



Yeo-Kal Electronics Pty Ltd 18/26 Wattle Road, Brookvale NSW Australia
Telephone +61 2 9939 2616 Fax +61 2 9905 1100

USER MANUAL

Model	618 Water Quality Analyser For firmware V1.10
Version	1.0
Date	20/4/2019

Information in this document is the copyright of YEO-KAL Electronics Pty Ltd and is subject to change without notice. No part of this document may be copied or reproduced by any means without the express written permission of YEO-KAL Electronics Pty Ltd. All trademarks are the property of their respective companies.

© 2017Yeo-Kal Electronics Pty Ltd

Contents

INTRODUCTION	4
GENERAL DESCRIPTION	4
SPECIFICATIONS	4
Reader Unit:.....	4
Sensors:.....	5
Temperature.....	5
Conductivity	5
Salinity.....	5
Dissolved Oxygen	5
Turbidity	5
pH	6
ORP	6
Depth (optional).....	6
Physical.....	6
DESCRIPTION OF READER UNIT	7
Connector Pins.....	7
DESCRIPTION OF PROBE	9
Temperature Sensor.....	10
Dissolved Oxygen Sensor	11
Conductivity Sensor	11
Turbidity Sensor	11
PH/ORP Sensor	11
ASSEMBLY	12
CONNECTING THE PROBE ASSEMBLY	12
OPERATION	13
OPERATING INSTRUCTIONS	13
KEY PAD DESCRIPTION	13
Main Menu	13
STORE DATA OUT (1).....	14
CLEAR STORE MEMORY (2).....	14
START LOGGER (3).....	14
LOGGED DATA OUT (4).....	15
CHECK BATTERY (5).....	18
SET UP MENU	18
SENSOR SERIAL NUMBER (1)	18
SET CLOCK (2)	18
AVERAGE (3).....	18
SET PRECISION (4).....	18

ASSIGN/DEL SENSORS (5)	18
CONFIGURE DISPLAY (6).....	18
AUTO OFF (7).....	19
LIVE COMMS (8)	19
ALTITUDE AND SALINITY CORRECTIONS (9)	19
CALIBRATION.....	19
TEMPERATURE CALIBRATION	21
HIGH CONDUCTIVITY/SALINITY CALIBRATION	24
LOW CONDUCTIVITY CALIBRATION.....	24
DISSOLVED OXYGEN CALIBRATION	25
pH CALIBRATION	26
ORP CALIBRATION	26
TURBIDITY CALIBRATION	27
DEPTH CALIBRATION	27
INTERNAL BLUETOOTH AND GPS	29
BLUETOOTH	29
One off Pairing:	29
GPS 29	
BLUETOOTH AND GPS POWER.....	29
MAINTENANCE.....	30
READER UNIT MAINTENANCE	30
BATTERY REPLACEMENT.....	30
D.O. SENSOR MAINTENANCE	30
Changing the Membrane	30
Dissolved Oxygen Stirrer Maintenance	31
pH/ORP SENSOR MAINTENANCE.....	32
PH/ORP Sensors.....	32
pH - Standard non-fill able:.....	32
pH - Optional refillable:	32
TURBIDITY SENSOR MAINTENANCE	33
CONDUCTIVITY SENSOR MAINTENANCE	33
STORAGE.....	35
APPENDIX 1 - CONVERSIONS USED.....	36
APPENDIX 2 - PART NUMBERS.....	38

Introduction

The YK618 comes already assembled. The only construction required is to connect the probe assembly to the Reader Unit.

General Description

The model 618 Water Quality Analyser Reading Unit is a robust multi-parameter field instrument which can be used for real time water quality measurements or for remote operation using a built in data logger.

The instrument consists of a multi-sensor probe and a reader unit which can store and display data. Additional auxiliary analog probe inputs can be facilitated on the reader unit. The probe and reader unit have been designed to be compact, durable and easy to use. Data is transferred to the reader unit using Bluetooth. The Reader Unit controls the operation of the instrument, provides easy access to the data, control, memory and calibration functions. The Reader Unit contains a real time clock and all stored data includes the date and time of measurement. Both stored data and calibration information can be easily down loaded to a computer using the data transfer program, YK Quick Terminal.

The YK618 comes with storage container to protect the sensors while the instrument is in storage.

The battery charging is available for this reading unit.

Specifications

Reader Unit:

Display:	TFT LCD with colour selectable display. All sensors of real time data can be displayed within one screen and on a computer at the same time.
Memory:	Remote logging – Maximum 65536 samples. Real time (STORE key) maximum 8192 samples. All samples include date, time, GPS and data tag if assigned. Memory's data can be kept for 10 years without battery.
Data tags:	You may type your own tag name or automatically generated by this reader unit according Time and Date, you older tag name or GPS data. Note: each data tag is limited to 18 characters long.
Sample Rate:	Logging time can be easily set from 3 seconds to 1sample every 24 hours. Display updates every 1 second.
ADC:	18bit ADC for probe and old models having 13bit ADC
Communications:	Baud rate 9600, 8 data bits, 0 parity, 1 stop bits.
Power:	Battery containing 2.2AH rechargeable lithium battery.
Case:	Impact resistance polycarbonate; waterproof display, keypad, connectors and case.
Dimensions:	100 mm X 35 mm X 200 mm
Weight:	0.4 kg

