# 9500 PHOTOMETER

The YSI 9500 direct-reading photometer is designed to give long and trouble-free operation. To ensure the best results, please read these instructions carefully and follow the procedures recommended.

The photometer is suitable for use in both the laboratory and the field. It is rugged and durable but should be regarded as a scientific instrument. It is designed to resist moisture and spills but care must be taken to maintain the life of the instrument.

Keeping the photometer clean, free from contamination and in good working order :-

1  Do not pour out samples or prepare the tests directly over the instrument.
2  Always cap the test tubes after preparing the blank and test sample.
3  Wipe test tubes with a clean tissue to remove drips or condensation before placing in the photometer.
4  Do not leave tubes standing in the photometer test chamber. Remove the tubes immediately after each test.
5  Immediately wipe up any drips or spills on the instrument or in the test chamber with a clean tissue.
6  Keep the instrument clean. Clean the test chamber regularly using a moistened tissue or cotton ball.
7  Keep the instrument away from all chemicals and cleaning materials.
8  Keep the instrument in a clean, dry place when it is not in use. Keep it on a clean, dry bench away from chemicals, place it in a storage cupboard or keep it in a carrying case.
9  Keep the carrying case in a clean, dry condition. Make sure that the carrying case is dry before the case is closed up and the instrument is put away.

**INDEX**

# OPERATING PRINCIPLE

The YSI 9500 direct-reading photometer is an instrument that measures color intensity. Light is passed through a test tube containing the sample solution, and then through a colored filter onto a photodetector. Filters have been chosen so that light of a specific wavelength is selected. When the solution is completely colorless, all of the light passes through the sample. With colored samples, light is absorbed and that which passes through the sample is proportionately reduced.

In 9500 test procedures, the direct-reading photometer is used to measure the color which is produced when chemical reagents are reacted with the sample. In these tests, the color intensity produced is proportional to the concentration of the parameter under test.

The photometer is pre-programmed with calibrations for each test parameter. Different test procedures are carried out at different wavelengths to optimize the sensitivity of each test. The required wavelength is selected automatically by the instrument.

The calibrations are accessed by entering a unique program number at the start of each test procedure. This enables the instrument to select the appropriate wavelength filter automatically and allows the photodiode response to be converted to a concentration reading. The instrument thus displays a <u>direct-reading</u> of the test result.

The photometer is ideally suited for general analytical applications. The instrument can be used as a laboratory or field photometer for standard analytical methods or for comparison of colored solutions.

For general analytical applications, Transmittance (test program 0), or Absorbance (test program 1) can be chosen.


## Power Supply

The photometer is designed to be powered either from alkaline batteries or via the USB socket. To use mains power, the instrument is connected using the USB Connection Cable plugged to the Mains Adapter. Alternatively, if the USB connection cable is plugged to a computer, power will be drawn from the computer. These items are sold separately.

The photometer features a battery indicator – see 'System Mode' functions and scroll down to Battery Level. A minimum voltage of 3.0V is needed to operate the photometer.

In addition to the above feature, a battery-warning message will appear automatically on the display when the battery voltage becomes low. The batteries should be replaced as soon as possible after the warning message appears.

**Replacing the Batteries**

The battery compartment in the base of the instrument is secured by four screws. To replace the batteries, remove the screws (set aside), remove the cover and install the batteries, observing the correct polarity as indicated.  Use 3 x 1.5V 'AA' alkaline batteries.

To avoid potential corrosion damage, remove batteries from the instrument if it is to be stored or left unused for a long period of time (> 30 days).

## GENERAL PHOTOMETER OPERATION

The photometer is controlled by a simple intuitive menu system.

- The highlight indicates the active line or section of the screen.

- The △ and ▽ keys move the highlight through the menu choices.

- The ◁ and ▷ keys allow selection of options.

- The flashing cursor in the 'options menu' at the bottom of the screen indicates the action which will occur if the [**OK**] button is pressed.

