press Dispense Controller once to step cursor onto month.
4. Rotate Dispense Controller to increase or decrease month.
5. Press Dispense Controller once to step cursor onto year.
6. Rotate Dispense Controller to increase or decrease year.
7. Press checkmark button ✓ to accept the date.

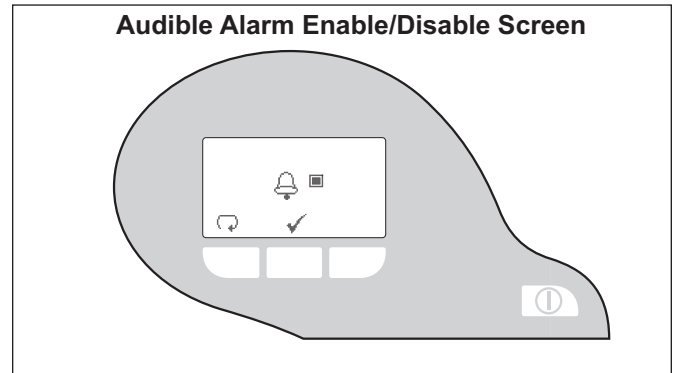


Step 5 - Audible Alarm Enabled/Disabled

This display provides the option of either enabling the audible alarm, causing it to sound (while the alarm icon flashes), or disabling the audible alarm causing it to remain muted.

1. Press scroll button ↻ to highlight box.
2. Press checkmark button ✓ to accept.

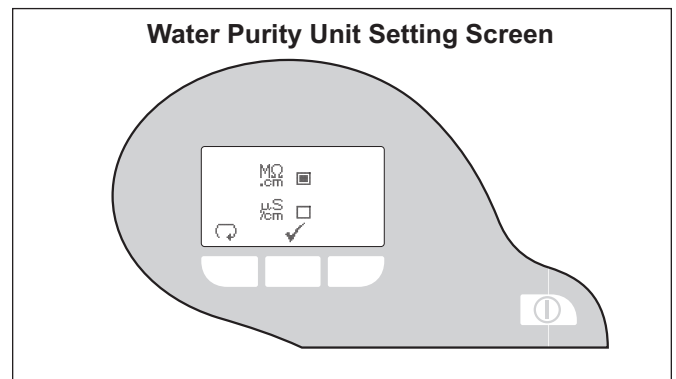
Note: The visual alarm cannot be disabled.



Step 6 - Water Purity Unit Setting

This screen allows preferred units of water purity to be set to either MV-cm or μ S/cm.

1. Press scroll button ↻ to highlight appropriate box.
2. Press checkmark button ✓ to accept.



Step 7 - Uncompensated Water Quality

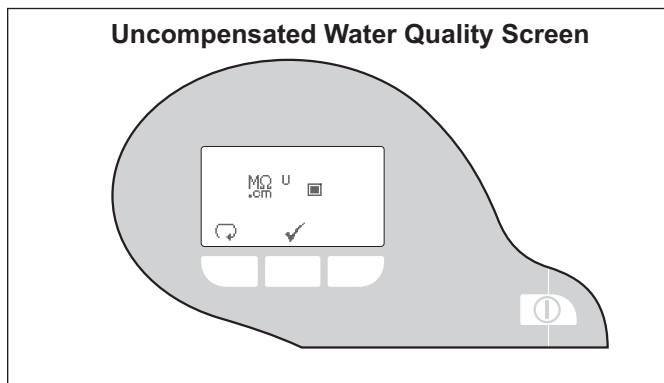
A "U" will indicate uncompensated readings in the normal process screen.

1. Press scroll button ↻ to highlight box if uncompensated reading is required.
2. Press checkmark button ✓ to accept.

Note: The on-going display of uncompensated values is generally not recommended. It can lead to confusion among users and increase the possibilities of dispensing water of inadequate purity.

Initial Controller Set-Up (continued)

Uncompensated Water Quality Screen

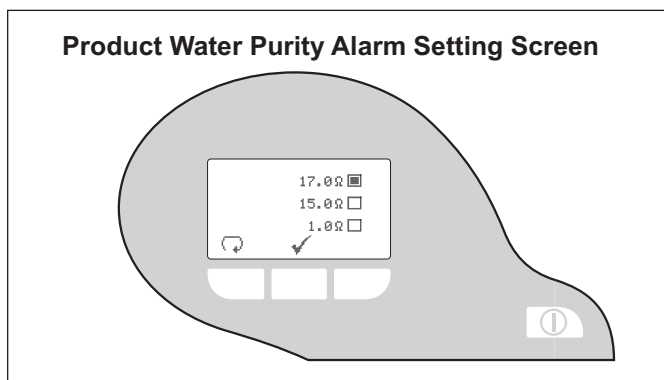


Step 8 - Product Water Purity Alarm Settings

This screen is used for setting the purity value at which the product water purity alarm will activate. The unit will alarm if this level is passed but will not switch off the process. The alarm will automatically clear if the water purity returns above its specified limit.

1. Press scroll button  to highlight appropriate box.
2. Press checkmark button  to accept.


Product Water Purity Alarm Setting Screen



Step 9 - Temperature Alarm Setting

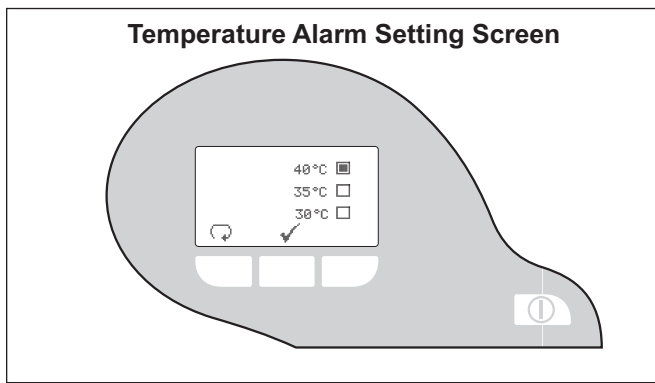
The temperature of the water is constantly monitored to ensure it does not increase to an unacceptable level. The Cascade™ Lab Water System will alarm and switch the process off if the alarm point is exceeded.

1. Press scroll button  to highlight appropriate box.

Note: To operate the unit without a temperature alarm, press scroll button  until all boxes are not highlighted. The unit will switch the process mode off at 50 °C (130 °F) to prevent any damage to the unit.


2. Press checkmark button  to accept.

Temperature Alarm Setting Screen

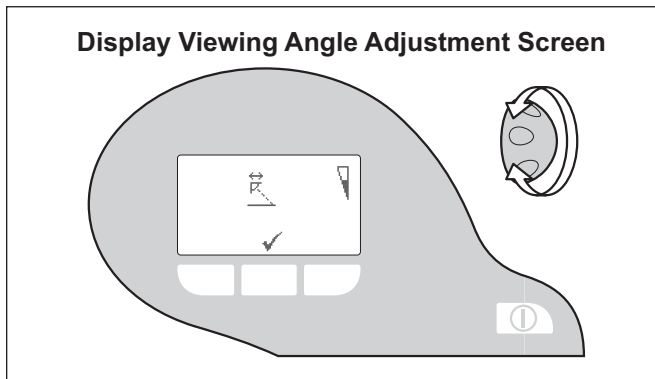


Step 10 - Display Viewing Angle Adjustment

The angle of the display can be electronically adjusted up and down to optimize the display graphics visibility.



1. Rotate Dispense Controller slowly to adjust viewing angle.
2. Press checkmark button  to accept.

Display Viewing Angle Adjustment Screen

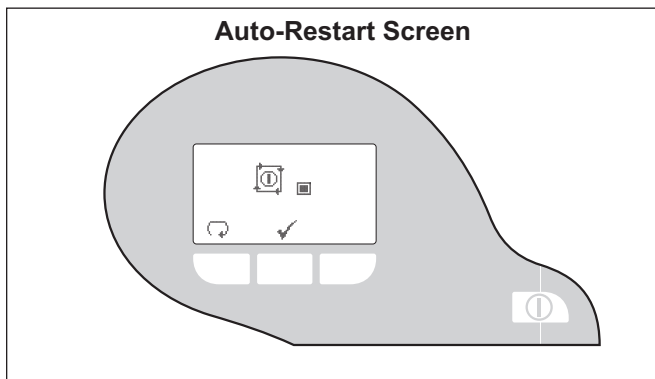


Step 11 - Auto-Restart

This allows the selection of the auto/manual restart option. If auto restart is selected, the unit will automatically restart after a temporary loss of power to the unit. In manual mode, the unit will remain in standby mode.

