Palintest

Water Analysis Technologies

Photometer 7500

User Manual

ZIINST7500 V5 EN

Who We Are

"Palintest aim to be the best global provider of water and environmental analysis equipment that enable critical water quality decisions to be made with confidence"

Palintest develops, manufactures and supports a comprehensive range of advanced water and environmental testing equipment. From our United Kingdom headquarters we export to over 100 countries across the globe. Our products are used in a wide variety of applications to protect the environment and safeguard public health.

To find out more about Palintest please visit www.palintest.com or contact your local Palintest partner.

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Appendix 1 Hints and Tips for Photometric Testing
Appendix 2 Troubleshooting
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Important Information concerning Bluetooth®

The Palintest Aqua Pal App that this instrument was designed to connect to, via Bluetooth, is no longer available. Connectivity is now solely via USB. Therefore, all references to Bluetooth have been removed from this user manual. You may still notice menu options in the instrument relating to Bluetooth and it remains installed and functional. However, it would require third-party software or applications to be developed for it to be useable. Please contact Palintest should you require further information about this.

1. Introduction

The Palintest Photometer 7500 is a direct-reading, waterproof photometer for determining key water quality parameters for drinking water, wastewater and process water samples. Designed for both portable and laboratory use, the Photometer 7500 should always be used with genuine Palintest reagents for optimal performance.

The fundamental operating technique applied to the Photometer 7500 is based on the principles of optical absorbance and scattering of visible light.

Optical absorbance techniques are based on the use of Palintest (spectro)photometric reagents, creating visible colours with specific analytes upon reaction. The intensity of colour produced is measured with the Photometer 7500 and the data compared to the stored calibration data to deliver the final result.

Optical scattering techniques produce small particles to scatter the source beam, the amount of scatter providing a result for the concentration of parameter under test.

For more information regarding the science behind both photometric and turbidimetric analysis technology please visit www.palintest.com

The Photometer 7500 is provided with programmed methods for a comprehensive range of water quality parameters. Upon choosing a test the instrument automatically selects the required parameters for accurate analysis including wavelength and reaction time. Upon completion of the test optional follow-on tests are available and results can be converted to alternative units of expression e.g. mg/l to ppm, N or NH_3.

The Photometer 7500 offers USB connectivity to download all or selected results and/or upload up to 30 User Defined Tests.

USB connection via the port located at the rear of the instrument provides a choice of either ‘Hard Disk’ mode or serial communication mode. See Section 7 for more details.

The Photometer 7500 offers a choice of either mains power via the USB port or using three 1.5V ‘AA’ batteries (supplied).

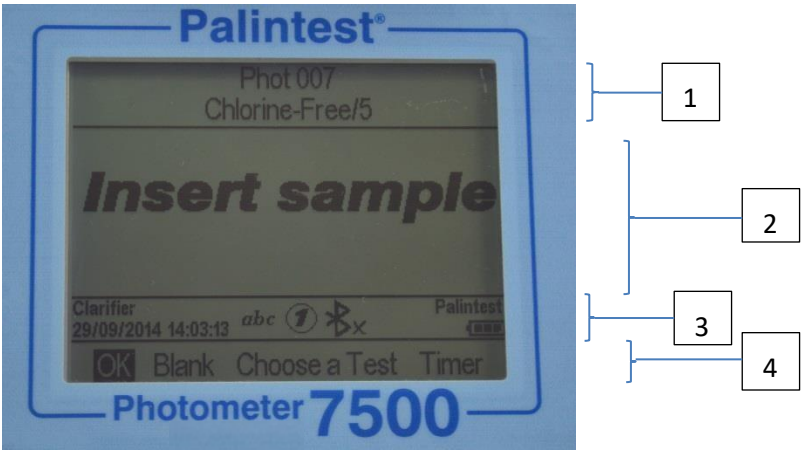
The Photometer 7500 is supported with a two year warranty and a full range of service, calibration and technical support. Support resources are available at www.palintest.com relating to both products and applications.

2. Quick Start

Photometer 7500 Layout

Photometer 7500 Interface

The LCD screen features a selectable backlight with the screen separated into four clear, easy to read zones:



1. Mode or Test Identification

2. Dialogue screen – prompts and choices will be displayed as a list. Select using up/down arrows.

3. Info Panel – displays status icons, date/time and Sample/Operator ID

4. Action select – choices are displayed as a row. Use left/right arrows to select.

Info Panel Icons

Icon	Description
	Battery status
ABC abc 123	Upper/lower case text/number entry
	Hotkey Entry Mode Enabled
	USB Connected
DISK COM	Hard Drive/COM port mode

3. Taking a Sample

The first critical step in any analysis is taking a representative sample. When selecting a sample point a number of care points are recommended as follows:

- Ensure the sample point is safe to access and follow all relevant/required precautions.
- When sampling from a tap or outlet, remove any attachment and clean the tap/outlet with a dry cloth before allowing the tap/outlet to run for 1 minute prior to sample collection.
- When sampling from a river or stream take the sample as near as possible to the main flow and not too close to the edge where the water may be still and unrepresentative of the sample as a whole.

- Rinse any sample container repeatedly with the sample to prevent any cross contamination from previous samples.

- Once collected the sample must be processed immediately or as quickly as possible, especially for highly reactive species such as chlorine for example. The use of a portable field test kit makes this possible. However if the delay between sample collection and analysis is likely to be several hours chill the sample to preserve and prevent potential microbiological growth.

- Samples containing solid particles can interfere with photometric analysis. Either allow solids to settle and decant the clear liquid or filter the sample prior to analysis.

4. Starting up the Instrument

Power Supply

The Photometer 7500 is designed to be powered either from alkaline batteries or via the USB port.

When operating on battery power, the battery level is indicated on the Info Panel. A minimum voltage of 3.0V is needed to operate the photometer and a flashing battery symbol indicates a critically low battery. Change batteries immediately or switch to alternative USB power. The Photometer 7500 will automatically power down when power is no longer capable of providing acceptable performance.

To power via the USB port, use the supplied cable connected either to the mains adaptor or a PC. The USB icon will appear

when the USB connection is made and battery power will no longer be consumed.