**Operating Modes**

The photometer has two distinct operating modes - the **PHOTOMETER** mode and the **SYSTEM** mode.

The **PHOTOMETER** mode is the normal operating mode for taking photometer readings. This mode is engaged automatically when the instrument is turned on by pressing the ⏻ key.

In order to conserve battery life, the photometer will switch off automatically after use. The switch off period is five minutes in normal use, but may be adjusted in **SYSTEM** mode.

 The **SYSTEM** mode is used to set the system options. This mode is engaged when the photometer is turned on using the ⏻ key and then selecting 'System' using the ◁ and ▷ keys and pressing [**OK**].

Scroll through the menu box to view all the options available.

## SYSTEM MODE

When the instrument is first used, the **SYSTEM** mode should be used to set the preferred operating options:

- Use the $\Delta$ and $\nabla$ keys to scroll through the features.
- Use the $\blacktriangleleft$ and $\blacktriangleright$ keys to select the options.

- Press [**OK**] to accept the selections and return to **PHOTOMETER** mode. Select the language required from English, French, German, Spanish or Italian.
- Select the display units required from mg/l, ppm, mmol/l, µmol/l and g/l.
- Set the sample number option to 'On' to allow the entry of a sample number during normal photometer operation.
- Set the sample increment option to 'On' to automatically increase the sample number.
- Set the dilution factor to 'On' or 'Off'. If the dilution factor option is set to 'On', the instrument will allow the entry of a numerical factor which will be used in the calculation of the result to be displayed on the instrument.
- Select the preferred date format. The date may be shown in either Date/Month/Year or Month/Date/Year.
- To change the date and time, select the date and time line then key in correct setting using the numeric keys. To correct an error, use the $\blacktriangleleft$ and $\blacktriangleright$ keys to move the cursor then key in the correct data.

### System - Full Options

The 9500 features a wide range of options which may be explored at leisure to get the best from the instrument. An explanation of the application of these options is as follows :-

### View Log

The photometer has an internal memory which can hold up to 500 test results. Once the memory is full, each new result overwrites the oldest entry.

Select 'View Log' to view stored results on screen. The $\Delta$ and $\nabla$ keys may be used to scroll through the list of stored results. The 'Options' menu offers several choices.

Select 'Clear' to empty the memory. Confirmation is requested to avoid accidentally erasing the data. Select 'Exit' to return to **SYSTEM** mode. Select 'Download' to transmit stored data to a PC. This option only appears if the USB mode is set to 'COM Port'. Refer to 'Interface Connection and Data Memory' for further information.

**Back Light**

The graphic display features a backlight to enhance the display contrast. This may be switched off to conserve battery power.

**Language Options**

The photometer can be operated in a number of different languages. When a particular language is selected, the test names and operating commands will appear in that language. Certain tests and unit options are provided in accordance with the conventions of particular countries and are only available when the photometer is switched to the language concerned. Select the language required from English, French, German, Spanish or Italian.

**Units**

Units may be expressed in mg/l, ppm, mmol/l, µmol and g/l.

**Sample Number**

A unique number may be associated with each result record to identify it in the log. If Sample Number 'On' is selected, the user is offered the choice of entering a number of up to 10 digits for each sample reading. If this function is set to 'Off', a sample number is automatically allocated.

**Sample Number Increment**

The sample number increment option may be used to determine whether the instrument does or does not automatically increment the sample number after each test. Incrementation of the sample number may be used when the instrument is used for carrying out a series of similar tests. Alternatively it may be preferable not to increment the number if typical use involves carrying out a number of different tests on the same sample.

**Dilution Factor**

When samples are out of range for the test, a dilution procedure may be used. If the dilution factor option is set to 'On', the instrument will allow entry of a numerical factor which will be used in the calculation of the result displayed and stored in the log.

**Date and Time**

The instrument records the date and time of each reading taken and associates this with the data record in the log. To correct the date and time on the internal clock, select the date and time display line.