1. Press scroll button  to highlight appropriate box.
2. Press checkmark button  to accept.



Auto-Restart Screen



Initial Controller Set-Up *(continued)*

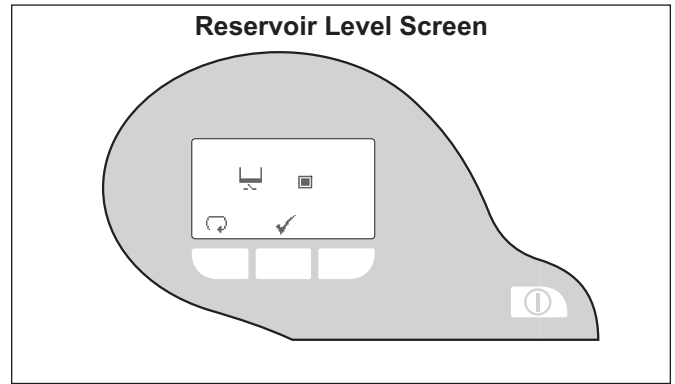
Step 12 - Reservoir Level

When operating the system from a reservoir, it is recommended that a low-level switch be connected to protect the system from running dry.


1. Press scroll button  to highlight appropriate box.
2. Press checkmark button  to accept.

The Controller Set-up is now complete.

Note: To escape from any of the set-up screens, press the Process button.



Setting Up Password/Resetting Replacement Timers


CAUTION!  Before resetting any of the Consumable Replacement/Reminder Dates, ensure that the appropriate new Consumable has been correctly installed and securely located in the Cascada™ Lab Water unit.

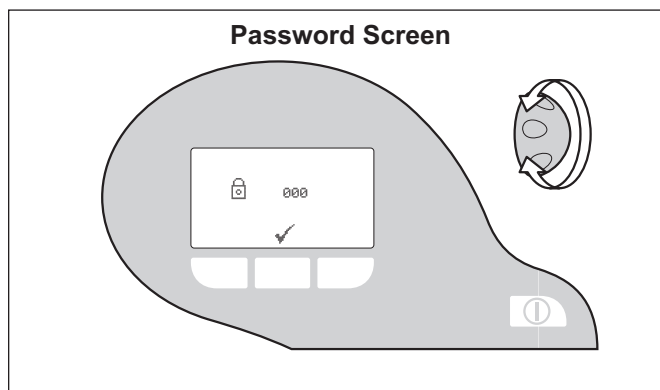
Step 1 - Enter Consumable Replacement Timer Set-up

1. Switch off at power switch.
2. Press and hold left-hand button and switch unit back on. The unit will now enter the Consumable Timer set-up display.
3. Release left-hand button.






Step 2 - Password Change

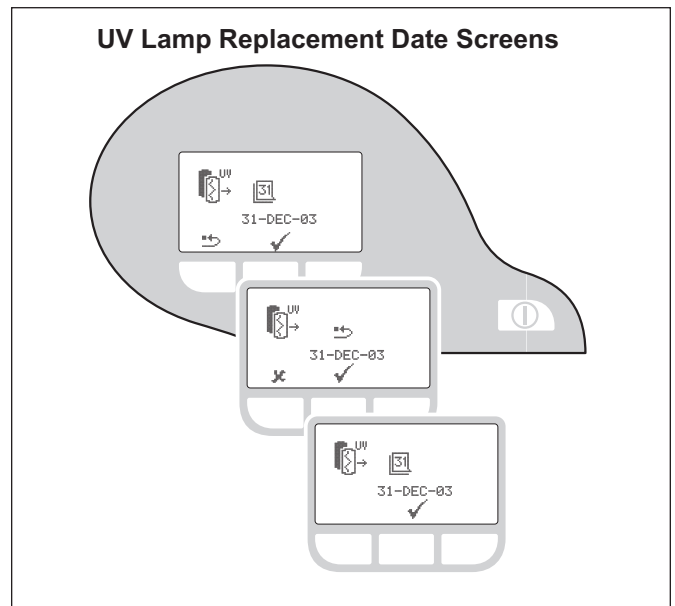
Note: If you do not wish to change password, press checkmark and proceed to Step 3.

1. Rotate Dispense Controller to enter password code. The default password is 000.
2. Press Dispense Controller once.
3. Rotate Dispense Controller to enter new password.
4. Record password in a secure location.
5. Press checkmark button  to accept new password.








Step 3 - UV Lamp Replacement Date (Cascada LS-water system only)

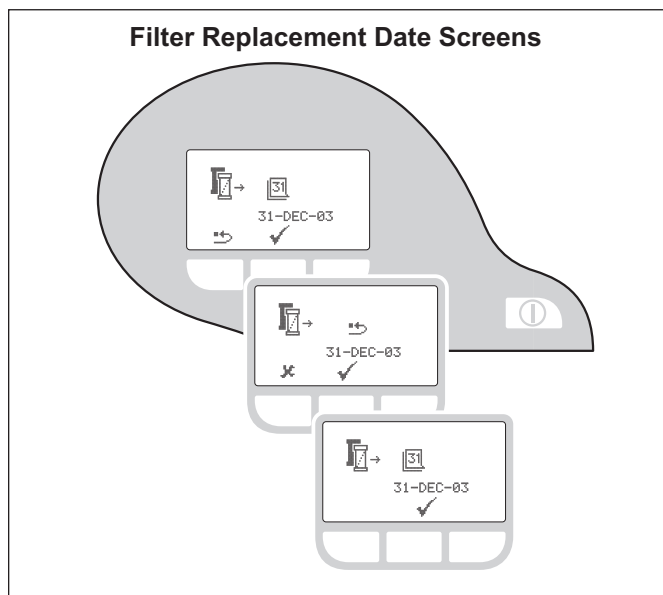
1. Press reset button  to reset UV Replacement Date or press checkmark button  to accept Replacement Date and proceed to Filter Replacement.
2. Press checkmark button  to confirm that resetting is required or press cross button  to abort reset.
3. Press checkmark button  to accept.



Setting Up Password/Resetting Replacement Timers *(continued)*







Step 4 - Filter Replacement Date (on Cascada LS-water only)

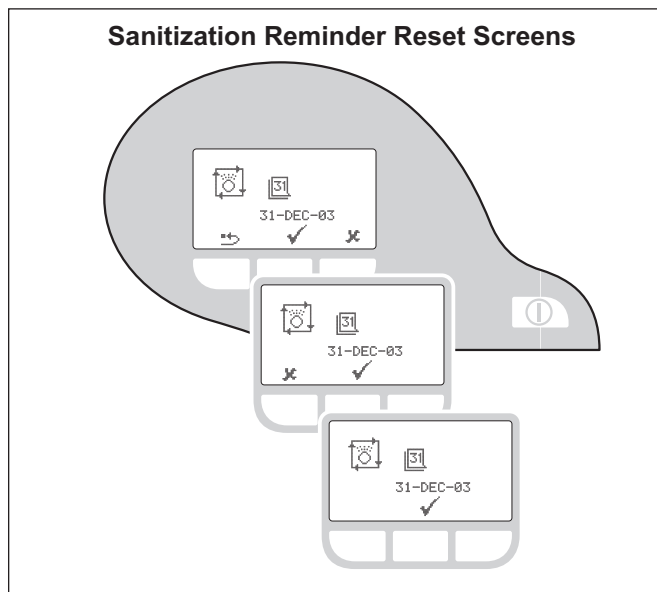
1. Press reset button  to reset the Filter Replacement Date or press checkmark button  to accept Replacement Date and proceed to Sanitization Reminder.
2. Press checkmark button  to confirm that resetting is required or press cross button  to abort reset.
3. Press checkmark button  to accept.



Step 5 - Sanitization Reminder Reset

The Sanitization Reminder will appear at the end of the sanitization routine and can be reset for a monthly reminder.