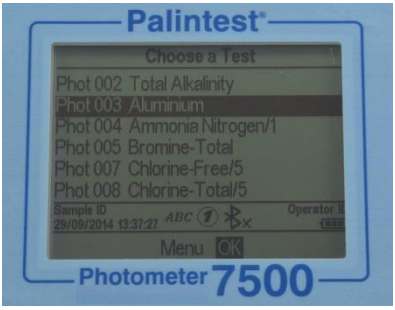
The Photometer 7500 has a back-up battery mounted internally to save instrument settings and data during power loss and instrument idle periods.

Replacing Batteries

The battery compartment is located on the base of the instrument and secured by four screws. Remove the cover and install a complete set of new batteries, observing the correct polarity as indicated. Use 3 x 1.5V 'AA' alkaline batteries or equivalent. See Appendix 2 for more details.

To avoid corrosion damage through leakage, remove batteries from the instrument if it is to be stored or left unused for a long period.

Start-up Screen



The default start-up screen on power up is the 'Choose a Test' screen.

To access the Mode menu press the left arrow key to highlight 'Menu' and OK.

To choose a test use the up/down arrows to scroll through the list and press OK on the desired parameter.

Mode Screen

The Photometer 7500 has four operating modes as follows:

Choose a Test
The Choose a Test mode is the standard operating mode for taking photometer readings and is the default start-up screen on power up. See Section 8 for more information.

Hotkey Test List
Assign up to 10 of the most frequently used tests for single button access when in Hotkey mode, indicated by the icon in the Info Panel. More information on how to set up and use Hotkey mode can be found in Section 7.

System Mode
Personalise your Photometer 7500 and manage stored data within the System mode. Options include setting Operator/Sample IDs, interrogating the result log and defining

the instrument operating conditions. See Section 7 for further information.

Check Standard Mode

Validate performance of your Photometer 7500 using Palintest Check Standards. See Section 9 for more information.

5. System Mode

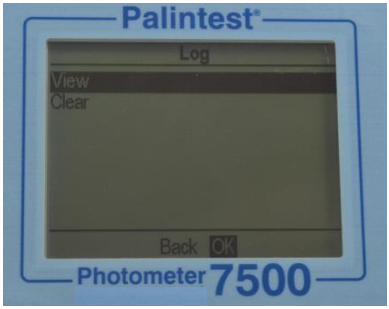
Personalise your Photometer 7500 and access the data log via the System Mode.

Scroll up or down using the appropriate keys to see all available options. The options and available settings are as follows:

Log

The Photometer 7500 has an internal data log for up to 500 data points. The data is stored automatically upon completion of the test and automatically overwrites the oldest result when the memory is full. The data log is unaffected by power on/off.

Each data point consists of the following information and is stored in a comma-separated values (CSV) format:

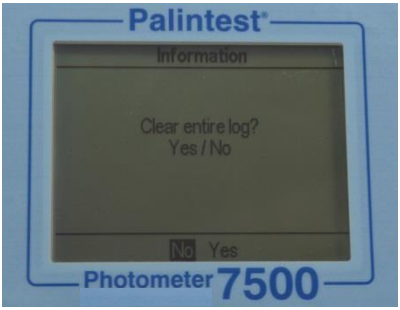


Selecting Log offers two choices:

View - to view individual data points use the up/down keys. Data is stored in chronological order with the most recent result shown by default. Scroll through results using the up/down arrows.

Select Back to return to the previous menu.

Clear – the entire log can be deleted from the Photometer 7500 if the instrument is not locked (see **System Lock)**. Selecting Clear produces the following screen:

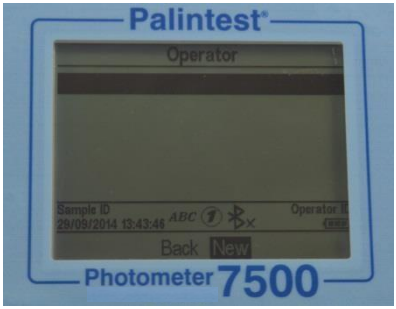


Choose Yes to delete all data, No to return to the previous screen.

Data can be downloaded via USB connection (see **USB Interface**).

Operator ID

The Photometer 7500 offers the option to create up to 12 unique alphanumeric Operator IDs. Operator IDs are added to the result data automatically but deleting IDs does not affect the result log.



To create a new Operator ID, select Operator ID and use the up/down keys to select a blank field.

Select New and press OK.

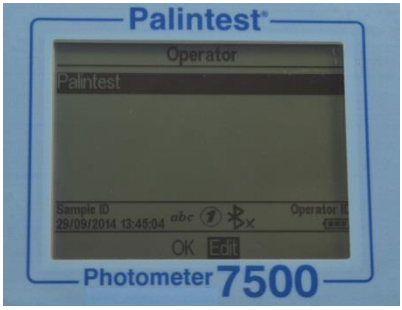
Alphanumeric characters are entered/edited using the 0 – 9 keys or the up/down keys. Press and hold the 1 key to toggle between upper case, lower case and numeric characters.

After entering a character, the cursor automatically moves to the next position if no key is pressed. Alternatively press the right key.

Up to 10 characters can be added for Operator IDs, including spaces.

To edit characters, use the left/right keys to select the desired character. Press and hold the left key to delete the character or change the character using the entry mode.

When the Operator ID is correct press the OK key to create the ID and return to the Operator ID list. The new Operator ID will be displayed in the Operator list.

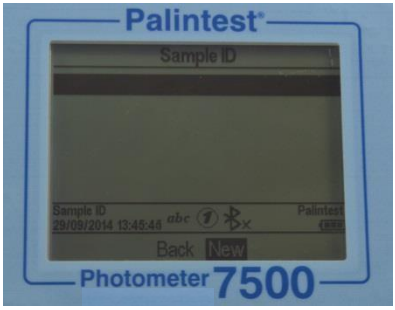


Choose the Operator ID to be used by scrolling through the list and pressing the OK key on the desired choice. The instrument will return to the System menu.

To modify or delete an existing Operator ID, highlight the ID and select Edit. Choose either Edit to modify the existing entry or Delete to remove it from the list.

