INSTRUCTION MANUAL

WaterWatch2950

Organic Pollution Monitor

partech

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1 Health and Safety Information

The following information is a guide and does not in anyway replace legal requirements for the handling of the equipment and chemicals or any safe working practise defined outside of this manual.

Care needs to be taken to ensure that the sensor assembly can be accessed safely for calibration and maintenance.

To ensure that our products are safe and without risk to health, the following must be noted:

1. The relevant sections of these instructions must be read carefully before proceeding.
2. Warning labels on containers and packaging must be observed.
3. Installation, operation, maintenance and servicing must only be carried out by suitably qualified personnel and in accordance with the information given.
4. Standard safety precautions must be taken to avoid the possibility of an accident occurring in conditions of high pressure and/or high temperature.
5. Chemicals should be stored appropriately and protected from temperature extremes. Follow normal safe handling procedures.
6. When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual may be obtained from:

Partech Electronics Ltd

111/113 Charlestown Road

Charlestown, St Austell

Cornwall PL25 3NN

United Kingdom

www.partech.co.uk

2 Manual Conventions

All dimensions stated in this manual are in millimetres (mm) unless otherwise stated.

The manual has been written on the basis that the user has a basic knowledge of instrumentation and an understanding of the type of measurement being made.

Training in the use of the ***WaterWatch2950 Monitor*** can be provided, please contact Partech for further information.

This manual covers two variations of the WaterWatch2000 Series:

- WaterWatch2950 – UV Organic Pollution Monitor.
- WaterWatch2950 – UV Organic Pollution Monitor with Data logging

3 Introduction

3.1 Organic Pollution Measurement

It is often important to make a continuous measurement of the organic pollution levels, often as COD (chemical oxygen demand) in water. The COD technique is not easily transferred to continuous online measurement and so ***WaterWatch System 2950*** has been developed as a means of providing a surrogate measurement. The chosen method to do this is to use an optical system that projects an Ultra-Violet light beam into a sample and measures the amount of light absorbed by the dissolved organic material present. ***WaterWatch System 2950*** uses a flowcell sensor that is designed to optimise the optical signals and eliminate drift. Measurements may be made on process water or effluent from a waste-water treatment works or manufacturing plant. Calibration of the instrument is carried out by making reference to laboratory values. An operator selectable conversion factor can then be entered via the keypad to produce the surrogate measurement value. The wide measurement range, combined with the ability to tolerate solids concentrations, allows this system to be applied to a wide range of applications.

In order to provide a reference point, ***WaterWatch 2950 Organic Pollution Monitor*** is factory calibrated by referring to a standard solution containing dissolved organic material at a known concentration. Calibrated using this solution the output is presented in mg/l of carbon equivalent. Once this standard calibration has been determined, a conversion factor can be entered into the software, using the keypad. This conversion factor can be programmed to provide output data in a range of units including COD mg/l, BOD mg/l and Dissolved Carbon. Details of the procedure for determining the conversion factor and entering it, are given later. For most applications, the pre-set values will be satisfactory.

3.2 Flow Cell System

A sample of the stream to be monitored is taken to the instrument header tank attached to the measurement cell. Excess sample is sent to drain whilst the constant head tank delivers a steady flow to the measurement cell. Pre-filtration can be included to remove large solids that may clog up the measurement cell.

3.3 Operating Principle

A Xenon light source shines light pulses into the sample and measures the light passing through the sample at 180º to the source. The cell is specially designed to eliminate stray light paths allowing low-level measurements (1mg/l resolution) as well as full-scale measurements to be made. The sensor is stable across the range and will not give false readings if the maximum value is exceeded. A multiple wavelength system is used to compensate for turbidity. The received light pulse is digitally scanned into memory and the shape and size of the pulse analysed by the microprocessor. The analyser computes the absorption characteristic of the sample and outputs the measured level. The conversion to surrogate COD levels assumes that the species measured by the sensor is directly proportional to the COD levels. In many specific processes where the contaminant is known this has been shown to be true.

3.4 Measurement Range and Resolution

The cell has a 4.9mm path length and will typically cover a range up to 500 mg/l COD for effluent monitoring. The range covered by the analogue output from the instrument can be set through the keypad using the SERVICE MODE software routines.

3.5 Conditioning the Sample

With all optical measurements the condition of the sample water is critical. In some cases the measurement may be taken from a fast-flowing stream that is turbulent and has entrained air. Selecting a take-off position out of the main flow can provide a more representative sample. Sample streams that have large solids material or “rags” may require a coarse-mesh pre-filtering guard. Once an air-free and consistent sample has been obtained the sensor will operate with only routine cleaning. A header tank/filter will remove small air bubbles.

3.6 Automatic Cleaning

The flow cell has an automatic cleaning system based on a mechanical wiper. The wiper keeps the optical parts of the flow cell free from contamination. The frequency of cleaning can be set through the software. Alarms and analogue output are ‘frozen’ during the cleaning cycle.

3.7 *WaterWatch* 2950

3.7.1 Overview

The System 2000 instruments are a range of high performance microprocessor based monitors and sensors designed to meet the need for water-quality monitoring and control.

The combination of the latest sensor design and established transmitter hardware and software results in a range of products that give long reliable service. The organic pollution monitors are designed to operate across the range of measurement from 1 mg/l upwards. Easy to operate and install, the instruments can be configured entirely via the keypad and display. There are a wide range of alarm and analogue output features integrated into the software.

3.7.2 Electronic Configuration

The monitors make use of a powerful high speed 8-bit microprocessor which uses an external EPROM for program storage. Critical data is held in a non-volatile EEPROM whilst battery backed RAM is used for short-term data storage. The system has a real-time clock for onboard and external function timing. The supervisor circuit (watchdog) monitors for power failures and 'stop' conditions. The ultra-violet absorption signals are converted to digital format using a 'flash' converter. The results are scanned at high speed into a block of memory, so that the pulse characteristics are stored for analysis.

A second microprocessor converts the stored data to calibrated units that are then passed to the primary instrument processor. The converted values are displayed and output via the analogue output. This is galvanically isolated and offers 4-20 mA output at 24 volts, driving into a 750 Ω load. A digital input is provided which can be configured to operate with normally closed or normally open contacts and functions as a sample flow failure alarm or remote system halt alarm. The loss of sample input, is triggered by an optical sensing device located in the instrument drain. Two alarm relays are provided which can be configured for upward or downward going latching or non-latching responses. In addition they can be set to be normally open or normally closed utilising the service routines.

3.7.3 Compliance with EMC Directives

All System 2000 instruments have been tested and conform to the required directives on EMC and carry the CE mark. In order to maintain this conformance after installation it is important to observe best practise for signal cabling by using screened cables and separating power and signal cables in cable trays and ducts.

3.7.4 Enclosure Specification

All System 2000 instruments are housed in a rugged plastic enclosure sealed to IP65/nema 4x and have a separate terminal enclosure. All connections are by, high quality, screw terminal connections. The front panel is also sealed to IP65 using an integral neoprene gasket seal. Terminations into the enclosure are by cable glands with 13mm holes for signal cables and 20mm hole for power cable. An additional outdoor enclosure is available offering weather and mechanical protection.

3.7.5 Data Logging (Optional)

The Data Card

The data is stored onto an SRAM PCMCIA memory card. This is a convenient method of collecting data and allows one card to be removed and replaced by a formatted card. Data can then be recovered in the office using the ***TimeTag*** software and the CS1300 reader unit. As standard the instrument is supplied with a card that has 256 k Byte capacity. This is sufficient for up to 4 weeks data at 15 minute intervals.

Inserting the Data Card

No special procedure is required. Check that the card is the right way up and the connection edge is being pushed in first. The green LED will illuminate when the card is correctly inserted. A red light indicates that the card has a fault such as a low battery.

Removing the Data Card

To remove the card first Press **<FN>** and remove card then Press **<ESC>.** This ensures that data is not written to the card as it is withdrawn.

Changing the Data Card Size

The data logging module is set for the card size in use. To alter this it is necessary to remove the front panel and gain access to the rear of the logging module. There is a rotary switch fitted labelled 0 to F.

**********WARNING**********

SWITCH OFF MAINS VOLTAGE

****

Select the card size to be used and set the switch according to this list.

0	**64K**
1	**128K**
2	**256K**
3	**512K**
4	**1Meg**
5	**2Meg**

Reassemble the front panel and switch on the unit. The new card size will be registered.

Data Format

Time, date, parameter and alarm status are output at an interval set using LOGGING MODE. This string can be collected on a purpose-built logger or any computer with a serial port. The string is transmitted at 9600 baud, 8 data bits and 1 stop bit. No parity. Only Rx, Tx and Gnd are supported.

