Issue 26-01

AQUACELL STATIONARY WASTEWATER SAMPLERS S50, S100 & S200

USER GUIDE

MCERTS
EN 16479
CERTIFIED

AQUAMATIC
Wastewater Samplers for the World

AQUAMATIC PRODUCT WARRANTY & BASIC TERMS OF SUPPLY

Congratulations on choosing an Aquamatic product. When used and maintained properly, this equipment should provide many years of reliable service

As a mark of confidence each new Aquamatic product is supplied with the following 12 month Warranty:

> Electrical and / or mechanical defects occurring during the 12 months from date of invoice will be rectified free of charge provided the defective item is returned carriage paid to the supplier during this 12 month period (see MAINTENANCE section for details of returns procedure)

Please read this User Guide carefully, as neither Aquamatic Ltd. nor its agents accept responsibility for any damage or defect caused by misuse, abuse, neglect or incorrect operation

Aquamatic products and equipment are NOT suitable for use in areas classified as hazardous zones. Aquamatic products are subject to continuous development and improvement. Components and specifications may change or be withdrawn without notice

One copy of this 'User Guide' is provided with your Aquamatic product. This is intended to assist the reader in the effective application of the product and although the information contained is given in good faith, Aquamatic Ltd. accepts no responsibility or liability for any loss or damage arising from the use of information provided or from information being omitted

In any event Aquamatic Ltd accepts no liability for any consequential loss or damage arising from the use or failure of the product or any information provided, including, but not limited to, economic or financial loss, damage to peripheral equipment or products, loss of use, productivity or time

All equipment is supplied subject to Aquamatic Standard Terms & Conditions of Sale, this will be supplied with each order acknowledgment, and is also downloadable from the Aquamatic website or can be emailed, on request, from the Aquamatic head office

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Congratulations on buying your new Aquacell Wastewater Sampler!

Before using your Sampler please check carefully that the contents of the package match your delivery note and in turn the items specified on your purchase order

Transit damage, or discrepancies, should be reported to Aquamatic immediately. If transit damage is not reported within 48 hours, transit insurance will be invalidated and the cost of repair will be chargeable

Samplers **1.3**

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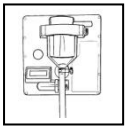
Samplers

Aquacell S50 Stationary Wastewater Sampler.....CL-1210-volts / hz

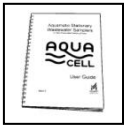


Aquacell S50
Sampler Unit

Intake Hose Anchor

2 x Anchor Bolt

Intake Hose Clip



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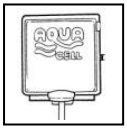
Spare Volume Control
Tube

Mains Supply Cable

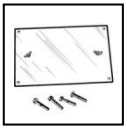
Intake Hose with Filter
5 metre

Aquacell S100 Stationary Wastewater Sampler.....CL-1220-volts / hz



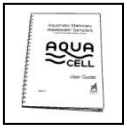
Aquacell S100
Sampler Unit

Intake Hose Anchor



Wall Mounting Bracket
with 4 x Anchor Bolt

Intake Hose Clip



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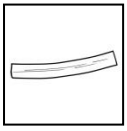


Spare Volume Control
Tube

Strain Relief Bracket

Mains Supply Cable

Intake Hose with Filter
10 metre

Contamination Shield

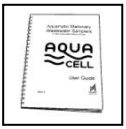
Aquacell S200 Stationary Wastewater Sampler.....CL-1230-volt / hz

Aquacell S200
Sampler Unit

Intake Hose Anchor

2 x Fridge Key

Intake Hose Clip



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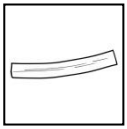


Spare Volume Control
Tube

Strain Relief Bracket

Intake Hose with Filter
10 metre

Sample Collection Vessels

Single Container Options

2.5 litre HDPE Bottle

CL-3124

5 litre HDPE Container

CL-3123

10 litre HDPE Bottle

CL-3122

25 litre Container

CL-3001

Bottler Options

Removable Bottlers

2 x 4.5 litre Self-Emptying Polypropylene

CL-3006

4 x 5 litre Glass

CL-3007

4 x 5 litre HDPE

CL-3008

12 x 0.75 litre Glass

CL-3002

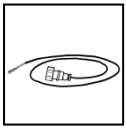
12 x 1 litre PET

CL-3003

24 x 1 litre HDPE

CL-3004

Optional Equipment - Electrical



Ancillary Signal Connection - Basic

CL-4004

Back-Up Battery inc Float Charger - Basic

CL-4024

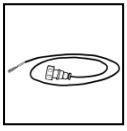
Partial Internal Part

Bottler Connection - Basic

CL-4001

Data Connection

CL-4006



Sample Temperature Monitoring

CL-4103

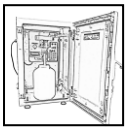
Partial Internal Part

Thermostatic Remote Control Trigger - Stationary

CL-4153

Pressurised Pipeline Interface – Standard

CL-4147-volts / hz



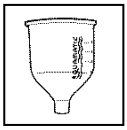
Enclosure – Aquacell S50

CL-4155

Optional Equipment - Mechanical

Contamination Shield (included in S100)

CL-5107



Sample Chamber – Glass Supplement

CL-7077

Security Padlock – All Weather

CL-4055

Suspension Bracket

CL-4034

2 INTRODUCTION

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- Infection
- Electrical
- Mechanical

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The Sampling Process **2.4**

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- Aquacell S100
- Aquacell S200

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- Bottlers

Optional Equipment **2.9**
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- Aux 1
- Mains
- Ancillary Signals Connection
- Bottler
- Enclosure – Aquacell S50
- Pressurised Pipeline Interface

Security **2.10**

Safety First

Infection

Aquacell Wastewater Samplers and the associated Sample Collection Vessels have been designed to minimise the risk of operator contact with the potentially hazardous wastewater medium, however great care should always be exercised when working in close proximity to wastewater. Particular attention should be paid to the following points:

1. Always wear appropriate PPE for the types of effluent being sampled
2. Wash hands thoroughly after handling contaminated sampler parts
3. Do not allow wastewater to come into contact with any open wounds or skin abrasions
4. If any glass has become cracked or chipped replace immediately to avoid the risk of cuts

Electrical

Aquacell S50 & S100 Samplers

Where chosen the S50 & S100 Samplers can be mains powered and receive power directly from the AC mains supply. Provision for and connection of an appropriate power supply must be carried out by a suitably qualified electrician to the end of the mains cable provided with the equipment, see 'Installation Section' for further details

Aquacell S200 Sampler

The S200 Sampler is mains powered only and receives its power directly from the AC mains supply. Provision for and connection of an appropriate power supply must be carried out by a suitably qualified electrician to the junction box on the outside of the S200 refrigerated cabinet, see 'Installation Section' for further details

Once correctly installed all mains connections on the equipment are safely housed behind fixed covers and contact with dangerous voltages is avoided. Always check the integrity of the mains cables/connectors before and during use

Mechanical

Care should be taken, whilst the Sampler is in operation, to avoid trapping fingers in the Pinch Valve Assembly, whilst this does not pose a serious injury risk it could cause some discomfort

Care should be taken to protect upper and lower back when lifting the Sampler module into position on its Wall Bracket (S50 & S100) or the Sampler Bracket (S200)

The Sampler can be supplied with a glass Sample Chamber and glass Sampler Collection Vessels, if this is the case care should be taken when handling as these can be very slippery when wet

The User Guide

The Aquacell sampling system is designed for ease of operation and maintenance. If followed carefully the instructions given in this guide should quickly enable you to assemble, program and deploy your new Aquacell Sampler and start to benefit from the collection of truly representative samples of your wastewater

This User Guide relates to the Aquacell S50, S100 & S200 models from the Aquacell Stationary Wastewater Sampler range. Much of the information supplied applies equally to all formats, however, where information relates to a specific format, Sample Collection Vessel or Optional Equipment then this will be stated

The Sampling Process

The Aquacell Wastewater Sampler extracts individual Sample Shots from a wastewater channel or vessel according to a predetermined program and deposits them into one or more Sample Collection Vessels. In this way the user is provided with a representative sample of the wastewater being discharged

Unless specified with an optional Pressurised Pipeline Interface, Aquacell Wastewater Samplers are only suitable for use on non-pressurised effluent sources only

The benefits of using a Sampler to automatically collect volumes of the wastewater effluent are varied but include:

a) Reduce the pollution load of the discharge (to fall within consent limitations)
b) Reducing water company effluent charges
c) Reducing product wastage

Following collection the way in which the samples are processed will vary from application to application. For example samples can be:

- Analysed using in-house laboratory facilities – when the objective of taking samples is to gain a greater knowledge of the discharge profile
- Sent to a specialist analytical laboratory for analysis - when an independent assessment of the discharge is required
- Made available to the local Water Company as a source of data on which to base charges. Self-monitoring is being increasingly encouraged by water companies both in the interests of accurate charging and to encourage dischargers to improve plant efficiency, and so reduce the pollution load of their discharge

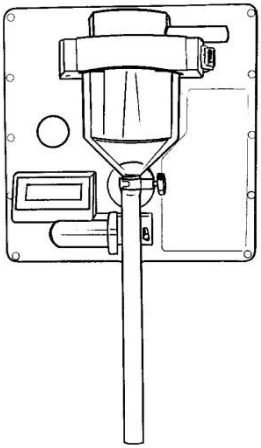
The Aquacell S50, S100 & S200 Sampler Range

The Aquacell S50, S100 & S200 range automatic Wastewater Samplers are designed for flexibility of application with simplicity of operation

As with all Aquamatic Samplers each of these models is compliant with the UK Environment Agencies MCERTS standard for Automatic Wastewater Sampling Equipment

Aquacell S50

The S50 is the simplest of the Aquacell Wall Mounted Samplers. Being extremely compact the S50 can be conveniently positioned adjacent to your effluent source, for indoor applications only



As with every Sampler in the Aquacell Sampler range the S50 model incorporates the well proven and dependable Aquacell Module

The Sampler is supplied with a Bracket / Mounting Bolts to facilitate attachment to a wall or similar flat vertical surface

When the Sampler is specified with a 10 litre HDPE Bottle (CL-3122), an optional Suspension Bracket (CL-4034) is available which attaches to the lower edge of the Sampler M provides a suspension point for the Bottle

All other Removable Sample Collection Vessels can be use S50 where the installation provides for the SCV to be locate beneath the Sampler

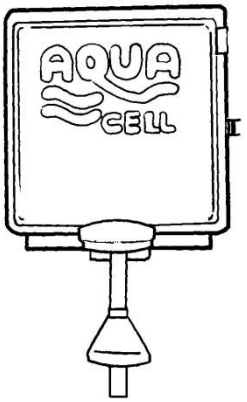
Whilst the S50 is suitable for operation at ambient temperatures between -10˚C and +50˚C, frost protection for the collected samples is <u>not</u> provided

Aquacell S50 features:

- MCERTs compliant
- S50 can be used with any one of the non-Integral range of Sample Collection Vessels
- Suitable for indoor operation
- Mains and / or Battery powered
- Quick release wall mounting system
- Via the optional Ancillary Signal Connection all Aquacell Samplers can be connected to, and controlled by, external equipment such as Flow Meters, pH Meters, PLCs etc.
- Via the optional Pressurised Pipeline Interface Aquacell Samplers can extract samples from pressurised effluent sources up to 6 BAR (at 20°C)

Aquacell S100

The S100 is the full specification Aquacell Wall Mounted Wastewater Sampler. Despite its high performance, being extremely compact the wall mountable S100 can be conveniently positioned adjacent to your effluent source, either indoor or outdoor



The Sampler is supplied with a Bracket / Wall Mounting Plate / Mounting Bolts to facilitate attachment to a wall or similar vertical surface

Lockable covers are provided to prevent access to the Sampler's operational components and Battery Compartment

When the Sampler is specified with a 2.5, 5 or 10 litre HDPE Bottle, an optional Suspension Bracket (CL-4034) is available which attaches to the lower edge of the Sampler M and provides a suspension point for the Bottle

All Removable Sample Collection Vessels can be used with th S100 and S200 (excluding the Self-Emptying) where the insta provides for the SCV to be located suitably beneath the Sampler

Whilst the S100 is suitable for operation at ambient temperatures between -10˚C and +50˚C, frost protection for the collected samples is not provided

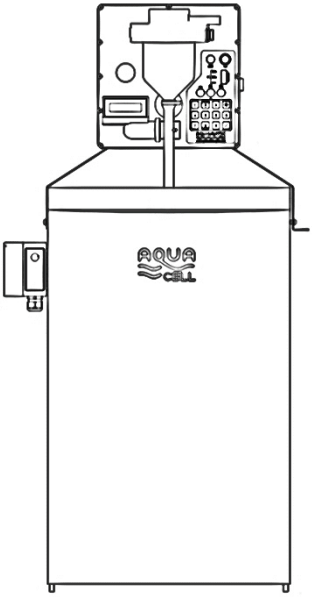
Aquacell S100 features:

- MCERTs compliant
- The Aquacell S100 can be used with any one of the non-Integral range of Sample Collection Vessels
- Suitable for indoor & outdoor operation
- Mains and / or Battery powered
- Lockable Front Cover
- Quick release wall mounting system
- Via the optional Ancillary Signal Connection all Aquacell Samplers can be connected to, and controlled by, external equipment such as Flow Meters, pH Meters, PLCs etc.
- Via the optional Pressurised Pipeline Interface Aquacell Samplers can extract samples from pressurised effluent sources

Aquacell S200

The S200 is the simplest of the refrigerated Aquacell Stationary Wastewater Sampler range. Where an indoor refrigerated Sampler is required for a secure location the S200 is the perfect solution. As with every Sampler in the Aquacell Sampler range the S200 model incorporates the well proven and dependable Aquacell Module

The Sampler Module is mounted above the metal Sample Container Housing. The door to the temperature controlled sample container housing is lockable



The S200 can be used with all of the Removable Sample Collection Vessels, except the 2 x 4.5 litre Self-Emptying Polypropylene Bottler

The S200 is suitable for operation at ambient temperatures between +5˚C and +40˚C

Aquacell S200 features:

- MCERTs compliant
- The Aquacell S200 can be used with any of the non-Integral range of Sample Collection Vessels (except Self-Emptying Bottlers)
- Suitable for indoor operation
- Mains powered
- Separate lockable Sampler Front Cover (optional) and Refrigeration compartment
- Via the optional Ancillary Signal Connection all Aquacell Samplers can be connected to, and controlled by, external equipment such as Flow Meters, pH Meters, PLCs etc.
- Via the optional Pressurised Pipeline Interface Aquacell Samplers can extract samples from pressurised effluent sources

Sample Collection Vessels

Once a sample has been taken it needs to be stored whilst awaiting collection by the user. For this reason all the models in the Aquacell range can be supplied with a variety of Sample Collection Vessels

Single Containers

In many applications a single composite sample is all that is required. For these situations Aquamatic offer a range of single container Sample Collection Vessels, all of which incorporate a sealed lid / cap and easy clean design

Bottlers

When a more detailed look at your wastewater profile is required it is often necessary to distribute collected samples into separate containers, each representing a specific time period or number of samples. For these situations Aquamatic provide a wide range of multi-bottle Sample Collection Vessels. These types of Sample Collection Vessels can be provided in two basic formats, Removable and Integral

Removable Bottlers

Apart from the pluggable connection cable, Removable Bottlers are fully independent from the Aquacell Sampler unit. As such the complete Bottler (including distribution mechanism and bottles) can be removed from the Sampler. This is particularly useful when there is the need to remove a full set of Bottles for analysis

Integral Bottlers (available for S200 format only)

Designed only for use with the Aquacell S200, Integral Bottlers have parts such as the Sample Distribution Mechanism which are integrated into the S200 Cabinet itself. As such, it is only the Sample Bottles themselves that can be removed from the Sampler (which in many cases is all that is required).