Sensors:**Temperature**

Range:	-2 - 50°C
Accuracy:	±0.05°C
Resolution:	0.01°C
Type:	pt 100 platinum element

Conductivity

HighRange:	0 - 80 ms/cm
Accuracy:	±0.05 ms/cm
Resolution:	0.02 ms/cm
Low Range:	0-8000 us/cm
Accuracy:	±5 us/cm
Resolution:	3 us/cm
Type:	Four electrode cell

Salinity

Range:	0 - 60 ppt
Accuracy:	±0.05 ppt
Resolution:	0.02 ppt
Type:	See Appendix 1 - Conversions Used

Dissolved Oxygen

Range:	0 - 200% saturation 0 - 20 mg/l
Accuracy:	±0.5%
Resolution:	0.1%
Type:	Active silver and lead electrode sensor with PTFE* membrane and built-in stirrer

Turbidity

Range:	0 - 600 ntu
Accuracy:	±0.5 ntu (0 - 300 ntu range) ±5 ntu (300 - 600 ntu range)
Resolution:	0.3 ntu

Type: Nephelometric measurement from a 90° sensor with pulsed infra-red light source

pH

Range: 0 - 14

Accuracy: ± 0.03

Resolution: 0.01

Type: Combination silver/silver chloride type with sintered Teflon* junction

ORP

Range: -1100 mV to +1100 mV

Accuracy: ± 3 mV

Resolution: 1 mV

Type: Combination bare metal electrode common reference junction with pH electrode (see Appendix 1 - Conversions Used)

Depth (optional)

Range: 0 - 100 m or
0 - 150 m

Accuracy: $\pm 0.5\%$ of full scale

Resolution: 0.1 m

Type: Dual active silicone strain gauge

Physical

Cable length: 3 m or 10 m. Other lengths made to order up to 100 meters.

Dimensions: 50 mm diameter, 320 mm long

Description of Reader Unit

The Reader Unit is housed in a tough, durable, high impact polycarbonate case with a keypad and TFT LCD display mounted on the front panel. The side of the case has probe/charging connector. The connectors also have a polarising pin so that incorrect connection cannot be made. Inside the Reader Unit a CPU controls the operation of the instrument, memory stores data and one rechargeable battery power the instrument.

Connector Pins

The connector pins on the Reader Unit connectors are numbered in clockwise order from the polarising pin (see figure 1). The following table lists the purpose of each pin on the connector.

Communications		Auxiliary Power	Sensor
Pin 1	Ground	Negative	Ground
Pin 2	RS232 out	Positive	Data
Pin 3	RS232 in	n/a	+12V

618 Water Quality Analyser Reading Unit and Probe



Figure 1: Reader unit for the YK618

Description of Probe

The probe assembly consists of sensor, cable and connectors. The body of the probe is made of PVC with a PVC sensor guard. The interface cable is permanently connected to the probe body to eliminate the need for underwater connectors. In the event of the cable being cut, the probe has a waterproof seal between the cable connection and the internal electronics package. At the other end of the cable is a corrosion and water resistant connector for connection to the Reader Unit.

The sensors can easily be accessed by sliding the sensor guard up and rotating the bottom section of the probe. (see fig 2b)

The conductivity and dissolved oxygen sensors can be removed for servicing. However, the whole unit must be **thoroughly dry** before these sensors are removed. A cotton bud can be used to dry the spaces in between the sensors.