The string consists of:

"TIME","DATE",S/S,pH,Temp,Flow,COD,(identifier)CRLF.

Reading the Data Card

Refer to the use of the ***TimeTag*** software and the CS1300 reader. The reader connects to a PC using the serial port. The card **cannot** be read using a standard PC card socket.

4 Installation

The Monitor and Flow-cell are provided on a back panel that will make installation quick and easy.

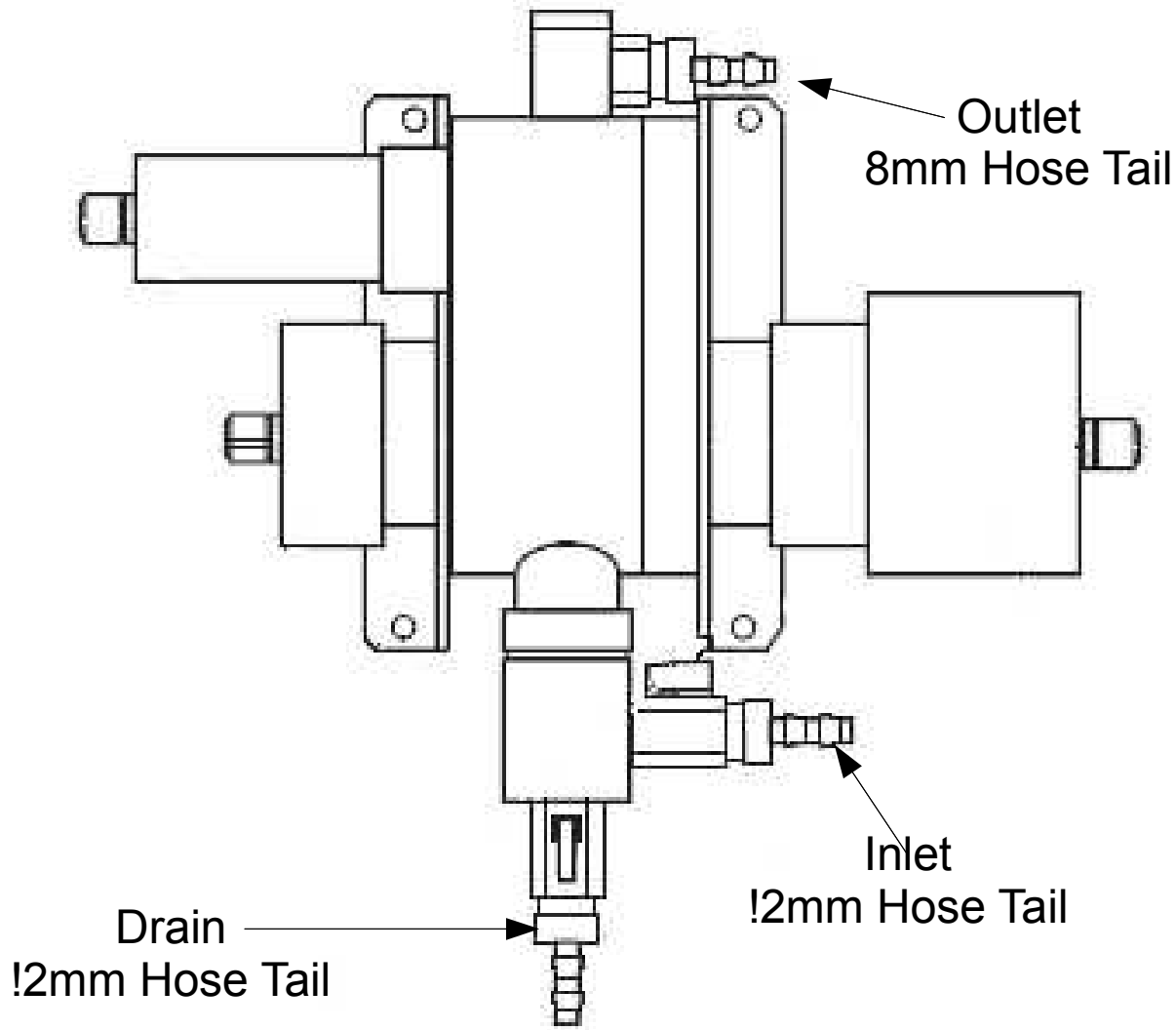
4.1 Installing the Panel

Attention should be given to preventing damage to the equipment by dropping, scraping or otherwise abusing it during the installation process. The equipment is ruggedly constructed but is not designed to take high levels of shock or impact. It is also advised that any protection film be left in place until installation is complete.

The panel should be fixed to the wall or other support in such a position to make reading the displays and operating the keypad convenient. Typically setting the unit at average eye level will be satisfactory. At the same time that the transmitter is screwed to the wall, it is advised, that a suitable switched and fused isolating box be installed close to the transmitter. This should be in a position, which allows the power to be switched off whilst standing in front of the unit.

For applications that are out of doors an additional enclosure is recommended to provide protection from weather and mechanical damage. Mount the equipment at a suitable height to allow servicing and viewing the displays, using the mounting holes provided.

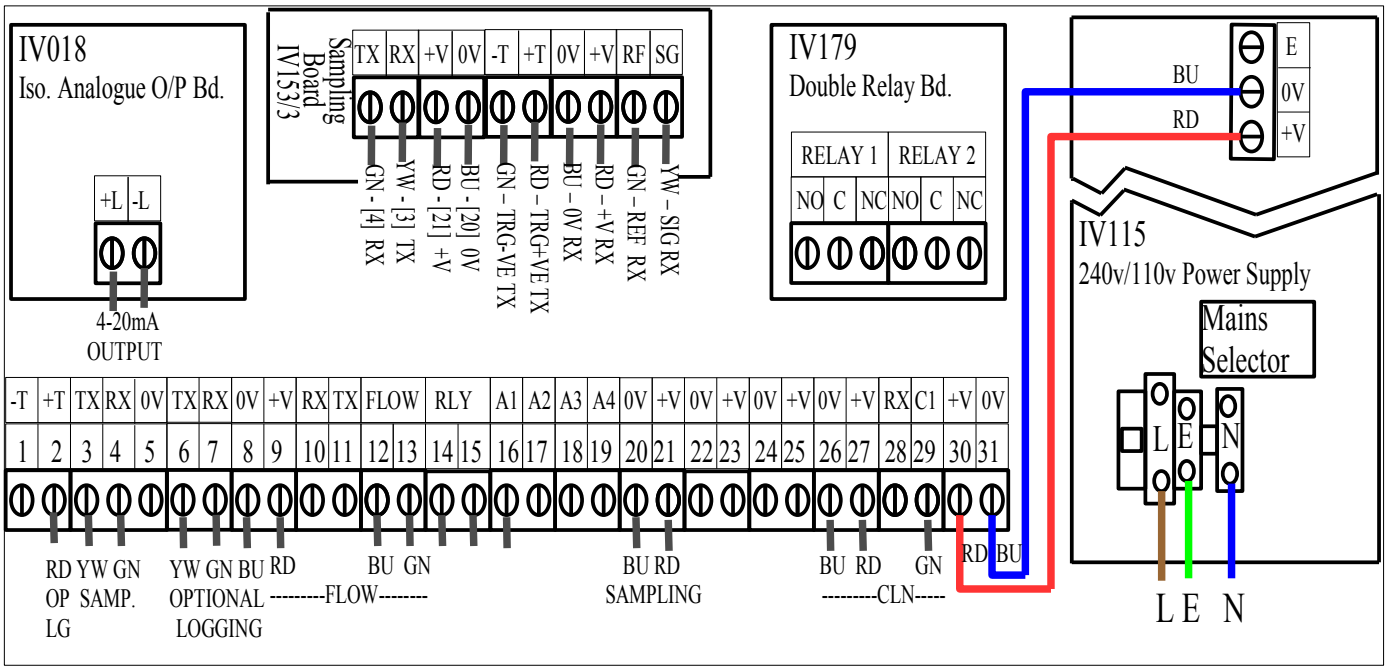
4.2 Connecting water supply



5 Electrical Connections

5.1 Electrical Connections to Flow Cell

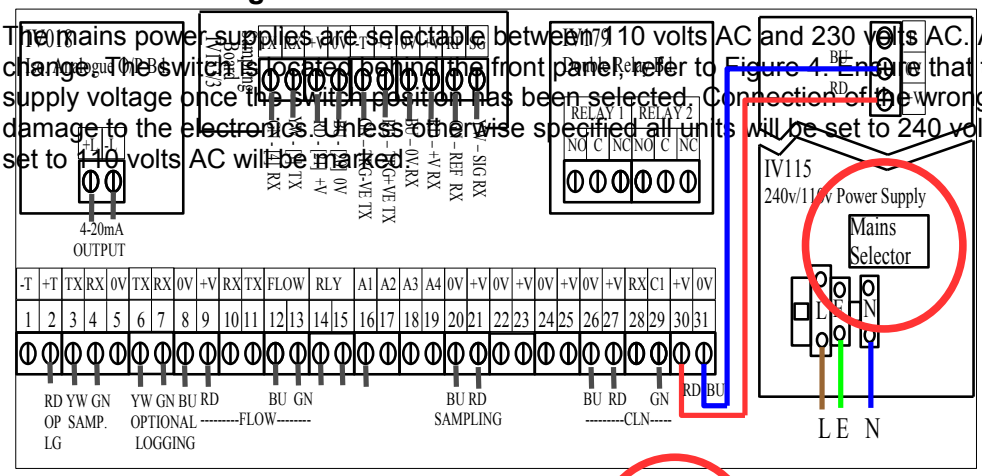
Electrical connections to the flow-cell are low voltage DC connections, so flexible conductors may be used. The sensor assembly is supplied with cable attached and this may be connected directly into the transmitter for most applications. Details of connections are shown below and within the instrument enclosure.