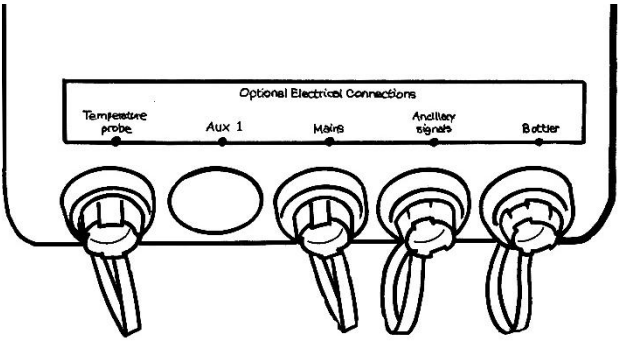
Self-Emptying Bottlers (for S50 and S100 only)

For the S50 and S100 the Self-Emptying Bottler is available in the Standard version only):

Standard
2 Containers diametrically opposed are filled in turn. Each Container is tipped, emptied and righted as the Distributor Pipe moves towards it in order to accept the next Sample(s). This Bottler is useful where the samples from a previous sampling period (e.g. day) is can be retained whilst the current periods samples are being collected, therefore meaning the previous periods samples are always available for analysis if required

Optional Equipment

Optional Connections are located on the rear of the Sampler module as follows:



Sample Temperature Monitoring (Temperature Probe Connection)

Aquacell S50, S100 and S200 Sampler models can be supplied with the facility to monitor collected Sample Temperatures

The temperature (including the corresponding time and date) of the composite sample is recorded every 5 minutes commencing immediately after the first programmed sample is attempted

Sample temperature data can be outputted to a suitable computer or hand held device via the optional Data Connection, details of how to set this up can be found in Section 'Operation > Basic Operations'

Aux 1 (multi-function connection)

This connector is commonly supplied as the Separate 12VDC Lead Acid Battery Connection. Additional functionality via this connector is available such as connection to a Pressurised Pipeline Interface

Mains

Connection point for AC mains power supply.

Ancillary Signal Connection

Required when connecting Sampler to auxiliary equipment. When connected to appropriate flow monitoring equipment, this connection enables the Sampler to extract sample on a flow proportional basis. Accepts flow input (4-20mA or volt-free contact closure) and Remote Control input. Additionally this connection can provide Sample Acquired and Sampler Warning outputs

Bottler

All Aquamatic Bottlers comprise a Distributor Unit characterised by its transparent Distributor Dome, a Distributor Pipe and a Bottle Carrier. It is important when locating the Distributor Unit on the Bottle Carrier that the polarising slot in the Distributor Dome engages with the corresponding peg on the Bottle Carrier

Enclosure – Aquacell S50

A rugged, lockable, weather resistant enclosure to house an Aquacell S50 Sampler and the collected composite samples. The Intake Hose (supplied with Aquacell S50 Sampler) will enter the enclosure through the side or base dependant on application. Power and (optional) signals cables are routed through the side of the enclosure

Pressurised Pipeline Interface

The Pressurised Pipeline Interface (PPI) works in conjunction with any of the Aquacell Sampler range. Providing an interface between the Sampler and a pressurised Sampling Point, the PPI gives the Sampler the ability to extract representative samples from pipelines under pressure. Further information on the PPI should be found in the User Guide Supplement titled 'Pressurised Pipeline Interface'

Security

The Aquacell S100 has a lockable Front Cover (optional on S200), this can be secured using the optional Security Padlock (CL-4055) to prevent unwanted interference. Additionally with an S200 the refrigeration system is lockable (2 keys supplied)

When specified with an Aquacell S100, the Integral Battery is also supplied with a lockable hinged Battery Cover

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Charging the optional Integral Sampler Battery
Enclosure – Aquacell S50
Pressurised Pipeline Interface

Choosing a Site

Aquacell Wastewater Samplers are NOT suitable for use in areas classified as hazardous zones

Unless specified with an optional Pressurised Pipeline Interface, Aquacell Wastewater Samplers are suitable for use on non-pressurised effluent sources only

The Sampler should be installed as close to the Sampling Point as possible to minimise the potential for cross-contamination between successive samples

Environmental Considerations

See Technical Specification (Section 6), for details of IP Ratings and Ambient Operating Temperature ranges

S50 and S200 Samplers are only suitable for indoor weather protected sites

S100 Samplers are suitable for indoor / outdoor sites

Samplers should be located as close as possible to the sampling point and ideally at a level such that the bottom of the Sample Chamber Pinch Valve Tube is always above top water level of the liquid from which the samples are to be taken. Failure to do this, in a power outage or equipment malfunction situation, may result in the source effluent being siphoned through the Sampler and into the Sample Collection Vessel. See 'Routing the Intake Hose' sub-section later in this Section

For outdoor installations, consideration should be given to the possibility that solar radiation could cause the Sampler to rise above its specified maximum temperature. If this might occur, then additional solar screening should be provided

NOTE: Depending on the Intake Hose installation, residual liquid may remain in the Intake Hose between samples. As such, for applications where freezing ambient temperatures are likely to be encountered trace heating of this Hose may be necessary

Preparing the Site / Equipment

Aquacell S50 / S100

A wall or similar flat surface is required, on which to mount the Sampler

The Sampler / SCV should be at a convenient height for operator access. A nominal dimension is suggested (in the Aquacell S50/S100 Installation Diagram on the following page) to the top edge of the Sampler above the floor. A shelf may need to be provided for the chosen Sample Collection Vessel (SCV)

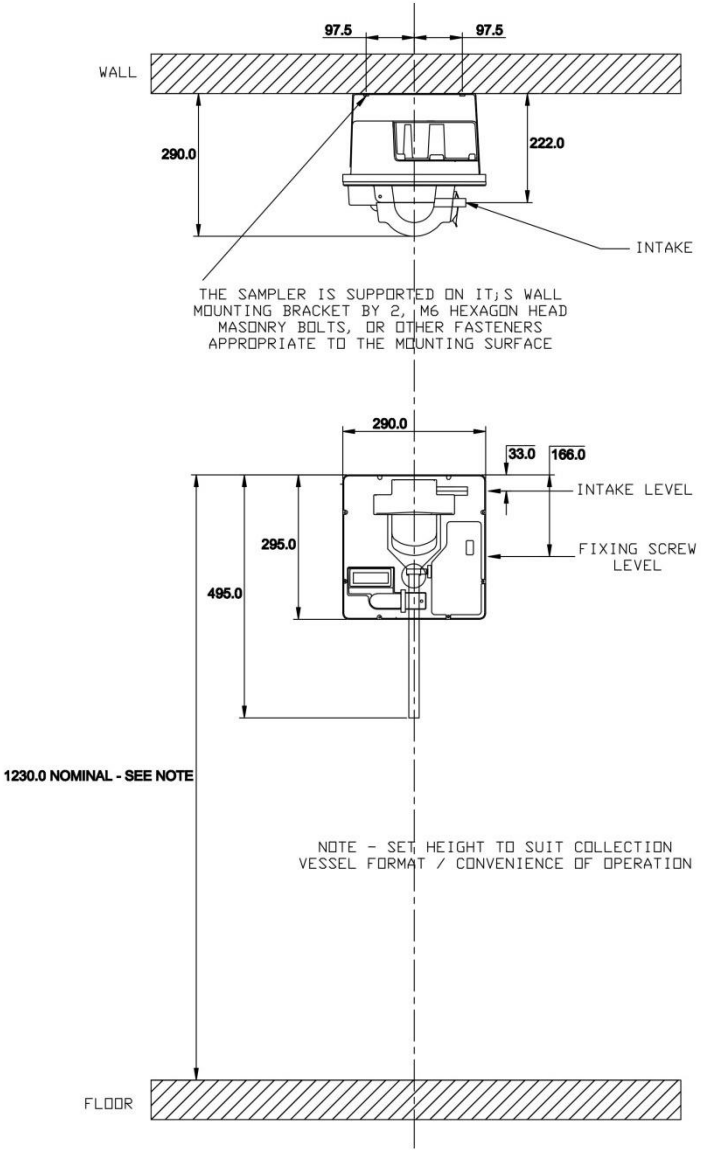
The Sampler should be positioned above the SCV such that the Pinch Valve Tube engages with the inlet of the SCV to a depth of approximately 60mm

If specified a Suspension Bracket can be provided which will allow any of the 2.5 / 5 & 10 litre HDPE Single Containers to suspend from the bottom of the Sampler module. This bracket is supplied with 2 x M4x8 screws for securing it to the back edge of the Samplers bottom flange

1. Fitting the wall mounting:
   a. **Aquacell S50** (supplied with a Sampler Wall Mounting Bracket only)
      - Drill 2 mounting holes in the wall (using an 8mm masonry drill) as per the Aquacell S50 / S100 Installation Drawing on the following page
      - Fit the 2 masonry bolts sleeves and bolts in the holes

   b. **Aquacell S100** (supplied with a Wall Mounting Plate and Sampler Wall Mounting Bracket)
      - Drill 4 mounting holes in the wall (using an 8mm masonry drill)
      - Fit the 4 masonry bolts sleeves in the holes
      - Secure the Wall Mounting Plate to the mounting surface with the 4 masonry bolts
2. Install the Back-up Battery (if applicable) – See sub-section 'Power' later in this section
3. If fitted, take note of the position and orientation of the optional electrical connections fitted on the bottom rear Connection Panel on the Sampler Module, as this will be difficult see when the Sampler is in place on the wall
4. Loosen the 2 fixing bolts slightly (wing-nuts on S100), in order to accommodate the keyhole cut-outs in the Sampler Module's mounting bracket. Hang the Sampler Module / bracket on the threaded bolts and tighten to secure the Sampler Module on the wall
5. Connect any other cables as appropriate – See sub-section 'Connecting the Optional Ancillary Signal Connections' later in this section
6. Install the Intake Hose – See sub-section 'Routing the Intake Hose' later in this section

Aquacell S50 / S100 Installation Drawing

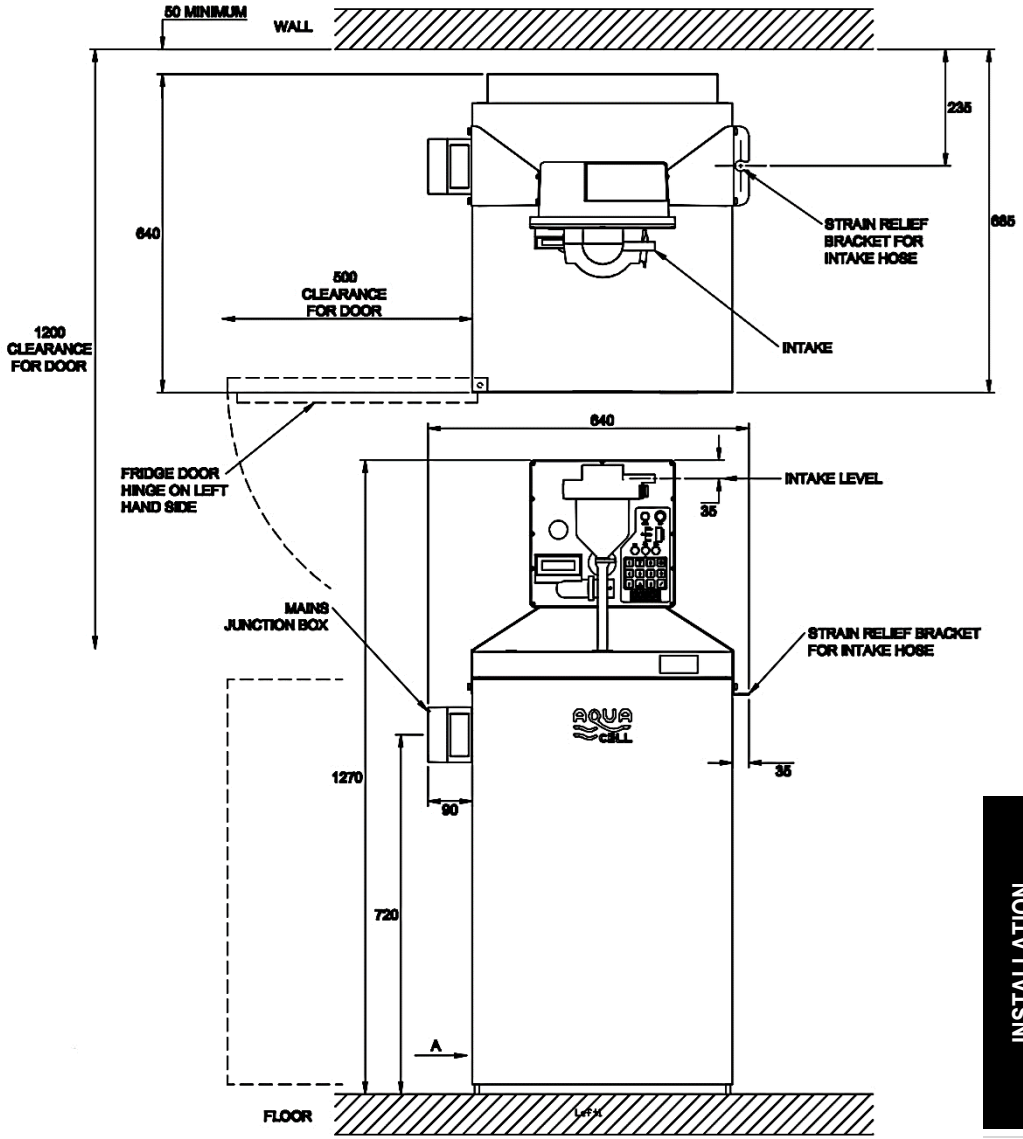


Aquacell S200

A flat horizontal floor in a dry, well ventilated, heated area is required to free-stand the Sampler. Avoid locating the unit in direct sunlight or close to heat sources such as radiators. Front access is required for operation of the Sampler and to retrieval of collected samples