1. Press reset button  to reset Sanitization Reminder Date, or press checkmark button  to accept Reminder Date, or press cross button  to clear the Reminder Date. Proceed to #3 to confirm.
2. Press checkmark button  to confirm that resetting is required or press cross button  to abort reset.
3. Press checkmark button  to accept.



Initial Start Up

Step 1 - Prepare Water Supply

1. The Cascada™ Lab Water System should be installed correctly as described in the Installation Instructions – Connecting Section (page 9).
2. Turn on the feed water supply to the unit and adjust the inlet pressure.

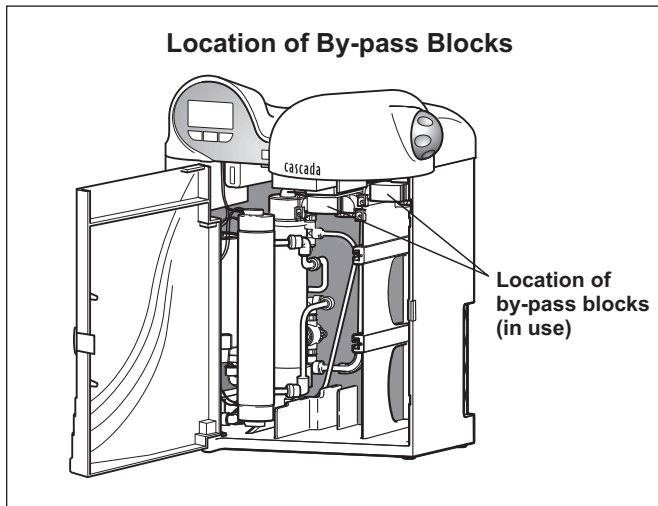
Note: Refer to page 9 for appropriate pressure feeds.

3. Check to make sure all tube connections are watertight and that there are no leaks.

Step 2 - Prepare Sanitization By-pass Block

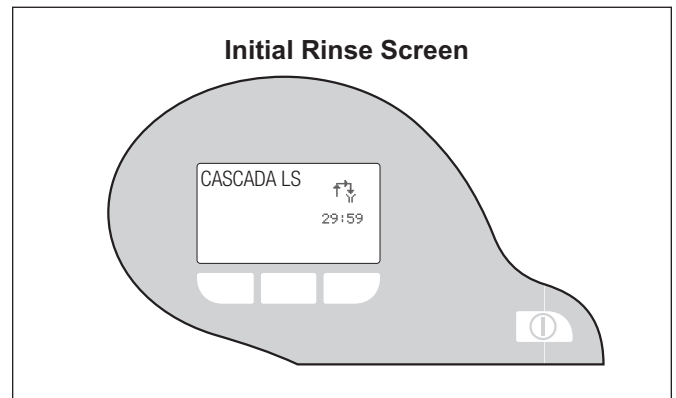
1. Open front door.
2. Check to make sure by-pass block is correctly located and locked in place.
3. Close door.

CAUTION! Unit contains 1% peroxide solution, which must be flushed to drain.



Step 3 - Initial Rinse

1. Connect a temporary tube from the dispense outlet to a suitable drain or sink.
2. Switch on electrical power switch.
3. Press the dispense controller. The unit will automatically go into a rinse procedure (36 minutes) to rinse bacteriostatic agents from the unit. This rinse must be completed. The process function will be inhibited until the rinse is complete.
4. Upon completion of the rinse, the unit will beep.
5. Remove temporary tube from dispense outlet.



Step 4 - Remove Sanitization By-pass Block

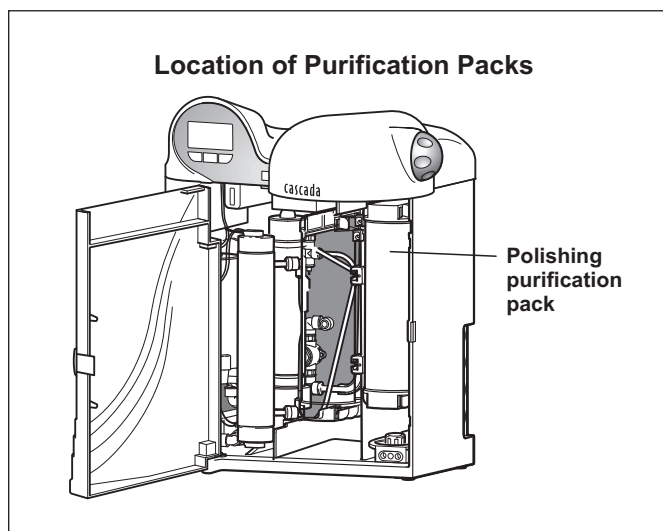
1. Switch off power.
2. Open the door.
3. Remove by-pass block and pour contents out.
4. Store by-pass block at bottom of unit.

CAUTION! Before installing the purification pack, ensure the correct date has been set as described in Installation Instructions, Initial Controller Set-up Section, Step 4, Date (page 12). Failure to enter the correct date may result in premature replacement of the Purification Pack.

Initial Start Up *(continued)*

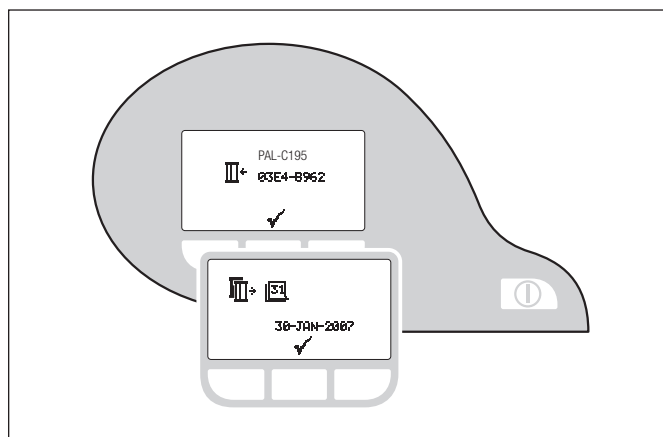
Step 5 - Fit Polishing Purification Pack

1. Remove a new Purification Pack from its packaging.
2. Remove the sealing plugs from inlet and outlet ports.
3. Wet O-rings and slide new Purification Pack into the right-hand position pushing upwards against pack reader contacts.
4. Position Purification Pack onto spigots.
5. Push into unit.
6. Ensure the Purification Pack is fully engaged and dropped down past the retainers.



Step 6 - Acceptance of Purification Pack Installation

1. Switch on power.
2. Press checkmark button ✓ to initiate programming to accept Polishing Pack.
3. Press checkmark button ✓ to accept Polishing Pack replacement date.



Step 7 - Final Rinse/Air Bleed

1. Press Process button ⓪. Allow calibration routine to be completed and process screen to appear.
2. Press Dispense Controller. Slowly rotate knob clockwise to increase flow. Direct dispense flow to drain or collect in suitable container (<10 liters).
3. Rotate Dispense Controller and increase the dispense rate to maximum.

Note: The unit will start. Initially during this stage, air/water will be purged from the unit via the dispenser and the drain line.

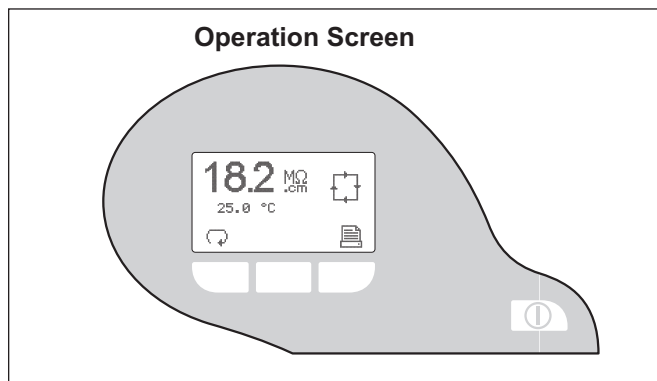
4. Allow to dispense for four minutes.
5. Release air from UF cartridge by carefully opening the valve on the Cascada LS-water system, located near the top of the UF, until all air bubbles are released.

Note: Place an absorbent cloth around the air bleed to catch any water that is expelled with the air.