### Date Format

The option of day/month/year or month/day/year date format is available.

### Battery Level

A battery level indicates the remaining battery life. At least 3.0V is required for successful operation of the instrument.

### Locking System Mode Settings

It is possible to 'lock' the system settings so that these cannot be tampered with or altered accidentally during use. This may be important where it is necessary to verify tests have actually been carried out at a particular time or date, or where procedures always require the use of a sample number or dilution factor. Please request locking settings from environmental@ysi.com.

### Rounding

In the normal default setting, the photometer will round test results appropriately for the resolution of the test. The rounding applied differs for each parameter depending on the shape of the calibration curve. This ensures the optimum precision and accuracy of each test procedure. For normal purposes it is strongly recommended that the instrument be left in the default setting.

For certain analytical applications, however, it may be useful to switch off the rounding to display the result data in unrounded form. This may be the case, for example, when carrying out statistical evaluations of test methods where it is necessary to use the data in calculation of standard deviation or distribution data.

### Time-Out

As a power-saving measure the photometer automatically switches off five minutes after the last key is pressed.

The photometer may be switched to 'Long' time-out which allows 15 minutes before shut-down or 'Off' which allows continuous use. This is particularly useful when powering the instrument through the USB interface.

### Edit User Defined Tests

Users may wish to develop their own test methods and store calibrations on the photometer. The 9500 has the facility to store up to 30 user-defined calibrations. See 'User Defined Tests' below for full instructions.

**USB**

The USB interface allows communication between the instrument and a PC. There is a choice of two operating modes – Hard Drive and COM Port.

In **Hard Drive** mode, the instrument appears as a removable hard drive when connected to a PC. No additional software is required on computers running Windows 2000, ME or XP. Windows 98SE driver may be available from environmental@ysi.com.

In **COM Port** mode, the instrument behaves as if connected to the PC serial port via RS232. In this mode, the PC requires installation of a USB virtual COM Port driver, available from environmental@ysi.com.

See the section on 'Interface Connections and Data Memory' below for full instructions.

## INTERFACE CONNECTIONS AND DATA MEMORY

Stored data can be accessed by recall to the screen (see 'View Log'). Alternatively, data can be accessed using a PC :-

- Connect the instrument to the computer via the USB port using a USB cable.
- Turn the instrument ON and select **SYSTEM** mode from the 'Options' menu.
- Scroll to 'USB' and select either 'Hard Drive' or 'COM Port'.

**'Hard Drive'** – Once this option is selected, simply turning the instrument ON while it is connected to a PC will cause an extra hard drive containing the instrument files to appear on the PC. The log of test results is in text file – '9500_LOG.txt'. The other files shown on screen contain calibration and operating systems for use when upgrading the instrument and should be ignored.

The log file can be copied from the instrument by dragging between windows and once copied can be opened with many text editors, word processors or spreadsheet programs.

**Note: Deleting this file from the instrument's hard drive will clear the data from the instrument memory.**

**'COM Port'** – Once this option is selected, data can be downloaded from the instrument to the PC :-

- Open the 'Virtual COM Port – HyperTerminal' window on the computer.
- In the instrument **SYSTEM** mode, scroll to 'View Log' and select 'Download'.

The data from the log will appear on the PC screen and can be transferred to Windows' applications or printed as required.

# TAKING PHOTOMETER READINGS

The photometer is very simple to use. Intuitive screen prompts guide the user towards the test result.

## Program Numbers and Test Instructions

Each test is identified by a separate program number or named key. Program numbers are shown in test instruction sheets supplied with the instrument or reagent systems. For some tests, a choice of different programs is offered in order to give the option of the result in different forms (eg for Nitrate - $NO_3$ or Nitrate Nitrogen - $NO_3$-N).

In certain methods, the test can be continued to a further stage - for example in the tests free chlorine and total chlorine. This is accomplished in the programming of the photometer. In these tests, once the first stage result is obtained, the 'Follow-On' option may be selected to progress the test to the next program stage or stages and the result will be calculated automatically.