Sample ID

The Photometer 7500 offers the option to create up to 24 unique alphanumeric Sample IDs. Sample IDs are added to the result data automatically but deleting IDs does not affect the result log.



To create a new Sample ID, select Sample ID and use the up/down keys to select a blank field.

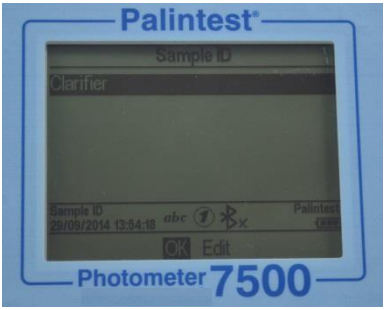
Select New and press OK.

Alphanumeric characters are entered/edited using the 0 – 9 keys or the up/down keys. Press and hold the 1 key to toggle between upper and lower case characters.

After entering a character, the cursor automatically moves to the next position if no key is pressed. Alternatively press the right key.

Up to 10 characters can be added for Sample IDs, including spaces.

To edit characters use the left/right keys to select the desired character. Press and hold the left key to delete the character or change the character using the entry mode.



When the Sample ID is correct press the OK key to create the ID and return to the Sample ID list. The new Sample ID will be displayed in the Sample list.

Choose the Sample ID to be used by scrolling through the list and pressing the OK key on the desired choice. The instrument will return to the System menu.

To modify or delete an existing Sample ID, highlight the ID and select Edit. Choose either Edit to modify the existing entry or Delete to remove it from the list.

USB Interface

The waterproof USB interface provides both communication between the Photometer 7500 and a PC and an alternative mains power source via the adaptor.

When connected the USB icon will appear, replacing the battery icon in the Info Panel, as power will be preferentially drawn from the external source.

The USB data interface has a choice of two operating modes – Hard Drive and COM Port. The current status of the USB connection is shown on the Info panel when the USB lead is connected.

Toggle between COM Port and Hard Disk mode in the System -> USB menu by selecting the desired option.

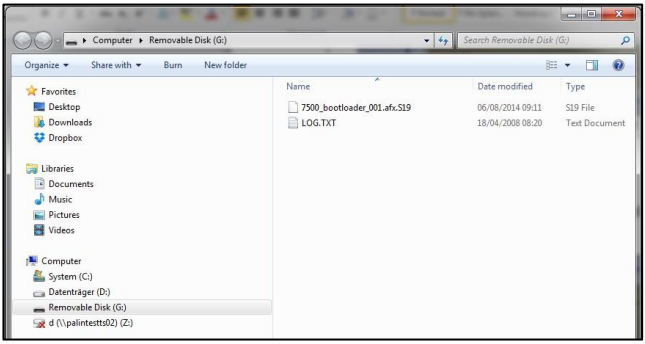
The USB connection supports software update and data download through a simple ‘drag and drop’ approach when operated in Hard Disk mode.

Hard Drive

The instrument appears as a removable hard drive when connected to a PC in Hard Disk mode. Upon connection the remote drive will have the following files included:

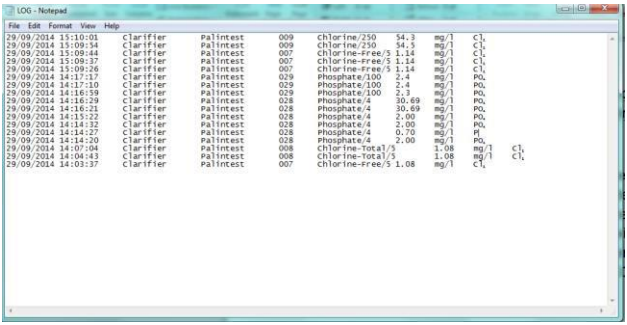
- 7500_bootloader_***.afx.*** where * represent version numbers of software – this is the operating software for the Photometer 7500

- Log.txt – the data log file stored in a comma separated value (csv) format



Operating software or calibration library can be updated by dragging a new version to the instrument – contact sales@palintest.com for new software if this option is required.

Downloading the result log is carried out by dragging the LOG.txt to the local desktop and opening the file with any program that can open CSV format files.



For more information regarding extracting and opening result logs using the Hard Disk mode visit www.palintest.com

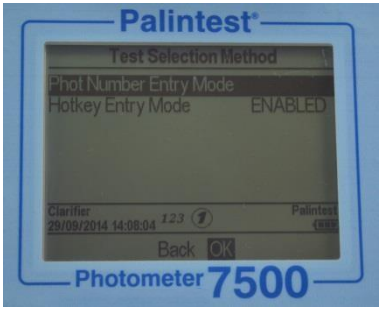
COM Port

The instrument behaves as if connected to the PC serial port via RS232 when connected in COM Port mode, allowing remote control from an external software system and data upload. This allows backwards compatibility with software written for earlier models of Palintest instruments. In this mode, the PC requires installation of a USB virtual COM Port driver and software operating as a virtual com port.

A large number of third-party software systems are available to provide data upload and remote control of testing using the COM port mode. Please contact your local Palintest representative for more details.

Test Selection Method

The Photometer 7500 offers two distinct methods of selecting test parameters – Phot Number Entry Mode or Hotkey Entry Mode.



Phot Number Entry Mode is active by default. Switching to Hotkey mode is carried out by enabling Hotkey Entry Mode in the Test Selection Method menu.

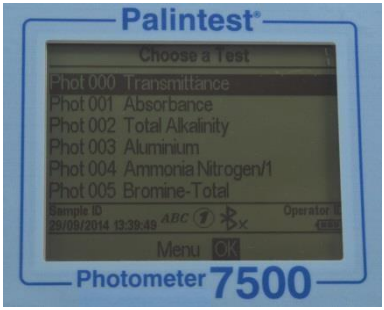
Select Hotkey Entry Mode and press OK. If ‘Hotkey Entry Mode’ is enabled, the icon is displayed on the Info panel.

Only one Test Selection Method is permitted at any time.

Phot Number Entry Mode

All methods/calibrations (including User Defined Tests) are identified by a unique three-digit ID Phot Number. When operating in Phot Number Entry Mode, access the test of choice quickly by typing the three-digit number when in either the Choose a Test screen or any result screen.

