



# AQUASERMO<sup>®</sup>

FLUID IMAGE TECHNOLOGY

# Safety Warning

This product is intended for use in advertising, informing or entertaining capacity. Do not use this product as a toy or as a recreational tool. Do not use this product in hazardous situations such as high wind, or rain with possibility for thunder and lightning conditions, nor in extreme cold or heat, as that will affect the functioning of the unit. Do not use this product where voltages and temperatures will exceed those listed within the Technical Data section.

Before using this product with mediums other than those specified, for non-advertising / informing / entertaining applications, or any other application not within published specifications, consult Norgren or a designated distributor. Before adding additional components to this system that do not originally come with the system or are not listed as possible additional components, consult Norgren or the designated Distributor. Through misuse, age or malfunction, components used in the AquaSermo system can fail. The system user is warned to consider the possible failure of all component parts used in the system and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.

System distributors must provide a warning to the public that will be exposed to this product, of any hazards that it may present. System distributors must also provide a warning to those that will be assembling it of any inherent hazard.

## Specific Warnings

**Lifting Hazards.** Parts of the AquaSermo assembly are classified as 'heavy'. Caution should be taken to carry out suitable risk assessments on working with heavy loads based on available lifting equipment, and the environment where it is to be assembled and operated. This should apply for unpacking, packing and assembly / disassembly of the AquaSermo.

Do not let electrical equipment, apart from that which is supposed to be used with the AquaSermo, to be set, or be used nearby.

Do not let children (or other people) use the AquaSermo as a recreational toy and play in the falling or static water.

Do not let children (or other people) drink from the falling water or trough. The assembly should be marked as 'Not Drinking Water' or 'Non-Potable Water'.

Check technical data as to the correct operating temperatures, voltages and connections.

Please consider the information contained within this manual as well as the use conditions and other warnings given.

Check during assembly that the correct plug outlets and set up is used and that safety considerations are taken into account due to the close source of water.

Do not fill trough too high as this creates leakage and electrical risk. Do not attempt to directly connect a water source directly to the unit, always utilise the water container and water pump.

Failure to comply with the water management instructions will invalidate the warranty.



# Compliance

RoHS is EU directive 2002/95/EC of the European Parliament and Council on the restriction of the use of certain Hazardous Substances (RoHS). The directive bans Electrical and Electronic Equipment (EEE) being put on the market that contains more than the permitted levels of lead, cadmium, mercury, hexavalent chromium and both polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants from 1st July 2006. These directives are designed to tackle the rapidly increasing levels of electrical and electronic equipment waste that is making its way into the landfills. This complements the European Union measures on landfill and incineration of waste.

All electrical components of the AquaSermo are RoHS compliant.

WEEE is EU directive 2002/96/EC of the European Parliament and Council in waste electrical and electronic equipment. The purpose of this directive is the prevention of waste electrical and electronic equipment (WEEE) and the recovery of disposing of this waste in an eco-friendly way. In addition it covers, the reuse, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste into landfills.

In accordance with the WEEE Directive, it is recommended that at the end of its useful life the unit is dismantled and:

1. All aluminium and other metal parts are disposed of with an approved 'metal' recycling organization.
2. All plastics are disposed of via a suitable approved re-cycling company.
3. Return the electronic components to your nearest Norgren company. Norgren will then ensure these assemblies are dismantled and re-cycled appropriately.

If further clarification is needed on these directives and our interpretation of them, please refer to the Norgren web site.

# Copyright

All drawings documents records computer software and other information supplied by Norgren whether produced by itself or a third party, are supplied on the express understanding that copyright is reserved to Norgren (or the third party) and that the Buyer will not without written consent of Norgren either give away loan exhibit or sell the same or extracts thereof or copies thereof or use the same in any way except in connection with the Products in respect of which they are issued.

# Software Virus and Malware Infection

Norgren has taken reasonable steps to ensure no viruses are present in the software provided. However, buyers should ensure they have taken reasonable and necessary steps before using the software to prevent virus or malware infection.

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# Product Overview

The AquaSermo, is a modular and scalable display system comprised of a manifold on a frame, a water trough, and a water pump. Each 0.8 metre section of the manifold is comprised of 96 Norgren standard 15mm valves whose opening and closing are controlled via a bitmap image installed on a laptop which then in turn control the system. The water pump circulates water from the trough up into the manifold where it then enters the valves.

Bitmap software helps achieve precision control of the valves so that precise control of the water drops can be obtained, thus allowing for clear and crisp images, words or logos to be formed in the cascading water.

Approved water dyes may be added to the system and combined with lighting systems to ensure that the images produced in the water are vibrant. New images can be created easily within the software program, entire programs can be created and programs themselves can be changed with 'the flick of a switch'.