6. Press Dispense Controller to stop dispense.

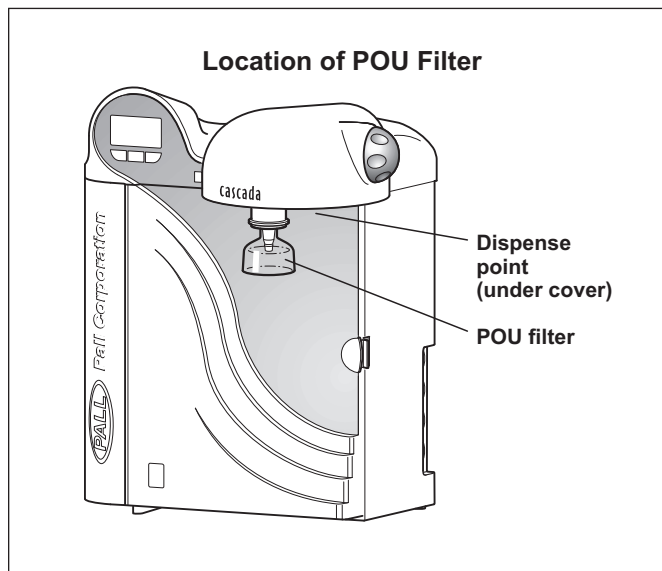
Step 8 - Normal Operation

Once product water quality is of a suitable standard, it can be used. It will usually require recirculation overnight to achieve peak quality.



Point-of-Use (POU) Filter Installation (PAL-C166) - Optional Accessory

The POU filter is necessary for the Cascada™ IX-water unit to meet the specifications for particles and bacteria. The Cascada LS-water unit incorporates internal filtration and does not require a POU filter to achieve particles and bacteria specification when operated as described in this manual. However, a POU filter is recommended to achieve additional laboratory-specific application requirements.



Step 1 - POU Filter Installation

1. Locate the fixed dispense point and unscrew the nozzle.
2. Ensure O-ring seal is still properly located.

Step 2 - Replace POU Filter

1. Aseptically, remove the new filter from its packaging.
2. Hand-tighten the filter into the fixed dispenser until resistance against the O-ring seal is felt.

CAUTION! Do not over-tighten.



3. Push clear bell cover supplied with the filter onto the outlet of the filter.

Step 3 - Bleed POU Filter

1. Switch on the Cascada Lab Water unit.
2. Press Process button \odot .
3. Place a beaker under the dispenser.
4. Press Dispense Controller button.
5. Open the top air bleed valve until water pours from the bleed valve, then close.
6. Dispense at full flow for approximately 5 minutes.
7. Discard water.

Operation

The Cascada™ Lab Water units have the following modes of operation:

- Intermittent recirculation.
- Manual dispense.
- Sanitization cycle (see Sanitization Procedure section, page 27)

Intermittent or Continuous Recirculation

The Cascada Lab Water unit intermittently recirculates internally to maintain water quality. It will circulate the water for 5 minutes every 60 minutes in whisper mode.

After dispense, the unit will continue to recirculate for a short period before returning to the intermittent routine.

CAUTION!



If the Process button ⓘ is double clicked, the unit will switch off. To maintain water quality, the unit should be left on.

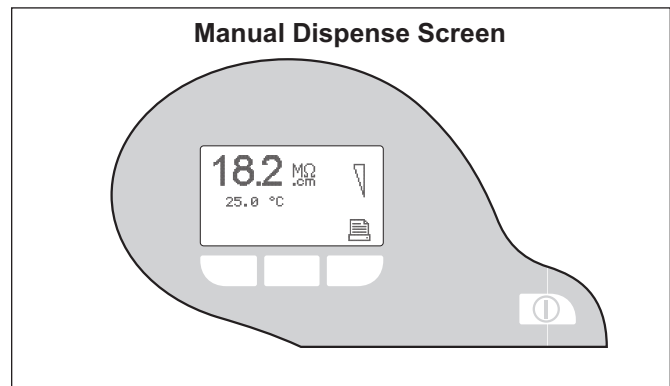
Manual Dispense

Step 1 - Product Quality

1. Ensure Cascada Lab Water unit is in process mode and the water quality is satisfactory.
2. Position suitable receptacle under fixed position.

Step 2 - Dispense

1. Press Dispense Controller once.
2. Rotate Dispense Controller clockwise.
3. Adjust the flow from the unit by rotating the Dispense Controller as necessary.
4. Press Dispense Controller once to stop dispensing and return to recirculation mode.



Maintenance

Any maintenance work not detailed in this manual should be carried out by an approved supplier or distributor. If further information is required on any aspect of maintenance, please contact Technical Service.

WARNING!



ALWAYS CHECK THAT THE ELECTRICAL POWER SWITCH AND FEED WATER SUPPLY ARE SWITCHED OFF BEFORE ATTEMPTING TO CHANGE A CONSUMABLE ITEM.

Replacing the Purification Pack

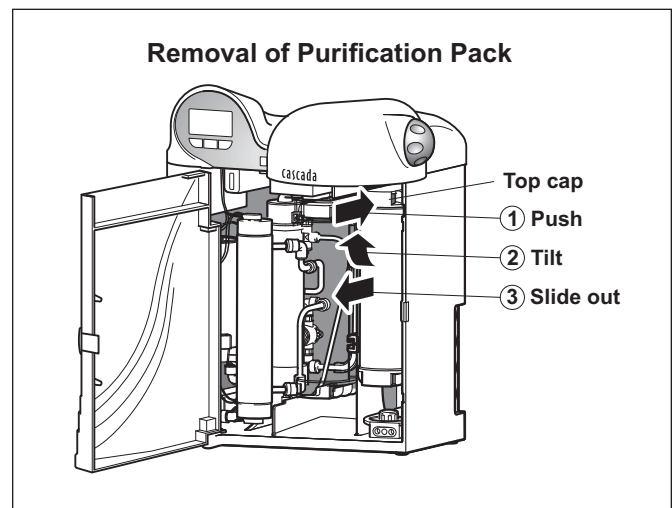
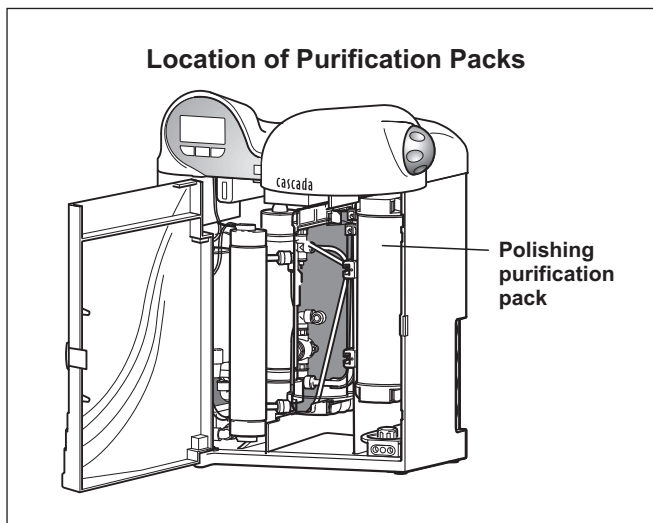
The Purification Pack should be replaced in the following circumstances:

- The quality monitor indicates that the pack requires changing.
- If the system is being recommissioned or sanitized after an extended period during which it was not used.
- If the pack has exceeded 12 months use as indicated by the consumable reminder alarm.

Use Purification Pack Part No. PAL-C195.

Step 1 - Removal of Purification Pack

1. Switch off Cascada™ Lab Water unit at the power switch.
2. Turn off the inlet water supply valve.
3. Remove POU filter, if fitted.
4. Open the front door.
5. Remove the purification pack by pushing the pack forward. Tilt by lifting the lower front of pack and then slide pack backward out of unit.
6. Discard the purification pack.