For example, to access the Phot 002 Total Alkalinity test press ‘002’, ‘02’ or just ‘2’ to load the method instantly.



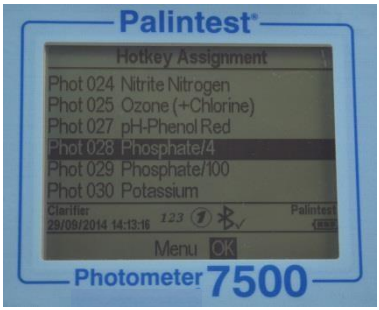
Hotkey Entry Mode

This option provides single button access to the ten most frequently used tests by assigning each to a unique position on the numerical keypad.

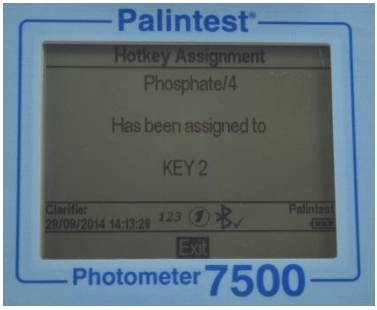
To assign a test to a specific Hotkey (0 – 9), firstly ensure that ‘Hotkey Mode’ is enabled. This is shown by the indicator on the Info Panel.

Select the Hotkey Test List from the Mode menu. The ten available positions are listed along with assigned or empty slots.

Select the Hotkey to assign (0 – 9) and use the up/down arrows to highlight the required parameter/method from the Choose a Test list.



Press OK and the test will be assigned to the defined number.



Units

The Photometer 7500 offers the choice of result expressed in mg/l, ppm, mmol/l, µmol, g/l and µg/l.

Changing the result units will not affect the result log.

Dilution Factor

When samples are above the test range, indicated by >> on the result screen, a dilution procedure can be used. Setting Dilution Factor to On will prompt the Photometer 7500 to automatically request the dilution factor when carrying out a test.

Change the dilution factor by using the up/down arrows or manually type the dilution factor. The instrument will automatically correct the result for the dilution and display the corrected result (which will also be stored in the result log).

The maximum dilution factor permitted is 99.

If the calculated result exceeds the available number of permitted characters >> will be displayed

NOTE: do not use sample dilution when measuring pH or alkalinity

System Lock

To prevent unauthorised or inadvertent changes to the System settings or log deletion a four digit code can be used to lock several options.

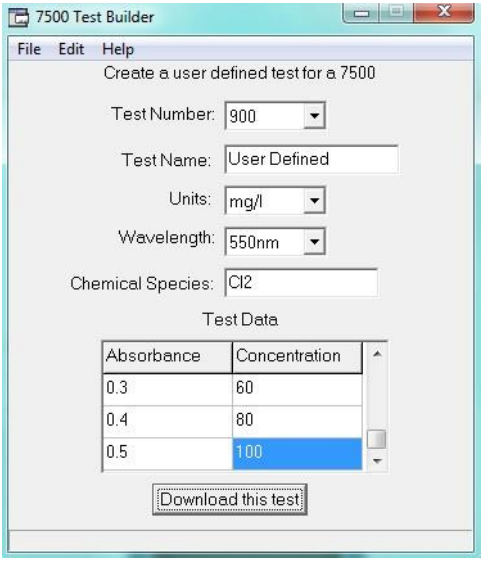
The default code is set to 6812. To change the System Lock code follow the on-screen prompts to choose a memorable four digit number.

Then the System Lock is applied, the items accessible within the System Mode are limited until the unlock code is entered. Access is limited to viewing the result log, adjusting the backlight, and contrast settings.

User Defined Tests

In addition to the many available calibrations/methods, the Photometer 7500 provides additional capability for up to 30 User Defined Tests. A User Defined Test is built using a table of calibration data consisting of up to 10 data pairs of absorbance and concentration.

Download or request a copy of Usertestbuilder.exe (suitable for Windows operating systems) from our websites to define the details and calibration data as shown below:



Connect the Photometer 7500 to the PC using the USB cable provided, ensuring the instrument is set to Hard Drive mode.

Once data is complete press “Download this test” to transfer the method details and calibration. The Photometer 7500 will respond with Test Data Accepted.

Alternatively save the test data as a *.txt file and drag and drop onto the Photometer 7500.

User Defined Tests are stored in Phot Numbers 900 – 929 to avoid confusion with standard Palintest calibrations.

Press OK once the test has been uploaded to view the test in the User Defined Test list.

A number of options are available within the Edit User Defined Test menu:

Back return to the previous menu

Add add additional User Defined Tests

Edit upload new data for the selected test

Delete remove the test from the instrument

For more information regarding creation and upload of User Defined Tests please visit palintest.com

Accessing User Defined Tests can be carried out by assigning to Hotkeys (if enabled), scrolling through the list of tests or entering the required Phot Number.

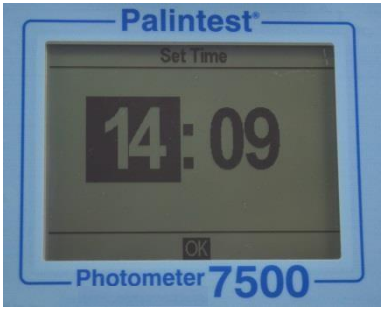
Language

Select the desired local language for operation, choosing from English, French, Spanish, German, Italian and Chinese (Mandarin). The selection of language will also adjust appropriate tests and units to local convention as required.

Set Time/Set Date/Date Format

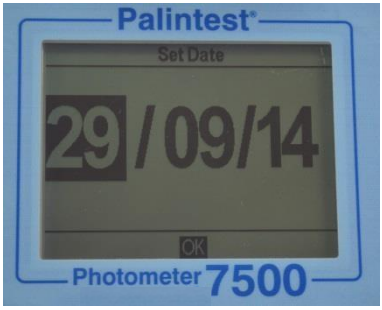
All test results are recorded automatically in the Data Log and appended with date and time (plus additional information). Date and time are stored on an internal clock, supported by a coin cell battery.

To correct the time select Set Time from the System menu. Use the up/down keys to adjust the hour; press the right key to select and adjust the minutes.