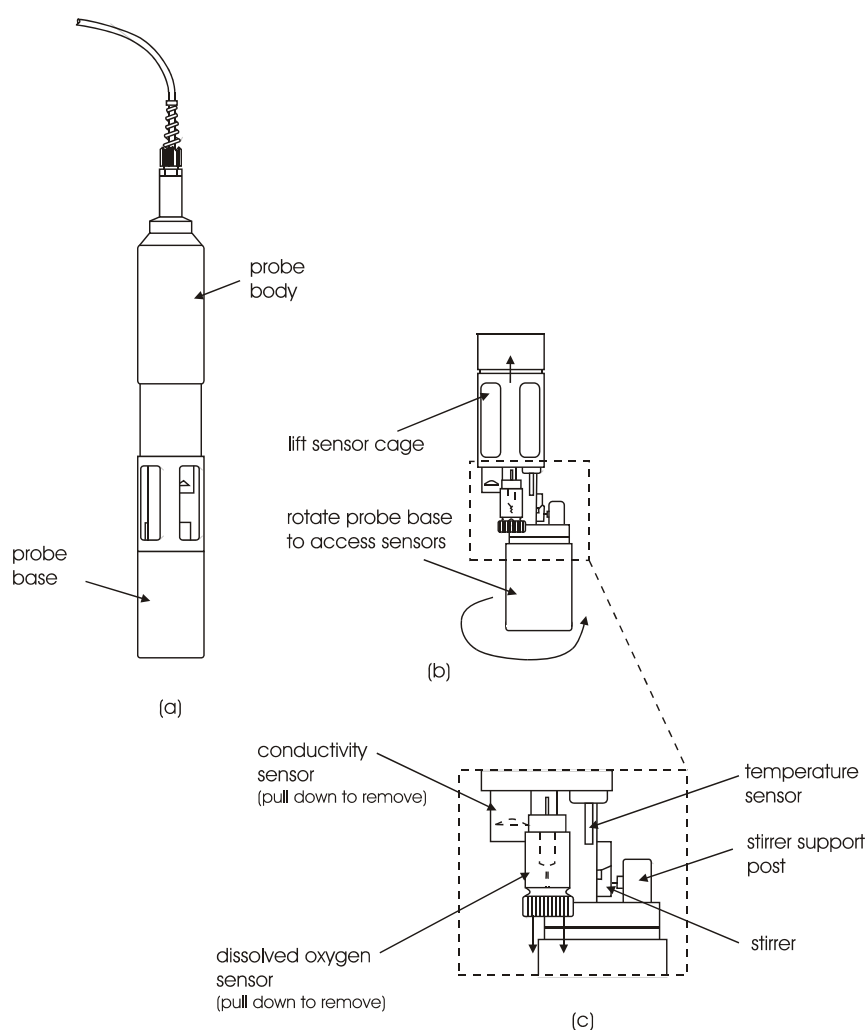


Figure 2: a) Complete probe assembly b) Sensor cluster exposed by lifting sensor cage and rotating probe base c) Expanded view of sensor cluster with dissolved oxygen sensor detached.

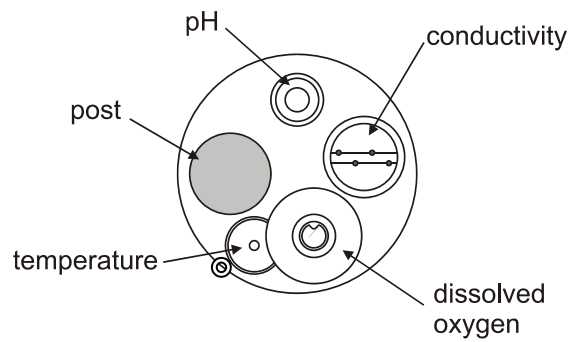


Figure 3: End view of probe
(without bottom section)
showing position of sensors.

Temperature Sensor

The temperature sensor consists of a pt 100 platinum element, housed in a stainless steel sheath for robustness and corrosion resistance. The temperature sensor requires little maintenance, however the temperature measurement is used for calculating the dissolved oxygen in mg/l and for temperature correction of the conductivity sensor, so it is important that the temperature sensor is properly calibrated.

Dissolved Oxygen Sensor

Dissolved Oxygen is measured using an active type membrane covered sensor. The sensor itself consists of silver and lead electrodes and a 25um PTFE membrane and is filled with a 1.0M potassium hydroxide. A constant flow of water passes the sensor, maintained by a stirrer located on the bottom section of the probe.

When the silver and lead electrodes are connected through the external circuit, electrons pass from the lead electrode to the silver electrode. When oxygen is present at the surface of the silver electrode, it reacts with electrons to produce hydroxyl ions.

At the lead electrode the loss of electrons produces lead ions. The lead's electrons combine with hydroxyl to precipitate lead hydroxide on the lead electrode.

The rate of transference of electrons via the external circuit from the lead to silver electrode ie that is the current flowing in the external circuit, is the measure of the rate of cell reaction and thus the rate at which oxygen reaches the silver electrode. The current flowing in the external circuit is directly related to the oxygen concentration in the sample being measured by the electrodes.

The Dissolved Oxygen sensor may periodically require a new membrane and electrolyte. A unique knurled nut is used to hold the sensor membrane in position without overstressing the membrane. This gives long term stability and allows easy replacement. The sensor can be removed from the probe for servicing. A replacement probe is ready for use immediately after installation and calibration.

Conductivity Sensor

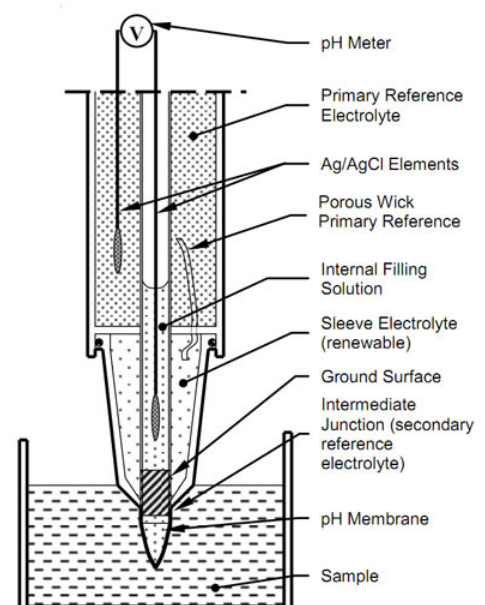
The conductivity is measured using a 4 electrode bridge. The four electrode system uses automatic compensation to overcome any build-up of contamination on the electrodes. The electrodes are made from fine platinum and are coated with platinum black to enhance the long term stability and sensitivity of the sensor. The coating should last for a long period of time if it is not mechanically removed, however, the coating can be replaced using the optional platiniser or by returning the sensor to YEO-KAL Electronics Pty Ltd.

Turbidity Sensor

The turbidity sensor is located in the hole which runs through the bottom section of the probe and is lined with a glass tube. Turbidity is measured by the nephelometric method which uses a light source and a detector measuring the light scattered at 90 degrees to the incident light beam. A pulsed infra-red light source is used.