1. Move the Sampler on its wooden pallet, to a position close to the prepared base
2. Remove the transit bolts attaching the Sampler to its pallet
3. Carefully remove the Sampler from its pallet and position it on its prepared base
4. Air must be allowed to circulate freely around the Sampler. Ensure there is adequate ventilation all around the S200 refrigerator, a gap is required of 50mm around the sides, 75mm at the rear and 25mm at the top
5. Install the Back-up Battery (if applicable) – See (Optional) Back-up Battery Installation
6. Connect any other cables as appropriate to the Sampler – See sub-section 'Connecting the Optional Ancillary Signal Connections' later in this section
7. Install the Intake Hose – See sub-section 'Routing the Intake Hose' later in this section
8. Allow the appliance to stand for at least 2 hours before first switching on, in order for the refrigerant to settle

Aquacell S200 Installation Drawing



Power

The procedure for connecting power to the Sampler depends on which Model and Power Option has been selected, the options are as follows:

Mains Connection

Aquacell S50 & S100

Electrical Mains Power Supply Installation

A suitable electrical supply should be provided to the equipment, see 'Technical Section' for further details. Provision for and connection of an appropriate power supply must be carried out by a suitably qualified electrician

Permanently connected equipment must have either an 'all pole' switch or circuit breaker (live and neutral conductors). The switch or circuit breaker must be included as part of the installation, it must be suitably located or easily reached and must be marked as the disconnecting device for the equipment

As the equipment is intended to go in potentially wet areas it is advisable to fit an RCD or RCBO (GFI/GFCI) in the circuit to protect operators from hazards.

Connect the waterproof connector at the end of the mains cable to the port marked 'Mains' on the bottom rear of the Sampler unit. Connect the unterminated end of the mains cable to the power supply

NOTE 1: As standard mains cabling is wired as:

Brown = Live Blue = Neutral Green/Yellow = Earth

NOTE 2: Where selected for USA & Canada mains cabling is wired as:

Black = Live White = Neutral Green = Earth

- The Mains Cable should have been connected to a suitable power source by a qualified electrician, see earlier in this section for details
- Use the customer supplied mains isolator to switch power either on or off to the Sampler
- If it is necessary to move the Sampler, make sure the isolator is in the off position then the Mains Cable waterproof connector at the bottom rear of the Sampler, marked Mains, can be unplugged
- To reinstate power to the Sampler, plug the waterproof connector back into the connector marked Mains, and switch the mains isolator back to on

Aquacell S200

Electrical Mains Power Supply Installation

A suitable electrical supply should be provided to the equipment, see 'Technical Section' for further details. Provision for and connection of an appropriate power supply must be carried out by a suitably qualified electrician

Permanently connected equipment must have either an 'all pole' switch or circuit breaker (live and neutral conductors). The switch or circuit breaker must be included as part of the installation, it must be suitably located or easily reached and must be marked as the disconnecting device for the equipment

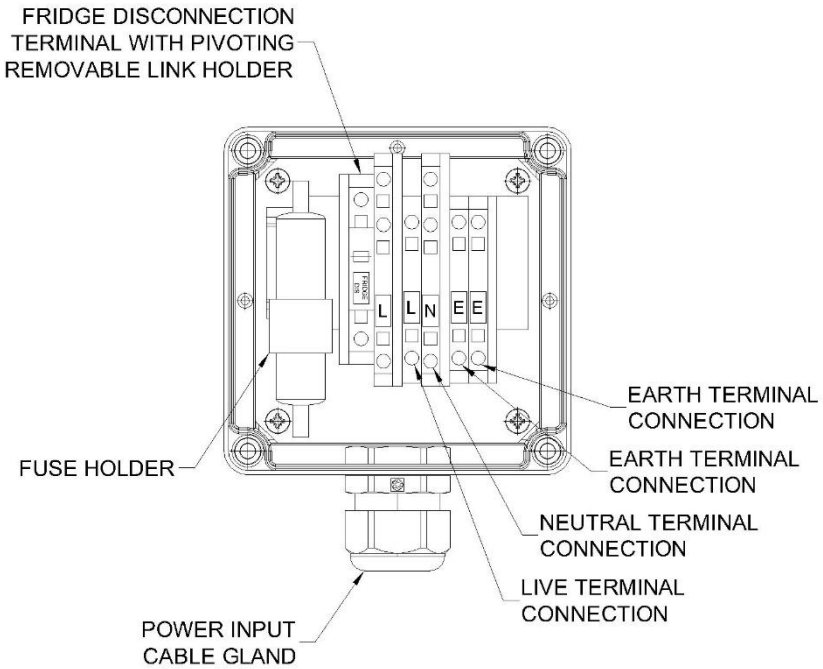
As the equipment is intended to go in potentially wet areas it is advisable to fit an RCD or RCBO (GFI/GFCI) in the circuit to protect operators from hazards

The mains power supply should be made to the junction box on the outside of the S200 refrigerated cabinet, see sub-section 'S200 Mains Junction Box' drawing later in this section for further details

NOTE 1: S200 Samplers contain a refrigeration system and as such electrical protective devices should be suitably motor rated

- The Mains Cable should have been connected to a suitable power source by a qualified electrician, see earlier in this section for details
- Use the customer supplied mains isolator to switch power either on or off to the Sampler, note this will switch power on/off the both the Sampler Module and the refrigerated cabinet
- If it is necessary to remove the Sampler Module, make sure the isolator is in the off position then the Mains Cable waterproof connector at the bottom rear of the Sampler Module, marked Mains, can be unplugged
- To reinstate power to the Sampler, plug the waterproof connector back into the connector marked Mains, and switch the mains isolator back to on

S200 Mains Junction Box



Mains Connection with Optional Integral Float Charged Battery

- Release the stainless steel clasp on the top rear of the Sampler
- Hinge down Battery Cover (no Battery Cover fitted on S50 and S200)
- Place Battery in position against rear and side bulkheads, with terminals adjacent to battery leads. Make sure Battery is pushed firmly against the side bulkhead
- Stretch the rubber Battery Restraint over the Battery and hook over the keeper
- Push the black / red battery connector firmly onto the corresponding connector on the Sampler
- Hinge up the Battery Cover and hook the stainless steel clasp over its keeper
- Proceed as for 'Mains' power option above

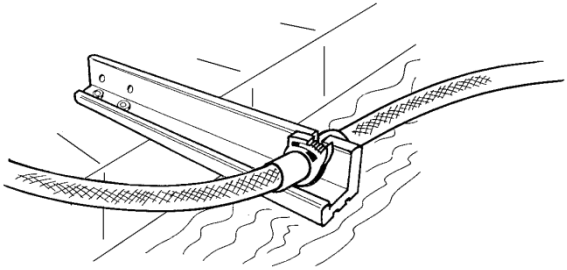
Optional Separate 12VDC Lead Acid Battery Connection

- Connect 12VDC Lead Acid Battery Cable to Sampler as indicated in 'Optional Connections' sub-section of Section 2 'Introduction'
- Connect the two battery crocodile clips to your separate 12VDC Lead Acid Battery (black clip to negative (-) terminal, red clip to positive (+) terminal)

Installing the Intake Hose and Setting the Sample Shot Volume

Aquacell S100 & S200 models are supplied with a 10m Intake Hose, Aquacell S50 5m. This should be installed as follows:

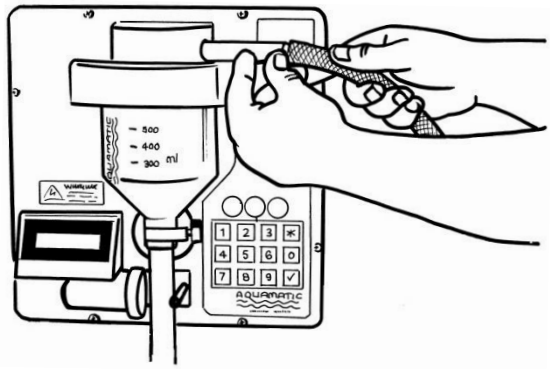
1. Provide a suitable support for the filter end of the Intake Hose such that it is optimally positioned in the wastewater source in order to extract a representative sample. The illustration below shows the optional Intake Hose Support Bracket Kit (CL-4010) being used for this purpose:



2. 2 x Intake Hose Anchors are provided with each Sampler. The Intake Hose Anchor comprises a short silicone rubber split tube which wraps around the Intake Hose and a plastic tube clip which is tightened around the silicone rubber, using pliers, as follows:

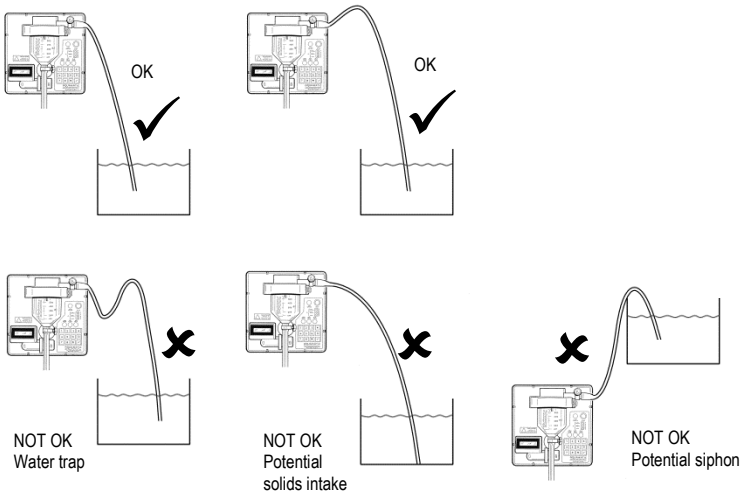
   Attach one of these to the Intake Hose at a point such that when it engages with the chosen support the stainless steel Intake Filter is suspended centrally in the body of wastewater from which samples are to be extracted
3. Suspend the Intake Filter in the flow by engaging the Intake Hose Anchor with the support (if supplied)
4. Now route the rest of the Intake Hose up to the Sampler Module, see the 'Intake Hose routing instructions' on the following page for details of this
5. Cut the Intake Hose to length so that it is able to engage with the Sample Chamber Intake Pipe on the Sampler Module
6. Thread the Intake Hose Clip over the loose end of the Intake Hose and soften the end of the Intake Hose by the application of heat

7. Push the softened end of the Intake Hose onto the Sample Chamber Intake Pipe so that approximately 20mm is engaged, as shown:



8. Secure in the Intake Hose onto the Sampler by tightening the Intake Hose Clip

Good and bad examples of Intake Hose routing



Additionally the following points should be considered when installing your Intake Hose:

- Ensure that there are no leaks in Intake Hose joints. Leaks will cause air bubbles in the water being drawn up the Intake Hose and, in turn, the Samplers lift velocity will be degraded
- Ensure the stainless steel Intake Filter is always fully immersed. A partially immersed Intake Filter will result in excessive splashing inside the Sample Chamber during the

sample intake phase, this can in turn lead to warnings and possible damage to your Sampler

- Restrain the Intake Hose such that the Sampler is always able to extract a representative sample in all flow conditions. The Intake Hose Support Bracket Kit (CL-4010) can be used for this purpose
- Try to ensure that the Intake Hose run is self-draining, this will help to maximise the integrity of each collected sampler
- Depending on the Intake Hose installation, residual liquid may remain in the Intake Hose between samples. As such, for applications where freezing ambient temperatures are likely to be encountered trace heating of this Hose may be necessary

Setting the Sample Shot Volume

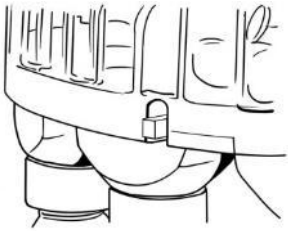
The Sampler is supplied from the factory to extract a nominal 100ml Sample Shot volume and in many applications this is adequate. Certain applications may require an alternative sample shot volume; this is extremely simple to set up:

1. Remove the Sample Chamber/Top Assembly from the Sampler (as detailed in Section 5 'Maintenance' sub-section 'Cleaning') and separate the Sample Chamber from the Chamber Top
2. For Sample Shot volumes greater than 100ml simply cut the silicone rubber Volume Control tube to the required length (approximate shot volume lengths are shown on the side of the Sample Chamber)
3. For sample shot volumes less than 100ml remove the existing silicone rubber Volume Control Tube and replace it with the spare Volume Control Tube (as supplied with the Sampler). Cut the new tube to the required length (approximate sample shot volume lengths are shown on the side of the Sample Chamber)

Note: Where a more precise sample shot volume is required, volumes can be fine-tuned using alternative means e.g. measuring cylinder, weight. Sample shot volumes can be checked and the Volume Control tube length progressively adjusted between samples until the required sample shot volume is achieved

Sample Collection Vessels

Single Containers / Removable Bottlers



When locating the Distributor Unit on the Bottle Carrier ensure that the orientation slot in the Distributor Unit engages with the corresponding peg on the Bottle Carrier

1. Place the Self-Emptying Bottler on the shelf in the S200 Sampler or a suitable support beneath the S50/S100 outlet tube
2. Place the Pinch Valve Tube in the top opening of the Container or Bottler. The tube should engage into the Container or Bottler Distribution Pipe to a nominal depth of 60mm
3. If the SCV is a Bottler, connect its cable to the Bottler Connection on the rear of the Sampler Module (or for S200 Samplers then to the cable suspended from the top underside of the refrigerated compartment)

Self-Emptying Bottlers

Gravity Wastewater Drain Installation

Self-Emptying Bottlers will automatically tip / empty their collected samples out of the rear drain, therefore depending on the site / location a suitable gravity drain may be required, this can be setup as follows:

- Construct the drain from 56mm O/D, 50mm I/D plastic pipe
- An expansion coupling is provided with the Bottler, which has a solvent weld joint at one end and a chevron seal at the other
- Terminate the drainpipe by solvent welding the pipe end to the expansion coupling
- The expansion coupling should be rigidly supported possibly by the drainpipe connecting to it such that the chevron seal aligns with the Drain Spigot at the base of the rear face of the Bottle Carrier, when the Bottler is in position beneath the Sampler
- The rubber chevron seal provides a removable coupling for the Drain Spigot

Note: Where possible the Wastewater Drain should be fitted in a temperature controlled area, this will avoid freezing of any 'trapped' effluent and possible damage to the Sampler. Where this is not possible additional trace heating maybe required to ensure continuous operation of the equipment

Connecting and Using Optional Equipment

Auxiliary Equipment (e.g. Flow Meters, pH Meters etc.)