Press OK when the correct time is set.

To correct the date select Set Date from the System menu. Use the up/down keys to adjust the day/month/year, using the left/right keys to select the field.



Press OK when the correct date is set.

The Date Format can be set to DD/MM/YYYY or MM/DD/YYYY as required. To select the required format highlight the desired choice and press OK.

Time Out

When operating using battery power the Photometer 7500 provides automatic power-off as a power-saving measure. Three settings are provided:

Normal	5 minutes
Long	15 minutes
Off	(disables Time Out)

The time intervals begin after the last key is pressed or activity takes place.

Time Out is automatically disabled when the instrument is powered by USB supply and during data log transfer.

Back Light

The instrument display features a high intensity backlight to support use in low light conditions. The backlight is designed to use minimal energy but activating the Backlight will naturally consume battery power more rapidly. The settings available for Backlight are:

Backlight Auto-Dim	Backlight activates on any key press and dims after 15 seconds automatically.
Backlight On	Backlight is on permanently`
Backlight Off	Backlight is off permanently

LCD Contrast

In addition to the Backlight, the default contrast setting for the display can be adjusted using the up/down keys when light conditions are difficult.

The display provides a sequence of alternating squares to give visual indication of the correct settings to apply.

When complete/acceptable press the OK key.

Version

The serial number of the instrument and the software version are displayed. The instrument serial number will be required for technical support and servicing/warranty and can also be found on the base of the instrument.

6. Analysing Samples

The Photometer 7500 provides simple, accurate and reliable analysis of key drinking water, wastewater and process water parameters. Selecting the required parameter and performing the test are supported through on-screen prompts and comprehensive test instructions.

The principle of photometric testing is based on the absorption or scattering of a measured intensity of incident light compared to the light intensity reaching the detector array. The light intensity is determined as Transmittance (%T) or Absorbance (A) and compared to calibration tables stored within the Photometer 7500. The stored calibration tables convert %T or A to results in a variety of units (mg/l, ppm etc.) as defined in Section 7.

Calibration tables are defined by Palintest based on the measurement of reference standards using Palintest reagents. To achieve the best quality results there are a small number of care points:

1. Always use the provided light cap to prevent ambient light affecting the results.

2. Ensure Sample and Blank cuvettes are clean, dry and inserted correctly into the sample chamber, using the allocated orientation mark to align.

3. Always blank the instrument with untreated sample prior to analysis

Additional guidance is provided in **Appendix 1 Photometric Testing Hints and Tips**

Selecting Test Parameters

The Photometer 7500 offers a number of choices to select the parameter to test:

Phot Number Entry – use the numeric keypad to enter the unique Phot Number to directly access any programmed calibration (including User Defined Tests). This method will not be available if the Photometer 7500 is operating in Hotkey Entry Mode.

Hotkey Entry – use the numeric keypad to directly access up to 10 of the most commonly used tests. When operating in this mode the Info panel will display the icon and Phot Number Entry mode will be disabled.

Choose a Test – available in either Phot Number Entry or Hotkey Entry modes, the full list of test parameters is available by selecting Choose a Test and scrolling using the up/down keys. When the desired parameter is highlighted, press the OK key to access the method. Tests are presented in Phot Number order.

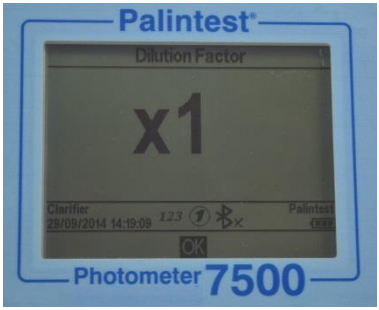
When the required test is selected the Photometer 7500 automatically selects the correct wavelength and sets additional method parameters as required.

Test method protocols are defined in detail in the Palintest Phot Book, supplied with the Photometer 7500, including the reagents and accessories that may be required.

When a test is selected, the Photometer 7500 screen will display a number of screens and options to guide the user through the testing process, as described in the following pages.

Dilution Factor

If selected in the System menu, the initial screen will request the defined Dilution Factor to apply to results.



If Dilution Factor is not active this screen will not be shown.

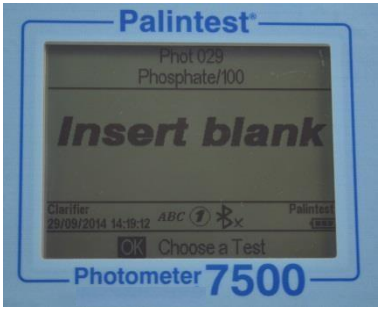
Results shown on the final screen have automatically been corrected for dilution prior to display. Corrected results will also be stored in the log.

Blanking the Photometer 7500

Blanking the photometer is a key first step in photometric analysis, effectively removing the potential entrained sample colour and minor amounts of turbidity from calculation of analytical results.

To blank the photometer, prepare a Blank cuvette using untreated sample i.e. sample that has not been reacted with any reagents. If the sample is to be diluted or physically treated (filtered for example) before analysis, use the same dilution/treatment for the Blank cuvette.

When accessing the test method the Photometer 7500 will request the user to Insert Blank



Insert the Blank cuvette and press OK

The Photometer 7500 will determine the absorbance due to the sample colour at all wavelengths simultaneously and store in temporary memory for use in analysis.

Upon successful blanking the Photometer 7500 will automatically move to the **Insert sample** stage of the analytical method.

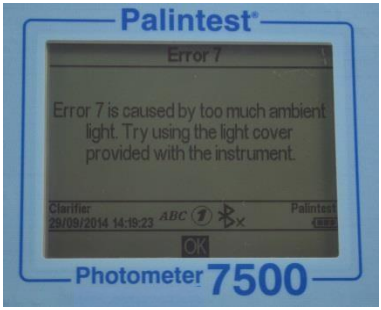
If the sample is too highly coloured to support effective blanking and subsequent analysis the error message “Error 9 is caused by the blank cuvette being too dark. Check the correct is being used”

Ensure the blank cuvette is being used, not the sample plus reagent cuvette. Sample colour can be reduced by dilution with clean water; the dilution selected should take account of the expected concentration of parameter under test.