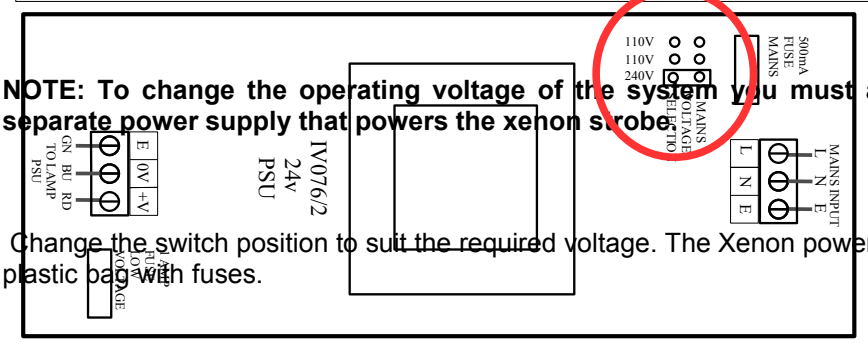


WaterWatch2950 Organic Pollution Monitor Connections.

5.2 Mains Voltage Selection

The mains power supplies are selectable between 110 volts AC and 230 volts AC. A switch is used to make the change. The switch is located behind the front panel, refer to Figure 4. Ensure that the unit is clearly marked with the supply voltage once the switch position has been selected. Connection of the wrong mains supply voltage can result in damage to the electronics. Unless otherwise specified all units will be set to 240 volts AC prior to leaving factory. Units set to 110 volts AC will be marked.





NOTE: To change the operating voltage of the system you must adjust both the main instrument and the separate power supply that powers the xenon strobe.

Change the switch position to suit the required voltage. The Xenon power supply utilises jumper links supplied in plastic bag with fuses.

WaterWatch2950 Organic Pollution Monitor Mains Voltage Selection

5.3 Electrical Power Connections to Monitor

When the ***WaterWatch 2950*** is supplied on a PVC back-board as shown in Figure 5, the power supply cables will be pre-wired and routed through conduit to the isolation switch.

When the instrument is not supplied on a PVC back-board, the mains power should be brought to a suitably fused and switched electrical isolator close to the right-hand side of the transmitter. Connection into the transmitter is made by a short length of double insulated flexible mains cable with standard colour coding. Blue is neutral, brown is live, yellow and green is earth. The earth is routed to all internal metal components at the factory. No metal components are directly accessible from outside the enclosure.

Nothing in this manual replaces the need to follow best practise or IEEE16th Edition of the Wiring Regulations for electrical installation and to follow site requirements.

**********WARNING**********

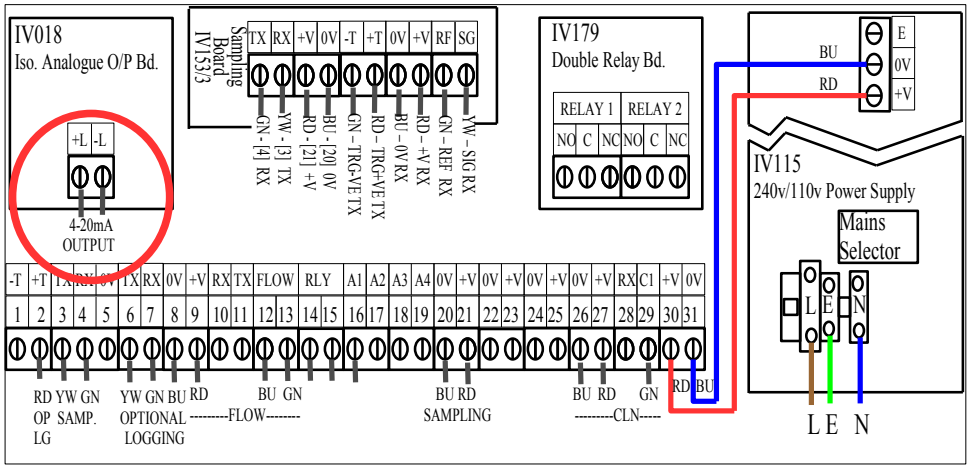
ISOLATE MAINS DURING INSTALLATION PROCEDURE

****

Remove the terminal enclosure cover. Route the mains cable through the right-hand cable gland to the screw terminals clearly marked with Live, Neutral and Earth. Refer also to the Figure 3. Ensure that the correct operating voltage has been selected. Ensure the correct operating voltage is displayed on the enclosure. Re-assemble the terminal cover to the box. Complete the termination of the mains supply cable into the isolating switch box.

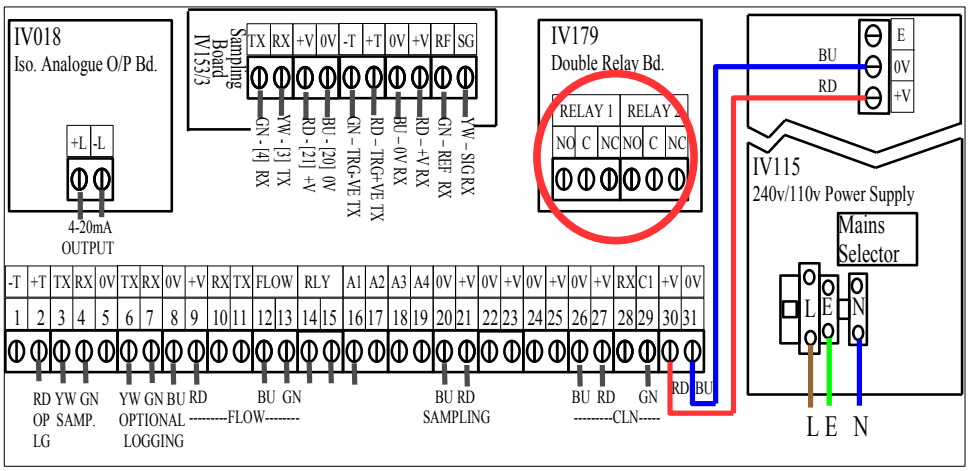
Terminate the second separate power supply in a similar manner.

5.4 Analogue Output Connections



The monitor has a 4-20mA analogue output located on an interface board plugged into the main processor board. The output is polarised +ve and -ve. It is important that the connections to the output are the right way round or readings will be incorrect. Connect to the analogue output by removing the lower termination enclosure. The analogue output terminals are marked (L+) and (L-). Use suitable twisted screened-pair signal cable for this circuit.

5.5 Alarm Relay Connections

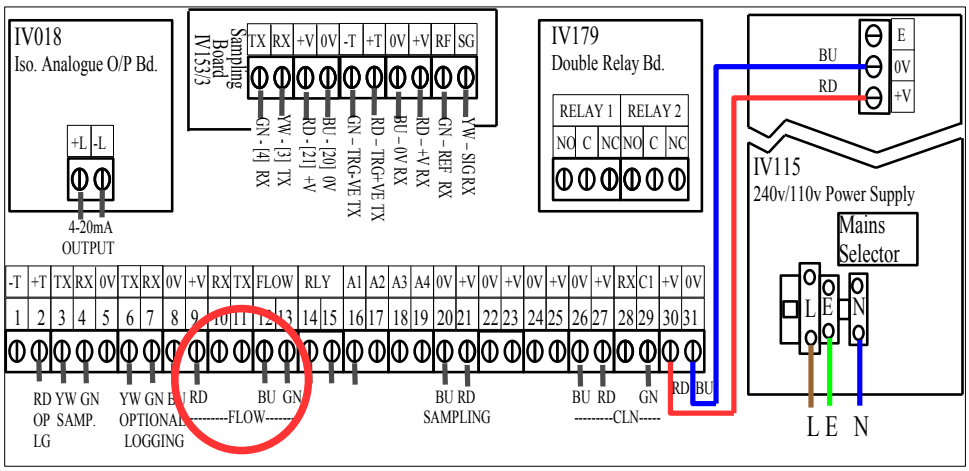


Two alarm relays are provided each having a 5A rating. Alarms can be connected using suitable signal cable.