The product is currently available with a manifold length of 2.4 metres. AquaSermo can be used as a stand-alone or self-contained unit, or it can be incorporated into various applications or scenes.

The speed of the cascading water can be altered by controlling the pressure of the water in the system, which can enhance the effect of the image. See Displaying Bitmap images, section 07 on page 18.

Low power electronics are used alongside with fresh water, resulting in a relatively safe human interface as long as certain guidelines are followed. One such guideline is the addition of a solution, which will help protect against legionella bacteria being spread via the water droplets.

The product can be made to run with a continuous stream of water, then images can be projected onto it.

# Technical Data

Medium

Dimensions

Weight of 2.4m Manifold

Weight of full 2.4m system

Compatibility

Power Source

Electrical Consumption

Electrical Connection

Laptop Cable Connection

Ambient Temperature

Water Temperature

Life Expectancy

Installation Time

Material of Construction

Control

Mounting Position

Footprint

Lighting

Valve Type

General tap water

See Figure 1

Approximately 20 kg

Crate 01

Weight: 125Kg

Dimensions: 3160mm x 400mm x 540mm (LxWxH)

Crate 02:

Weight: 190Kg

Dimensions: 2830mm x 560mm x 640mm (LxWxH)

See appendix A for details of compatible dyes that can be added to the water

Mains: 240 or 110V AC

Approximately 2000 W

Standard mains plug

Standard serial cable and USB converter (supplied)

5C to 40C

5C to 40C

Valves mean cycles before failure 20 million

Minimum 2 hours with 2 people

Manifold: anodised aluminium

Internal Frame: aluminium

Booth: aluminium, fiber board & fabric

Valves: stainless steel & polymer

A laptop or PC will be required to drive the system (not supplied)