When required auxiliary equipment should, if possible, be positioned adjacent to the Sampler, within reach of the Samplers Ancillary Signal Cable. Connections between the Sampler and the Auxiliary equipment should be made as detailed in sub-section 'Connecting the Optional Ancillary Signal Connection' later in this Section

Cables to / from the Auxiliary equipment may need to be terminated in one or more signal isolators (not supplied by Aquamatic). These isolators may be necessary to protect the Samplers inputs / outputs from damage caused by electrical transients which are sometimes induced in long cables

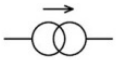
Ancillary Signal Connection

A 1.5m multicore Ancillary Signal Cable will be supplied with this connection. Connect the waterproof connector to the port marked 'Ancillary Signals' on the bottom rear of the Sampler unit. Remove the insulation from the ends of the required cores and terminate as follows:

Flow Meter Input * – Option A
Integrated flow impulse signal – Normally open volt free contact

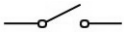
Cable Cores	*Pin No.*	*Notes*
Black (common)	1	Inputs should be a 'Normally Open' volt free contacts Minimum contact closure period >30ms followed by minimum opening period of >20ms
Red	2	

Flow Meter Input * – Option B
Isolated 4-20mA flow analogue signal



Cable Cores	*Pin No.*	*Notes*
Red (- negative)	2	
Blue (+ positive)	5	

Remote Control Input (typically from pump controller or PLC etc.)



Cable Cores	*Pin No.*	*Notes*
Black (common)	1	Inputs should be a 'Normally Open' volt free contacts Minimum contact closure period >50ms
Green	4	

Sample Acquired Output (typically connected to logging device)

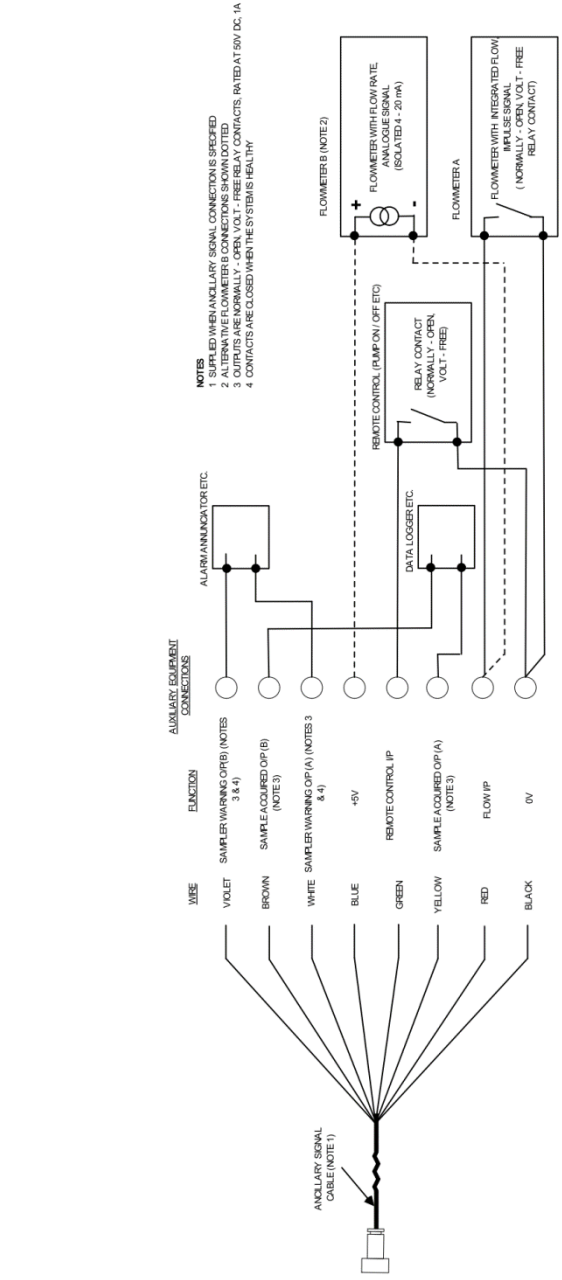
Cable Cores	*Pin No.*	*Notes*
Yellow	3	Outputs are 'Normally Open' volt free relay contacts rated at 50VDC 1A
Brown	7	

Sampler Warning Output (typically connected to alarm monitoring system)

Cable Cores	*Pin No.*	*Notes*
White	6	Outputs are 'Normally Open' volt free relay contacts rated at 50VDC 1A NOTE: Contacts are CLOSED when system is healthy
Violet	8	

* Peripheral equipment should connect directly to the Sampler via the supplied 1.5 metre Ancillary Signal Cable. Where this is not possible, then appropriate isolators maybe sourced and fitted to the wires in order to protect from potentially damaging electrical transients resulting from long cable runs (subject to site conditions)

Ancillary Signal Connection wiring diagram



Charging the Integral Sampler Battery with the Battery Charger

- Disconnect and remove the Sampler Battery from the rear of the Sampler
- Connect the red / black battery connector to the corresponding connector on the Battery Charger
- Connect the Battery Charger power cable to a suitable the AC power outlet and switch on. Supply voltage must match that indicated on the serial number label on the rear of the charger. Unplug the AC cable from the mains power outlet or switch off before disconnecting the charger from the batteries. This avoids the possibility of spark generation
- The indicator lights on the Battery Charger should be interpreted as follows:

INDICATOR	STATUS	COMMENTS
RED	Static ON	Power is on (will switch off when charging)
YELLOW	Static ON	Charging Battery *
YELLOW	Flashing	Battery is 80% charged
GREEN	Static ON	Battery is fully charged. Float charging in process
YELLOW & RED	Flashing	BATTERY RECOVERY MODE Battery has been deeply discharged and the Charger is in soft charge recovery mode
GREEN	Flashing	FAULT CONDITION This maybe due to a Battery defect or a fault in the Battery Charger. Both Battery and Battery Charger should be tested

* Maximum charge time is approximately 8 hours

Battery performance will vary greatly depending on the following:

1. Initial delay – The period before the first Sample is taken should be minimised for maximum battery performance
2. Sample Interval – The time between samples should be minimised for maximum battery performance
3. Purge times – These should be minimised for maximum battery performance
4. Lift height– This should be minimised for maximum Battery performance
5. Battery age - Battery capacity will reduce with age
6. Battery charge condition - Battery should be kept on continual charge until being deployed
7. Ambient temperature - Battery capacity will reduce with ambient temperature
8. LOW POWER MODE – If selected in the Program (see Programming Section for details) then quiescent current is reduced to a minimum

The Sampler Battery supplied by Aquamatic is a Valve Regulated Lead Acid type (VRLA). These batteries are very recyclable. Please ensure that spent batteries are safely returned to Aquamatic Ltd, your distributor, or an approved waste handling/disposal organisation. For neutralized spills, place residue in acid-resistant containers with sorbent material, sand or earth and dispose of in accordance with local regulations

Enclosure – Aquacell S50

The enclosure is for use with the Aquacell S50 only, it is suitable for indoor and outdoor operation (when combined with the optional Anti-Frost Heating System (CL-4156)). Mains and optional signals cables are all routed through the left side of the enclosure, these should be connected as per the instructions earlier in this section. The Intake Hose (supplied with the Aquacell S50) should be routed through the rubber gland on the right side of the enclosure and installed / routed as per the instructions earlier in this section

A lockable door will keep both Sampler Module and collected samples secure. Mounting feet provide an air gap beneath box thus minimising stagnation of rainwater and / or effluent. Internal lugs in base provide the option to fix the enclosure to the ground

Side vents and a fixed drainage device work to control humidity within the enclosure. A removable drainage plug in the enclosure base allows for the manual release of gross effluent spillages, if these occur

Pressurised Pipeline Interface

The optional Pressurised Pipeline Interface should setup as detailed in the separate User Guide Supplement titled 'Pressurised Pipeline Interface'

4 OPERATION

Definitions **4.3**

Basic Operation **4.3**

Controlling the Sampler
Taking a Spot Sample

Programming **4.5**

System Settings
Program Settings
Special Option Settings
Using INFORMATION i button
The Event Log
Running the Program
Data Connection

Definitions

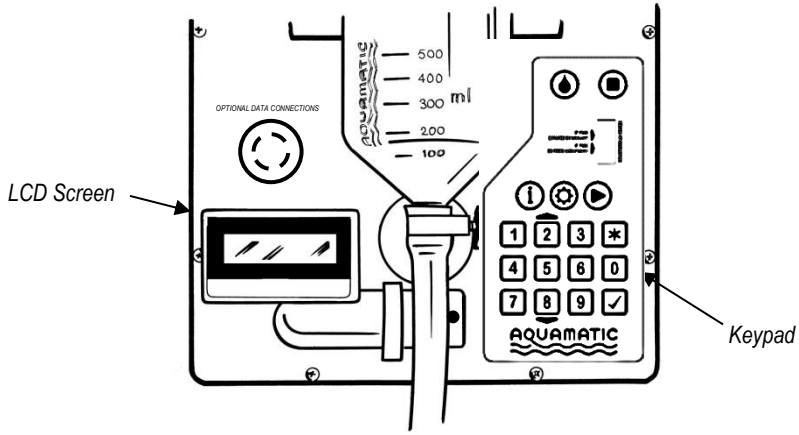
SAMPLE SHOT	A single aliquot of liquid extracted from a specific sampling point
SAMPLE	One or more SAMPLE SHOT's taken in immediate succession
SPOT SAMPLE	A manual SAMPLE initiated by pressing the 'SPOT SAMPLE' button
PROGRAM	The user defined sampling instructions which are entered into the Sampler
SYSTEM SETTINGS	Core Sampler settings e.g. Time, language, configuration, operating mode etc.
PROGRAM SETTINGS	Start and stop times, sampling frequency, time / number of samples per bottle (multiple bottle formats) etc.
SAMPLE ROUTINE	A sequence of SAMPLE's taken in line with the PROGRAM

Basic Operation

Controlling the Sampler

The Sampler is controlled and programmed using the panel mounted keypad in conjunction with LCD screen

Front Panel of Sampler Module



The keypad is divided into circular operating buttons and square programming buttons:

Operating Buttons

SYMB	DEFINITION	DESCRIPTION
●	SPOT SAMPLE	Manually initiates a single sample (available either in standby or during a running program)
■	STOP	Aborts a running program or Sample Shot
i	INFORMATION	Gives access to various Sampler information
☼	SET PROGRAM	Allow user to setup specific sampling program parameters
▶	RUN PROGRAM	Initiates users sampling program

Programming Buttons

SYMB	DEFINITION	DESCRIPTION
✱	TOGGLE	Step through available options or return to the start of a date / time entry
O - 9	NUMBER ENTRY	Numerical selections
✓	ACCEPT	Enter / move to next selection
▲(key 2)	SCROLL UP	Steps up Event and Warning logs in information menus
▼(key 8)	SCROLL DOWN	Steps down Event and Warning logs in information menus

Taking a Spot Sample

SPOT SAMPLE ● is an Operating button on the Keypad. This button can be pressed both in Standby mode and during a running program and will activate a single sample. Each sample will be collected as follows:

IDENT	DISPLAY	ACTION / COMMENTS
SPOTSAM1	==SAMPLING NOW== CLOSE VALVE	Pinch Valve closes on the Pinch Valve Tube connected to the outlet of the Sample Chamber ➔ See SPOTSAM2
SPOTSAM2	==SAMPLING NOW== PRE PURGE	Air is blown into the Sample Chamber and down the Intake Hose. This will purge any standing effluent from the Intake Hose ➔ See SPOTSAM3
SPOTSAM3	==SAMPLING NOW== INTAKE	Effluent is drawn up Intake Hose and into the Sample Chamber at a nominal 0.5 metres / second. Effluent fills the Sample Chamber up to the 2 long electrodes protruding down from the Sample Chamber Top ➔ See SPOTSAM4

SPOTSAM4	==SAMPLING NOW== POST PURGE	Excess effluent is purged from Sample Chamber back up the Volume Control Tube and down the Intake Hose until the level reaches the bottom of the Volume Control Tube. This leaves a measured volume in the Sample Chamber, this is the Sample Shot ➔ See SPOTSAM5
SPOTSAM5	==SAMPLING NOW== SAMPLE RELEASE	Pinch Valve opens and the collected Sample Shot is released into the specified Sample Collection Vessel ➔ See DEFAULT

Programming

Once your Aquacell Sampler has been installed, connected to any optional equipment, switched on, and you have become familiar with the basic operations, it is then necessary to input your specific sampling program requirements.