WARNING - MAINS CONTROL VOLTAGE SHOULD NOT BE INTRODUCED INTO THE ENCLOSURE

Where control of mains circuits is required, slave relays should be used. Contact your supplier for more information on control options. The operating sense of the relays can be changed through the service routines within the software of the monitor.

5.6 Loss of Sample Alarm Connections



Where fitted, the flow-cell contains a switch to detect the loss of sample flow. This is an optical device and connects to the main PCB terminals. The loss of sample input is linked to Alarm 1 relay. The function of this alarm is setup through ALARM MODE. If this input is not required do not connect it and disable the alarm via the keypad. In the event of a loss of sample alarm, the analogue output is set to a default value. This value is set in SERVICE MODE, ANALOGUE OUTPUT.

6 Software Overview

6.1 Fuses

For mains input voltage the monitor is protected with a 500mA fuse. The Xenon Strobe supply is protected by two fuses rated at 1A and 500mA.

6.2 Low Voltage Operation

It is possible to operate System 2000 instruments from a range of low-voltage power supplies. Some special techniques may be needed to ensure that there is the required electrical isolation between multiple units if a common AC supply is used. For 24 volt AC or DC operation a special converter is used. This must be specified when ordering but can be retrofitted.

This section describes the function of all the software features in the WaterWatch2610 monitor; care must be taken when making changes to ensure that the analyser continues to operate in the manner expected.

Power On

When power is switched on, or after a mains power failure, the analyser will re-establish itself in the operating mode exactly as before power down. Set-up data is stored in non-volatile memory and will not be lost when powered is removed from the analyser.

Use of the Keyboard

The keyboard has five keys providing access to all the system functions. The **<FN>** key moves the software to the next menu option. The **<OK>** key selects a function or confirms an entry. **<ESC>** moves the routine back to the previous function. The **<UP ARROW>** increments a digit or toggles an option on and off. **<RIGHT ARROW>** moves the cursor to the next digit or selection position. The monitor uses a clicking sound to confirm the key action.

Displays

LED Display 

LCD Display 

The two displays work together to give a complete picture of the current value, alarm types, progress through cleaning and calibration and other information on the selected functions. The large red LED display will flash to indicate an alarm that has occurred that has forced the system to adopt default values.

Modes

Measure Mode

When the power is switched on the monitor will default to the normal running mode with the measured value displayed on the LED display and the channel information displayed on the two-line LCD display.

Press **<FN>** to move from one mode to the next mode.

The modes available on this monitor are:

- Alarm Mode

- Calibration Mode
- Misc Mode
- Service Mode

In measuring mode the software in the monitor is measuring the incoming sensor signals and temperature, carrying out checks on alarm levels, checking internal integrity and outputting the calculated analogue value. This is the routine to which the monitor will always default.

The monitor will default to Measure Mode if the keypad is not used for 60 seconds in all modes except Calibration where the delay is 240 seconds and when monitoring the current readings in Service mode where the monitor will not default to Measure Mode.

Alarm Mode

Pressing the **<FN>** key will step to the Alarm Mode. This mode allows the user to adjust the function of the process and system relays.

Calibration Mode

Pressing the <FN> key will step to the Calibration Mode. This mode requires the entry of a security passcode to gain access. The complete sequence of calibration and changing standards is available through this option.

Misc. Mode

Pressing the **<FN>** key will step to the Misc. Mode. This set of routines gives access to setting the clock, cleaning functions, signal damping and supply check.

Service Mode

Pressing the **<FN>** key will step to the Service Mode. Routines in the service mode are designed to help set-up the monitor when first installed and to offer fault finding information for service engineers. Entry is passcode protected. These routines allow the instrument configuration to be changed and should only be used by persons familiar with their operation.
Pressing the **<FN>** key will take the menu option back to ALARM MODE.
Press **<ESC>** to return to the MEASURING MODE.

7 Alarm Mode

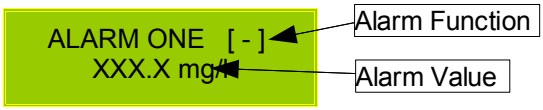
ALARM MODE

This mode selected with the **<OK>** key provides the facility for setting the levels, operating direction and latching/non-latching nature of the alarms. The alarms can be configured as normally opened or closed and powered on or off by selection in the software routines. The WaterWatch2950 monitor has two alarms. In all cases alarm values will only be updated when the **<OK>** key is pressed and the 'VALID' message returned. ALARM ONE operates Relay 1 and ALARM TWO Relay 2.

7.1 Alarm One

The alarm levels can be set to any value within the range of the measured parameter. The numerical value is selected using the **<RIGHT ARROW>** to move the cursor to the position to be changed, and the <**UP ARROW**> to increment a digit or toggle a function.

Unsuccessful alarm setting
An unsuccessful setting will be confirmed with the word INVALID. An INVALID setting is most likely if the value selected is not in logical sequence with the other alarm. i.e. Alarm One must be greater than Alarm Two.



The Alarm Function can be set in five modes:

- Upward going (Hi) non-latching [↑ small up arrow]
- Upward going (Hi) latching [↑large up arrow]
- Downward going (Lo) non-latching [↓small down arrow]
- Downward going (Lo) latching [↓large down arrow]
- Alarm off [- horizontal bar]

The options in the square brackets may be stepped through for as often as needed until the correct function is displayed. The cursor is moved using the **<RIGHT ARROW>** and the numeric value (in engineering units) is changed using the **<UP ARROW>.** Press **<OK>** to store the new alarm setting. The lower line of the LCD display will show 'VALID' if the entry has been accepted. If unsuccessful the display will show 'INVALID'.

Press the **<ESC>** key to revert to ALARM MODE, or the **<FN>** key will step to ALARM TWO:

7.2 Alarm Two

ALARM TWO [-]
XX.XX mg/l

This alarm operates in the same manner as ALARM ONE above.

Press the **<ESC>** key to revert to ALARM MODE, or the **<FN>** key will step to SAMPLE ALARM:

7.3 Sample Alarm

SAMPLE ALARM N.O	SAMPLE ALARM N.C	SAMPLE ALARM OFF

Each of the above screens shows the possible status for the SAMPLE ALARM input function: N.O. = Operating normally with open circuit contacts, N.C. = Operating normally with closed circuit contacts, OFF = Sample input will not be tested.

Remember
The sample alarm contacts refers to the status of the 'DIGITAL INPUT' terminals not the output relays.

Press the **<UP ARROW>** to scroll through the screens above and **<OK>** to accept the setting.

Cycle Freeze Option
If the DIGITAL INPUTS have been configured for 'the CYCLE FREEZE' function in SERVICE MODE / DIGITAL INPUT, the SAMPLE ALARM status above refers also to the condition of the incoming contacts that control this freeze function. Therefore instead of alarming when the contact conditions are met, in 'CYCLE FREEZE' mode the monitor will stop measurement and await the clearing of the 'FREEZE' signal.

Press the **<ESC>** key to revert to ALARM MODE or the **<FN>** key to go on to LAMP ALARM.

7.4 Lamp Alarm

LAMP ALARM - OFF	LAMP ALARM - ON

Each of the above screens shows the possible status for the LAMP ALARM function: OFF = Light source integrity will not be tested, ON = Light source will be checked against a zero value, which is not possible in normal measurement operation. (Calibration secondary standard excepted)

Press the **<UP ARROW>** to toggle the screens above and **<OK>** to accept the setting.

Cancelling Process Alarms
*If the alarm is set to non-latching it will cancel automatically once the level has descended or ascended past the alarm point. For latching alarms it is necessary to press the **<ESC>** key to cancel the alarm. In the event the alarm is cancelled while the value is still in an alarm condition the alarm will re-establish itself.*
Testing
The operation of the relays can be tested through SERVICE MODE / DIGITAL OUTPUT. See appropriate section.
Normally open or normally closed operation
For the purposes of the alarms, 'normally open' indicates a non-powered relay coil and normally closed a powered relay coil. The text labels on the PCB refer to the relay status in a powered down condition. The relay sense of the alarms can be determined in the SERVICE MODE / DIGITAL OUTPUT menu. See appropriate section.

Press the **<ESC>** key to revert to ALARM MODE or the **<FN>** key to go on to ALARM ONE again.

In ALARM MODE press the **<ESC>** key to revert to normal MEASUREMENT MODE or the **<FN>** key to progress to CALIBRATION MODE.