These continuation programs have their own program number for reference purposes although direct access to these programs may be restricted.

## Sample Dilution

The 9500 has a sample dilution option. This enables a factor to be entered when samples have been diluted to bring them within the measuring range of the test. For example if a five times dilution of the sample has been made, then the dilution factor x5 should be entered. The photometer will multiply the observed result by this factor so that the correct result for the original sample is displayed.

This option may be used in conjunction with the Dilution Tube which enables dilutions of x2, x3, x4, x5 and x10 to be made; or with Dilution Syringes which enable dilutions of up to x100 and xl000. Higher dilution factors may be entered subject to the limitation of the number of digits available on the result display for each test. When the display capabilities are exceeded, the symbol [xxx] will appear on the result display. The sample should not be diluted prior to carrying out a pH test, or Transmittance or Absorbance reading.

## Blank and Sample Tubes

A BLANK TUBE is needed each time the photometer is used. This enables the instrument to be set automatically and compensates for any inherent color in the test sample.

The BLANK TUBE is a test tube filled <u>only</u> with the sample being tested. It is important to use the actual sample to be tested to provide a true comparison for the test results.

The term 'SAMPLE TUBE' is used to describe the tube containing the sample <u>and</u> the reagents which have been added in accordance with the appropriate test instructions. This tube is used to take the photometer reading.

## Light Cap

A light cap is provided with the photometer. This cap fits over the test chamber and prevents excess light from reaching the photodiode.

It is <u>not</u> necessary to use the light cap when using the photometer indoors or under shaded outdoor light. The light cap should be used when working outdoors in strong sunlight. The light cap is also recommended when carrying out turbidity-based tests such as the cyanuric acid test or under bright lighting conditions. Test instructions indicate when the light cap should be used.
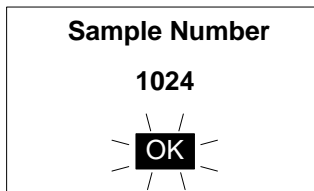
## Getting the Best Results

Success in obtaining accurate and consistent test results will depend on the care with which test procedures are carried out. Always follow the test instructions carefully and observe the stated standing periods and temperature conditions where applicable.

Wipe test tubes free from condensation before placing in the photometer. Test tubes should always be kept in a clean condition. Wash and dry carefully after use. Dirty tubes may be soaked in weak detergent solution if necessary. Tubes which become stained or scratched in use should be replaced.

## Taking Test Readings

1 Press ⏻ key. The instrument will beep and display the 'Choose a Test' menu box, with the last test program used highlighted as the active line.

   The cursor will flash on 'OK' in the options menu at the bottom of the screen.

   Press [**OK**] to accept this program and follow the on-screen instructions for the chosen test.

2 To choose a different test program, **either** use the ▲ and ▼ keys to scroll through the menu options, **or** use the numeric keys to enter the **Phot** number of the desired test. The four most recently used tests are listed at the top of the 'Choose a Test' screen for convenience.

   Press [**OK**] to accept the selected program.

3 If the sample number option is pre-selected, then the following display will appear, for example :-

```
┌─────────────────────────────┐
│      Sample Number          │
│                             │
│         1024                │
│                             │
│        ╲│╱                  │
│       ─ OK ─                │
│        ╱│╲                  │
└─────────────────────────────┘
```
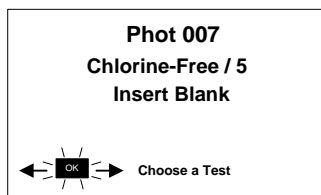
Enter or confirm the sample number (up to 10 digits), then press [**OK**].