The tables below show the various screens used to program your Sampler. The 'DISPLAY' column shows the default option on the second line and alternative options below in square brackets [ ]

IDENT	DISPLAY	ACTION / COMMENTS
DEFAULT	AQUACELL READY	Press SET PROGRAM ☼ button to program the Sampler ➔ See SETPROG
SETPROG	SELECT MODE ∗ PROGRAM SETTINGS [SYSTEM SETTINGS] [SPECIAL OPTIONS]	Select SYSTEM SETTINGS to set up the basic system information. Select PROGRAM SETTINGS to setup specific sampling routine information ➔ See SYSSET1 if SYSTEM SETTINGS ➔ See PROGSAM1 if PROGRAM SETTINGS ➔ See SPECOP 1 if SPECIAL OPTIONS

System Settings

IDENT	DISPLAY	ACTION / COMMENTS
SYSSET1	SELECT LANGUAGE ∗ ENGLISH [OTHER LANGUAGES]	Select the language of your choice ➔ See SYSSET2
SYSSET2	DATE/TIME 21-05-00 15:30	Set current time & date ➔ See SYSSET3
SYSSET3	DAYLIGHT SAVING ∗ NO [EUROPE]	Select the clock time mode for the Sampler: • NO – Clock time remains consistent through the year • EUROPE – Clock time changes to European Summer Time (forward 1hr at 01:00 last Sunday in March, back 1hr at 02:00 last Sunday in October) ➔ See SYSSET4

SYSSET4	SAMPLE TEMP LOG ∗ NO [STOP WHEN FULL] [ROLLING]	The Sampler is capable of logging sample temperatures when specified with Sample Temperature Monitoring (see MAINTENANCE for details of fault registration). There are 2 ways in which the Sample temperature data can be stored: • ROLLING – Where data will over write when the log is full, giving approximately the last 41 days of data for up to 70 days from running the program • STOP WHEN FULL – Where data will stop being stored when the log is full, giving the first 41 days of data only ➔ See SYSSET5
SYSSET5	LOW POWER MODE ∗ NO [YES]	When selected, in the absence of a button press (for approx. 70 seconds), the Sampler will enter a low power consumption mode. During this phase the LCD will switch off. Pushing any button will restore the LCD display. Notes: • LOW POWER MODE cannot be used when SAMPLING MODE is set to FLOW • LOW POWER MODE will disable the Sampler Warning Output ➔ See SYSSET6
SYSSET6	PPI MODE ∗ NO [YES]	The Sampler is capable of sampling from a pressurised effluent source when specified with the appropriate Pressurised Pipeline Interface / Connection ➔ See SYSSAM1
SYSSAM1	SAMPLER SETTINGS > > > > > > >	Information screen only ➔ See SYSSAM2
SYSSAM2	BOTTLER FITTED ∗ NO [YES]	The Sampler is capable of distributing samples into multiple bottles when specified with a Bottler ➔ See SYSSAM3
SYSSAM3	SHOTS/SAMPLE 01	The Sampler is capable of extracting larger volumes of wastewater by taking multiple consecutive 'Sample Shots' each time a 'Sample' is due ➔ See SYSSAM4
SYSSAM4	INITIAL SAMPLE ∗ YES [NO]	On 'Running' a program the first sample can be taken either immediately following the programmed 'START TIME' or be governed by the programmed 'TIME' or 'FLOW' interval NOTE: With a flow proportional sampling application 'INITIAL SAMPLE' would not normally be selected ➔ See SYSSAM5
SYSSAM5	SAMPLING MODE ∗ TIME [FLOW]	Samples can either be taken at fixed time intervals or, when coupled to a suitable flowmeter, in relation to flow ➔ See SYSSAM8 if TIME ➔ See SYSSAM6 if FLOW

SYSSAM6	FLOW ORIDE TIME ∗ DISABLED [ENABLED]	When working with a FLOW signal, a forced timed sample can be scheduled when insufficient effluent has passed to activate a sample on flow basis alone ➔ See SYSSAM7
SYSSAM7	FLOW SIGNAL ∗ 4/20mA [IMPULSE]	Sampler can accept either an impulse signal repeating at equal flow increments or an analogue 4/20mA signal corresponding to flow rate ➔ See SYSSAM8
SYSSAM8	REMOTE CONTROL ∗ NO [YES]	The sampling routine can be inhibited / enabled by an external signal. Each time a new REMOTE CONTROL signal is ON the sample routine will start, each time REMOTE CONTROL is OFF the sample routine will stop ➔ See SYSSAM9 if YES and sampling by TIME ➔ See SYSSAM10 if YES and sampling by FLOW ➔ See SYSSAM11 if NO
SYSSAM9	CONTROL MODE ∗ SAMPLER ENABLE [PUMP/TIME TRIG]	With SAMPLER ENABLE selected, the start time for timed samples will begin from zero each time REMOTE CONTROL signal is switched to ON. ➔ See SYSSAM10 With PUMP/TIME TRIG selected, the start time for timed samples begins when RUN PROGRAM is pressed and sample timing continually counts from this point irrespective of whether REMOTE CONTROL is ON or OFF ➔ See SYSSAM10
SYSSAM10	INITIAL DELAY 00HR 02MIN	A delay can be programmed in the Samplers recognition of the external signal. This delay is typically used when a pump is providing the control signal to allow the pump to establish a representative flow ➔ See SYSSAM11 if Bottler is not fitted ➔ See SYSSAM13 if Bottler is fitted
SYSSAM11	OVERFILL PROT ∗ NO [YES]	The number of sample shots can be limited, when using a single composite sample container to avoid overfilling ➔ See SYSSAM12 if YES ➔ See SYSSAM13 if NO
SYSSAM12	MAXIMUM SAMPLES 0100	Set maximum allowable number of samples ➔ See SYSSAM13
SYSSAM13	PRE PURGE 03 SEC	The time required, to expel the standing column of water in the submerged sample Intake Hose prior to the sample shot being collected The PRE PURGE time should be long enough to ensure that water is expelled from the Intake Hose followed by bubbles emitted from the end of the Intake Hose for approximately 2 seconds ➔ See SYSSAM14

SYSSAM14	POST PURGE 06 SEC	The time required, to expel the risen column of water from the submerged sample Intake Hose. The POST PURGE time should be long enough to ensure that water is expelled from the Intake Hose followed by bubbles emitted from the end of the Intake Hose for approximately 2 seconds ➔ See SYSSAM15
SYSSAM15	TIME OUT LIMIT 060 SEC	The period for which the Sampler will attempt to draw the effluent up the Intake Hose can be varied to suit the application. Maximum 199 seconds ➔ See SYSSAM16
SYSSAM16	SYSTEM SETTINGS INSTALLED	Information screen only ➔ See SETPROG if Bottler not fitted ➔ See SYSBOT1 if Bottler is fitted
SYSBOT1	BOTTLER SETTINGS > > > > > > >	Information screen only ➔ See SYSBOT2
SYSBOT2	BOTT LOCATIONS ∗ 24 [etc]	Set according to bottler format ➔ See SYSBOT3
SYSBOT3	RE-CYCLE ∗ NO [YES]	Bottler can either stop on last bottle or continue on to Bottle 1 and repeat its cycle continuously ➔ See SYSBOT4
SYSBOT4	BOTTLER MODE ∗ SINGLE [GROUP]	In SINGLE mode each bottle is addressed individually according to the program selected. In GROUP mode a nominally identical sample is deposited into each bottle of a group simultaneously* - Perhaps a bottle for each interested party, or possibly a separate bottle for each determinant (necessary where preservative dosing of the sample is required for example) ➔ See SYSBOT7 if SINGLE ➔ See SYSBOT5 if GROUP
SYSBOT5	BOTTLES/GROUP ∗ 2 [*other group sizes*]	Select number of bottles to be addressed simultaneously* (2, 3, 4, 6, 8, 12 or 24). This number must be a factor or equal to the number of specified bottle locations ➔ See SYSBOT6
SYSBOT6	BOT 15 SEC PAUS ∗ NO [YES]	To avoid residual effluent drops falling into a subsequent Bottle the Sampler can be programmed to hold the Distributor Pipe over each Bottle for 15 seconds following Sample Release ➔ See SYSBOT7
SYSBOT7	INCREMENT BY ∗ TIME [SAMPLES]	The Bottler can be programmed to advance bottles (or groups) either at regular time intervals or after a fixed number of samples ➔See SYSBOT8 if TIME and SAMPLING MODE is FLOW Otherwise: ➔See SYSBOT9

SYSBOT8	MAX SAMPS/BOTTLE 0005	Set maximum number of allowable samples per Bottle ➔ See SYSBOT9
SYSBOT9	BOTTLE CLEANING NO [YES]	Select this where a 2 x 4.5 litre Self-Emptying Self-Cleaning Bottler has been supplied with your S300 Sampler ➔ See SETPROG

Program Settings

IDENT	DISPLAY	ACTION / COMMENTS
PROGSAM1	SAMPLER SETTINGS > > > > > > >	Information screen only ➔ See PROGSAM2
PROGSAM2	START ROUTINE ∗ IMMEDIATELY [21-05-12 15:30]	Set a date / time for the sample routine to commence, or select IMMEDIATELY. If IMMEDIATELY is selected the sample routine will start at the time the RUN PROGRAM ► button is pressed ➔ See PROGSAM3
PROGSAM3	STOP ROUTINE ∗ NON STOP [22-05-00 15:30]	Set a date / time for the sample routine to stop, or select NON STOP ➔ See PROGSAM4 if time between START ROUTINE and STOP ROUTINE is less than 24 hours and both are within the same day ➔ See PROGSAM5 if SAMPLING MODE is TIME ➔ See PROGSAM6 if SAMPLING MODE is FLOW & IMPULSE ➔ See PROGSAM7 if SAMPLING MODE is FLOW & 4/20MA
PROGSAM4	REPEAT DAILY ∗ NO [YES]	If the duration of the sampling routine is less than 24 hours it can be repeated daily if required ➔ See PROGSAM5 if SAMPLING MODE is TIME ➔ See PROGSAM6 if SAMPLING MODE is FLOW & IMPULSE ➔ See PROGSAM7 if SAMPLING MODE is FLOW & 4/20MA
PROGSAM5	SAMPLE INTERVAL 00HR 01MIN	Set time between samples ➔ See PROGSAM9 if Bottler not fitted ➔ See PROGBOT1 if Bottler is fitted
PROGSAM6	IMPULSES/SAMPLE 0005	Set flow impulses between samples ➔ See PROGSAM9 if Bottler not fitted ➔ See PROGBOT1 if Bottler is fitted
PROGSAM7	INT AT FULLSCALE 001 MIN	Set required sample interval time when flow is at Full Scale i.e. 20mA ➔ See PROGSAM8 if FLOW OVERRIDE is ENABLED ➔ See PROGSAM9 if FLOW OVERRIDE is DISABLED

PROGSAM8	FLOW O/RIDE TIME 00HR 10MIN	Set the time after which a sample will be taken in a situation where the flow during that period has been insufficient to trigger one ➔ See PROGSAM8 if Bottler not fitted ➔ See PROGBOT1 if Bottler is fitted
PROGSAM9	PROGRAM SETTINGS INSTALLED	Information screen only ➔ See DEFAULT
PROGBOT1	BOTTLER SETTINGS > > > > > > >	Information screen only ➔ See PROGBOT2 if INCREMENT BY SAMPLES ➔ See PROGBOT3 if INCREMENT BY TIME
PROGBOT2	SAMPLES/BOTTLE 001	Set the number of samples to be deposited into each Bottle ➔ See PROGBOT4
PROGBOT3	TIME PER BOTTLE 00 HOURS 30 MINS	Set the time duration for which samples are to be deposited into each Bottle ➔ See PROGBOT4
PROGBOT4	PROGRAM SETTINGS INSTALLED	Information screen only ➔ See DEFAULT

Special Options Settings

Special Options is available for functions which are only required for specialised applications

IDENT	DISPLAY	ACTION / COMMENTS
SPECOP1	AUTO RESTART ✱ NO [YES]	The Sampler can be made to automatically restart its program after a power interruption (this option is not available when a Bottler is connected) ➔ See SPECOP2
*SPECOP2 **	SHOTS/BOTTLE(G) ✱ NO [YES]	The Sampler can be made to deposit individually designated numbers of sample shots into each bottle of a bottle array when in GROUP mode ➔ See SPECOP3
SPECOP3	SAMP ACQUIRED OP ✱ ON COMPLETION [DURING ATTEMPT]	'Sample Acquired' relay output can be programmed to operate in 2 ways: • ON COMPLETION – Closes on acquisition of a successful sample shot, at the end of the INTAKE phase *(SPOTSAM3)* • DURING ATTEMPT – Closes for the full duration of the sample shot attempt (whether successful or not), opening at the end of the POST PURGE phase (*SPOTSAM4)* ➔ See SPECOP4

SPECOP4	SAMP ACQUIRED OP ∗ DEFAULT LATCH [AUTO LATCH]	'Sampler Warning' relay output can be programmed to operate in 2 ways: • DEFAULT LATCH - The output will hold for 10 seconds only • AUTO LATCH – The output will hold for a preset time, or when i INFORMATION button is pressed ➔ See SPECOP5 if AUTO LATCH Otherwise: ➔ See SPECOP06
SPECOP5	AUTO LATCH TIME ∗ 00HR 00MIN 10SEC	Set the 'Sample Acquired' relay output latch time ➔ See SPECOP6
SPECOP6	SAMP WARNING OP ∗ DEFAULT LATCH [AUTO LATCH] [MANUAL LATCH]	'Sampler Warning' relay output can be programmed to operate in 3 ways: • DEFAULT LATCH - The output will hold for 10 seconds only • AUTO LATCH – The output will hold for a preset time, or when i INFORMATION button is pressed • MANUAL LATCH – The output will hold indefinitely until the i INFORMATION button is pressed ➔ See SPECOP7 if AUTO OFF Otherwise: ➔ See SPECOP08
SPECOP7	AUTO LATCH TIME 00HR 00MIN 10SEC	Set the 'Sample Warning' relay output latch time ➔ See SPECOP8
SPECOP8 **	SELECT ZONES ∗ SINGLE ZONE [MULTI-ZONE]	Set the number of sampling time zones: • SINGLE ZONE – Normal program settings (i.e. START on TIME/IMMEDIATELY and STOP on TIME/NON-STOP) • MULTI-ZONE – Program settings will request a start date/time and a stop date/time for each of the number of zones selected in SPECOP7 ➔ See SPECOP10 if SINGLE ZONE ➔ See SPECOP9 if MULTI-ZONE
SPECOP9	MULTI-ZONE #02 ZONES	Set the number of desired sampling zones (maximum 24) ➔ See SPECOP10
SPECOP10	WHEN BTL FULL ∗ WAIT FOR INTERVL [ADV TO NEXT BTL]	With a Bottler fitted, sampling by FLOW and advancing the Bottler by TIME, if high flowrate demands more samples than 'MAX SAMPLES PER BOTTLE' this option advances the Bottler to continue taking Samples within the 'TIME PER BOTTLE' period • WAIT FOR INTERVAL – Only one Bottle per 'TIME PER BOTTLE' period will be used • ADV TO NEXT BTL – Multiple Bottles per 'TIME PER BOTTLE' period will be used as Flow demands ➔ See SPECOP11