PH/ORP Sensor

The pH and oxidation reduction potential (ORP) are measured using separate pH sensor and bare metal platinum electrode for ORP. They both share an internal reference electrode in the pH sensor. This sensors has a refillable secondary junction for sensor maintenance. This sensor with maintenance helps combat accumulation of internal contamination.



Assembly

The YK618 comes already assembled. The only construction required is to connect the probe assembly to the Reader Unit .

Connecting the Probe Assembly

To attach the probe assembly, first unscrew the knurled connector cap from the SENSOR connector of the Reader Unit. The connector cap is attached to the Reader Unit by a chain so that it can be replaced whenever the probe assembly is disconnected. To connect the probe assembly, align the locating pin on the Reader Unit with the slot on the cable connector and push the cable connector into the Reader Unit sensor connector then screw home the retaining ring.

Operation

The YK618 comes already assembled. The only construction required is to connect the probe assembly to the Reader. If the pH sensor has a cap over it, the cap should be removed (**SLIDE THE CAP OFF, DO NOT UNSCREW**) prior to operation. See section 6 for **IMPORTANT INFORMATION**.

Operating Instructions

The following is provided as a quick reference for operation of the instrument. To gain maximum performance and reliability from the YK618, make sure that you read and understand the entire user manual before operating the instrument.

The instrument is switched on or off by pressing the button of the ON/OFF key for about 3 seconds.



When the unit is switched on, the display will briefly show the serial number of the instrument and the version number of the software loaded in the Reader Unit. If the probe is connected, the display will then automatically begin to show the value of readings from the probe. The parameters displayed will be all parameters at one time.

From here, the main menu is entered by pressing the **MENU** key. If the sensor is not connected, the LCD display will show no sensors have been used. Press main menu to scroll through the menu options, press the **arrow** keys to select a menu items as indicated by the arrows on the LCD display.

Key Pad Description

Time: It is automatically displayed on top right of the main menu.

MENU: Select Main menu.

STORE: Store data in real time and by holding down the key, a data tag can be entered.

ESC: To exit a particular routine.

ENT: To accept a particular routine

Arrows: Up, Down, Left or Right Forward used in the main menu and tagging data.

The menu options are as follows:

Main Menu

- | | | |
|----|-----------------|---|
| 1. | Calibration | Calibrate sensors |
| 2. | Logger Settings | Clear Memory, Logging settings and arm |
| 3. | Real Time | Real time data display |
| 4. | U620 ->&<- PC | PC directly connected to U620 Probe by Bluetooth |
| 5. | Upload to PC | Upload data and constant to PC by Bluetooth |
| 6. | R618 Settings | Set clock, R618 reading unit display format, real time display on PC etc. |

The Reader Unit can be turned off without losing any of the instrument settings. If the logger is activated, the unit will continue to record measurements.

Store Data Out (1)

The Reader Unit has two separate memories: the store memory and the logger memory. The logger memory can hold up to 16384 readings and the store memory can hold up to 4096 readings. Once stored, the data can then be down loaded into a computer via Bluetooth.

The store memory is used to hold spot measurements. To store a reading while in the field simply press the **STORE** key. The data will be down loaded in the order in which it is stored so keep a record of the site at which each measurement was made so that the data can be easily analysed.

Clear Store Memory (2)

From the main menu select Logger Settings press the ENTER and then selecting Clear 618 (or 620) Memory. Press ENT and the operator will proceed and clear memory.

Start Logger (3)

The YK618 can also be programmed to take measurements at regular intervals and store the results in the logger memory.

The fastest sample rate in Standard Logging Mode is one per two minutes, the stirrer is activated one minute before the sample is to be taken and will switch off immediately after the data has been recorded.

Programming the Reader Unit

To program the logger for a measurement routine, perform the following steps:

1. Enter the main menu, select Logger Settings and press **ENTER**. Then follow ON Screen instructions.
2. Set Logger Tag if want a tag name for the logging.
3. Set Start/Stop time and sample rate and press STORE button for arm the logging.

The instrument is now programmed. The logger will automatically switch on the stirrer 1 minute before the programmed Start time.

To halt the logging process, select ESC key and follow the on screen instruction.

Logged Data Out (4)

Data stored in the YK618 can be down loaded to a computer by bluetooth and then stored, graphed or printed out using most popular applications. When the data is down loaded, it includes a header, as shown in figure 4 below, indicating whether the data is from the logger or store memory.