4  If the dilution factor option is pre-selected, then the following display will appear :-

```
┌─────────────────────────────┐
│      Dilution Factor        │
│                             │
│          x 1                │
│                             │
│        ╲│╱                  │
│       ─ OK ─                │
│        ╱│╲                  │
└─────────────────────────────┘
```
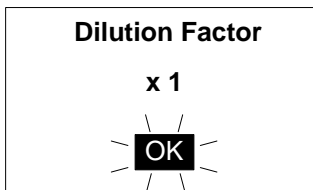
Press [**OK**] to accept the default value (x1, no dilution), or key in new dilution factor then press [**OK**].

5  The following display will now appear :-

```
┌─────────────────────────────┐
│        Phot 007             │
│     Chlorine-Free / 5       │
│      Insert Blank           │
│                             │
│  ◄─ ─ OK ─ ─►  Choose a Test│
└─────────────────────────────┘
```
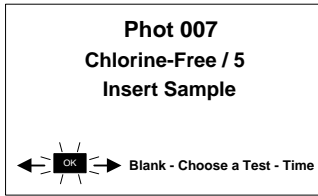
Place a **BLANK TUBE** in the test chamber, then press [**OK**].

If the instrument is in continuous use mode, it is advisable to re-blank from time to time.

**NOTE:** The instrument is designed to hold the blank setting as long as the instrument is switched on.  This stage will be omitted when further tests are being carried out.  However, when changing to a test which requires a colored or reagent blank, or uses a tube of a different diameter, the 'Insert Blank' prompt will be displayed.

6  The instrument will be set automatically, and after a few seconds the following display will appear :-

12

```
┌─────────────────────────────────┐
│          Phot 007               │
│      Chlorine-Free / 5          │
│        Insert Sample            │
│                                 │
│  ◄─ ▣OK ─►  Blank - Choose a Test - Time │
└─────────────────────────────────┘
```

Place **SAMPLE TUBE** (sample and reagent) in the test chamber, then press [**OK**].

7  The instrument will take the reading and display the result as follows, for example :-

```
┌─────────────────────────────────┐
│          Phot 007               │
│      Chlorine-Free / 5          │
│           1.00                  │
│         mg/l Cl₂                │
│ ◄─ Choose a Test ─► Read  Blank  Follow-On │
└─────────────────────────────────┘
```
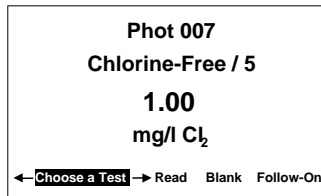
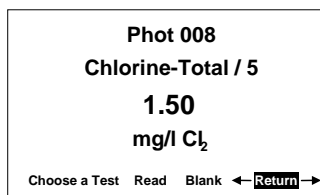The following symbols indicate the result is out of test range :-

Result is higher than range  **> >**

Result is lower than range  **< <**

8  The 'Options' menu at the bottom then offers the choice to :-

'Choose a Test'  - return to the menu of test programs and select another test

'Read'  - read further sample tubes of the currently selected test

'Blank'  - re-blank the instrument

'Follow-On'  - carry out a continuation test if available.

## Continuation Tests (*Certain Tests Only*)

1  Select 'Follow-On' and press [**OK**] during the result display period of the foregoing test stage.  The 'Insert Sample' screen will appear.

Place **SAMPLE TUBE** in the test chamber, then press [**OK**].

2  The instrument will take the reading and calculate the result from the combination of readings (where appropriate).  The result will be displayed:

```
┌─────────────────────────────────┐
│          Phot 008               │
│      Chlorine-Total / 5         │
│           1.50                  │
│         mg/l Cl₂                │
│ Choose a Test  Read  Blank ◄─ Return ─► │
└─────────────────────────────────┘
```

13

3  During the display period, the same options are available as at the end of a normal test program.  Select 'Return' from the 'options menu' to take the program back to the start of the first stage of a multiple test procedure to enable further samples to be tested for the same parameters.

Some continuation test procedures involve a standing period. The photometer may switch off automatically during this time. To avoid the instrument switching off, use the timer function to time any standing period.  The timer will over-ride the auto switch off function.

**Favorite Tests List**

The four most recently used tests are listed at the top of the 'Choose a Test' screen for convenience.