Protect from rain and strong winds

See figure 01

Standard LED Lighting Options Available

Norgren 15mm valves

# AquaSermo Dimensions

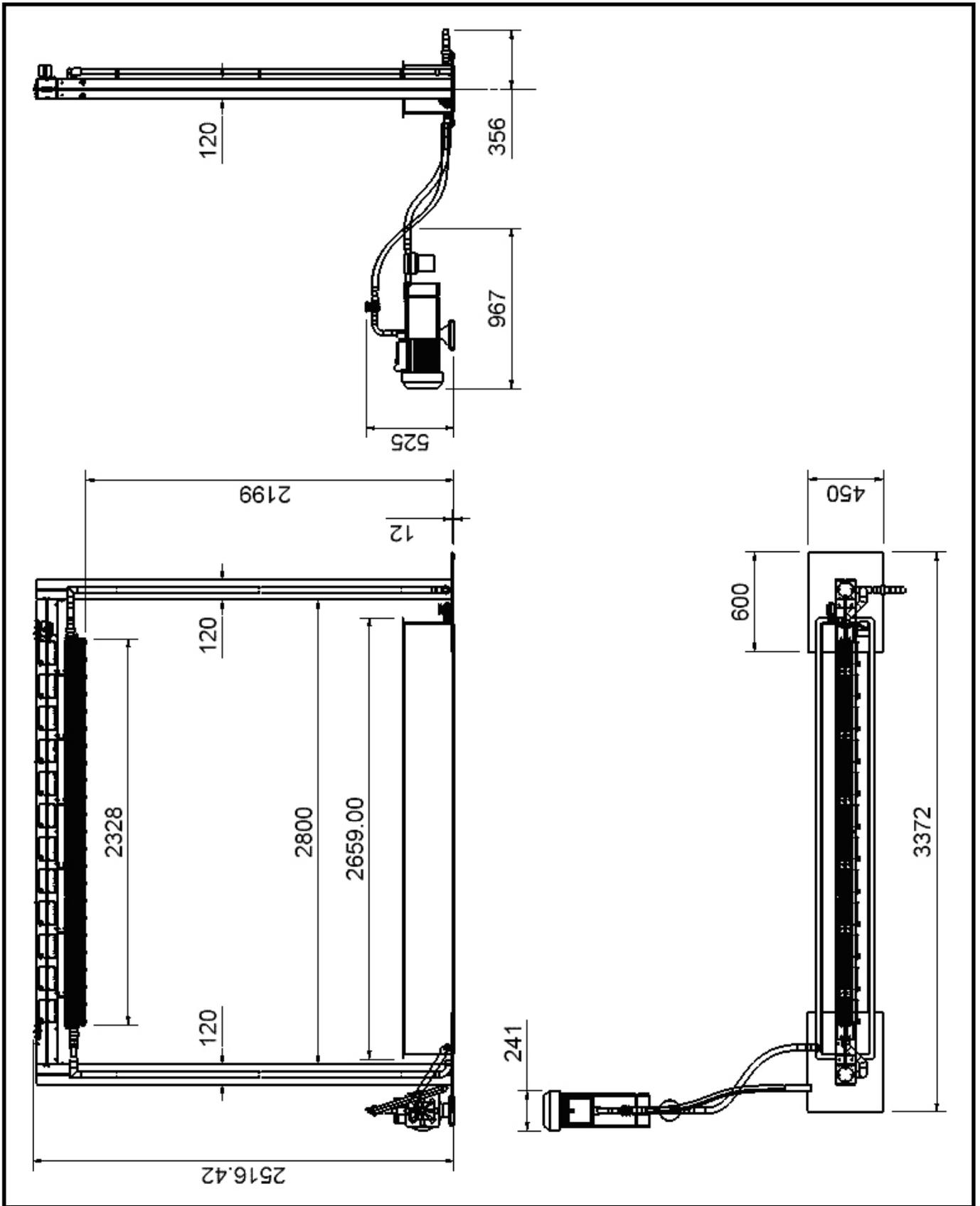


Figure 01

# Preparation for Assembly

## AquaSermo Components

The following items are supplied with a standard AquaSermo:

Crate 01      Weight: 125Kg      Dimensions: 3160mm x 400mm x 540mm (LxWxH)

### Quantity

### Component

1	Crossbar and Manifold
1	AquaSermo - PC Serial cable
1	Power Supply to Crossbar Cable
1	IDC - UK Mains Plug (5A) with RCD
1	Torx Tool for frame claw attachment
6	Pipe Clips
10	M6-25 Socket Head Bolt
4	M6-12 Hexagon Head
14	M6 Washers
1	Valve Hex Drive
1	Goalpost Allan Key
8	Spare Valves (Free Issue)
2	Water Treatment Kit (Free Issue)
1	Water Treatment Test Kit (Free Issue)
1	Spare Piping Valve
2	Spare Piping 'O'-Ring
1	Spare End Plate 'O'-Ring
20	Spare Valve 'O'-Ring
8	Spare Valves (Free Issue)

Crate 02      Weight: 190Kg      Dimensions: 2830mm x 560mm x 640mm (LxWxH)

### Quantity

### Component

2	Frame Bases
1	Vertical Post (LHS)
1	Vertical Post (RHS)
1	Power Supply
1	Water Pump
2	Water Tube
2	Water Pipe
2	Wire Trunking Cover
1	Trough
1	Assembly and Maintenance Booklet



# AquaSermo Components

Should an LED lighting system be incorporated the following additional components will also be stored in Crate 1:

Quantity	Component
1	IDC - UK Mains Plug (5A) with RCD
2	LED Top Lights (Incorporated into crossbar)
2	LED Ground Lights (Complete With Brackets)
1	LED Light Controller

## Power and EMC Precautions

When installing, performing maintenance work and dismantling, make sure that power is removed from the system and that nothing remains connected to the power mains. All power cords are fused and supplied with Earth Leakage Detectors (RCD's) that are built into the actual wiring of the plug. It is highly recommended that no changes are made to any of the electrical wirings or its power sources. To alter the wiring or remove the RCD's will void any warranty that is currently in place with the product and will put yourself and customers at risk for any electrical problems that may occur as a result.

Make sure all power supply cables and electric wires are kept dry and separate from any water. Should spillage occur, promptly remove the mains supply power to the unit in the safest way possible before cleaning up the spill.

Ensure that the mains power supplies have sufficient current capacity for each cable. Ensure mains extension cables are fully unwound before operation, and that mains adaptors are not overloaded.

## Water Hygiene Protection

As with any water feature, there is a risk of harmful bacteria that could cause Legionnaires Disease and Pontiacs Fever to be distributed into the atmosphere and inhaled by the population who can then fall ill. In the worst cases, Legionnaires Disease and Pontiac Fever could prove to be fatal.

Thus, it is vital that a risk assessment be carried out in regards to water hygiene issues and that the necessary preventative measures be taken. More information on water hygiene protection is available in Appendix A to this document.

Ensure the base of the tank is clean and free from debris.

# PC Software Installation

Before the AquaSermo can be connected to the PC and operated the following steps must be followed in the following order:

1. Device Driver for AquaSermo needs to be installed (if using a USB port and not a serial port). See section 01 below.

**THIS MUST BE DONE BEFORE CONNECTING THE LAPTOP TO THE AQUASERMO IN ORDER FOR IT TO RUN PROPERLY.**

2. The AquaSermo control software needs to be installed.
3. Bitmap programs need to be created as the software currently comes with only a sample program.
4. Laptop for running the AquaSermo needs to be connected to unit.