SPECOP11	SPECIAL OPTIONS INSTALLED	Information screen only ➔ See DEFAULT

* When SPECOP2 'SHOTS / BOTTLE' is selected 2 new screens will appear in the 'System Settings' > 'Bottler' menus, these are shown as follows:

IDENT	DISPLAY	ACTION / COMMENTS
SYSBOT4A	BOTTLES / GROUP ∗ 2 [other group sizes]	Select number of bottles to be addressed sequentially during each sample. This value must be a factor of the number of bottles locations ➔ See SYSBOT5A
SYSBOT5A	BOTTLE = 01 ∗ SHOTS = 02	Use ∗ to select the bottle number and input SHOTS = 02 a 2 digit number using the number keys to select the number of shots required to be deposited into each bottle of the bottle array ➔ See SETPROG

** When SPECOP8 'SELECT ZONES' is selected as 'MULTI-ZONE' the 'Program Settings' screen will change as follows as follows:

IDENT	DISPLAY	ACTION / COMMENTS
PROGSAM2X	START ZONE 01 [21-05-12 15:30]	Set a date / time for each of the sampling zones to start ➔ See PROGSAM3X
PROGSAM3X	STOP ZONE 01 [22-05-00 16:30]	Set a date / time for each of the sampling zones to stop ➔ See PROGSAM4 if total time between START zone 01 and STOP zone 24 (or last zone) is less than 24 hours and both are within the same day

Having selected one or more of the 'SPECIAL OPTIONS' the 'DEFAULT' screen will show a '+' positioned at the bottom left of the display.

Using INFORMATION i button

To assess the Program you have entered, or its progress, press the INFORMATION i button. The display will show as follows:

IDENT	DISPLAY	ACTION / COMMENTS
INFODEF	VIEW ∗ PROG SETTINGS [SHOT PROGRESS] [SAMPLE TEMP] [WARNING LOG] [SAMP/WARNING LOG] [EXIT]	Select YES to see options available or EXIT to return to default display. ➔ See INFO1 if PROG SETTINGS ➔ See INFO2 if SHOT PROGRESS ➔ See INFO3 if SAMPLE TEMP ➔ See INFO4 if WARNING LOG ➔ See INFO5 if SAMP/WARNING LOG ➔ See DEFAULT if EXIT

INFO1	START SAMPLING IMMEDIATE ↓ STOP SAMPLING NON-STOP ↓ SAMPLE INTERVAL OOHOURS 30MINS ↓ SAMPS/BOTTLE 001	Auto-scrolls though key Sampling Program settings ➔ See DEFAULT
INFO2	SHOTS ATTEMPTED 0048 ↓ SHOTS COMPLETED 0048	Auto-scrolls though key shot progress information ➔ See DEFAULT
INFO3	MAX SAMPLE TEMP = 4.0°C ↓ MIN SAMPLE TEMP = 1.0°C ↓ MEAN SAMPLE TEMP = 2.5°C ↓ PRESENT SAMPLE TEMP = 2.0°C	Auto-scrolls though key sample temperature data. This menu choice is only available if the Sampler is fitted with the Sample Temperature Monitoring Facility ➔ See DEFAULT
INFO4	0181 GUARD HIT 19:45 21-05-11 ⇕ ↓ 0295 TIME OUT 15:00 22-05-11 ⇕ ↓ etc.	Allows manual scrolling though all logged Warning Events. Each event has a unique 4 digit reference number, a short form description and a time and date of occurrence ➔ See DEFAULT
INFO5	0179 SAMPLE OK 19:15 21-05-11 ⇕ 0180 SAMPLE OK 19:30 21-05-11 ⇕ 0181 GUARD HIT 19:45 21-05-11 ⇕ ↓ 0182 SAMPLE OK 20:00 21-05-11 ⇕ ↓ etc.	Allows manual scrolling though all logged Sampling and Warning Events. Each event has a unique 4 digit reference number, a short form description and a time and date of occurrence ➔ See DEFAULT

The Event Log

The Samplers Event Log can contain up to approximately 1350 events. When these initially occur they will be momentarily displayed on the Samplers screen in the 'Full Form' format, but when being reviewed in the Event Log they will display in the 'Event Log Form' as shown in the table below.

The following table is a list of normal operational events which may appear in the Event Log, for all full set of Warnings event please see the Maintenance Section later in this User Guide.

FULL FORM MESSAGE	EVENT LOG FORM MESSAGE	ACTION / COMMENTS
INITIALISING	PRG START	Program has been initiated by pressing the ▶ RUN PROGRAM button
None	SAMPLE OK	Sample has been successfully acquired
None	ZONE STA 01	Start of zone
None	ZONE END 01	End of zone
INCREMENTING BOTTLER	INC BOTTLER	Bottler has moved to its next location after programmed time / number of samples
None	REM I/P ON	The external Remote Control input has closed
None	REM I/P OFF	The external Remote Control input has opened
PROGRAM COMPLETE	PRG COMPLET	Program has completed
STOP BUTTON PRESSED	STOPPED	Program has been stopped by pressing the ■ STOP button

Running a Program

To run your program, press the RUN PROGRAM ▶ button. On doing this the following screens will appear:

IDENT	DISPLAY	ACTION / COMMENTS
RUNPROG1	TESTING BOTTLER PLEASE WAIT	Only appears where Bottler is specified in SYSTEM SETTINGS
RUNPROG1	PROGRAM RUNNING 19-02-11 10:35	Shows current status and date / time
RUNPROG3	NEXT SAMPLE DUE 00HR 09MIN 34SEC	Indicates when next sample is due
RUNPROG4	BOTTLE INC. IN 00HR 19MIN 34SEC	Only appears where Bottler has been successfully detected in RUNPROG1 Indicates when next Bottler increment is due

In addition to the above status displays the Sampler will also display warning messages relating to any events which may have occurred during the program. Warning messages are displayed every few seconds and are accompanied by a bleep sound. When the program has completed the display will show:

PROGRAM COMPLETE or MAXIMUM SAMPLES REACHED

Data Connection

The Sampler's event log and optional temperature log can be downloaded via the optional Data Connection to a suitable computer / handheld communication device

The event log can store up to approx. 1350 events, including Sample Shots, Bottler increment events, external signal events etc. and approx. 12,000 Sample Temperature records. Samplers with the Data Connection fitted can be allocated a user defined tag / name

Communicating via the Data Connection

The following assumes that the computer has a suitable serial port communication program installed (such as HyperTerminal). Proceed as follows:

1. Connect the USB cable to the Sampler on the front panel
2. Connect other end of the USB cable to communications port (COMX) on computer
3. Power up computer and Sampler
4. Open a suitable serial port communication program (such as HyperTerminal) on the Computer
5. Set the Computer port properties as follows (settings may vary dependant on communications program):

Bits per second	19,200
Data bits	8
Parity	None

Stop bits 1
Flow control None

6. Set the Computer ASCII Setup as follows:
   Append line feeds to incoming line ends
   Wrap lines that exceed terminal width
   Emulation set to 'Auto detect'
7. Communication with the Sampler should now be possible

The Sampler can receive 7 control codes from the Computer, these are:

CODE	COMMENTS
✳s*[tagname]*	Where [*tagname*] is a user definable tag / ID (up to twenty ASCII characters long) Example: ✳sSAMPLER_123 then carriage return gives the Sampler the name SAMPLER_123
✳i	Shows basic Sampler information plus the full list of control codes: ✳i Unit = SAMPLER_123 Date: 21-05-19 Time 15:30 Sampler firmware: SXX.XX.XX.XX Temperature Correction = 0.0 C Command list: *i - Download Information *e - Download Event Log *w - Download Warning Log *t1 - Download Temperature Log in Spread Sheet Format *t2 - Download Temperature Log in Visual Appraisal Format *s - Change unit name *c - Cancel download
✳e	Calls the full Event Log from the Sampler If the logger contains 150 or more events, the computer will show:

```
*e
Unit = SAMPLER_123
Date: 21-05-19 Time 15:30
Sampler firmware: SXX.XX.XX.XX
EVENT LOG
Record Count = XXXXX
Approximate download time = XXX to XXX sec
Press the '1' button on the Sampler to continue with the download
Press the '2' button on the Sampler to abandon the download
The Sampler is waiting for response...
```

and the Sampler LCD will show:

```
[1] TO DOWNLOAD
[2] TO ABANDON
```

Press the 1 button on the Sampler to continue with the download

The Sampler LCD will show:

```
DOWNLOADING
```

When the download is complete, the screen returns to the DEFAULT

Note: If the logger contains less than 150 events the above choice will not be given and the download will automatically continue

***w**

Calls the Warning Log from the Sampler

The computer will show:

```
*w
WARNING LOG
Record Count = 00001
21-05-19 15:35, 0003 SHOT T/OUT, (for example)
Download Complete
```

***t1**

Calls the Temperature Log from the Sampler in spread sheet format suitable for transferring into a Spreadsheet on a Computer

The computer will show:

	∗t1 NOTE: Temperatures are logged at 5 minute intervals Enter ∗c to cancel the Download Approximate download time = 001 to 002sec SAMPLE TEMPERATURE LOG Spread Sheet format selected… Temperature Correction = 0.0 C Record Count = XXXXX DOWNLOADING Start Date: 21−05−19 Time 15:30 Maximum Sample Temp = 3.0 C Minimum Sample Temp = 3.0 C Mean Sample Temp = 3.0 C 00001, 21−05−19 15:35, 3.0 00001, 21−05−19 15:40, 3.0 *[more temperatures etc.]* Download Complete
∗t	Calls the Temperature Log from the Sampler in visual appraisal format suitable for viewing directly in the download The computer will show: ∗t2 NOTE: Temperatures are logged at 5 minute intervals Enter ∗c to cancel the Download Approximate download time = 001 to 002sec SAMPLE TEMPERATURE LOG Spread Sheet format selected… Temperature Correction = 0.0 C Record Count = XXXXX DOWNLOADING Start Date: 21−05−19 Time 15:30 Maximum Sample Temp = 3.0 C Minimum Sample Temp = 3.0 C Mean Sample Temp = 3.0 C 21−05−19 15:35 3.0, 3.0, 3.0, 2.9, 2.9. 3.0, *[more temperatures etc.]* Download Complete
∗c	Instructs the Sampler to cancel the current download. Once a download has started, if taking too long entering ∗c will cancel that download

5 MAINTENANCE

General **5.3**
- Removing / Refitting the Sample Chamber
- Cleaning Sample Tract (Intake Hose and Sample Chamber)
- Changing Desiccant Bag
- Lubricating Pinch Valve Piston
- Cleaning S200 Sample Refrigeration Housing
- Cleaning S200 Condensate Channel

Troubleshooting **5.7**
- General Operational Troubleshooting
- Sampler Warning Message Troubleshooting

Test Modes **5.10**
- Sampler Test Mode
- S200 Sample Refrigeration Housing Test Mode

Service Support **5.13**

General

Routine user maintenance on your Aquacell Sampler is made as minimal as possible. It is however strongly recommended that regular preventative maintenance is carried out by an Aquamatic Certified Engineer. Please contact Aquamatic offices for details of annual Maintenance Contracts under which this work can be carried out

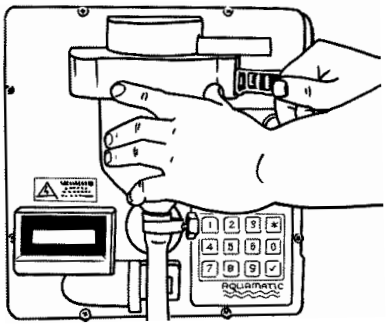
It is good policy to maintain the Sampler and its accessories in a generally clean condition bearing in mind the potential infection hazards associated with wastewater

NOTE: Suitable PPE must be worn when handling / cleaning your Aquacell Sampler

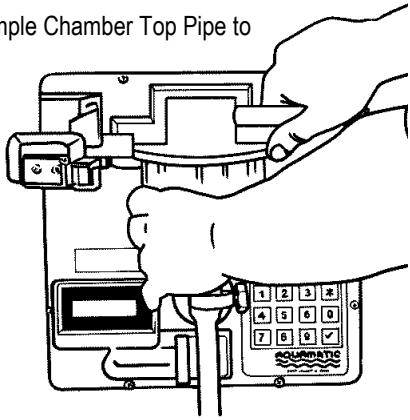
Removing / Refitting the Sample Chamber

Removing and refitting the Sample Chamber is necessary when carrying out a number of different operations. It is therefore useful to become familiar with this simple operation

1. Remove Intake Hose
2. Release retaining clip at right side of Top Clamp



3. Hinge open Top Clamp whilst gripping Sample Chamber Top Pipe to ensure Sample Chamber stays in place
4. Gripping Sample Chamber Top Pipe with one hand and Sample Chamber with the other carefully release the assembly from the Top Clamp
5. Carefully remove the Sample Chamber Top assembly from the Sample Chamber assembly using the top pipe as a lever
6. Carry out the above procedure in reverse order to replace the Sample Chamber



Cleaning Sample Tract (Intake Hose and Sample Chamber)