In order to download the data stored in memory to a computer, you will need terminal software ie YK Quick Terminal or similar. To transfer data, perform the following operations:

1. From Main MENU select Upload to PC and press ENT.
2. Pair PC Bluetooth to R618 read unit.
3. Calibrated constants or All Data or STO data (the data is sampled/stored in real time by pressing STORE) will be selected and transferred to PC.

```

$H
Ver: 1.27
$H
YEO-KAL MODEL 618
SERIAL NUMBER: 625
DATE OF DOWNLOAD: 13/04/17 11:08
DATE FORMAT: DD/MoMo/YY HH:MM:SS

Port      Param      Date      Time      lo dat    lo sp    lo temp  hi dat    hi sp    hi temp  offset    slope
-----
Ser4 Phyco (ppb) 24/03/17 12:57    111      0      0.00    30613    4500    0.00    -111.000    6.778
Ser0 E.C (uscm)  23/03/17 13:26      8      0      0.00    2367    1413    26.34      8.000    1.626
Ser1 Sal (ppt)   23/03/17 13:29      9      0.00    0.00    8969    35.00    26.82      9.000 162934.43
Ser2 Temp (C)    23/03/17 13:25   -5605    14.60    0.00    12818    35.50      0.00 18474.656  881.483
Ser3 Turb (ntu)  23/03/17 13:50    -611      0.0    0.00    4840    200.0      0.00    611.000    27.255
Ser5 pH (pH)     23/03/17 13:38   13855    4.00    26.15 -14074    10.00    26.49 32440.386 -4629.346
Ser6 ORP (mv)    23/03/17 13:41    6120     295     0.00    7284     472      0.00 -4178.687    6.576
Ser7 D.O.(%sat)  23/03/17 13:46   -125      0.0    0.00   10449    100.0     25.06 -125.000    49.568
Aux0 Aux chan 0  Not calibrated.
Aux1 Aux chan 1  Not calibrated.
Aux2 Aux chan 2  Not calibrated.
Aux3 Aux chan 3  Not calibrated.
Aux4 Aux chan 4  Not calibrated.
$H-----

Samples in memory: 0027
ID,Tag,Date/Time,Phyco (ppb),Temp (C),E.C (uscm),E.C (mscm),Sal (ppt),Dens(g/cm3),S.G. (sg),TDS (g/l),D.O.(%sat),D.O.(mg/l),pH (pH),ORP (mv),Turb (ntu),GPS
Latitude,GPS Longitude
1,A36,24/03/17 14:48:37,-15,26.25,0,0,0,6.17,-900,40,95.8,7.73,0,0.9967,996.56,000 00.0000',000 00.0000'
2,A36,24/03/17 14:48:39,-15,26.25,0,0,0,6.17,-900,40,95.8,7.73,0,0.9967,996.56,000 00.0000',000 00.0000'
3,A36,24/03/17 14:48:40,-15,26.25,0,0,0,6.17,-900,40,95.8,7.73,0,0.9967,996.56,000 00.0000',000 00.0000'
4,A36,24/03/17 14:48:41,-15,26.25,0,0,0,6.17,-900,40,95.8,7.73,0,0.9967,996.56,000 00.0000',000 00.0000'
5,A36,24/03/17 14:48:43,-15,26.25,0,0,0,6.17,-900,40,95.8,7.73,0,0.9967,996.56,000 00.0000',000 00.0000'
6,A36,24/03/17 14:48:44,-15,26.25,0,0,0,6.17,-900,40,95.8,7.73,0,0.9967,996.56,000 00.0000',000 00.0000'
7,A36,24/03/17 14:48:45,-15,26.25,0,0,0,6.17,-900,40,95.8,7.73,0,0.9967,996.56,000 00.0000',000 00.0000'
8,A36,24/03/17 14:48:47,-15,26.25,0,0,0,6.17,-900,40,95.8,7.73,0,0.9967,996.56,000 00.0000',000 00.0000'
9,A36,24/03/17 14:48:48,-15,26.25,0,0,0,6.17,-900,40,95.8,7.73,0,0.9967,996.56,000 00.0000',000 00.0000'
10,A36,24/03/17 14:48:49,-15,26.25,0,0,0,6.17,-900,40,95.8,7.73,0,0.9967,996.56,000 00.0000',000 00.0000'
11,A36,31/03/17 09:22:16,-15,21.64,0,0,0,7.45,900,75.8,69.6,6.13,0,0.9979,997.7,000 00.0000',000 00.0000'
12,A36,31/03/17 09:22:18,-15,21.64,0,0,0,7.45,900,75.8,69.6,6.13,0,0.9979,997.7,000 00.0000',000 00.0000'
13,A36,31/03/17 09:22:21,-15,21.64,0,0,0,7.45,900,75.9,69.6,6.13,0,0.9979,997.7,000 00.0000',000 00.0000'
14,A34,31/03/17 09:22:46,-15,21.66,0,0,0,7.45,900,76.6,6.13,0,0.9978,997.69,000 00.0000',000 00.0000'
15,A34,31/03/17 09:22:49,-15,21.66,0,0,0,7.45,900,76.1,69.6,6.13,0,0.9978,997.69,000 00.0000',000 00.0000'
16,E26,31/03/17 09:23:14,-15,21.67,0,0,0,7.45,900,76.1,69.6,6.12,0,0.9978,997.69,000 00.0000',000 00.0000'
17,E26,13/04/17 11:06:51,-15,20.84,0,0,0,6.43,768,134.5,49.1,4.39,0,0.998,997.87,000 00.0000',000 00.0000'
18,E26,31/03/17 09:23:14,-15,21.67,0,0,0,7.45,900,76.1,69.6,6.12,0,0.9978,997.69,000 00.0000',000 00.0000'
19,E26,13/04/17 11:06:51,-15,20.84,0,0,0,6.43,768,134.5,49.1,4.39,0,0.998,997.87,000 00.0000',000 00.0000'
20,E26,31/03/17 09:23:14,-15,21.67,0,0,0,7.45,900,76.1,69.6,6.12,0,0.9978,997.69,000 00.0000',000 00.0000'
21,A36,31/03/17 09:22:16,-15,21.64,0,0,0,7.45,900,75.8,69.6,6.13,0,0.9979,997.7,000 00.0000',000 00.0000'
22,A36,31/03/17 09:22:18,-15,21.64,0,0,0,7.45,900,75.8,69.6,6.13,0,0.9979,997.7,000 00.0000',000 00.0000'
23,A36,31/03/17 09:22:21,-15,21.64,0,0,0,7.45,900,75.9,69.6,6.13,0,0.9979,997.7,000 00.0000',000 00.0000'
24,A34,31/03/17 09:22:46,-15,21.66,0,0,0,7.45,900,76.6,6.13,0,0.9978,997.69,000 00.0000',000 00.0000'
25,A34,31/03/17 09:22:49,-15,21.66,0,0,0,7.45,900,76.1,69.6,6.13,0,0.9978,997.69,000 00.0000',000 00.0000'
26,E26,31/03/17 09:23:14,-15,21.67,0,0,0,7.45,900,76.1,69.6,6.12,0,0.9978,997.69,000 00.0000',000 00.0000'
27,E26,13/04/17 11:06:51,-15,20.84,0,0,0,6.43,768,134.5,49.1,4.39,0,0.998,997.87,000 00.0000',000 00.0000'