**Expressing Different Chemical Forms**

If the test result can be expressed in different chemical forms, the chemical symbol will have flashing $\triangle$ and $\triangledown$   to indicate this.  Use the the $\triangle$ and $\triangledown$ keys to step through the options available.

**Reading in Transmittance and Absorbance**

When taking readings in Transmittance or Absorbance mode, use the $\triangle$ and $\triangledown$ keys to step through the wavelengths until the required wavelength is reached.

**Timer**

The photometer features a countdown timer with alarm as an aid to carrying out test procedures.  The timer can be accessed at any time by selecting 'Timer' from the 'Options' menu.

The following display will appear :-
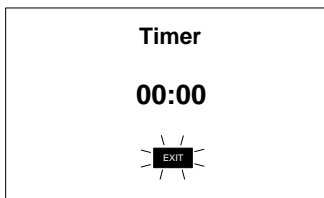


Key in the time required in minutes and seconds, maximum 29 minutes and 59 seconds, using the numerical keys, then press [**OK**] to start the timer.  Use the $\triangleleft$ and $\triangleright$ keys to reposition the cursor and re-enter the time if it is keyed in incorrectly.

14

The timer will count down, giving an audible alarm at the end of the timed period.  Press [**OK**] to stop the alarm.

During the timer countdown period, an 'Options' menu is available :-

Stop - to abort the timing operation, or stop the alarm at the end of the timed period

Exit - to return to the program screen to take readings.  The timer will continue to run and give an audible alarm at the end of the period.

Exit and Read - to return to the program screen with the timer counting down on screen - the instrument will automatically take a reading at the end of the timed period - no alarm will sound.

**User Defined Tests**

Users may wish to develop their own test methods and store the calibration data on the 9500 photometer.  This will allow direct reading of user tests.  The 9500 has the facility to store up to 30 user-defined calibrations.

To program user-defined calibrations :-

1 Turn the instrument 'ON', select 'System' menu and press [**OK**].  Scroll through the options to the USB entry and make sure the option is set to 'Com Port'.

2 At the PC, open the HyperTerminal connection for the 9500.

3 At the instrument, in the 'System' menu, select 'Edit User Defined Tests' and press [**OK**].  The instrument will display the tests already downloaded, or show 'LIST EMPTY'.

4 In the 'Options' menu, select [**Add**] to add a new test, or [**Edit**] to edit the test which is currently highlighted.  Change the highlighted test with △ and ▽ keys.  Press [**OK**].

5 The instrument displays a message box instructing the user to download the new or edited test file.

6 At the PC, download the calibration file from HyperTerminal using 'Transfer', 'Send Text File' and select the file to be downloaded.

7 The instrument will check the downloaded data.  If it is acceptable, it will display a message box 'Accepted' over the downloaded data.  If there are errors in the file, a list of errors will be displayed.  The user should edit the calibration file to correct the errors then re-send it.

8 Press [**OK**] to accept the test.  The instrument will change to the 'User Test List' screen (See 3), with a summary of the test displayed.  Press [**OK**] to accept the test and write to memory.  Select [**Cancel**] at any time to reject the calibration.

The format of the user calibration file is as follows :-

- The file must start with 'USER CALIBRATION' and end with 'END'.
- Test Number must be between 900-929 (30 tests).
- Test name, up to 18 characters.
- Units. Must be one of the following - mg/l, ppm, mmol/l, µmol/l or g/l.
- Wavelength. Choose one – 450 nm, 500 nm, 550 nm, 570 nm, 600 nm or 650 nm.
- Chemical symbols: up to 8 characters.
- Data pairs. Up to 10 pairs of data in the form :-
  ABSORBANCE x.xxx, CONCENTRATION *(Concentration may be up to five digits).*

An example is shown below :-
USER CALIBRATION
900
Chlorine
mmol/l
500nm
Cl2
0,0
0.174,0.50
0.481,1.50
0.733,2.50
0.854,3.00
1.022,4.00
1.086,4.50
1.187,5.00
END

## CARE AND MAINTENANCE

The photometer is designed to give long and trouble-free operation. Spills and moisture should be wiped off immediately with a dry cloth. Avoid solvents or abrasive materials be used to clean the instrument. Care should be taken to keep the test chamber clean.