Blank results are stored in the temporary memory of the Photometer 7500 and will be used for all subsequent tests until:

- The instrument is powered down (temporary memory is lost/deleted).
- A new Blank reading is taken – this option is available on accessing any subsequent test at the base of the screen. Repeat the blanking process if the sample changes significantly or a new sample is under test.
- Some tests use a reversed blanking process where a coloured blank cuvette may be required. When changing between standard tests and ‘reverse blank’ test, a new blank sample will be requested by the Photometer 7500.

If the blank value generated in this step is not detectable an error message will be displayed “Error 7 is caused by too much ambient light. Try using the light cover provided with the instrument”



See Appendix 1 Photometric Testing Hints and Tips for more advice regarding effective blanking.

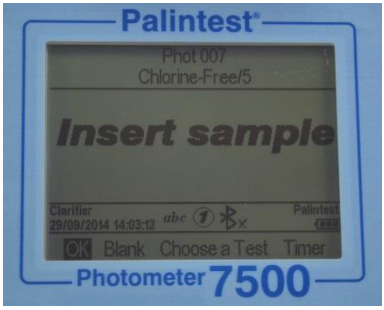
Reading Results with the Photometer 7500

Assuming a suitable blank has been recorded, the next step of the photometric analysis process is to carry out the reading step.

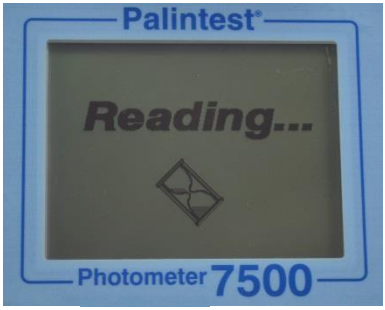
Prepare a Sample cuvette following the method instructions provided in the Palintest Phot Book.

Select **Read** at the base of the screen and press **OK**

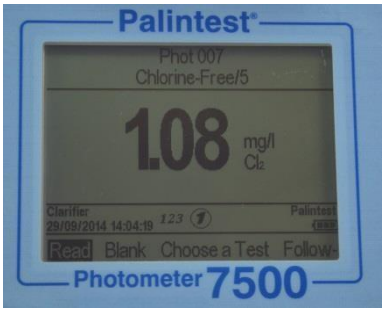
At the **Insert sample** prompt, insert the sample cuvette ensuring it is clean and dry and oriented correctly using the location mark.



Press OK to begin the measurement process. The screen will display Reading…



At the completion of the measurement process the result is displayed on screen.



Timer

Many photometric methods require a reaction time to develop optimize sensitivity, the recommended time period being documented in the Palintest Phot Book and included as part of the method parameters programmed into the Photometer 7500.

Tests requiring a reaction time will have the option to select an automatic timer to count down the reaction time required. While in the Insert sample screen use the right key to move the cursor to highlight **Timer**.

The programmed reaction time will be displayed.

Press **OK** to **Start** the countdown.

Three options will be displayed:

Stop cancel the countdown timer

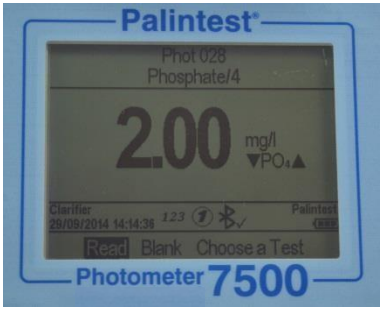
Exit exits the countdown screen and returns to the Insert sample screen. The countdown will continue and the current time can be seen by selecting **Timer**. At the end of the countdown an audible alarm will sound to indicate the

sample is ready to read. Select OK to read the sample manually.

Exit and Read exits the countdown screen and automatically reads the sample at the completion of the allocated time period.

Changing Result Units of Expression

Many chemical species have a number of alternative units that can be used for reporting results e.g. Phosphate can be expressed as PO_4 or P for example.



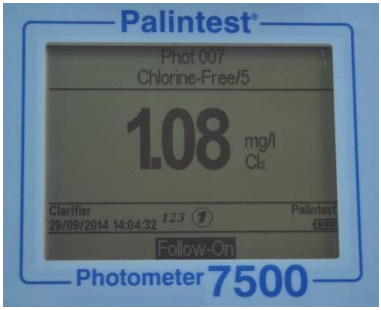
Where alternative units of expression for results are available the ▲▼symbols will be displayed next to the current result units. Use the up/down arrows to change the units of expression as required. Values are modified automatically.

Results stored in the log will be in the units selected on screen, changing the chemical species will add an entry to the log showing the updated result and species parameter selected.

Follow-on Tests

A number of photometric methods have additional optional methods that can be applied, known as Follow-on Tests e.g. Phot 008 Total Chlorine follows Phot 007 Free Chlorine. Follow-on methods are usually either based on further reagent addition to the sample just measured for sequential parameters or used to correct for potential/known interferences.

Follow-on tests are clearly defined in the Palintest Phot Book and, if available, are accessed via the **Follow-on** option located at the right hand side of the options.



To access the Follow-on test, highlight Follow-on and press OK. The next method is automatically loaded and operated in the usual manner.
NOTE: if no viable result is produced during the first stage of a sequential test method, the **Follow-on** option will be automatically removed.

For correction methods, the data log will store the corrected result automatically along with all other results in the sequence.

All Follow-on methods have unique allocated Phot Numbers but not all can be directly accessed. Follow-on methods that cannot be directly accessed are not listed in the **Choose a Test** list for Hotkey Entry but will be available following a viable result in the initial test stage.

7. Calibration/Validation

Your Photometer 7500 is delivered with a calibration certificate validating the performance of the instrument as it leaves Palintest.

We recommend annual service and calibration of all photometric instruments in normal use.

The Photometer 7500 also includes an automatic routine to validate analytical performance using certified Palintest Check Standards. Accessed via the Mode menu, the **Check Standard Mode** provides a field method of ensuring your instrument is operating within defined specifications and also a troubleshooting method for unexpected results.

Every Palintest Check Standards set is supplied with certified values expressed as %T (Transmission), derived from traceable reference materials. Acceptable tolerances are defined on the certificate and are automatically specified within the Photometer 7500.