8 Calibration Mode

CALIBRATION MODE

In order to ensure the instrument is giving the best possible results it is necessary to carry out routine calibration of the sensors. The sensor is factory calibrated and routine calibration will be needed only occasionally. Potassium Hydrogen Phthalate solutions may be used and calibration is carried out with de-ionised water at zero and 100mg/l carbon equivalent at the span value. This calibration fixes the curve that is then used to generate the organic pollution conversions. The ***WaterWatch2950 Monitor*** allows calibration of the Dissolved Organics sensor using the techniques described below.

8.1 Frequency of Calibration

There is no absolute guide to the frequency of calibration. The sensor is inherently stable and validation of the operation of the instrument may be more of a requirement than re-calibration. The process is quick and simple so can be carried out routinely using the standard solutions.

To enter the calibration mode press the **<FN>** until CALIBRATION MODE is shown then press **<OK>**.

8.2 Calibration Code

CALIBRATION CODE
000

The first screen in CALIBRATION MODE requires the entry of a CALIBRATION CODE using the **<RIGHT ARROW>** and **<UP ARROW>** keys. The default calibration code is 321, unless changed in the SERVICE MODE by the user. A unsuccessful code entry will repeat the CALIBRATION CODE screen. A successful attempt will advance to:

8.3 Last Calibration Date

LAST CALIBRATION
XX/XX/XX

The date on which the last calibration was carried out is also stored and displayed. This date is shown whenever the CALIBRATION MODE is accessed. Press **<FN>** to toggle between CHANGE STANDARDS and CALIBRATE. Select CHANGE STANDARDS:

8.4 Change Standards

CHANGE STANDARDS

This screen gives access to setting the calibration standard. Press the **<OK>** key to enter:

LO STD. VALUE
0.0 mg/lC

The number displayed is the mg/l value of the low calibration standard chosen to validate the instrument. This value is normal set to zero and represents the value obtained from deionised water. To change and save this value the normal editing keys apply. An INVALID entry for this standard would exceed the maximum measurement value for the sensor. Press the <**ESC**> key to return to **CHANGE STANDARDS** or the <**FN**> key to progress to:

HIGH STD. VALUE
xxx mg/lC

The number displayed is the mg/l value of the low calibration standard chosen to validate the instrument. This value will depend on the range of the cell and for the standard instrument is normally set to 100mg/l. To change and save this value the normal editing keys apply. An INVALID entry for this standard would exceed the maximum measurement

value for the sensor. Press the <**FN**> key to return to **LOW STD** setting or the <**ESC**> key to return to **CHANGE STANDARDS.** From the **CHANGE STANDARDS** screen press **<FN>** key to display **CALIBRATE** screen.

8.5 Calibrate

CALIBRATE

Press **<OK>** to access the CALIBRATE options:

DISS. ORGANICS

This screen displays the parameter intended for calibration. If other channel options are available the <**FN**> key will scroll through the options. For the standard WW2950 monitor there is only one parameter option. Press the <**OK**> key to access:

Low Calibration

LOW CALIBRATION

NOTE: Carrying out calibration without fully cleaning the flow-cell can lead to major errors. The system is inherently stable and often a validation check will be sufficient.

Ensure that the flow cell is thoroughly clean and has been flushed through with de-ionised water. Fill the flow cell with de-ionised water. Press the **<OK>** key. The calibration sequence will commence and continue for approximately 60 seconds, during which time '**PLEASE WAIT**' will be displayed on the bottom line. The instrument will then store the calculated value. The display will change to the adjusted reading and should show zero or close to zero. The response **VALID** should be received. If **INVALID** is displayed the calibration attempt has been unsuccessful. Press **<FN>** to go to the next calibration routine.

Why INVALID?
If the magnitude of the mV reading acquired from the sensor is too far outside of the value expected for the media the sensor is measuring, then an INVALID message will result. Stored values from the last VALID calibration will still be current inside of the instrument. Please contact Partech Technical Support for advice about calibration.

Press <**ESC**> to return to **CALIBRATE** or **<FN>** to advance to:

High Calibration

HIGH CALIBRATION

Ensure that the flow-cell is thoroughly clean and has been flushed through with the high standard solution. Fill the flow-cell with the high calibration standard. (100mg/l Potassium Hydrogen Phthalate). Press the **<OK>** key. The calibration sequence will commence and continue for approximately 60 seconds, during which time '**PLEASE WAIT**' will be displayed on the bottom line. The instrument will store the calculated value. The display will change to the adjusted reading and should show the value of the high standard. The response **VALID** should be received. If **INVALID** is displayed the calibration attempt has been unsuccessful. Press **<FN>** to go back to the **LOW CALIBRATION** routine again, or <**ESC**> to return to **CALIBRATE**.

Press the <**ESC**> key to return to **CALIBRATION MODE**. Press the <**FN**> key to go to:

9 Misc. Mode

MISC. MODE

The **MISC**. **MODE** define range of functions including setting the clock, logging and cleaning interval can be set up in this mode.

This menu holds all the functions that may be required occasionally or during the initial installation period.

Select using **<FN>** and then press the **<OK>** key to select **MISC**. **MODE** and display the clock setting option.

9.1 Clock Setting

XX:XX XX/XX/XX
HIT > TO SET

This function allows the time and date to be set on the internal realtime clock. Press <RIGHT ARROW> to stop the clock and present the time and date digits for setting.

Use the **<RIGHT ARROW>** to move the cursor along to the digit to be altered.

Use the **<UP ARROW>** to increment the digit to the desired value.

When all the digits have been set use the **<OK>** key to store the values and start the clock running.

Press **<ESC>** to go back to **MISC. MODE** or **<FN>** to advance to:

9.2 Logging Mode

Please note: Although the screens can be accessed, the following logging options will only be supported if the logging hardware (PCMCIA logging module) has been specified when the instrument was supplied. It is also possible to connect the monitor to a PC to temporarily log data using an RS232 cable. Please contact Partech for further details.

LOGGING MODE

Sub-menu is accessed by pressing the **<OK>** key. The display will show:

Logging Status

LOGGING ON

LOGGING OFF

This shows the current status options for the monitors logging. The **<UP ARROW>** key toggles the selection between the two. If logging is 'ON' data will be stored onto the PCMCIA card at the end of each measurement cycle, the frequency of which is designated by the power up PCB. The setting of the logging status does not affect the storage of data on the modem module or the email functions. The **<OK>** key will store the status. Pressing <ESC> again will return to the LOGGING MODE. Press the **<FN>** key to advance to CLEANING MODE.

9.3 Cleaning Mode

CLEANING MODE

The WW2950 flow cell is equipped with a cleaning option. Press **<OK>** to access the first option:

This next screen will display the current status of the automatic cleaning; either **CLEANING ON** or **CLEANING OFF**.

Press the <**UP ARROW**> to toggle between the two options and <**OK**> to store the status. If **CLEANING OFF** is selected then the <**FN**> will not advance any further into the sub-menu. With **CLEANING ON** selected the <**FN**> key will access:

9.4 Cleaning Interval

This optional allows you set the interval between clean cycles. Use the **<RIGHT ARROW>** to move the cursor along to the digit to be altered. Use the **<UP ARROW>** to increment the digit to the desired value. The interval can be set in hours [H], minutes [M] or seconds [S].

When all the digits have been set use the **<OK>** key

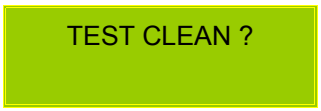
Press **<FN>** to go to the next menu option or **<ESC>** to return to the previous menu.

9.5 Clean Hold

This optional allows you set the length of time the displayed reading is held following a clean cycle. This value can be set using the **<RIGHT ARROW>** to move the cursor along to the digit to be altered. Use the **<UP ARROW>** to increment the digit to the desired value. The interval can be set in seconds.

Press **<FN>** to go to the next menu option or **<ESC>** to return to the previous menu.

9.6 Test clean



This option allows you to test the clean cycle. Press the **<OK>** key

The wiper module will perform on cycle whilst displaying the message ‘CLEANING’

Press **<ESC>** to return to the previous menu, **<FN>** to access:

9.7 Damping Value

In order to suppress the influence of short-term variations in the sample, special software has been incorporated to provide a damping effect on the displayed value and loop output.

Setting this to a value greater than one (1) can prevent short-term fluctuations in the signal from being re-transmitted. The DAMPING VALUE can be set between 1 and 50 but always use the lowest value that returns a suitable output.

A damping value of 1 means the readings is updated once per second. For values higher than 1 the monitor performs a rolling average of the number of values selected. Therefore a damping value of 25 means the output is the rolling average over 25 seconds.

Select the digit to be changed using the **<RIGHT ARROW>** and increment the value using the up arrow. Confirm the new value for storage using the **<OK>** key.