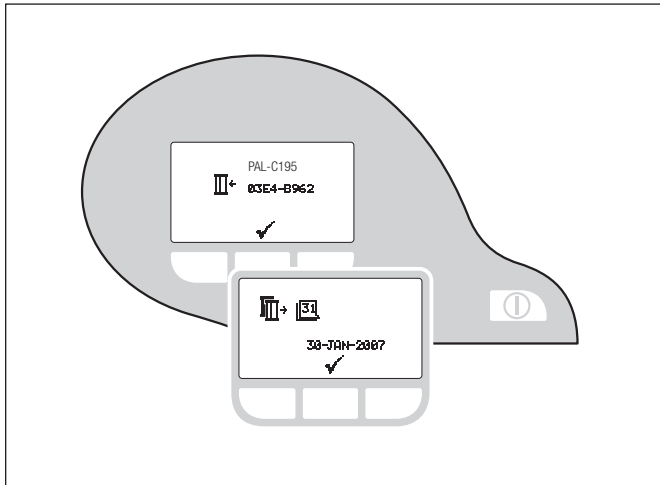
Step 2 - Fit New Polishing Purification Pack

1. Remove a new Purification Pack from its packaging.
2. Remove the sealing plugs from inlet and outlet port.
3. Wet O-rings and slide the new Purification Pack into the right-hand position.
4. Position this Purification Pack onto spigots.
5. Push into unit.
6. Ensure the Purification Pack is fully engaged and dropped down past the pack retainers.

Replacing the Purification Pack (continued)

Step 3 - Acceptance of Purification Pack Installation

1. Turn on the inlet water supply valve.
2. Switch on power.
3. Press checkmark button ✓ to accept the Purification Pack installation date (upper date).
4. Press checkmark button ✓ to calculate Replacement Date.



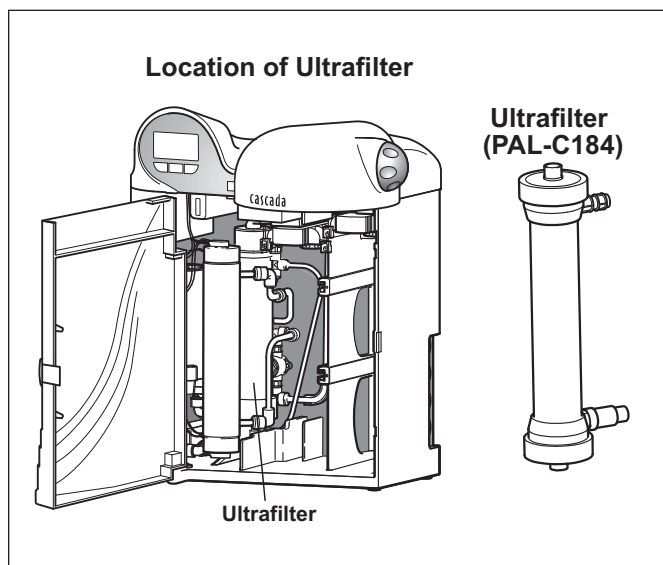
Step 4 - Rinse Purification Pack

1. Position a container under the dispense outlet.
 2. Press Process button Ⓞ. The unit will start.
 3. Press the Dispense Controller.
- Note:** The unit will start. Initially during this stage, air/water will be purged from the unit.
4. Dispense water for 5 minutes. Empty the container as necessary.
 5. Press the Dispense Controller to stop dispense and return the unit to recirculation.

Replacing the Ultrafilter (UF) Cartridge (PAL-C184)

The UF should be replaced in the following circumstances:

- If indicated by the Consumable Reminder Alarm.
- When low pyrogen levels can no longer be maintained.
- When the required flow rate can no longer be maintained.



Step 1 - Switch Unit Off

1. Switch off Cascada™ Lab Water unit at the power switch.
2. Turn off the inlet water supply valve.
3. Remove POU filter, if fitted.
4. Open the front door.

Step 2 - Remove Purification Pack

1. See Maintenance Section, Replacing the Purification Pack, Step 1 – Removal of Purification Pack (page 23).
2. Insert by-pass block but **DO NOT** add a chlorine tablet. See Sanitization Procedures Section, Step 4, Fit By-pass Block (page 28).

Step 3 - Remove the UV Lamp

1. See Maintenance Section, Replacing the Ultraviolet Lamp, Step 2, Remove UV Lamp (page 23).

Replacing the Ultrafilter (UF) Cartridge (PAL-C184)

Step 4 - Remove the UF Cartridge

1. Unclip UF from spring clips.
2. Pull UF forward to allow access to rear connection.
3. Push back outer sleeve of quick connect coupling.
4. Unscrew bottom cap from UF housing.
5. Locate a suitable beaker under the UF.
6. Unscrew the top cap from the UF housing and allow the water to drain into the beaker.
7. Remove the UF from the Cascada Lab Water system.
8. Dry spilt water from inside the unit.

Step 5 - Ready New UF Cartridge

1. Unpack new Ultrafilter.
2. Remove the top and bottom brown caps and discard.

Step 6 - Fit New UF Cartridge

1. Refit top and bottom connectors to new UF ensuring the O-rings are correctly located at each end.
2. Reconnect quick connect coupling.

CAUTION! Ensure tubes are fitted to correct ports.



3. Clip the new UF into spring clips.
4. Refit the UV housing on securing screws.
5. Tighten securing screws.





Step 7 - Replace the UV Lamp





1. See Maintenance Section, Replacing the Ultraviolet Lamp, Step 5, Replace UV Lamp (page 23).

Step 8 - Rinse New UF Cartridge

CAUTION! The new UF cartridge must be rinsed using the Sanitization Procedure (page 27). Ensure the by-pass block is correctly fitted and that **NO tablets have been inserted.**



1. Switch on power. The unit will enter sanitization mode. The insert tablet icon  will appear, press checkmark button  to continue. **(DO NOT insert a PAL-C100 tablet).** The sanitization recirculation icon  will appear. Press checkmark icon to continue. The unit will begin a 10 minute recirculation.
2. Once the cycle has been completed, the unit will display "Open Flush Valve"  indicating that the manual flush valve should be opened.

3. Connect a temporary tube from the dispense outlet to a suitable drain or sink.
4. Open the flush valve and press the dispense knob. The system will begin its flush sequence.
5. After approximately 3 minutes (countdown is indicated on the display), the unit will sound a buzzer and stop. The unit will display "Close Flush Valve"  indicating that the flush valve should be closed.
6. Close the flush valve and press the dispense knob. The system will begin its rinse sequence.
7. Upon completion of the rinse sequence, the "Open Flush Valve"  icon will appear again. Open the flush valve and press the dispense knob to start the 3 minute flush sequence again.
8. Once flush sequence has been completed, the "Close Flush Valve"  icon will appear again. Close the flush valve and press the dispense knob to continue. The flush is then complete after a 5-second flush to drain.
9. Ignore the prompt to reset the sanitization date. Press checkmark button .
10. Remove temporary tube from dispense outlet.
11. Reconnect POU if fitted (see page 18).

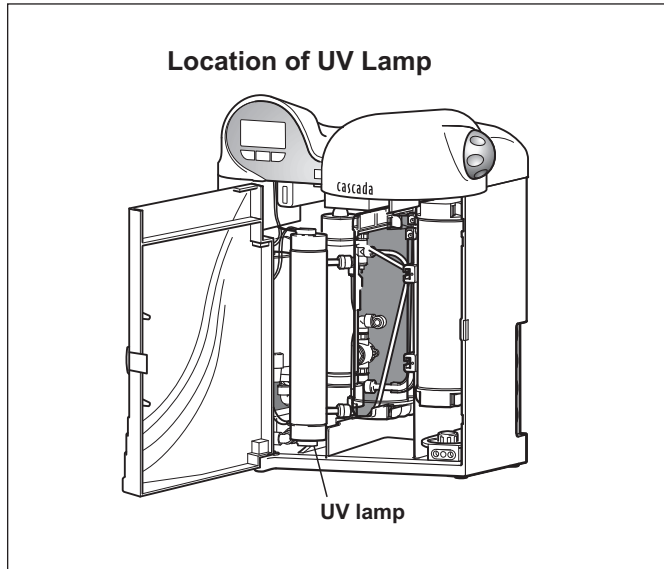
Step 9 - Set UF Change Reminder

1. See Installation Instructions Section, Setting Up Password/Replacement Timers (page 14).

Replacing the Ultraviolet (UV) Lamp (PAL-C151)