```

Figure 4b: Sample of comma separated data output from the YK618 (date format: dd/mm/yy).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
25	Samples in memory: 0027																			
26	ID	Tag	Date/Time	Phyco (pp	Temp (C)	E.C (uscm)	E.C (mscm)	Sal (ppt)	Dens(g/cm	S.G. (sg)	TDS (g/l)	D.O.(%sat	D.O.(mg/l	pH (pH)	ORP (mv)	Turb (ntu)	GPS Latitu	GPS Longitude		
27	1	A36	24/03/2017 14:48	-15	26.25	0	0	0	6.17	-900	40	95.8	7.73	0	0.9967	996.56	000 00.000	000 00.0000'		
28	2	A36	24/03/2017 14:48	-15	26.25	0	0	0	6.17	-900	40	95.8	7.73	0	0.9967	996.56	000 00.000	000 00.0000'		
29	3	A36	24/03/2017 14:48	-15	26.25	0	0	0	6.17	-900	40	95.8	7.73	0	0.9967	996.56	000 00.000	000 00.0000'		
30	4	A36	24/03/2017 14:48	-15	26.25	0	0	0	6.17	-900	40	95.8	7.73	0	0.9967	996.56	000 00.000	000 00.0000'		
31	5	A36	24/03/2017 14:48	-15	26.25	0	0	0	6.17	-900	40	95.8	7.73	0	0.9967	996.56	000 00.000	000 00.0000'		
32	6	A36	24/03/2017 14:48	-15	26.25	0	0	0	6.17	-900	40	95.8	7.73	0	0.9967	996.56	000 00.000	000 00.0000'		
33	7	A36	24/03/2017 14:48	-15	26.25	0	0	0	6.17	-900	40	95.8	7.73	0	0.9967	996.56	000 00.000	000 00.0000'		
34	8	A36	24/03/2017 14:48	-15	26.25	0	0	0	6.17	-900	40	95.8	7.73	0	0.9967	996.56	000 00.000	000 00.0000'		
35	9	A36	24/03/2017 14:48	-15	26.25	0	0	0	6.17	-900	40	95.8	7.73	0	0.9967	996.56	000 00.000	000 00.0000'		
36	10	A36	24/03/2017 14:48	-15	26.25	0	0	0	6.17	-900	40	95.8	7.73	0	0.9967	996.56	000 00.000	000 00.0000'		
37	11	A36	31/03/2017 9:22	-15	21.64	0	0	0	7.45	900	75.8	69.6	6.13	0	0.9979	997.7	000 00.000	000 00.0000'		
38	12	A36	31/03/2017 9:22	-15	21.64	0	0	0	7.45	900	75.8	69.6	6.13	0	0.9979	997.7	000 00.000	000 00.0000'		
39	13	A36	31/03/2017 9:22	-15	21.64	0	0	0	7.45	900	75.9	69.6	6.13	0	0.9979	997.7	000 00.000	000 00.0000'		
40	14	A34	31/03/2017 9:22	-15	21.66	0	0	0	7.45	900	76	69.6	6.13	0	0.9978	997.69	000 00.000	000 00.0000'		
41	15	A34	31/03/2017 9:22	-15	21.66	0	0	0	7.45	900	76.1	69.6	6.13	0	0.9978	997.69	000 00.000	000 00.0000'		
42	16	E26	31/03/2017 9:23	-15	21.67	0	0	0	7.45	900	76.1	69.6	6.12	0	0.9978	997.69	000 00.000	000 00.0000'		
43	17	E26	13/04/2017 11:06	-15	20.84	0	0	0	6.43	768	134.5	49.1	4.39	0	0.998	997.87	000 00.000	000 00.0000'		
44	18	E26	31/03/2017 9:23	-15	21.67	0	0	0	7.45	900	76.1	69.6	6.12	0	0.9978	997.69	000 00.000	000 00.0000'		
45	19	E26	13/04/2017 11:06	-15	20.84	0	0	0	6.43	768	134.5	49.1	4.39	0	0.998	997.87	000 00.000	000 00.0000'		
46	20	E26	31/03/2017 9:23	-15	21.67	0	0	0	7.45	900	76.1	69.6	6.12	0	0.9978	997.69	000 00.000	000 00.0000'		
47	21	A36	31/03/2017 9:22	-15	21.64	0	0	0	7.45	900	75.8	69.6	6.13	0	0.9979	997.7	000 00.000	000 00.0000'		
48	22	A36	31/03/2017 9:22	-15	21.64	0	0	0	7.45	900	75.8	69.6	6.13	0	0.9979	997.7	000 00.000	000 00.0000'		
49	23	A36	31/03/2017 9:22	-15	21.64	0	0	0	7.45	900	75.9	69.6	6.13	0	0.9979	997.7	000 00.000	000 00.0000'		