Steps 1 and 2 of this process are covered within this section.

Steps 3 and 4 are described in the AquaSermo Operating Instructions.

## 01

### Device Driver Installation (FOR USB USE ONLY)

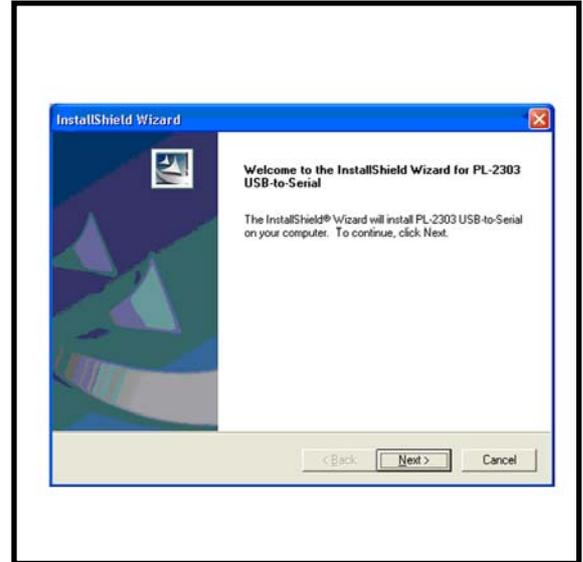
Should the PC be fitted with a 9 pin serial connector, the device drivers need not be installed, proceed to installation of the AquaSermo control software.

The installation steps below apply to Windows 98SE, ME, 2000 and XP. **COMPLETE THE DRIVER INSTALLATION FIRST BEFORE YOU CONNECT THE CONVERTER.**

Insert the CD provided at the rear of this document into your CD-ROM drive.

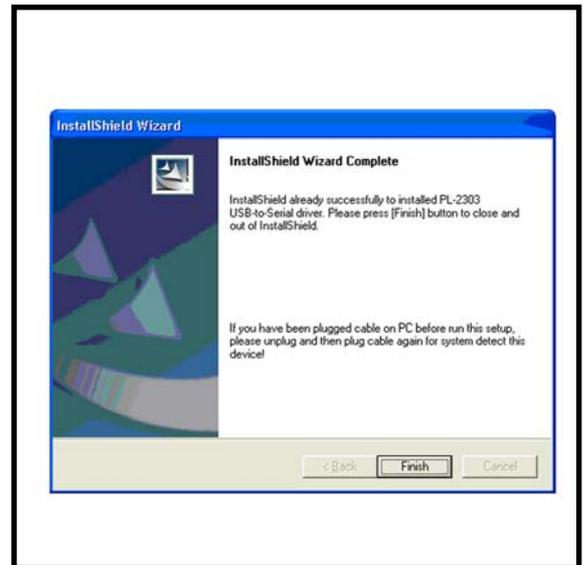
# 02

Run the Setup file under x:\USB Driver\ where x: is your CD-ROM drive letter. When the welcome screen appears, click Next



# 03

When the following screen appears, click Finish:



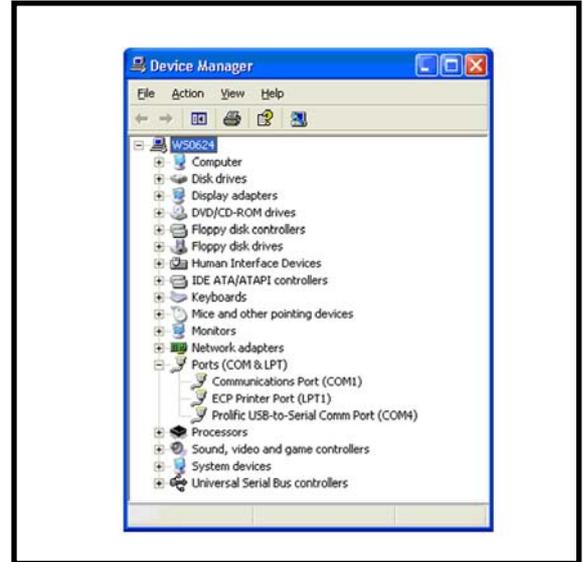
# 04

Connect the USB - Serial converter connector to a free USB port on your computer

# 06

To verify the driver installation, select Control Panel > System > Hardware > Device Manager. Under the Ports (COM & LPT) group, a string similar to "USB to Serial Port" or "USB-to-Serial Comm Port" should be displayed.

The name "COMx", (COM4 in this case) indicates the new COM port provided by the converter. This is the COM port that you must select within the communications program.