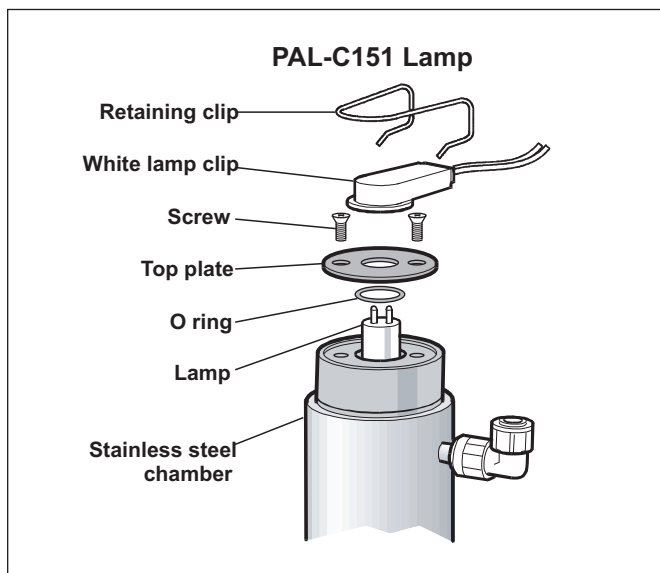
The UV lamp should be replaced in the following circumstances:

- If indicated by the Consumable Reminder Alarm or after 12 months use. This avoids the decline in the short wave radiation used to destroy the micro-organisms and to oxidize organics.
- If Lamp Fail Alarm occurs repeatedly.



Step 1 - Switch Unit Off

1. Switch off Cascada™ Lab Water unit at the power switch.
2. Turn off the water supply valve.
3. Remove POU filter, if fitted.
4. Open the front door.



Step 2 - Remove UV Lamp from Cascada Lab Water unit

1. Loosen two securing screws which retain UV lamp.
2. Lift and remove UV lamp from the securing screws.
3. Remove top and bottom retaining clips.
4. Unplug the white lamp clip fitted to the bottom of the UV unit.

CAUTION! Hold on to the pins on the UV lamp to ensure it does not fall out and break.



Step 3 - Remove Lamp Plates

1. Undo screws in plate at top.
2. Remove plate at top.
3. Undo screws in plate at bottom.
4. Remove plate at bottom.
5. Remove O-rings from the UV lamp and retain.

CAUTION! Hold on to UV lamp while removing plates to ensure it does not fall out and break.



Step 4 - Remove UV Lamp

1. Remove old UV lamp from the center bore of the housing.

Step 5 - Replace UV Lamp

1. Unpack the new UV lamp.

CAUTION! Take care not to touch the surface of the glass. Wear gloves, handle with soft cloth, and wipe the surface with alcohol before fitting into the housing.



1. Slide the new UV lamp into the center bore of the UV housing.
2. Note orientation of pins on each end.

Step 6 - Replace Lamp Plates

1. Replace O-rings on the end of the UV lamp.
2. Push O-rings into recesses.
3. Refit plate on the bottom of the unit.
4. Tighten screws on the plate.
5. Fit plate on top of UV lamp assembly.
6. Tighten screws on top plate.

Replacing the Ultraviolet (UV) Lamp (PAL-C151) *(continued)*

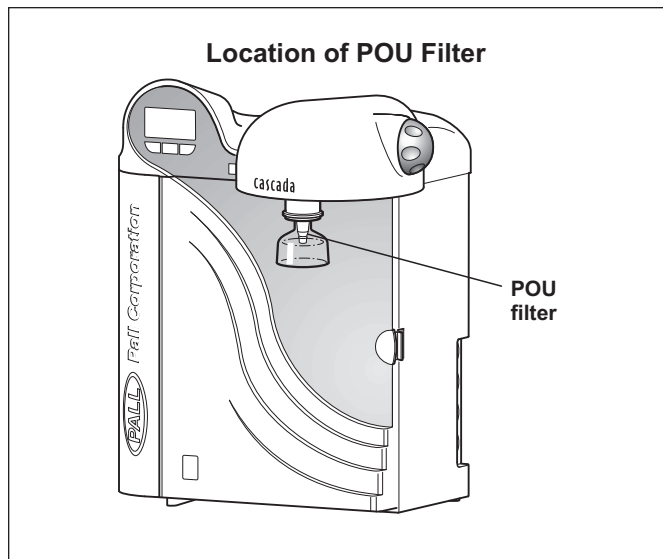
Step 7 - Assemble UV Lamp

1. Plug the white lamp clip into the bottom of the UV unit.
2. Refit spring clip.
3. Plug in the white lamp clip into the top of the UV unit.
4. Refit spring clip.
5. Refit the UV housing on securing screws.
6. Tighten securing screws.

Step 8 - Set UV Lamp Change Reminder

1. See Installation Instructions Section, Setting Up Password/Resetting Replacement Timers (page 14).

Replacing the Point-of-Use (POU) Filter (PAL-C166)



Step 1 - Remove POU Filter

1. Unscrew the old filter from the fixed dispenser and discard.
2. Ensure O-ring seal is still properly located.
3. Rinse connection with Isopropyl alcohol (IPA) or ethanol. Dispense water from the unit for several minutes to flush connection.

Step 2 - Replace POU Filter

1. Aseptically remove new filter from its packaging.
2. Hand-tighten the filter into the fixed dispenser until resistance against the O-ring seal is felt.

CAUTION! Do not over-tighten.



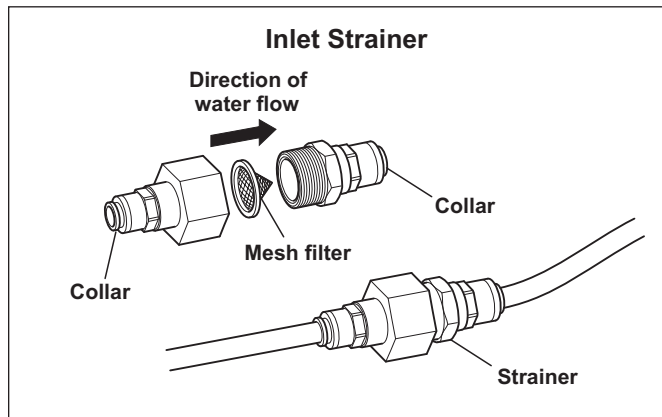
3. Push clear bell cover supplied with the filter onto the outlet of filter.

Step 3 - Bleed POU Filter

1. Switch on the Cascada Lab Water unit.
2. Press Process \odot button.
3. Place a beaker under the dispenser.
4. Press Dispense Controller button.
5. Open the top air bleed valve until water pours from the bleed valve, then close.
6. Dispense at full flow for approximately 5 minutes.
7. Discard water.
8. Flush the Inlet Strainer (External) with water.

Cleaning the Inlet Strainer

The Inlet Strainer should be checked and cleaned every six months to ensure the strainer does not become clogged.



Step 1 - Remove the Inlet Strainer

1. Turn off inlet water supply valve.
2. Switch off electrical power switch.
3. Open front door.
4. Depress collars on both sides of strainer and disconnect tubing.
5. Remove the inlet strainer from its position.

Step 2 - Dismantle the Inlet Strainer

1. Hold inlet strainer over a sink or receptacle.
2. Unscrew inlet strainer.
3. Remove mesh filter.
4. Check mesh filter for signs of wear or damage, replace or flush with water as necessary.

Step 3 - Reassemble the Inlet Strainer

1. Insert mesh filter into strainer. Ensure it is facing the correct direction (see diagram).
2. Screw in the inlet strainer.

Step 4 - Replace the Inlet Strainer

1. Reposition the inlet strainer.
2. Refit tubes to inlet strainer. Ensure it is facing the correct direction.
3. Turn on inlet water supply valve.
4. Switch on power.