Check Standard Mode

Access Check Standard Mode from the Mode screen.

Highlight Check Standard Mode and press OK

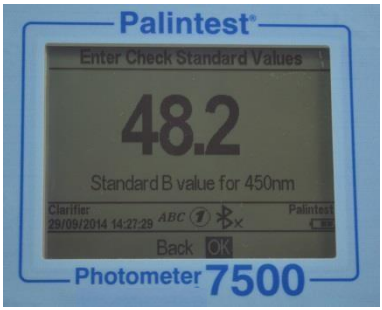
Two choices are offered:

Enter Check Standard Values use the up/down keys to adjust the displayed values to match the certificate

Check Standard Measurement insert the Check Standards in the defined order to generate a validation report

Enter Check Standard Values

Each standard has two values assigned, for two individual wavelengths.



Use the up/down keys to adjust the values to match the certificates, following the order defined on the display. Press OK when the correct value is shown and the prompt will forward to the next value.

Upon completion the message **Check Standard Values assigned successfully** will be displayed.

Press **OK** to return to the Check Standard Mode menu.

Check Standard Measurement

Follow the on-screen prompts to insert the Check Standards in the defined order. The Photometer 7500 will automatically measure the Transmittance at the required wavelength.

Upon completion of the sequence the results are displayed on screen with pass or fail status.

If the Check Standard Mode reports a failure, see Appendix 2 Troubleshooting for guidance or contact your local Palintest supplier.

Appendix 1 - Photometric Testing Hints and Tips

Photometric analysis is a very powerful technique, providing accurate analysis of a wide range of critical drinking water, wastewater and environmental parameters.

Palintest has focused on simplifying the test methods and equipment used for this technique but there are still a number of ways to ensure the results you generate are as accurate as possible:

1. Always use genuine Palintest reagents when using the programmed test methods. Each parameter has a unique calibration which has been generated using Palintest reagents. Alternative reagents may follow the same general methodology but can differ substantially in formulation and colour generated thereby rendering the calibration and hence results inaccurate.

2. Always correct for the blank value – any inherent colour in the sample (which may not be visible to the naked eye) will offset the result if the blank step is omitted. If the sample colour is too intense for the photometer to blank use dilution with deionised water to reduce the intensity. Remember to dilute the sample to the same extent for analysis.

3. Always respect the reaction time specified within the instructions. Some methods produce instant colour whereas others require a reaction time to reach full development. Taking a reading before the reaction time has elapsed may lead to low results.

4. The presence of solids, either large or in the form of turbidity, can adversely affect the quality of results by preventing incident light from reaching the detector. The blanking step can reduce the impact of turbidity interference but large solid particles must be removed prior to analysis. Solids can be removed by filtration prior to analysis or, if the solids are settleable and will not lie in the optical path, allowing them to settle in the photometer cuvette can be acceptable.

5. Calibration curves relate transmission/absorbance to concentration to provide result data but not all

calibration ranges are linear. Frequently at higher concentrations the curve ‘flattens’ leading to higher potential variability in results. If greater accuracy is required than can be achieved on neat samples then dilution can be used to improve performance.

6. Ensure the photometer cuvette is clean, has no droplets on the outside and not excessively scratched. Good technique is to wipe the outside surface of the cuvette prior to inserting into the optical chamber to prevent contamination of the optical system.

7. Always use good quality, genuine Palintest cuvettes. Use the orientation mark to ensure repeatable positioning of the cuvette.

8. Maintain the cleanliness of the optical chamber by only inserting clean cuvettes. If the chamber becomes fouled or sample is spilled the base can be removed for cleaning access. Clean the optical chamber with a soft cloth. Do not use abrasive chemicals or scouring agents.

9. Always use the light cap provided to prevent ambient light affecting results. This is especially relevant when operating in strong sunlight or other light conditions.

10. Ensure your Photometer 7500 is operating effectively by using Palintest Check Standards and the Check Standard Mode (see Section 9 Calibration/Validation) and having the photometer serviced and calibrated at regular intervals. Calibration is recommended at 12 month intervals for normal

usage and can be provided by your local Palintest distributor.

Appendix 2 - Troubleshooting

The Photometer 7500 features self-diagnostic software and hardware to optimise performance and battery life. The Info Panel indicates the status of the Photometer 7500 and any specific fault conditions are defined and displayed on screen.

Optical Errors

I have an Error 9 message

Error 9 is caused by the blank cuvette being too dark to allow the blanking step to be carried out.
Check that the correct cuvette is being used i.e. ensure the sample cuvette is not being used for blanking.
If the sample is too highly coloured or contains significant solids, dilute and repeat the blanking step.

If the problem persists and the blank cuvette is not the issue, clean the optical chamber by removing the access cover and cleaning with a soft cloth. Do not use corrosive or abrasive chemicals.

I have an Error 7 message

Error 7 is caused by too much ambient light reaching the detector. Use the light cover provided with the instrument.

Check Standard Issues

How do I maintain my Check Standards?

Check Standards are manufactured to precise values/tolerances, certified against traceable reference materials and provided in sealed cuvettes. Do not decant or remove the sealed cap from the Check Standard.

Ensure the Check Standard cuvettes are clean and dry using lint-free cloths before inserting into the optical chamber.

Insert the Check Standard aligning the orientation arrow towards the front of the optical chamber.

Values assigned to calibration standards are defined at 20 - 25°C. Extremely high or low ambient temperatures can affect Check Standard results so ensure standards are at the defined temperature to effectively validate.

Check Standards have a two year shelf-life, after which the colours will no longer be valid. Please dispose of the expired standards after this period according to the MSDS.

My Check Standard validation has failed

Photometers may fail the Check Standard validation step due to the requirement for service/calibration. Contact your local Palintest partner for service and support.

Ensure the Check Standards are inserted correctly, using the orientation mark to align and inserted fully. Use the light cap to prevent any ambient light interference.

Service/calibration is recommended at annual intervals in normal operation.

Battery/Power Issues

My batteries are running out too quickly

Use good quality batteries and always replace the batteries completely when indicated on the Info Panel. The battery compartment is located underneath the Photometer 7500 and secured by four screws.

Remove the battery cover and replace batteries as a set.