# 07

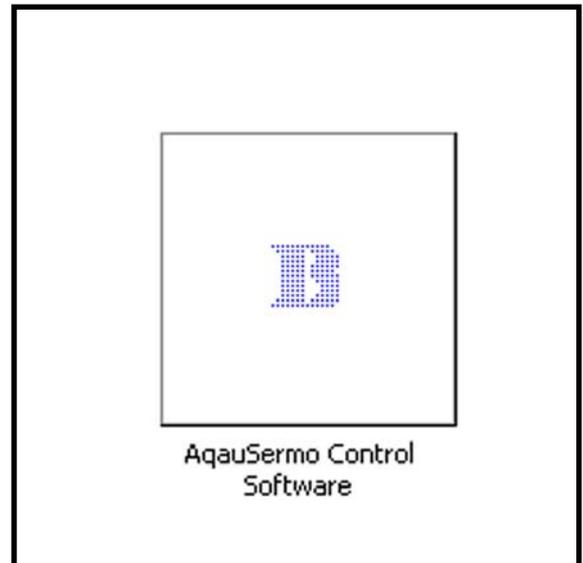
## Installing the AquaSermo Control Software

The AquaSermo control software may be run from the CD provided at the rear of this manual, or for convince, the software may be copied onto the PC.

The software may be located under x:\PC Software\ where x: is your CD-ROM drive letter.

To run the software 'double click' on the icon.

If you wish to put a copy of the software on a PC, select the icon and 'right click'. Select copy, then paste the file in the preferred location on the PC such as the desktop.



# Operating Instructions

## Creating AquaSermo Images

The AquaSermo images are stored in the form of black and white bitmaps.

The AquaSermo control software converts these images and controls the fall of water to replicate the image. Within the bitmaps, black areas on the program indicate 'valve on' while white areas indicate 'valve off'. The opposite effect can be achieved by clicking the invert bitmap option in the AquaSermo control software as stated on page 14, Displaying images, section 03"

Most of the available graphics packages can create and edit bitmap images. These instructions are based on Microsoft Paint as this graphics package is provided free with Windows.

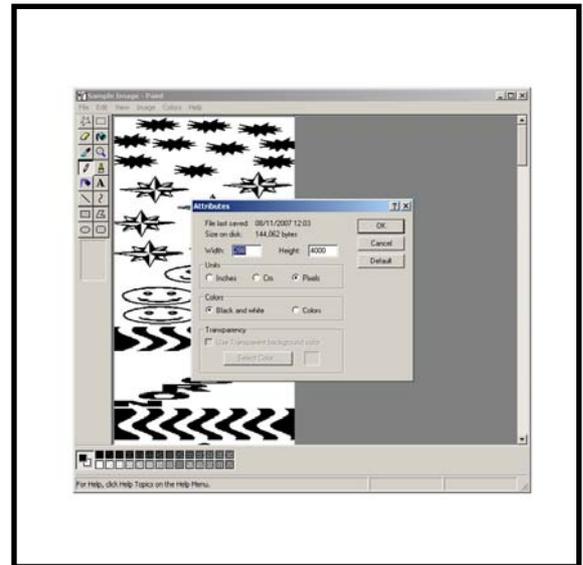
Sample bitmap images are provided on the CD provided to the rear of this manual located under x:\Sample Graphics\ where x: is your CD-ROM drive letter, it is advised that users begin with these sample images.

### 01

To open and edit these images use the 'open with' option and choose Microsoft Paint.

If you click on the 'Image Tab' and then the 'attributes' tab you will see that the width is set to 288 and the length 4000.

The width represents the number of valves on your AquaSermo and hence must not be adjusted. The Length represents the duration of the program; similar to a ticker tape, this program will loop at 4000 pixels. This value can be adjusted.



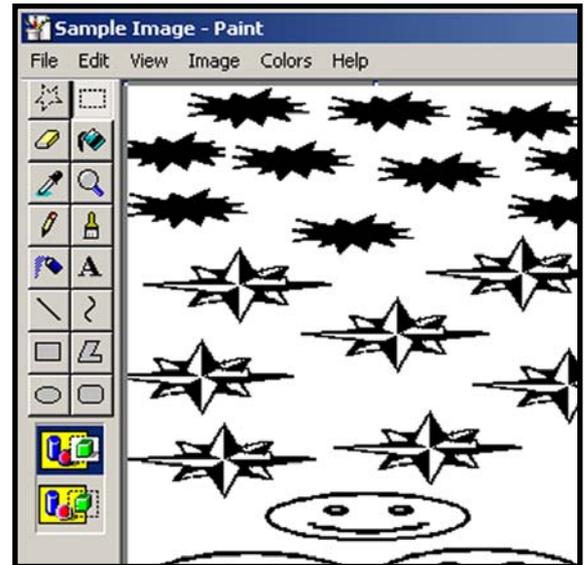
### 02

You can now commence the construction of your program. This needs to be constructed from the bottom of the page upwards as the bottom of the page/screen will be what falls from the waterfall first.