Sanitization Procedure

The unit is sanitized to destroy the bacteria within the pipework and the filters of the unit. Read this entire section to become familiar with the procedure before you start. Sanitization may be required in the following circumstances:

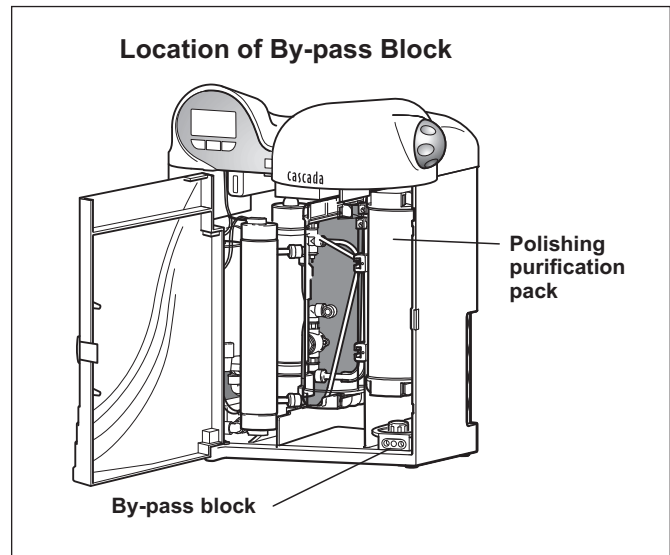
- Once a month to maintain low bacterial counts.
- If the unit has not been used for a prolonged period of time.
- If the product water is used for particularly stringent applications.

Step 1 - Start Sanitization Cycle

1. Ensure unit is ready to use.
2. Turn off the electrical power switch.
3. Remove POU filter, if fitted.
4. Open the door.

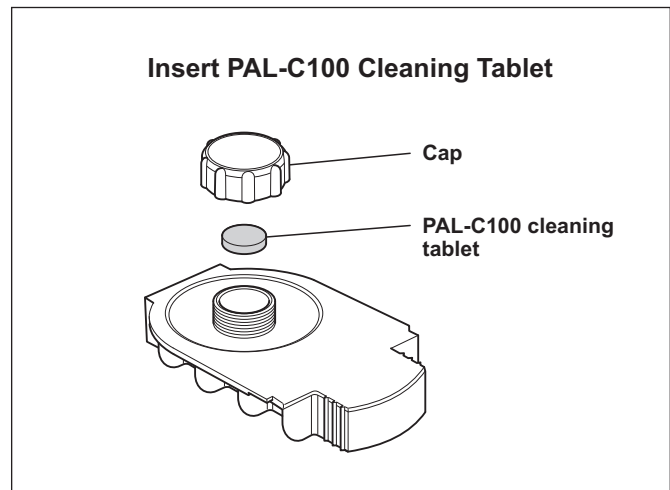
Step 2 - Insert PAL-C100 Tablet into Sanitization By-pass Block

1. Remove the by-pass block located at the bottom of the unit.
2. Invert the by-pass block.
3. Unscrew cap on sanitization by-pass block.
4. Insert PAL-C100 cleaning tablet.
5. Refit cap on by-pass block and hand-tighten.








Step 3 - Remove the Purification Pack


1. Remove Polishing Purification Pack. See Maintenance Section, Replacing the Purification Pack (page 20).







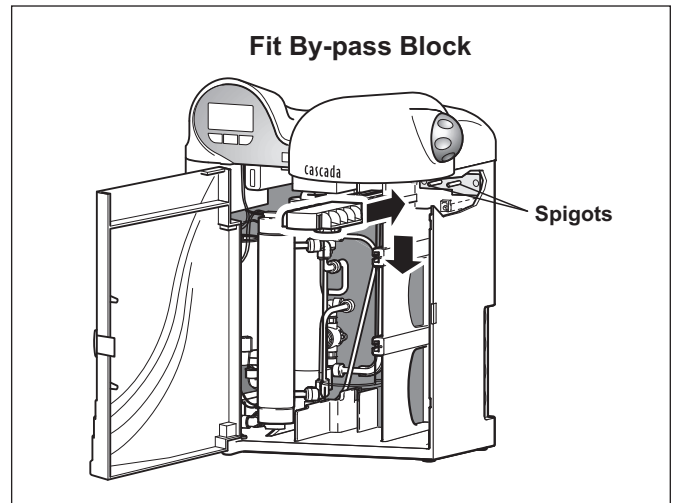
Sanitization Procedure *(continued)*

Step 4 - Fit By-pass Block

1. Wet O-rings on by-pass block.
2. Slide by-pass block into unit.
3. Position by-pass block onto appropriate spigots.
4. Ensure by-pass is locked in place.
5. Connect temporary tube from the dispense outlet to a suitable drain or sink.
6. Switch on power. The screen will display the insert tablet icon , press  to continue.
7. The unit will display the sanitization recirculation icon  to indicate that the unit is ready to commence the sanitization procedure. Press  to continue or  to cancel sanitization procedure.
8. Upon selecting to continue the sanitization procedure, the unit will enter a 10 minute recirculation cycle.
9. On completion of this cycle, the Cascada IX-water version will automatically start a 44 minute rinse sequence.

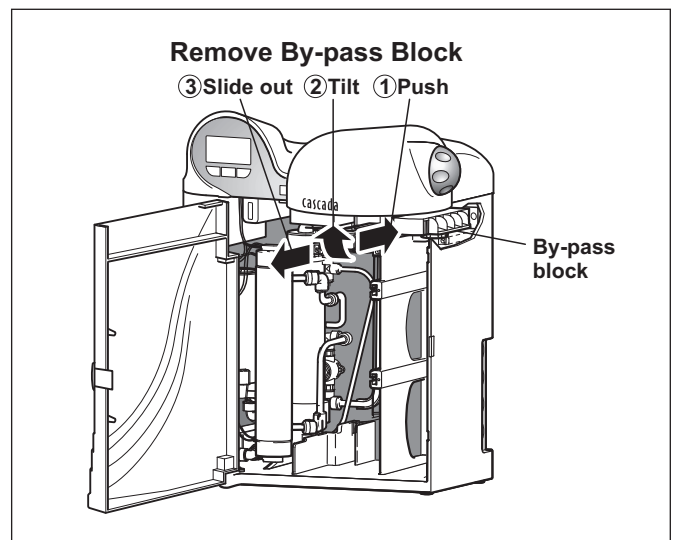
The Cascada LS-water version will display the UF "Flush Valve Open"  icon indicating that the manual UF rinse valve must be opened.

10. Press the dispense knob to continue and the unit will commence the flush sequence.
11. The LS-water model will display the UF "Flush Valve Open"  icon indicating that the manual UF rinse valve must be opened. Open the valve and press the dispense knob to continue. The unit will commence the flush sequence. The LS-water model will dispense to drain for 3 minutes (countdown is indicated on the display), the unit will then sound a buzzer and stop. The UF "Flush Valve Close"  icon will appear indicating the manual UF flush valve should be closed.
12. Disconnect the temporary drain line.
13. On completion of the rinse the sanitization cycle is now finished. The unit will display the next sanitization date reminder screen. To set the sanitization reminder alarm, press  or  to cancel the next reminder.



Step 5 - Remove By-pass Block

1. Push and tilt by-pass block.
2. Slide out of unit.
3. Place at the bottom of the unit.




Sanitization Procedure *(continued)*

Step 6 - Replace Purification Pack

1. Insert Polishing Purification Pack into right-hand side of the compartment (see page 20). Allow the Cascada™ Lab Water unit to recognize the Purification Pack and ensure that it has been replaced into the correct position.
2. Ensure Purification Pack is locked into position.
3. Close front door.

Step 7 - Return to Normal Operation

1. Press Process button  twice. The unit has now been sanitized but should be allowed to rinse to a suitable quality. For particularly sensitive applications, it is recommended that this occur overnight.

Note: *Once a sanitization cycle has commenced, the Cascada Lab Water unit cannot be used to purify water until the cycle has been completed. If the electricity supply to the Cascada Lab Water unit is interrupted while the cycle is in process, the unit will resume sanitization at point of interruption when it is restarted.*

PAL-C100 Sanitization Tablet - Safety Information

General Description:

White, solid tablet which rapidly dissolves in water and is used for sanitization applications.

Hazard Assessment:

Contains sodium dichloroisocyanurate dihydrate and is toxic by inhalation, ingestion, and skin contact.

Properties:

Soluble in water and pH 6. Non-combustible.

Handling Precautions:

Keep container tightly closed in a dry place. Wear protective clothing when handling.

Spillages:

If tablets are dry and uncontaminated, gather and place in heavy-duty plastic bag. Do not return to original container. Wash away any residues with copious amounts of water.

Toxicity:

Serious risk of poisoning by inhalation or ingestion. Irritating to skin, eyes, and respiratory system.

First Aid:

Eyes - thoroughly wash out with clean water for at least 15 minutes. Seek medical advice.