With all Aquacell Sampler models, in the interests of minimising sample contamination the Sample Tract (Intake Hose and Sample Chamber) should be kept clean. The method adopted to clean the sample tract will depend on how sensitive the application is to cross contamination

Most parts of the sample tract are easily accessible and can be cleaned with a detergent and / or a cream cleaner such as 'CIF' using a suitable brush

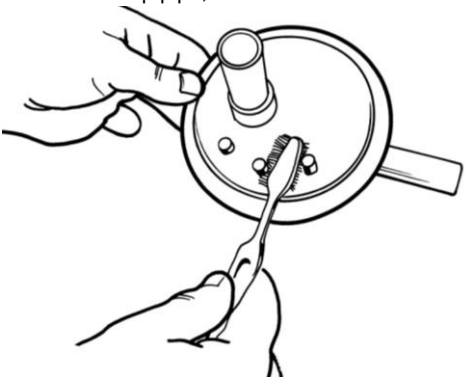
Inaccessible parts of the sample tract are usually flushed out with clean water. Where the Sampler has to be completely free from the contamination of previous sampling operations then replacement of inaccessible parts is the only option

The frequency of cleaning will depend very much on the application. Operational experience with the Aquacell Sampler will enable you to decide how frequently the sample tract should be cleaned in order to ensure that reliable and representative samples are always collected

The parts of the sample tract which need to be kept clean are as follows:

- Intake Hose assembly – Loosen hose clamp to remove. Either flush out with clean water or replace
- Sample Chamber / Chamber Top
  When cleaning the Sample Chamber Top it is important to ensure that the inside surface, particularly between the electrode pins, is kept free of wastewater contamination. Wastewater deposits can form a conductive path between the electrode pins which may lead to the occurrence of CLEAN CHAMBER TOP and / or GUARD PROBE HIT faults. A test for conductive build-up on the Sample Chamber Top is detailed in the 'Test Mode' later in this section
  a) To clean the Sample Chamber Top firstly remove the Sample Chamber assembly as detailed in 'Removing / Refitting the Sample Chamber' earlier in this section
  b) Clean the Sample Chamber with a cleaning sponge using a detergent solution followed by a clean water rinse. Stubborn deposits may require a more aggressive cleaner

c) Clean the sample Chamber Top in a similar manner but using brushes instead of a sponge. A small diameter bottle brush or similar can be used to clean the inside of the horizontal top pipe, and the silicone Volume Control Tube



d) A small toothbrush (or similar) can be used to reach the base of the 3 electrodes and the inside surface of the Chamber Top between the electrodes. Clean the 3 electrodes both above and below the Chamber Top

e) Once cleaned retest the Sample Chamber Top to ensure that any conductive path is removed as detailed in the 'Test Mode' sub section later in this section

- Sample Collection Vessel - The method used to clean the Sample Collection Vessel will vary depending on which format is purchased:

2.5 / 5 / 10 litre HDPE Bottles

Clean with a brush using detergent solution, followed by a clean water rinse

25 litre Polyethylene Container

Remove the central access disc for cleaning. Clean with a brush using detergent solution, followed by a clean water rinse

0.75 litre Glass Bottles

Either clean in a bottle washer or replace

1 litre P.E.T. Bottles

Either flush with clean water or replace

1 litre Polypropylene Containers

Clean with a brush using detergent solution followed by a clean water rinse

Bottler Distributor Pipe

Force the Distributor Pipe out of its white retaining clip. Clean with a brush using detergent solution, followed by a clean water rinse

Changing Desiccant Bag

It is important to ensure that electronic / electrical hardware inside the sealed Sampler Module remains dry. As such periodically it may be necessary to change the Desiccant Bag inside your Aquacell Sampling Module. To do this proceed as follows:

- Switch off and isolate the Sampler module
- Remove Sample Chamber / Top assembly (see removing / refitting the Sample Chamber)
- Remove rubber Desiccant Bag access plug from Sampler Module Front Panel
- Withdraw Desiccant Bag and discard in suitable waste disposal bin
- Remove new Desiccant Bag from its sealed bag and push into Front Panel
- Replace the rubber Desiccant Bag access plug

Lubricating Pinch Valve Piston

Occasionally it may be necessary to lubricate the Pinch Valve Piston, this should be carried out using the appropriate lubricant as follow *:

- For 'Pinch Valve Piston – Series 2' (black) use 'Silicone Grease – 25g' (CL-6179) *
- For 'Pinch Valve Piston – Series 1' (red) use 'Pinch Valve Grease – Series 1 – 25g' (CL-6140) *

* Caution – Using the incorrect grease is likely to cause damage to the Sampler Module

A small deposit of grease should be applied to the Pinch Valve Piston shaft and spread over the working surfaces by manually moving it in and out

Cleaning S200 Sample Refrigeration Housing

Before attempting any type of cleaning, always switch off and isolate the Sampler

- Use only gentle cleaning agents. Never use aggressive or caustic cleaning agents, scouring powder, steel wool, abrasive sponges or chemical solvents
- When cleaning, make sure that no fluids of any kind run into the ventilation housing
- Dust should be removed from the condenser (black grill on the back of the refrigerator) once every six months. Use a soft brush or a vacuum cleaner with a brush attachment fitted

Cleaning S200 Condensate Channel

In the event of condensate build-up in the Condensate Drip Channel below the Evaporator Plate inside the S200 Sample Refrigeration Housing, this can usually be released by poking a pipe cleaner into the drain hole in the middle of the 'v' in the Drip Channel

Trouble Shooting

If your Sampler is not operating correctly check the symptoms against the following list. If you are unable to remedy the problem then refer back to Aquamatic Ltd or your local dealer (see Service Support section for details)

General Operational Troubleshooting

SYMPTOM	FAULT	ACTION / COMMENTS
1. No Display	a. Power off	a. Connect power
	b. Electronic fault	b. Contact supplier for service advice
2. Reduced sample lift capability / transport velocity	a. Partially blocked sample tract	a. Clean sample tract
	b. Leaking top clamp pneumatic connector	b. Replace 'O' ring, stub pipe
	c. Leaking Chamber Top seal	c. Replace 'O' ring, Chamber Top
	d. Leaking pinch valve (bubbles rising through pinch valve tube)	d. Change pinch valve tube N.B. Often a new pinch valve tube will need to undergo several sample cycles before it seals properly
	e. Leaking intake hose, or intake filter connection (excessive bubbles entrained in water entering sample chamber)	e. Check connections and seal
	f. Pump inefficiency	f. Contact supplier for service advice
	g. Internal pneumatic fault	g. Contact supplier for service advice
3. Sample shot sequence error	a. Purge times are incorrectly set	a. Check purge times and reset if necessary
	b. Internal pneumatic / electronic fault	b. Contact supplier for service advice
4. Samples not being kept at required temperature	a. Vent blocked	a. Clean vents
	b. Lower Compartment door not fully closed	b. Close door and secure with clasp
	c. Condensate Drain blocked	c. Unblock drain. See sub-section 'Cleaning' earlier in this section
	d. Refrigeration System fault	d. Contact supplier for service advice

Sampler Warning Message Troubleshooting

When Warnings initially occur a warning message will be momentarily displayed on the Samplers screen in the 'Full Form' format (see table below), when being reviewed in the Event Log they will display in the 'Event Log Form'. If a Warning occurs whilst a program is not running the message will only appear temporarily on the Sampler screen

MESSAGE	CONDITION	ACTION / COMMENTS
1. Display shows: Full Form: FAULT Event Log Form: OPEN CIRCT PROBE OPEN CIRCT and sample shot cycle aborts **Notes:** • This fault will not cause the program to abort. It will, however, prevent a program being initiated	a. Chamber not fitted b. One or more contact springs in front panel sample chamber assembly recess not connecting to its respective electrode c. Electronic fault	a. Fit chamber b. Clean tops of electrodes where contact is made with contact springs. See Cleaning Sample Tract / Stainless Steel Electrodes earlier in this Section N.B. Contacts springs should project about 6mm from their location holes c. Contact supplier for service advice
2. Display shows: Full Form: FAULT – CLEAN CHAMBER TOP Event Log Form: CLEAN CHTOP and sample shot cycle aborts **Notes:** • This fault will not cause the program to abort. It will, however, prevent a program being initiated	a. A conductive path is present between the 'common' central Level Sensing Probe and either one or both of the other two Level Sensing Probes prior to commencing the sample intake phase. This is probably due to effluent build up resulting from splashing during the intake phase b. Electronic fault	a. Clean Chamber Top. See Cleaning Sample Tract / Stainless Steel Electrodes earlier in this Section Review Sampler installation to ensure splashing does not occur during the intake phase. See Installation Section of this User Guide b. Contact supplier for service advice
3. Display shows: Full Form: FAULT Event Log Form: GUARD HIT GUARD PROBE HIT but sample shot cycle continues normally **Notes:** • This fault will not cause the program to abort. It will, however, prevent a program being initiated	a. Sample induction phase is terminated by short guard probe because long probes have become insulated due to contamination build-up b. Sample induction phase is terminated by short guard probe because wastewater is entering the Sample Chamber in a turbulent manner causing random triggering due to splashing	a. Clean Chamber Top. See Cleaning Sample Tract / Stainless Steel Electrodes earlier in this Section b. Check for air leaks in the Intake Hose. Ensure Intake Hose Filter is fully submerged in effluent channel

4. Display shows: Full Form: FAULT Event Log Form: LOW VOLTS LOW VOLTAGE and a shot is not acquired **Notes:** • This fault will not cause the program to abort	Supply voltage below minimum threshold	Restore adequate supply voltage
5. Display shows: Full Form: FAULT Event Log Form: SHOT T/OUT SHOT TIMED OUT and a shot is not acquired **Notes:** • This fault will not cause the program to abort	a. Intake filter is out of source effluent b. Channel is dry c. Blocked sample tract d. See Symptom 2 in 'General Operational Troubleshooting' table earlier in the Section	a. Ensure Intake Filter is fully immersed. See Installing Intake Hose (See Operation Section) b. Ensure effluent is present in channel whilst Sampling is in operation c. Clean Sample Tract (see Cleaning Sample Tract / Stainless Steel Electrodes earlier in this Section) d. No further action
6. Display shows: Full Form: FAULT Event Log Form: BOTT FITTED BOTTLER FITTED and a program is aborted	Bottler is connected to the Sampler but not specified in the program settings	Disconnect Bottler or reprogram Sampler
7. Display shows: Full Form: FAULT Event Log Form: BOT MISSING BOTTLER MISSING and a program is aborted	Bottler is not connected to the Sampler but is specified in the program settings	Ensure Bottler is fully connected to Sampler then recheck If fault persists contact supplier for service advice
8. Display shows: Full Form: FAULT Event Log Form: BOTT FAULT BOTTLER FAILED and a program is aborted	Sampler is not receiving correct signals from Bottler	Ensure Bottler is fully connected to Sampler, then recheck If fault persists contact supplier for service advice
9. Display shows: Full Form: FAULT - SAMPLE TEMP SENSOR Event Log Form: TEMP SNSR X and program is aborted	a. Temperature Sensor is not connected to the Sampler but is specified in the program settings b. Electronic fault	a. Connect Temperature Sensor or reprogram Sampler b. Contact supplier for service advice
10. Display shows: Full Form: FAULT - SAMPLE TRACT BLOCKED Event Log Form: TRACT BLKD and Sample is aborted	Some part of the Sample Tract is blocked causing an over pressure in the Sample Chamber during a pre or post purge	Check and remove any blockages from: • Intake Hose • Sample Chamber Top • Top Clamp breather orifice

11. Display shows: Full Form BACK-UP BATTERY IN OPERATION	Event Log Form B BCK-UP ON	Appears where main power is lost with a Sampler being operated on mains with a float charged Back-Up battery option	Restore mains power supply
12. Display shows: Full Form MAINS POWER RESTORED	Event Log Form PWR RESTORD	Appears where main power is restored with a Sampler being operated on mains with a float charged Back-Up battery option	None
13. Display shows: Full Form	Event Log Form WARN LATCH	A Sampler Warning has occurred and Special Option LATCH WARNING OP is set for AUTO OFF or MANUAL	None
14. Display shows: Full Form	Event Log Form WARN T/OUT	A latched Sampler Warning has automatically timed out	None
15. Display shows: Full Form	Event Log Form WARN DISAB	A latched Sampler Warning has been manually disabled	None

Test Modes

Sampler Test Mode

The Sampler has a Test Mode which is very useful in helping to diagnose fault conditions both within the Sampler and in its peripheral equipment. The Test Mode can also be useful during the commissioning of a Sampler

Use '∗' button to step from one test to the next. To return to the normal operating mode press 'SET PROG' button