Simple bold images, logos, and lettering will display best. With a bit of time and imagination though, some more intricate images can be achieved.

# 03

You may choose to copy some of the special designs such as the water curtain, stars etc from the sample programs by using the 'selection' option in paint (this is the dotted rectangle) and then copying and pasting the chosen item into other programs.



# 04

You can also use the sample programs provided and make adjustments where needed. Specific areas can be erased by using the select box.

One can then add in their own images where chosen, or copy images already included in the program to other areas within the program.

Repeating key messages and logo's work well.

# 05

In order to insert text directly from Paint:

Click on the bold 'A' option on the left hand side of the program.

Select the area within the program that you will be inserting the text, this is done selecting an area within the program / 'painting area'. Once you have set the desired text area with the 'dotted line box' and 'font options' box will appear.

Select the font type and size from this options box.

# 06

It is recommended to first look at the sample programs to obtain a good indication of what size and layout works best. Once you've had some practice however, you will find yourself experimenting with various designs and creating new and unique displays.

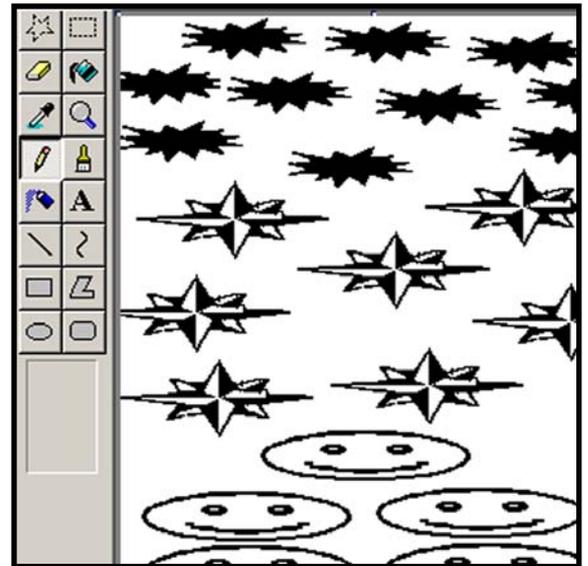
The text types available give you every option that you'll need to produce the majority of logos, trademarks and brand names.

# 07

To insert shapes and free draw you can choose from the many Paint options of brush, pencil, erase, base shapes etc.

You can also search the Internet for bitmap images such as logos or images that you wish to insert into your program.

Image insertion works best when you save it as a 'paint' object in another file first so that it can be further manipulated, select the areas of that image that you need and then simply copy and paste into your program.



Note: Gravity will have an affect on the falling image, therefore this needs to be taken into account when placing your image / lettering into the bitmap program. Some images and letters will need to be scaled down by as much as 70-80% on the vertical plane. This can be determined by running the programme through the AquaSermo to see how it falls, and then making the slight adjustments needed.

To scale down an item, in the toolbox, click the Select icon. Drag a box around the area you want to change. On the Image menu, click Stretch/Skew and under stretch, type the percentage you want to reduce your picture by vertically.

Alternatively you can simply grab the bottom centre of the selected area and drag it to the desired position.

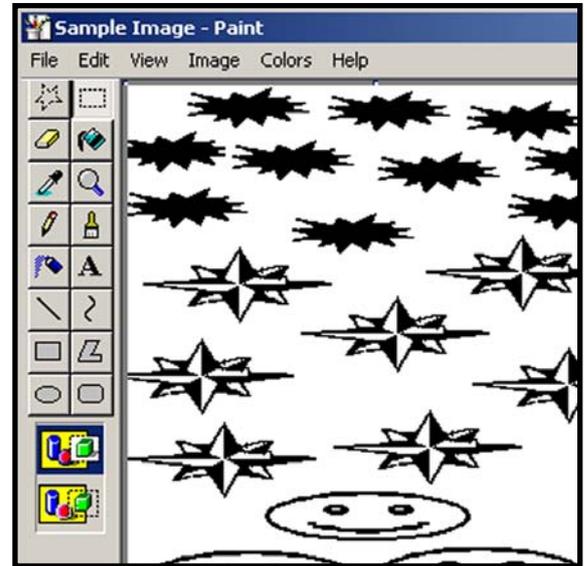
# 08

The commands in Paint are quite simple and a little practice will result in being able to produce stunning effects in a short time.

If you wish to move the image first click on the "Select" rectangle tool on the tool bar and surround the image to move.

The image can then be dragged and dropped.

Now click outside of the image box to anchor image.