Inhalation - remove from chemical exposure, rest, and expose self to fresh air. In severe cases, obtain medical attention and treat for acute chlorine poisoning.

Skin - drench the skin with plenty of water. Remove contaminated clothing and wash before reuse. Obtain medical advice in severe cases.

Mouth - wash out the mouth thoroughly with water and give a large quantity of milk to drink. Obtain medical advice.

Note: *A comprehensive data sheet is available on request and is supplied with each packet of tablets.*

Troubleshooting

This section highlights the problems that could occur with the Cascada™ Lab Water system and how to rectify them. The unit will normally sound an alarm and the respective icons will flash. Silence the alarm by pressing the mute button. If the problem cannot be solved using this manual, please call either your local Pall office or distributor. See Contact Information on back cover.

| Problems | Action |
|--|---|
| No display message | <p>Check main power supply and cord.</p> <p>Check that the main power is switched on.</p> <p>Check fuses in power inlet module and replace if blown.</p> |
| Alarm and flashing quality value | <p>Mute alarm. Check alarm set value is correct. See Installation Instructions Section, Initial Controller Set-up, Step 8, Purity Alarm Settings (page 13).</p> <p>Dispense approximately 10 liters of water to drain.</p> <p>Check UF, if fitted.</p> <p>If problem persists, replace polishing Purification Pack. See Maintenance Section, Replacing the Purification Pack (page 20).</p> <p>If problem persists, call Technical Service.</p> |
| === Mv-cm | <p>Feature out of measurement range. Allow unit to recirculate.</p> <p>Replace Purification Packs. See Maintenance Section, Replacing the Purification Pack (page 20).</p> <p>If problem persists, call Technical Service.</p> |
| High water temperature alarm | <p>Check correct alarm point is set. See Installation Instructions Section, Initial Controller Set-up, Step 9, Temperature Alarm Setting (page 13).</p> <p>Check feed water temperature has not risen suddenly. Dispense some water to allow cold water to be drawn into the unit.</p> <p>Operate unit in intermittent operation to minimize temperature rising.</p> |
| Purification pack change reminder alarm | <p>Mute alarm. Replace Purification Pack. See Maintenance Section, Replacing a Purification Pack (page 20).</p> |
| UF change reminder alarm | <p>Mute alarm. Replace UF filter. See Maintenance Section, Replacing the UF Filter (page 21).</p> |
| UV change reminder alarm | <p>Mute alarm. Replace UV filter. See Maintenance Section, Replacing the UV Lamp (page 23).</p> |
| Sanitization reminder alarm | <p>Mute alarm. Initiate Sanitization Procedure. See Sanitization Procedure Section (page 27).</p> |
| Reservoir low level alarm | <p>Mute alarm. Ensure unit is fed from a reservoir and the correct feature has been set.</p> <p>See Installation Instructions Section, Initial Controller Set-up, Step 12, Reservoir Level (page 14).</p> <p>Check feed to the reservoir is operational and the reservoir is filling.</p> |
| Reservoir level disconnect fault alarm | <p>Mute alarm. Ensure control lead from reservoir is properly connected. Note: <i>unit must be powered down to clear alarm.</i></p> |
| Reduced flow from dispenser | <p>Check inlet water strainer. Replace POU filter if fitted. Replace UF if fitted.</p> <p>Pump worn, call Technical Service.</p> |
| Unit noisy | <p>Open front door and secure pipework to stop vibration.</p> |
| Unit will not operate | <p>Ensure that the Purification Pack is correctly installed. See Maintenance Section (page 20).</p> <p>Ensure Purification Pack has a valid consumable date and that the reminder has not over run 12 months.</p> |

Consumables and Accessories

| Consumable | Maximum Service Life* | Maximum Shelf Life |
|--|-----------------------|--------------------|
| PAL-C195 Purification Pack-RO Feed (Americas, China, Asia) | 12 months | 2 years |
| PAL-C184 UF Filter | 24 months | 2 years |
| PAL-C151 UV Lamp 185 | 12 months | 5 years |
| PAL-C166 POU Filter | 6 months | 2 years |
| PAL-C100 (Sanitization tablets) | 1 per month | 2 years |
| PAL-C169** (Composite Vent Filter) | 6 months | 2 years |













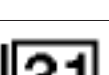
* Service life is an estimate only and will depend on the application and feed water quality. Care should be taken to order the correct consumable items.

** Required for reservoirs (PAL-A644, PAL-A645, PAL-A646, PAL-A653).










| Accessory | Part Number |
|---|-------------|
| Installation kit | PAL-A675 |
| Pressure regulator valve (feedwater pressures > 0.7 bar (70 kPa, 10 psi) but < 4.0 bar (400 kPa, 60 psi)) | PAL-A500 |
| Wall mounting kit (Europe, Japan) | PAL-A643 |
| Wall mounting kit (Americas, China, Asia) | PAL-A655 |
| 25 liter reservoir | PAL-A644 |
| 40 liter reservoir | PAL-A645 |
| 75 liter reservoir | PAL-A646 |
| Wall mounting kit (25 and 40 liter reservoir) | PAL-A624 |
| Wall mounting kit (75 liter reservoir) | PAL-A625 |
| RS232 printer kit | LA618 |
| Docking vessel – 35 Liter | PAL-A653 |
| Sanitization block | PAL-A671 |

Key to Control Panel

Icons




| Icon | Description |
|---|----------------------------|
|  | Mute Alarm |
|  | Accept |
|  | Scroll |
|  | Auto Restart |
|  | Manual Restart |
|  | Set Up Menu |
|  | Cursor Option Choice |
|  | Cursor Selection Choice |
|  | Cancel |
|  | Reset |
|  | Printer |
|  | Intermittent Recirculation |
|  | Replacement Date |

Alarm Conditions



| Icon | Alarm Conditions |
|---|------------------------------------|
|  (Flashing) | UV Lamp Failure |
|  (Flashing) | Sanitization Tablet Reminder |
|  (Flashing) | By-pass Fitted - Warning |
|  (Flashing) | Purification Pack Not in Place |
|  (Flashing) | Reinstall Purification Pack |
|  (Flashing) | Clock Stopped |
|  (Flashing) | Reservoir Level – Disconnect Fault |
|  (Flashing) | Incorrect Password |
|  (Flashing) | Open UF Flush Valve |
|  (Flashing) | Closed UF Flush Valve |

Key to Control Panel *(continued)*

Replacement Timers

| Icon | Replacement Time | Preset |
|---|-------------------------------|-----------|
|  | UV Lamp Replacement | 1 year |
|  | Purification Pack Replacement | 12 months |
|  | UF Filter Replacement | 2 years |

Quality Alarms

| Screen | Description |
|--|---------------------|
|  | Outlet Purity Alarm |
|  | Temperature Alarm |

Warranty, Limitation of Liability and Remedies:

1. There is no warranty of merchantability or fitness for any particular purpose with respect to any of the products, nor is there any other warranty expressed or implied, except as provided for herein.
2. For a period of 12 months from the date of delivery from Seller (the "Warranty Period"), Seller warrants that products manufactured by Seller, when properly installed and maintained, and operated at ratings, specifications, and design conditions, will be free from defects in material and workmanship.
3. Seller's liability under any warranty is limited solely (in Seller's discretion) to replacing (F.O.B. original ship point), repairing, or issuing credit for products which become defective during the Warranty Period. Purchaser shall notify Seller promptly in writing of any claims and provide Seller with an opportunity to inspect and test the product claimed to be defective.
4. Buyer shall provide Seller with a copy of the original invoice for the product, and prepay all freights charges to return any products to Seller's factory, or other facility designated by Seller. All claims must be accompanied by full particulars, including system operating conditions, if applicable.
4. In no event shall Seller be liable for any product altered outside of the Seller's factory by someone other than Seller or for a product subjected to misuse, abuse, improper installation, application, operation, maintenance or repair, alteration, accident or negligence in use, storage, transportation, or handling.
5. In no event will Seller be liable for any damages, incidental, consequential or otherwise, whether arising out of or in connection with the manufacture, packaging, delivery, storage, use, misuse, or nonuse of any of its products or any other cause whatsoever.

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Ann Arbor, MI 48103-9019
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Technical Service:

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