Figure 4c: Sample of comma separated data opened in MS Excel ®

Check Battery (5)

Battery voltage will be always displayed on Main MENU. The warning information will be displayed if the battery needs charging. Note: After plugging in the charger switch ON then switch OFF . The LCD will momentarily flash when charging. If the charger is plugged into the unit without switching ON and OFF it could be up to an hour before it starts charging.

Set Up Menu

Sensor Serial Number (1)

The reader reads the serial number of the probe attached to the 618. If more than one probe is used it identifies the correct probe to be used with the Reader Unit.

Set Clock (2)

The clock uses 24 hour format DD/MM/YYYY HH:MM:SS

From main MENU select R618 Settings->Set Clock and then follow the on screen instructions to set clock.

Average (3)

From main MENU select R618 Settings->Set Average and then follow the on screen instructions to set the average samples.

Set Precision (4)

From main MENU select R618 Settings->Assgn/Confg Sens and then follow the on screen instructions to set precision.

Assign/Del Sensors (5)

From main MENU select R618 Settings->Assgn/Confg Sens and then follow the on screen instructions to assign or delete sensors.

Configure Display (6)

From main MENU select R618 Settings->Assgn/Confg Sens and then follow the on screen instructions to configure display.

Auto Off (7)

To save battery power the 618 will shutdown if no key is pressed after X minutes.

From main MENU select R618 Settings->More Settings and then follow the on screen instructions to set auto off time.

Live Comms(8)

When Data Port is ON, real time data will be displayed on PC at the same time. (PC needs to be paired by bluetooth). Default password is 0000 or 1234

Altitude and Salinity Corrections (9)

The solubility of oxygen in water is less in brackish or sea water than in fresh water and also decreases with increasing altitude. For dissolved oxygen concentration measurements to be accurate, they must be compensated for the salinity of the water being tested and for the atmospheric pressure. The YK618 will calculate the correct value of dissolved oxygen concentration and percent saturation once you have entered the altitude for the particular sample being tested, salinity corrections are made automatically.

From main MENU select R618 Settings->More Settings->Alt Correct and then follow the on screen instructions to set the altitude.

Calibration

Calibration order to ensure the accuracy of the YK618, the instrument needs to be calibrated on a regular basis as well as after any maintenance has been performed on the probe. The frequency at which calibration is required will depend on the specific application for which the instrument is to be used. The optimum time between calibrations can be established by regularly checking the performance of the instrument in standard solutions. If the YK618 is kept well maintained and calibrated on a regular basis, a single point calibration is sufficient to keep the instrument performing to specification. However, two point calibrations whenever a sensor has had any maintenance.

The calibration procedures require that the probe be immersed in standard solutions. The probe storage container which is supplied with the YK618 is ideal for this purpose as it provides a water tight seal on the probe and minimizes the volume of standard solution required (about 150 ml).

Make sure that you rinse both the probe and container before each calibration and between each calibration solution. The standard solutions are available from YEO-KAL Electronics Pty Ltd or most major scientific suppliers.

Both dissolved oxygen, conductivity and pH + measurements require a correction for temperature (this correction is automatically made by the instrument) hence the temperature sensor must be correctly calibrated before you can calibrate either the dissolved oxygen or salinity / conductivity sensors.

To enter the calibration menu, select **Calibration** in main MENU and press ENT. Select the proper sensor and press ENT again. Then then follow the on screen instructions to complete the calibration(s).

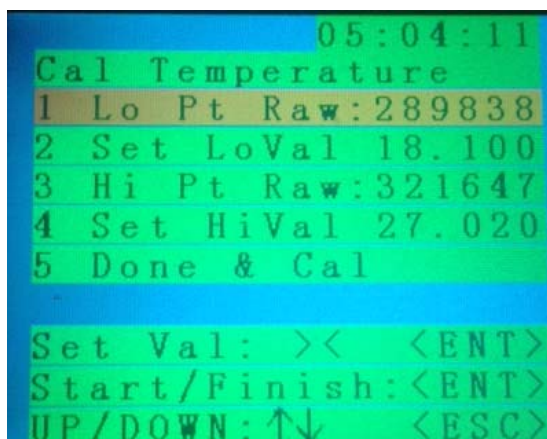
The previous calibrated data can be used again for the current calibration if the data is right.