If you have inserted an image that you would like to appear several times in the programme, select that image using the "Select" rectangle tool, and copy and paste the image as many times as required. You can then use the Move Tool to precisely place them in the programme.

# 09

Text can be formatted and pasted into the programme from many sources such as Microsoft WordArt. Again, this will need to be scaled down vertically to account for gravity.

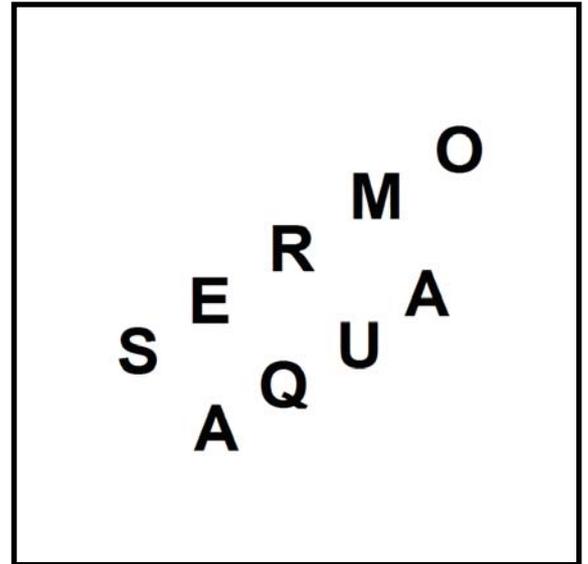
This can be carried out as mentioned above, or scaled within Microsoft, and then copied and pasted into the Microsoft Paint image.

Staggered close lettering will also have a good effect when run on the AquaSermo. Remember, if you are using staggered wordings, the bottom left letter on the screen will be falling first from the display.

Therefore to properly display the words Aqua Sermo for example (as you will see from the promotional DVD), the words should appear in the programme as follows:

The bottom left 'A' will drop from the display first.

Save your programme when complete.

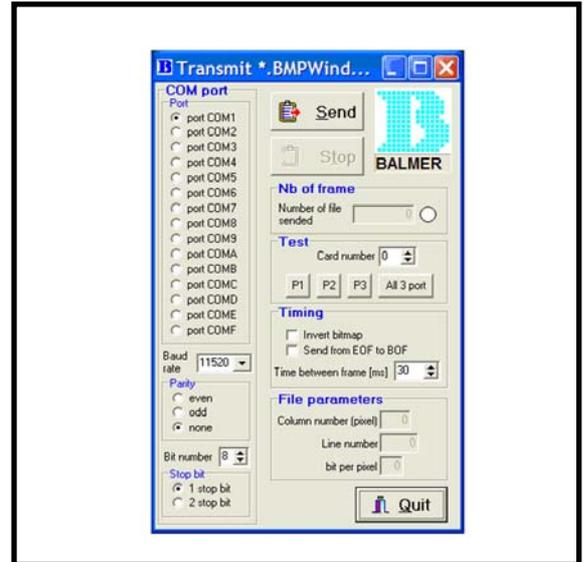


# Displaying Images

Prior to operation the PC software drives and AquaSermo control software need to be installed as described in Section III

## 01

'Double Click' the icon of the AquaSermo control software.



## 02

Select a 'Time between frame (ms)' setting of 20.

This means that each pixel line is scanned at intervals of 20 msecs.

## 03

Tick the Invert Bitmap box to toggle between positive and negative images as explained on page 12



# 04

Select the COM Port for the USB or Serial Port.

If you are unsure of the port number, section III - PC Software Installation provides instructions on how this may be determined.

# 05

Click Send and select the desired file to be displayed.

# 06

AquaSermo will display the selected image

# 07

As stated in the product overview section the cascade rate of the water can be adjusted by altering the pressure control valve situated on the water return pipe (left hand pipe)"

Start with the ball valve fully open, then reduce flow to increase back pressure, for the best image, it is recommended to have minimum back pressure that is high enough for continual water drops.

During operation, water pressure can drop and hence the ball valve will need to be adjusted to compensate, pressure drop can be symptom of a blocked filter.

# 08

To select a new image, press STOP and repeat Steps 01 to 07 above.

# Assembly Instructions

The following assembly instructions refer to the standard AquaSermo and AquaSermo variants incorporating the LED lighting option. Instructions for assembly of the AquaSermo Booth are contained within Appendix.

## 01

Check contents of box.

## 02

Take care when removing the contents from the packaging as several of the pieces are classified as 'heavy' and present a health risk in lifting if not done correctly and with the correct number of people.

If possible, it is recommended to lift the Manifold (Crossbar) assembly from its packing box using suitable lifting equipment secured to the eyebolts of the Crossbar (these are easily visible from the top of the packing box when opened).