Refit the battery cover ensuring the cover is tight enough to prevent water ingress. Do not overtighten as this will damage the screw housings.

The Photometer 7500 has a number of powersaving features such as auto-dim of the backlight and automatic power down after inactivity (See Section 7). Activating these features will prevent power being used unnecessarily.

Using the USB port to provide power will automatically prevent battery power being consumed when mains or external power is available.

My photometer will not switch on

The Info Panel provides an ongoing indication of power available from the battery supply. When the voltage available falls below 3.0V the Photometer 7500 will not switch on as the available power will not be sufficient to provide effective photometric testing.

Use the USB cable to provide an alternative power supply. If the photometer still fails to switch on, contact your local Palintest partner for service support.

My USB power supply is not working

Ensure your PC is not operating in power save mode or the mains supply is not isolated.

Replace the cable with an alternative to ensure the cable is not faulty.

USB Connection Issues

I cannot download my data

Check the USB mode is set to Hard Disk, not COM port mode. In Hard Disk mode the data can be ‘dragged and dropped’ as with a conventional memory stick and is available in CSV format.

Opening CSV data files can be accomplished by a number of text editing or spreadsheet programs.

Where do I find the COM port drivers?

The latest drivers are available at www.palintest.com

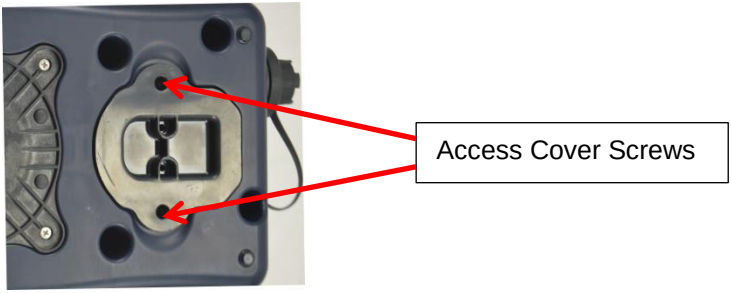
COM port drivers are provided for Windows operating systems (Windows Vista, XP and 7).

Care and Maintenance

The Photometer 7500 contains no user-serviceable parts internally. User maintenance is only recommended for cleaning of the optical chamber, changing batteries and validating performance using the Check Standard Mode.

Cleaning the Optical Chamber

The optical chamber has been designed to support removal and cleaning with a lint-free cloth as required by removal of the access cover.



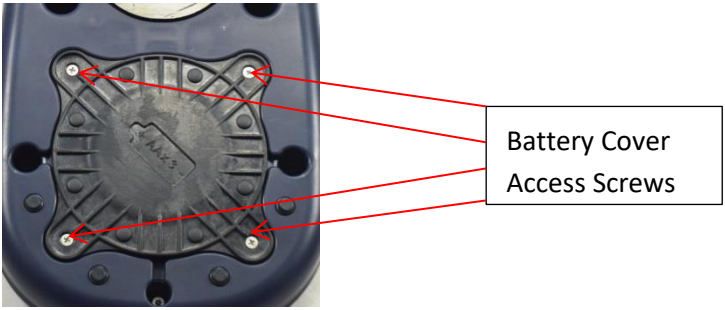
Do not use any of the following agents when cleaning this optical chamber:

- Abrasive cloths
- Corrosive chemicals
- Any organic solvents

Do not overtighten the screws on re-assembly to avoid damaging the access cover.

Replacing the Batteries

Remove the four retaining screws from the battery cover and gently prise the cover free.



Replace all batteries at the same time.

Ensure on replacing the battery cover that the gasket is correctly located to prevent any water ingress. Tighten the screws carefully but do not overtighten.

Appendix 3 - Technical Specifications Photometer 7500

Instrument Type	Multiple fixed wavelengths photometer offering direct-reading of pre-programmed test calibrations, absorbance and transmittance.

Optical System

Optical Source:	Dual LED source with optical filters
Optical Detectors:	Silicon photodiodes
Peak Wavelengths:	450nm, 500nm, 550nm, 570nm, 600nm, 650nm

Wavelength Selection: Automatic

Bandwidth:	±5nm
Range:	1 - 100%T (0 – 2.3 Abs)

Accuracy:	± 1.0% T
User Interface	
Display:	320 x 240 pixel LCD with contrast adjustment
Backlight:	Timed, on key press with auto-dim and off
User Interface:	On-screen prompts available in English, French, Spanish, German, Italian, Turkish and Mandarin (Chinese).
Keypad:	Numeric keypad with assignable Hotkeys. Four navigation keys and OK key.
Physical	
Size (W x L x H)	150 x 250 x 70mm
Weight	975 g
IP Rating:	IP67
Power Supply	
Batteries:	3 x 1.5v ‘AA’ batteries
Lifetime:	20 hours (typical use, backlight off, ‘AA’ alkaline cells)
Mains:	5V DC, 900mA delivered via USB port
Power Management:	Auto-switch off (user selectable between 5 -15 minutes on battery) or continuous operation

Power Saving:	User control for Backlight to minimise battery consumption.

Test Methods

Tests Available:	Pre-programmed for Palintest reagent based tests. Also operates in Absorbance and Transmittance modes.
User Defined Tests:	Up to 30 user calibrations can be entered. Up to 20 points per calibration.
Test Selection:	Phot number entry, Hotkey or selection from a list
Test Cuvettes:	12 – 20mm OD with automatic cuvette centering
Result Units	g/l, mg/l, ppm, mmol/l, µmol/l, µg/l, ppb
Blanking:	Automatic blanking at all wavelengths. Blank value stored in memory until power off or new blank recorded.

Connectivity

USB:	USB Type B Connector. Waterproof connector available.

Data Management

Instrument Memory:	Non-volatile storage

Memory Capacity:	Up to 500 data sets. Each data set includes date, time, Sample ID, Operator ID, method number, method name, result, units
Sample IDs:	Up to 24 at any time
Operator IDs:	Up to 12 at any time
Data Download:	To computer via USB using Hard Disk or COM port mode
Data Output Format:	Plain text
Software Upload:	Software update by ‘drag and drop’ in USB Hard Disk Mode.

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