Press **<FN>** to go to the next menu option or **<ESC>** to return to previous menu.

9.8 Supply Voltage

This option displays the low voltage supply within the instrument and can be used for fault finding.

Press the **<ESC>** key to return to **MISC. MODE** or the **<FN>** key to access the CLOCK SETTING again.

With **MISC MODE** displayed press **<FN>** to access **SERVICE MODE**.

10 Service Mode

SERVICE MODE

SERVICE MODE is generally only accessed during set-up and commissioning although from time to time changes may be made to the analogue output or system settings. Always be careful to understand the consequence of changing values in this mode as they can impact on the operation of the equipment. A 4-digit security code is used to prevent unauthorised access to the service parameters. Press **<FN>** to go to **SERVICE MODE**. Press **<OK>** and the screen will request the four-digit password.

PASSWORD
2000

Insert the code using the arrow keys and press **<OK>** again. A successful completion of the code will display the first option:

10.1 Analogue Input

ANALOGUE INPUT

Care should be exercised as routines in this option can override calibration values.

Press **<OK>** and the screen will confirm the channel identification. As this is a single channel monitor, pressing **<FN>** will not select an alternative channel unless the Turbidity option is enabled later in the **SERVICE MODE**.

10.1.1 Dissolved Organics

DISS. ORGANICS

Press **<OK>** again to select the first screen:

10.1.2 Real-Time Reading

S=4000 R=4400
(PEAK)S=59, R=59

This screen displays the raw values as received through the optical filters. The values will be refreshed approximately every 7 seconds, on each flash of the xenon lamp. On entering this mode the message **INTERROGATE** will be displayed on the top line until the first reading has been received and evaluated. The diagnostic screen is explained thus: The top line represents the total area under the curve reading from each light path. The 'S' is the signal or 254nm reading and the 'R' is the reference or 400nm reading. In deionised water these should be around the 4000 mark with the 'R' value a little larger than the 'S'. The bottom line are the peaks for each of the paths. Again in deionised water they should be similar, at about 59/60. The absolute maximum for these peaks are 63. If 64 is displayed then the received values are being 'clipped' and significant inaccuracies in the readings will be the result. The main reason for clipping is the ageing of the filters in the receive housing, which is allowing more visible light through as the filter coatings degrade. Please contact Partech technical support if more information is required about this diagnostic screen or problems with calibration are being experienced.

Press the <**ESC**> key to return to **ANALOGUE INPUT** or the <**FN**> key to go to:

10.1.3 Reference Total Low Value

REF. TOTAL LOW
4400

This screen displays the value of the reference path during low calibration (with deionised water in the cell). Although editable through the keypad in the normal manner it is not recommended to interfere with any of the following calibration settings unless as a temporary fix prior to a full service visit and calibration. If in doubt please contact Partech technical support.

Press the <**ESC**> key to return to **ANALOGUE INPUT** or the <**FN**> key to go to:

10.1.4 Signal Total Low Value

This screen displays the value of the signal path during low calibration (with deionised water in the cell).

Press the <**ESC**> key to return to **ANALOGUE INPUT** or the <**FN**> key to go to:

10.1.5 Reference Total High

This screen displays the value of the reference path during high calibration (with the high standard in the cell). It should be the same or almost the same value as the **REF. TOTAL LOW** above.

Press the <**ESC**> key to return to **ANALOGUE INPUT** or the <**FN**> key to go to:

10.1.6 Signal Total High

This screen displays the value of the signal path during high calibration (with the high standard in the cell). This will be the attenuated value due to the organic carbon present in the calibration solution. Normally expected at around 900-1100 using default standard values.

Press the <**ESC**> key to return to **ANALOGUE INPUT** or the <**FN**> key to go to:

10.1.7 Reference Peak Low Value

This screen displays the peak value of the reference path during low calibration (with deionised water in the cell). Remember this value should never read 64. If this problem is experienced contact Partech technical support.

Press the <**ESC**> key to return to **ANALOGUE INPUT** or the <**FN**> key to go to:

10.1.8 Signal Peak Low Value

This screen displays the peak value of the signal path during low calibration (with deionised water in the cell).

Press the <**ESC**> key to return to **ANALOGUE INPUT** or the <**FN**> key to go to:

10.1.9 Reference Peak High

REF. PEAK HIGH
59

This screen displays the value of the reference path during high calibration (with the high standard in the cell). It should be the same value as the **REF. PEAK LOW** above.

Press the <**ESC**> key to return to **ANALOGUE INPUT** or the <**FN**> key to go to:

10.1.10 Signal Peak High

SIG. PEAK HIGH
10

This screen displays the peak value of the signal path during high calibration (with the high standard in the cell). This will be the attenuated value due to the organic carbon present in the calibration solution. Normally expected at around 8-15 using default standard values. If this reading is high, then this indicates visible light breakthrough and replacement filters should be considered.

Press the <**ESC**> key to return to **ANALOGUE INPUT** or the <**FN**> key to go to:

10.1.11 Low Standard Value

LOW STD. VALUE
0.0 mg/l

This setting will configure the value in engineering units that equates to the 'LOW mV value set earlier. Standard editing procedure applies.

Press the <**ESC**> key to return to **ANALOGUE INPUT** or the <**FN**> key to go to:

10.1.12 High Standard Value

HIGH STD. VALUE
100 mg/l

This setting will configure the value in engineering units that equates to the 'HIGH mV' value set earlier. Standard editing procedure applies.

Press the <**ESC**> key to return to **ANALOGUE INPUT** or the <**FN**> key to go to the first **REAL-TIME READING** option again.

With **ANALOGUE INPUT** displayed press the <**ESC**> key to return to **SERVICE MODE** or the <**FN**> key to access:

10.2 Analogue Output

ANALOGUE OUTPUT

The value generated by the measurement is converted to an analogue output spanning between 4 and 20mA. The values for the 4mA position and 20mA position can be entered via the keypad.

Press **<OK>** to access the options:

10.2.1 Loop O/P Min

LOOP O/P MIN
X FTU

This allows the user to set the 4.00 mA value in engineering units. The usual editing keys apply. Press the **<ESC>** key to return to the 'ANALOGUE OUTPUT ' screen. Press the **<FN>** key to go to the next option:

10.2.2 Loop O/P Max

LOOP O/P MAX
XXX FTU

This allows the user to set the 20.00 mA value in engineering units. The usual editing keys apply. Press the **<ESC>** key to return to the 'ANALOGUE OUTPUT ' screen. Press the **<FN>** key to go to the next option:

10.2.3 Loop O/P Min. Bit

LOOP O/P MIN BIT
XXX

This option allows the span of the Digital to Analogue converter to be adjusted and should only be accessed by a qualified service engineer. If the 4 mA value needs to be corrected increasing this number will increase the mA output for 4 mA and decreasing the number will reduce the 4 mA value. The usual editing keys apply. Press the **<ESC>** key to return to the 'ANALOGUE OUTPUT ' screen. Press the **<FN>** key to go to the next option:

10.2.4 Loop O/P Max. Bit

LOOP O/P MAX BIT
XXXX

This option allows the span of the Digital to Analogue converter to be adjusted and should only be accessed by a qualified service engineer. If the 20 mA value needs to be corrected increasing this number will increase the mA output for 20 mA and decreasing the number will reduce the 20 mA value. The usual editing keys apply. Press the **<ESC>** key to return to the 'ANALOGUE OUTPUT ' screen. Press the **<FN>** key to go to the next option:

LOOP O/P MIN BIT & MAX BIT *– What do the numbers represent?*
The output is scaled between 0 and 1023 (10 bits). This means that 0 will output 0mA and 1023 will output 20mA. Using any proportion of this scale will allow the limits of the loop to be modified. Note: If a smaller proportion of the scale is utilised remember the resolution of the output will also be reduced.
*Example: A dosing pump requires a 0 to 10mA input. The limit values are calculated using the formula (x/20)*1023 where 'x' is the desired current value. Therefore the lower limit should be set at (0/20)*1023 = 0 and the upper limit set at (10/20)*1023 = 512. The step size for this scaling will be 0.02mA.*

10.2.5 Loop O/P Test

LOOP O/P TEST
XXX FTU

The current output loop may be set in real time for test purposes; the FTU value entered will be converted to a mA output in proportion to the range set in the instrument. Normal editing keys apply. When the value has been entered, press **<OK>** - the value will be transmitted. Press the **<ESC>** key to return to the 'ANALOGUE OUTPUT ' screen. Press the **<FN>** key to go to the next option:

10.2.6 Default O/P

In some applications it is desirable to force the output loop to a safe value during a System Alarm condition. This option allows that default value to be defined. Normal editing keys apply.