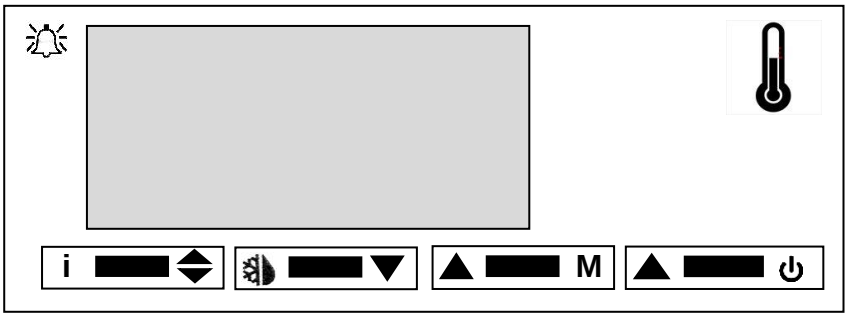
DISPLAY	COMMENTS
AQUACELL READY	Press and hold 'STOP' button to enter Test Mode
total shots 0000000001	Records total number of sample shots taken by the Sampler since its date of manufacture. This display only shows briefly 0000000001
test pump ∗ [test finished]	Press ✓ button to exercise pump. Listen for uneven running or any spurious noises
test level det ∗ 0514 [test finished]	Press ✓ button to check main level probe Reading should be in the range 0507 to 0517 A reading below this range suggests that a conductive path exists between the 2 long electrodes. This probably means that the inside of the Sample Chamber Top needs cleaning A reading above this range suggests a bad contact between one or more of the spring contacts and its corresponding electrode

test guard elec ✳ 0515 [test finished]	Press ✓ button to check guard level probe Reading should be in the range 0507 to 0517 A reading below this range suggests that a conductive path exists between the centre electrode and the short electrode. This probably means that the inside of the sample Chamber Top needs cleaning A reading above this range suggests a bad contact between one or more of the spring contacts and its corresponding electrode
test pwr supply ✳ 12.10 [test finished]	Press ✓ button to check power supply under load On DC power reading should be in the range 11.00 to 12.25 On AC power reading should be in the range 11.30 to 13.50
test sv valves ✳ [driving valve 1] [driving valve 2] [driving valve 3] [test finished]	Press ✓ button to check solenoid valves 1 to 3 in turn Listen for 3 clicks as valves automatically energise in turn
test acquired op ✳ [test finished]	Press ✓ button to drive the Sample Acquired output Contact closure should be detected on yellow and brown cores of Ancillary Signal Cable
test warning op ✳ [test finished]	Press ✓ button to drive the Sampler Malfunction output Contact closure should be detected on white and violet cores of Ancillary Signal Cable
test bottler ✳ [test finished]	Press ✓ button to drive Bottler around to 'Bottle 1' position When the Bottler reaches the 'Bottle 1' position the display will show: 'bottler homed✳' then 'test finished' If the bottler is not operating correctly (or is not connected) the display will show: 'BOTTLER FAILED✳' then 'test finished'
test impulse ✳ 00001 [test finished]	Press ✓ button to show impulse counter Providing a contact closure between red and black cores on Ancillary Signal Cable should increment counter
test 4-20 loop ✳ 0001 [test finished]	Press ✓ button to show 4-20mA input signal representation Feeding 4-20mA current signal via blue core (positive) and red core (negative) on Ancillary Signal Cable should display readings within the following ranges: 4mA (no flow) 0808-0828 12mA (half scale flow) 0399-0419 20mA (full scale flow) 0000-0010
test remote in ✳ input open [input closed] [test finished]	Press ✓ button to show remote input display Contact closures between green and black cores on Ancillary Signal Cable should switch display
temp correction ✳ 24.0ºC [test finished]	Press ✓ button to show temperature probe correction screen With Temperature Probe immersed in a liquid, the temperature of which is monitored by a calibrated thermometer, adjust the Samplers displayed reading to match. Press button 2 ▲ to increase and button 8 ▼ to decrease reading

S200 Sample Refrigeration Housing Test Mode

For recording purposes, the refrigeration controller on your Aquacell S200 logs the minimum and maximum air temperatures

The display on the front of the S200 Sample Refrigeration Housing looks like this:



Checking minimum and maximum temperatures

To check the max / min air temperatures, follow this procedure:

1. Press [i] to display 't-hi'
2. Press and hold [i] again to display the maximum temperature
3. Record this value, then release the button
4. Press [i] again to display 't-lo'
5. Press and hold [i] to display the minimum temperature
6. Record this value, then release the button
7. If it is necessary use [i] to scroll around to 't-hi' again

To reset these readings, simply press [▲ ⏻] whilst viewing the max or min temperatures (steps 2 and 5 respectively)

To revert back to normal temperature display press [▲ ⏻] or do not press any button for approximately 15 seconds

Service Support

There are no user serviceable parts on the Aquacell apart from those mentioned earlier in this section. In the event of failure of a Sampler the following procedure should be followed:

1. Report the failure to Aquamatic Ltd or its approved distributor. Often a telephone call is enough to resolve a perceived problem
2. When a problem cannot be resolved over the telephone then there are 2 options:

On-Site Support

Following discussion with Aquamatic or its approved distributor an engineer can arrange to come to site to assess your equipment. This is often the easiest and most practical option, particularly when the fault lies somewhere other than within the removable Sampler Module or Removable Bottler

Returning a Sampler

a. Remove Sampler unit from its mounting / base
b. Do not return the battery (if supplied) with the Sampler unless requested
c. Do not remove the Sample Chamber assembly from the Sampler
d. Pack the Sampler unit (and Battery [separately] if requested) in the original packaging if possible. If original packaging materials have been discarded please contact your supplier who will arrange for a new transit pack to be forwarded to you
e. Return to Aquamatic Ltd. or it's approved distributor, for repair

Returning a Bottler

a. Pack the Bottler in original packaging materials if possible. If original packaging materials have been discarded please contact your supplier who will arrange for a new transit pack to be forwarded to you
b. Return to Aquamatic Ltd or it's approved distributor, for repair

Returning other hardware

Either pack in original packaging if available, or use suitable alternative packaging materials

NOTE: For all equipment being return to Aquamatic a Decontamination Certificate must be completed. This will be issued by Aquamatic on or before receipt of the equipment

Please ensure that all items are packed securely such that movement within the box is prevented during transit. Repair of transit damage is chargeable

6 TECHNICAL SPECIFICATION

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Operation / Performance

General usage	Aquacell Wastewater Samplers are NOT suitable for use in areas which have been classified as ATEX hazardous zones
Sample media suitability	Non-pressurised wastewater (unless specified with Pressurised Pipeline Interface)
Sample extraction method	Air pump vacuum system
Operating modes	Time 1 min to 100 hour sampling interval Flow Volt-free impulse or 4-20mA Event Externally triggered e.g. by pH meter
Maximum lift height	> 7 metres
Transport velocity	0.5 metres/sec (average over 7m lift)
Sample shot volume range	30-500ml (30-100ml when used with 12 Bottle Removable Bottlers, 30-300ml with PPI)

NOTE: Minimum volume may vary subject to application and Sample Chamber Top configuration

Sample shot cycle time	Approx. 30 seconds (with 4 metres lift)
Data logging	Up to 1350 events can logged and viewed on the Samplers LCD or downloaded via the optional Data Connection (CL-4006). Sample temperature can also be logged / downloaded when the optional Sample Temperature Monitoring connection is specified
Intake Hose	10 metre (5 metre for Aquacell S50) long flexible braided PVC hose with Stainless Steel Intake Filter incorporating 5 x Ø12mm intake ports
Intake Hose purging	Air and residual effluent are purged pre and post sample intake
Sample tract diameter	12mm increasing to 16mm (22mm with bottler) between sample intake and discharge
Maximum sample media temperature	60°C
Control panel	17 button keypad. Alpha numeric LCD

Humidity control Desiccant Bag with graduated Humidity Indicator visible on Sampler Front Panel

Sample Collection Vessel availability

1 x 2.5 litre HDPE Bottle	4 x 5 litre HDPE Bottler
1 x 5 litre HDPE Bottle	12 x 0.75 litre Glass Bottler
1 x 10 litre HDPE Bottle	12 x 1 litre P.E.T. Bottler
1 x 25 litre MDPE Container	24 x 1 litre HDPE Bottler

2 x 4.5 litre Self-Emptying Bottler (not suitable for use with Aquacell S200)
Note: Contact re-seller for full current list of options

Security

Aquacell S100	Locking point such that when secured with optional Security Padlock - All Weather (CL-4055) the Sampler is rendered tamper resistant
Aquacell S200	Locking point on Sample Container Zone such when secured the Sampler is rendered tamper resistant

Ingress Protection Rating

Aquacell S50	IP6X
Aquacell S100 (with Front Cover closed)	IP65
Aquacell S200 (Module only)	IP6X

Ambient operating temperature range

Aquacell S50	-10°C to 50°C (no protection for samples)
Aquacell S100	-10°C to 50°C (no protection for samples)
Aquacell S200	5°C to 45°C

Mechanical

Dimensions

Aquacell S50	H290mm x W290mm x D240mm
Aquacell S100	H330mm x W300mm x D250mm
Aquacell S200	External: H1270mm x W640mm x D640mm Internal: H500mm x W420mm x D430mm

Weight (excluding Optional Equipment / Sample Collection Vessel)

Aquacell S50	7.5kg
Aquacell S100	8.0kg
Aquacell S200	54.0kg

Typical Optional Equipment:	
Integral Battery	2.7kg
Bottler (24x1 HDPE inc Bottles)	6.4kg

Key materials of construction

Sample Chamber	Acrylic (Glass optional)
Sample Chamber Top	Polypropylene, Silicone rubber, UPVC, Stainless Steel
Sample Collection Vessels	Various materials: HDPE, MDPE, P.E.T., Glass (see Sample Collection Vessels above)
Intake Hose with Filter	PVC with Polyester braid hose, Stainless Steel Intake Filter
Sampler Module	Polyurethane plastic casing mouldings, Polypropylene cover (S100), Stainless Steel hardware - EEE
Bottler Distributor Unit	Acrylic dome, Polyurethane, Brass, Stainless steel hardware - EEE
Bottle Carrier (24x1 formats)	Polypropylene, Nylon 6-6, UPVC, Stainless steel hardware
Bottle Carrier (4x formats)	ABS / Stainless Steel
Bottle Carrier (2x Self-Emptying)	MDPE, UPVC, Stainless Steel hardware
Bottle Distribution Tray (12x formats)	Polypropylene, UPVC, Nitrile rubber, Stainless Steel hardware
Refrigerated enclosure (S200 only)	Mild Steel with white powder coating, Polyurethane foam insulation, Stainless Steel 304, powder coated Aluminium
Refrigerant (S200 only)	R134A

Power Supply

Power options

Mains AC (standard with all units)	110/120/220/230VAC @ 50/60Hz
Mains AC (as above) with Integral Float Charge Backup Battery	As above + 12VDC 7Ah Sealed Lead Acid Battery
Separate 12VDC Battery Connection	12VDC (Suitable 12VDC Lead Acid Battery supplied by Customer)

Power consumption - S50 & S100

Mains powered Samplers	60VA @ 110/230V / 50Hz
Battery powered Samplers	12V @ 5A max

Power consumption - S200	500VA @ 110VAC / 50Hz (with 24A max inrush) (includes 60VA for the Sampler module) 336VA @ 230VAC / 50Hz (with 5.7A max inrush) (includes 60VA for the Sampler module)

Optional Connections / Equipment

Ancillary Signal Connection

Remote control input	Inputs should be 'Normally Open' volt free Minimum contact closure period >50ms
Analogue flow input	4-20mA into 255Ω
Digital pulsed flow input	Inputs should be 'Normally Open' volt free Minimum contact closure period >30ms followed by minimum opening period of >20ms
Sample acquired output	Normally open volt free contact (50VDC 1A). Contact closes when sample medium bridges level probes in Sample Chamber
Sampler malfunction output (not available in 'LOW POWER MODE')	Normally open volt free contact (50VDC 1A). Contacts held closed when system is powered and healthy. Contacts open when one or more of the following warning conditions occur:

1. Probe open circuit
2. Chamber Top is contaminated
3. Guard probe hit
4. Low supply voltage
5. Intake phase is timed out
6. Bottler is fitted but sampler is programmed for no Bottler
7. Bottler is not fitted but sampler is programmed for Bottler
8. Temperature Sensor (when optional Temperature Sensor is fitted)
9. Bottler failed
10. Power supply failed (where there is no Battery backup)
11. Ancillary signal cable open circuit
12. Sample Tract is blocked (when Blockage Detection System option is fitted)

Data Connection output Requires Data Connection (CL-4006)	USB cable A-B connecting to suitable USB COM port. Requires serial port PC communication software

Disposal

In the event that this equipment is being disposed of particular reference should be made to the 'Key Materials of Construction' earlier in this section. All parts must be disposed of in line with current UK regulations.

Electrical and electronic equipment (EEE) contains materials, components and substances that can be dangerous and harmful to human health and the environment if the waste (WEEE) is not disposed of properly.

Products that are labelled with a 'crossed-out wheelie bin' are electric and electronic equipment. The crossed-out wheelie bin symbolizes that waste of this type cannot be disposed of with unsorted waste, but must be disposed of separately

Standards Compliance

UK Environment Agency Standard

MCERTS Performance Standard for Continuous Water Monitoring Systems – Automatic Water Sampling Equipment Part 1

European Standard

EN16479:2014 Water Quality – Performance requirements and conformity test procedures for water monitoring equipment – Automated sampling devices (Samplers) for water and wastewater

UK Regulations

The fulfilment of the requirements set out in Schedule I of the **Electromagnetic Compatibility Regulations 2016** has been demonstrated, having applied the following standards:

BS EN 61000-6-3:2007
Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments

BS EN 61326-1:2013
Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements

The fulfilment of the safety objectives for equipment referred to in Part 1.3 and set out in Schedule I of the **Electrical Equipment (Safety) Regulations 2016** has been demonstrated, having applied the following standards:

BS EN 61010-1:2010
Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements

It has been demonstrated that the requirements specified in **The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012** has been met

EU Directives

The fulfilment of the requirements set out in Annex I of the **Electromagnetic Compatibility Directive (EMC) 2014/30/EU** has been demonstrated, having applied the following standards:

BS EN 61000-6-3:2007
Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments

BS EN 61326-1:2013
Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements

The fulfilment of the safety objectives referred to in Article 3 and set out in Annex I of the Low Voltage Directive (LVD) 2014/35/EU has been demonstrated, having applied the following standard:

BS EN 61010-1:2010
Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements

It has been demonstrated that the requirements specified in Article 4 of the **Restriction of Hazardous Substances Directive (RoHS) 2011/65/EU** has been met

ISO International Standard

Generally in accordance with:

ISO 5667–10 : 1992
Water quality - Sampling: Guidance on sampling of waste waters

European & International Standards

See Operation / Performance Section for ratings:

EN 60529 : 1992 + A2 : 2013
IEC 60529 : 1989 + A2 : 2013
Degrees of protection provided by enclosures (IP Code)

AQUA CELL

Established in 1991, Aquamatic Limited is a leading manufacturer of automatic Wastewater Sampling Equipment, based in Manchester, United Kingdom. The company and its product range benefit from over 50 years experience in the wastewater sampling industry

From the outset the Aquamatic philosophy has been to focus strictly on the design and manufacture of uncomplicated, robust and reliable wastewater sampling equipment. By remaining committed to this goal, Aquamatic now offer a true leading edge range of products suitable for the worldwide market

Available both direct from Aquamatic in England and around the world via a network of local distributors, Aquamatic equipment is accessible globally to any company with a requirement for high quality, dependable wastewater sampling equipment

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