### Cleaning the Optics

Any build-up of dirt or deposits may interrupt light transmission and affect readings. To clean the optics, undo the two screws on the bottom of the instrument and set aside to remove the optics base plate. Gently clean the internal surfaces of the optics with a soft, non-abrasive cloth. Deposits may be removed with a slightly dampened cotton ball. Replace the optics base plate and tighten the screws.

## SERVICE REQUIREMENT

The photometer is fitted with long-life light sources and contains no user-serviceable components beyond cleaning. If the instrument requires servicing or repair, this can be arranged through our Technical Support Department (+1 937 767-7241, (800) 897-4151, environmental@ysi.com or visit www.ysi.com to find an authorized service center).

## ERROR MESSAGES

The photometer will display an error message in the unlikely even of malfunction. These error messages are mainly designed to assist service staff in diagnosing instrument faults.  In the event of an error message appearing on the photometer display, contact our Technical Support Department for advice.

Error messages are coded 1 – 10.  Errors 1, 2, 3, 4, 5 and 6 are internal self-checks.  In the first instance, the user should change the instrument batteries.  If the error message still appears, it indicates a potential electronic issue with the instrument.

Errors 7, 8, 9 and 10 relate to blanking in the instrument.  In the first instance, the user should check operating technique and sample clarity.  If these are in order then these errors indicate a potential issue in the instrument optics.

## PHOTOMETER UPGRADE

It is now possible to upgrade the photometer with new test calibrations using a computer system.  This will ensure that users can always keep the instrument up-to-date with the latest tests.  Updates for the photometer can be supplied on disk or via the YSI web site (www.YSI.com).  No special computer software is required.  Full instructions will be supplied with the upgrade data.

## COMPUTER CONTROLLED OPERATION

The photometer can be controlled from a computer using suitable control software. Such software is available from software houses or from water treatment specialists to cover specific applications. These software programs typically instruct the photometer to go through a predetermined series of tests specific to that application, and then automatically receive data from the photometer and process the test results. The internal software of the photometer is able to receive computer commands to start new sample, receive test program number, receive sample number and instigate continuation test. Programmers requiring further details should contact YSI Technical Support.

# WARRANTY

The YSI photometers are warranted for one (1) year from date of purchase by the end user against defects in materials and workmanship, exclusive of batteries and any damaged caused by defective batteries. Within the warranty period, YSI will repair or replace, at its sole discretion, free of charge, any product that YSI determines to be covered by this warranty.

To exercise this warranty, write or call your local YSI representative, or contact YSI Customer Service in Yellow Springs, Ohio at 800-897-4151. Send the product and proof of purchase, transportation prepaid, to the Authorized Service Center selected by YSI. Repair or replacement will be made and the product returned, transportation prepaid. Repaired or replaced products are warranted for the balance of the original warranty period, or at least 90 days from date of repair or replacement.

Limitation of Warranty

This Warranty does not apply to any YSI product damage or failure caused by:

1) failure to install, operate or use the product in accordance with YSI's written instructions;
2) abuse or misuse of the product;
3) failure to maintain the product in accordance with YSI's written instructions or standard industry procedure;
4) any improper repairs to the product;
5) use by you of defective or improper components or parts in servicing or repairing the product;
6) modification of the product in any way not expressly authorized by YSI.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. YSI's LIABILITY UNDER THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT OF THE PRODUCT, AND THIS SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY DEFECTIVE PRODUCT COVERED BY THIS WARRANTY. IN NO EVENT SHALL YSI BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY DEFECTIVE PRODUCT COVERED BY THIS WARRANTY.