Press the **<ESC>** key to return to the 'ANALOGUE OUTPUT ' screen. Press the **<FN>** key to go to the first Loop O/P Min again.

With ANALOGUE OUTPUT displayed, press **<FN>** to access:

10.3 Digital Input

This sub menu allows the digital input to be configured and tested. Press **<OK>** to access.

10.3.1 Digital Input Function

This screen displays the current function of the digital input. Press the **<UP ARROW>** to toggle between the two options above, and **<OK>** to store.

Cycle Freeze I/P

This function allows the status of the digital input to control the measurement of the sensor. If enabled and the input is 'True' then the 2300 monitor will effectively go into standby mode: The sensor optics will be retracted (as in half a clean) and the display will show:

As soon as the freeze input reverts to 'False' the sensor optics will be deployed ready for measurement and the display will show values as normal. The 'True' or 'False' status of the input is decided by the SAMPLE ALARM XX setting in ALARM MODE. The sense selected represents the 'True' state of the input where the 'Freeze' function is exerted.

Sample Alarm I/P

This function allows the user to activate the sample alarm input. This can be connected to a set of contacts that indicate that flow is or isn't present. The sense at which an alarm condition is exerted is defined by the SAMPLE ALARM XX setting in ALARM MODE. A suitable flow alarm can be provided by Partech. Please contact Partech for details.

Press **<ESC>** to return to DIGITAL INPUT, or **<FN>** to access:

10.3.2 Digital I/P Test

The above screens display the current status of the digital inputs. This is ideal for testing the functionality of contacts feeding the 2300 monitor. Press **<ESC>** to return to DIGITAL INPUT, or **<FN>** to access Digital input function again.

With DIGITAL INPUT on display press **<ESC>** to return to SERVICE MODE or **<FN>** to access:

10.4 Digital Output

This sub menu allows the digital output to be configured and tested. Press <OK> to access:

10.4.1 Relay Sense

The above screens show the current status of the relay sense. Press the **<UP ARROW>** to toggle between the two options above, and **<OK>** to store. The sense indicates the relay condition when operating in normal (or non-alarmed) mode. N/O indicates 'Normally Open' which represents the relay coil not powered. N/C indicates 'Normally Closed' which represents the relay coil powered, and is regarded as the preferred 'fail safe' method to configure alarm relays. Press **<ESC>** to return to DIGITAL OUTPUT, or **<FN>** to access:

10.4.2 Relay Testing

The above screens are toggled using the **<UP ARROW>** and portray the actual status of the selected relay. This feature offers the commissioning engineer the opportunity to test the relay telemetry manually. Relays will revert under program control once the monitor is in measurement mode again. Press **<ESC>** to return to **DIGITAL OUTPUT**, or **<FN>** to access the Relay Sense setting again.

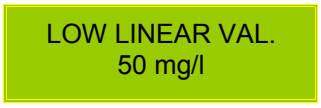
With **DIGITAL OUTPUT** displayed press **<ESC>** to return to **SERVICE MODE** or **<FN>** to access:

10.5 Linearise Mode

Linearisation mode is used to compensate for non-linearities in the measures light paths. In practice slight deviations in the response are experienced which can be effect the readings as the measurement moves away from the calibration points. The two linearisation values 'tweak' the readings using coefficient values above and below the high calibration standard. This procedure would have been done prior to dispatch from the factory. It is not normally expected to carry out this procedure unless there has been a hardware change within the flow cell. For example if a new receive module has been fitted with new optical filters then a linearisation would be indicated. Also if degradation of the optical filters is expected then this linearisation procedure will extend the valid working life of the receive module before replacement is essential.

Press <**ESC**> to return to **SERVICE MODE** or <**OK**> to access sub-menu:

10.5.1 Low Linearise Value



This screen displays the current standard solution used to linearise the readings below the calibration standard. Typically this will be midway between between zero and the high calibration standard. Normal keypad editing are supported. It is obvious that values above the high calibration standard cannot be entered; an **INVALID** message will result if this is attempted. Press <**ESC**> key to return to **LINEARISE MODE** or the <**FN**> key to access:

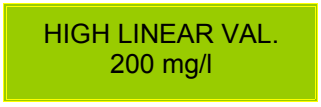
10.5.2 Low Linearise

This screen gives the option to enter into a new low linearisation using a solution of the value entered above in the **LOW LINEAR VAL**. If undergoing a new linearisation it is important to observe all the procedures for avoiding contamination and ensuring a clean cell as described in the **CALIBRATION MODE** above. Ensure that the flow-cell is thoroughly clean and has been flushed through with the linearisation standard solution. Fill the flow-cell with the low linearise standard. (50mg/l Potassium Hydrogen Phthalate). Press the **<OK>** key. The linearisation sequence will commence and continue for approximately 60 seconds, during which time '**PLEASE WAIT**' will be displayed on the bottom line. The instrument will store the new calculated low coefficient value. The response **VALID** should be received. If **INVALID** is displayed the linearisation attempt has been unsuccessful. Usually indicated by the calculated value outside normal accepted parameters: Most likely caused by degraded optical filters. Press **<ESC>** to go back to the **LINEARISE MODE,** or <**FN**> to go on to:

10.5.3 Low Linear Coefficient

This screen displays the current Low Linear Coefficient. If a low linearisation has just been completed this will be the new resultant value. A value of 1.00 will have no effect on the reading. A value greater than 1.00 will augment the reading while a value below 1.00 will suppress it. The strength of this coefficient is dependant on the distance of the reading from the calibration standards. The value can be changed using the normal editing keys, but it is not recommended to override the linearisation results unless the value is known for the current emitter receive pairing. Press **<ESC>** to go back to the **LINEARISE MODE,** or <**FN**> to go on to:

10.5.4 High Linearise Value



This screen displays the current standard solution used to linearise the readings above the calibration standard. Typically this will be twice the high calibration standard. Normal keypad editing are supported. It is obvious that values above the maximum range for the instrument cannot be entered; an **INVALID** message will result if this is attempted. Press <**ESC**> key to return to **LINEARISE MODE** or the <**FN**> key to access:

10.5.5 High Linearise

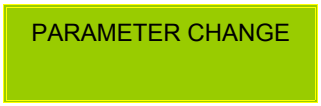
This screen gives the option to enter into a new high linearisation using a solution of the value entered above in the **HIGH LINEAR VAL**. If undergoing a new linearisation it is important to observe all the procedures for avoiding contamination and ensuring a clean cell as described in the **CALIBRATION MODE** above. Ensure that the flow-cell is thoroughly clean and has been flushed through with the linearisation standard solution. Fill the flow-cell with the high linearise standard. (200mg/l Potassium Hydrogen Phthalate). Press the **<OK>** key. The linearisation sequence will commence and continue for approximately 60 seconds, during which time '**PLEASE WAIT**' will be displayed on the bottom line. The instrument will store the new calculated low coefficient value. The response **VALID** should be received. If **INVALID** is displayed the linearisation attempt has been unsuccessful. Usually indicated by the calculated value outside normal accepted parameters: Most likely caused by degraded optical filters. Press **<ESC>** to go back to the **LINEARISE MODE,** or <**FN**> to go on to:

10.5.6 High Linear Coefficient

This screen displays the current High Linear Coefficient. If a high linearisation has just been completed this will be the new resultant value. A value of 1.00 will have no effect on the reading. A value greater than 1.00 will augment the reading while a value below 1.00 will suppress it. The strength of this coefficient is dependant on the distance of the reading from the calibration standards. The value can be changed using the normal editing keys, but it is not recommended to override the linearisation results unless the value is known for the current emitter receive pairing. Press **<ESC>** to go back to the **LINEARISE MODE,** or <**FN**> to go to the first linearisation option again.

With **LINEARISE MODE** displayed on the screen, press the <**ESC**> key to return to **SERVICE MODE** or the <**FN**> key to access:

10.6 Parameter Change

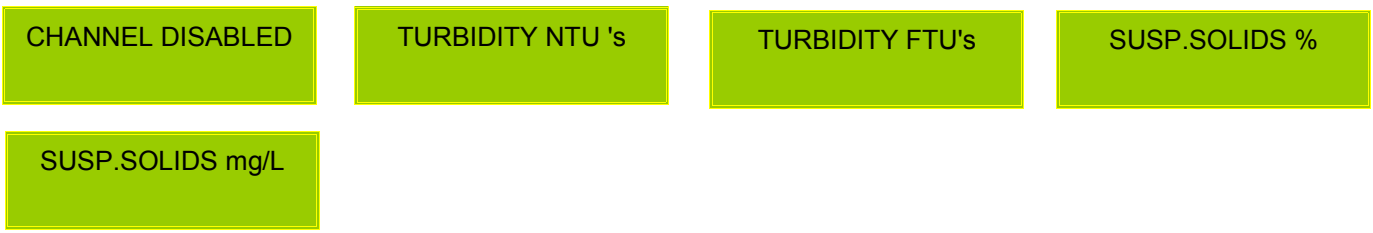


The primary measurement for the WW2950 is dissolved organics as carbon. It is possible to show surrogate measurements as the main displayed parameter which have been derived form this primary measurement. All the surrogates will use a predetermined set of coefficients that are applied to the reading to convert it into the appropriate engineering units. Press the <**OK**> key to access the sub-menu.