Temperature Calibration

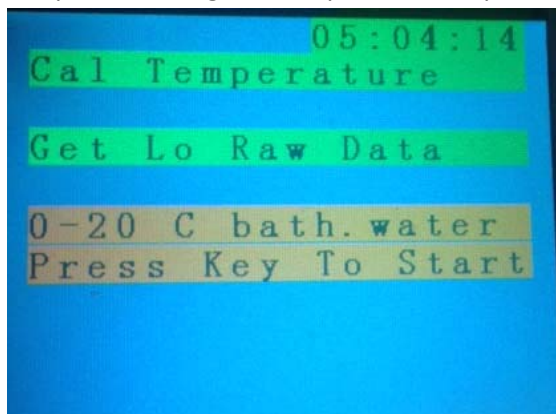
The temperature calibration should vary very little over the lifetime of the instrument however it is worth checking on the accuracy of your temperature measurements before calibrating the dissolved oxygen or salinity sensors.

Temperature calibration is performed at two temperatures. The low temperature must be between 0 and 20 C and the high temperature must be between 30 and 50C. A thermometer to at least 0.1°C accuracy and resolution must be used. To calibrate temperature, proceed as follows:

1. Select TEMPERATURE from the **Calibration.Lo Pt Raw** or **Hi Pt Raw** will appear. Press the



ARROW keys to **Lo Pt Raw** to make the selection then press **ENT** to calibrate the low temperature range 0-20°C press **ENT** to proceed. Place the probe into stirred water bath.

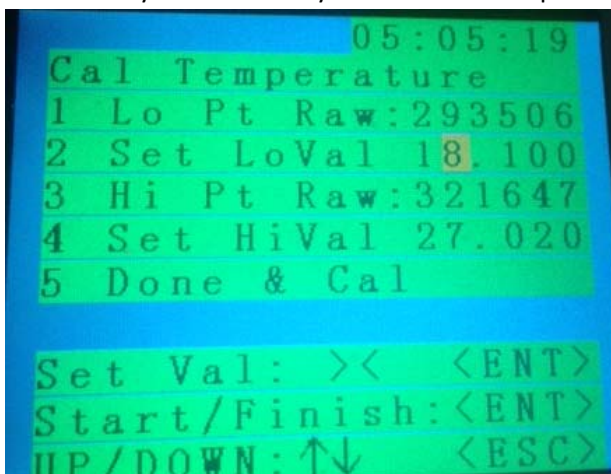


After pressing **ENT**, Raw Data from the temperature sensor will appear, wait until the



readings are stable and make a note of the reading on the calibration thermometer and press **ENT**.

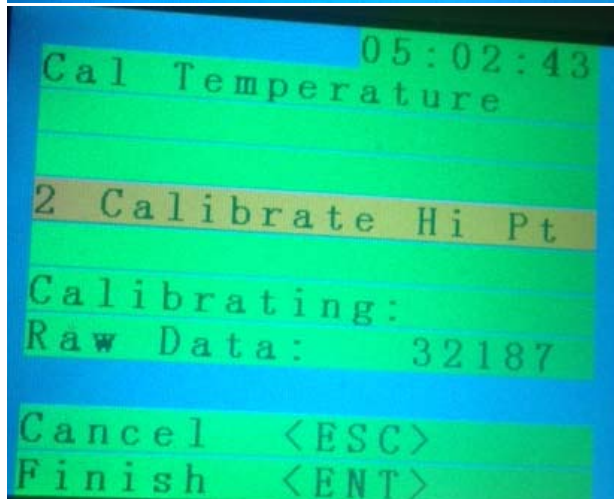
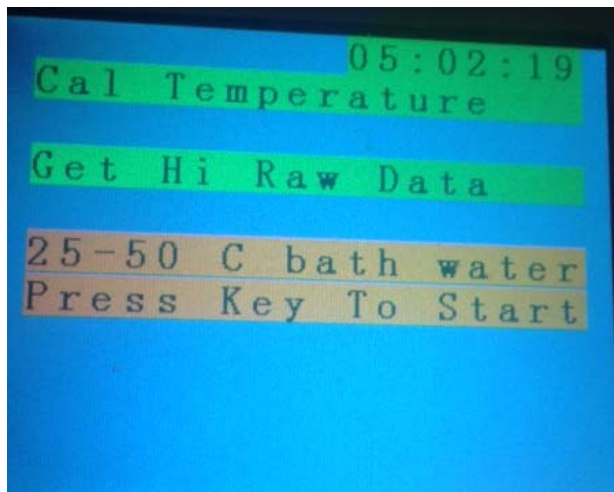
2. Use ENT key and arrow keys to **Set LoVal** temperature.



3. If you proceed with the high range calibration, Select **Hi Pt Raw** by using the arrow keys and



press **ENT**. The message place probe into 25- 50°C water bath. Press **ENT**, the raw data is



displayed. Immerse the probe in a stirred water bath held at a constant temperature between 25 and 50 C and wait for the probe to reach a constant temperature. Make a note of the temperature on the calibration thermometer and press ENT.

4. Use Ent key and arrow key to **Set HiVal** temperature value.



5. Select **Done & Cal**. Press ENT.