Pressing the <**FN**> key will scroll through the above parameter list. Pressing the <**OK**> key will accept the current selection. Please note that calibration is still carried out using the primary mg/l carbon regardless of the surrogate measurement units selected. Press the <**ESC**> key to return to **PARAMETER CHANGE** and the <**FN**> key to go on to:

10.7 Turbidity Mode

Under high conditions of Turbidity the accuracy of the organics reading will suffer. Within normal operating mode solids within the cell will be compensated for by the existing optics. It is possible to enhance this process if levels of Turbidity higher than 100NTU are being experienced. The Turbidity Mode enables a 4-20mA input from a separate Turbidity or Suspended Solids monitor to be used within the organic calculations, and increase the relevance of the readings. In order to support this feature an extra current interface will need to be installed within the monitor. This is normally specified with original order. Please contact Partech Technical Support for details. Press <**OK**> to access options:



Pressing the <**FN**> key will scroll through the above parameter list. Pressing the <**OK**> key will accept the current selection. Please note that access to the scaling for each of the above parameters is available through the **SERVICE MODE/ANALOGUE INPUT/TURBIDITY.** If the channel is disabled this Turbidity setting is not accessible within **SERVICE MODE.** Press the <**ESC**> key to return to **TURBIDITY MODE** and the <**FN**> key to go on to:

10.8 Calibration Code

This option allows the Calibration Code to be read and changed. Normal editing keys apply. Confirm the new code using the **<OK>** key.

Press **<ESC>** to return to **SERVICE MODE** or **<FN>** to access:

10.9 Reference Factor

The reference factor adjusts the raw value from the reference optical path to compensate for differences in the attenuation of the two light paths due to particle absorption. The algorithm used looks at the value stored during the calibration with deionised water and applies the factor on the difference between the this and the current value. It effectively strengthens the attenuation on this reference path relative to the factor value. A value of zero has no effect on the reference reading, a value of 1 would effectively double the attenuation applied. Use this factor cautiously as uninformed use can seriously affect the monitors accuracy. Usual editing keys apply to changing this factor.

Press **<ESC>** to return to **SERVICE MODE** or **<FN>** to access:

10.10 Slope Factor

The slope factor is applied to the final reading and is usually derived from the measured units currently displayed. This factor is changed if the displayed measurement units are altered in the **PARAMETER CHANGE** function above. Direct editing of the value can also be achieved using the normal editing keys.

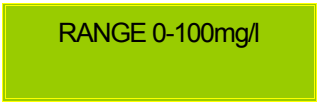
To use this factor effectively for **BOD/COD** for example it is necessary to apply a value derived from actual local conditions. While the instrument is online and measuring take a sample of the effluent and note the instrument reading. Carry out lab tests to determine the actual value of mg/l **COD/BOD** for the sample taken.

Calculate the conversion factor from the formula **lab value ÷ instrument value.**

Press **<ESC>** to return to **SERVICE MODE** or **<FN>** to access:

10.11 Range Change

This menu is to ensure calibration and other critical settings in the monitor match the supplied flow cell range. Access to sub-menu is achieved through the <**OK**> key.



Pressing the <**FN**> key will toggle between the above range options. Please note that you cannot arbitrarily change these settings without having the appropriate flow cell fitted. Press <**OK**> to accept selected range.

Press **<ESC>** to return to **SERVICE MODE** or **<FN>** to access the **REAL-TIME READING** option again.

11 Maintenance

Routine maintenance of organic pollution sensors is largely limited to cleaning and visual inspection of the windows. After extended periods of operation the sensor may need to be re-calibrated by a factory trained technician.

11.1 Fault Finding

Faults with organic pollution sensors are most likely to occur due to gross fouling of the optical system. The presence of a fault tends to show up as a high reading that will trigger an alarm. Failure of the light source is a very remote possibility but is detected by the electronics and shown as an alarm. In some cases artificially high readings may be as a result of bubbles in the sample requiring installation of a de-bubbler.

11.2 Resetting Factory Defaults

Factory default conditions can be reset.

Power down the instrument and then power up with the **<ESC>** key pressed. This will cause all calibration, alarm and other settings to be overwritten with the factory default values. Only carry out this procedure if new firmware has been installed or as a quick method of getting back to a known starting position. It is not usually necessary to carry out this procedure during normal running of the system.

12 Calibration Solution

12.1 Calibration Stock Solution

Potassium Hydrogen Phthalate (**$C_8H_5O_4K$**) 1000mg/l as C.

To make 1000ml of stock solution:

Place **2.128g** of Potassium Hydrogen Phthalate in a clean 500ml beaker. Add 250ml (approx) of deionised water, gently heat and stir till crystals are dissolved. Place solution in a 1000ml volumetric flask, rinse beaker with deionised and add this rinsate to flask. Top up volumetric flask with deionised water. Store this stock solution in tightly stoppered one litre bottle. Label accordingly. Renew stock solution after one month.

12.2 Calibration Standards

The diluted standards of this chemical do not store well, so fresh standards should be made from the stock solution each time a calibration procedure is required.

Prepare up each of the following Phthalate standards using 1000mg/l stock solution.

i) **200mg/l**: Place 100ml of stock solution in a 500ml volumetric flask and top up with deionised water. Place into clean dry beaker.

ii) **100mg/l**: Place 250ml of 200mg/l standard in a 500ml volumetric flask and top up with deionised water. Keep in flask.

iii) **50mg/l**: Place 100ml of 100mg/l standard in a clean dry beaker and dilute with 100ml of deionised water.

You should now have the following:

400ml of 100mg/l standard in volumetric flask.

250ml of 200mg/l standard in beaker.

200ml of 50mg/l standard in beaker.

This Calibration Solution can be purchased from Partech. Where a service contract has been agreed please refer to the details of that contract for the method of reagent supply.

13 Technical Support

Technical Support is available by phone, fax, or email, the details of which are shown below.

- Phone: +44 (0) 1726 879800
- Fax: +44 (0) 1726 879801
- Email: techsupport@partech.co.uk
- Website: www.partech.co.uk

To enable us to provide quick and accurate technical support please have the following information ready when you contact us:

- Serial Number or original purchase details
- Sensor Type, and Serial Number
- Application details
- Description of fault

13.1 Returning Equipment for Repair

If equipment needs to be returned to Partech for repair or service the following address should be used:

SERVICE DEPARTMENT

PARTECH (ELECTRONICS) LTD

CHARLESTOWN

ST AUSTELL

CORNWALL

PL25 3NN

UNITED KINGDOM

Please include the following information with the returned equipment. Also ensure that sensors are adequately protected for transportation (Advice on packing can be provided by our service department).

- Contact name and phone number
- Return address for equipment
- Description of fault or service required
- Any special safety precautions because of nature of application

14 Technical Specification (should be last section)

Monitor

Power Supply	115/230 VAC
Weight	2.5 kg
Enclosure Rating	IP65
Dimensions	222x310x180 (hxwxd)
Outputs	4-20 mA, Isolated, max load 750 Ω 2x SPCO Relay, rated to 5A @12 VDC
Cable Entries	5xM13, 1xM20
Max Conductor Size	Cross section 4 mm^2
Display	4 Digit Red LED display for process variable 2 Line LCD display for Configuration and Operation

Sensor

Power Supply (Lamp)	24VDC from Separate power supply on panel
Power Supply (Receiver)	12VDC from Monitor
Weight	6.5 kg
Dimensions	405x373x136 mm (hxwxd)
Wetted Material	Black Acetal, Polypropylene, Glass, Stainless Steel and PVC connectors

Physical

Operating Temperature	0 to 50 ˚C
Storage Temperature	-20 to 50 ˚C
Operating Pressure	1 Bar
Flow rate	0.5 to 5 l/min
Location	Indoor or in protective enclosure

Measurement

Range	0-100 to 0-500 mg/l C
Resolution	1 mg/l C
Accuracy	+/- 10%
Calibration	Two Point
Light Source	Xenon Strobe
Source Life	30,000 hours typical
Measured Wavelength	254 nm
Turbidity Correction	400 nm
Path Length	4.9 mm
Response Time	3 minutes for 90% Step Change
Self Cleaning	Integral Wiper

partech