Lift the Manifold to a suitable height in order to then assemble the legs, pipe work and electronics to it following the instructions below.

If suitable lifting equipment is not available then assembly can be carried out on the floor. The directions that follow are written based on a "floor" assembly. When the internal frame is assembled this should be lifted into the vertical position.

**NOTE:** Before assembling, a health and safety risk assessment should be carried out by a competent and properly trained individual in accordance with working at height regulations and working with "heavy" loads.

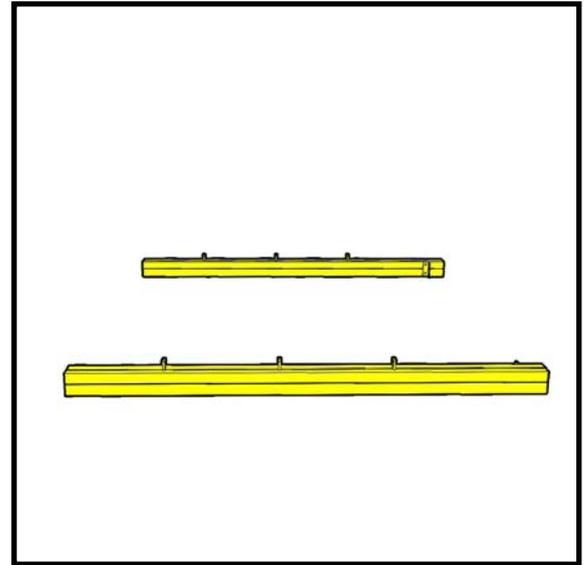


# 03

Remove both bases and place on the ground approximately 3m apart with the cylinder pointing vertically upwards and the largest part of the section pointing inwards towards each other.

# 04

Remove both vertical posts and lay them parallel to each other, in front of the bases, with the pipe clips facing upwards and the right-angled brackets facing towards each other



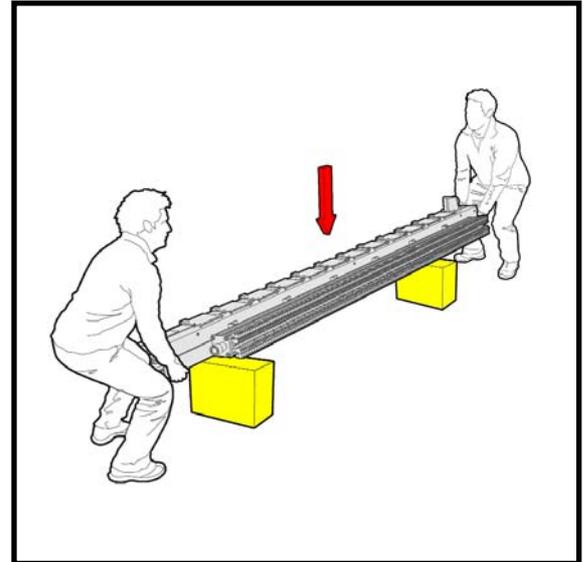
# 05

Place the two pieces of foam provided between the right-angled brackets about two meters apart.

# 06

Remove the Crossbar and Manifold from the crate and gently place on the foam with the circuit boards facing up.

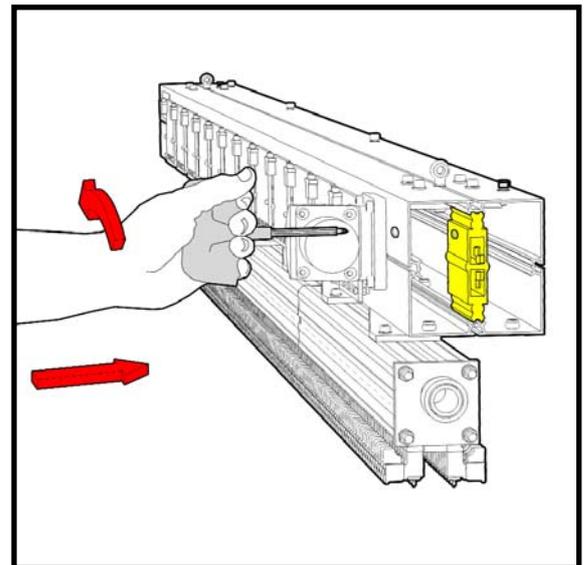
Care should be taken with the nozzles on the valves because they are both delicate and can be sharp.



# 07

Use the red handled tool (torx tool) to open the claw mechanism by inserting the tool tip through the holes on the back of the Aquasermo and rotating anticlockwise until it is no longer possible, now rotate 10 degrees clockwise so the claw closes slightly making it easier to slot in.

Repeat using the other access hole positioned slightly above or below

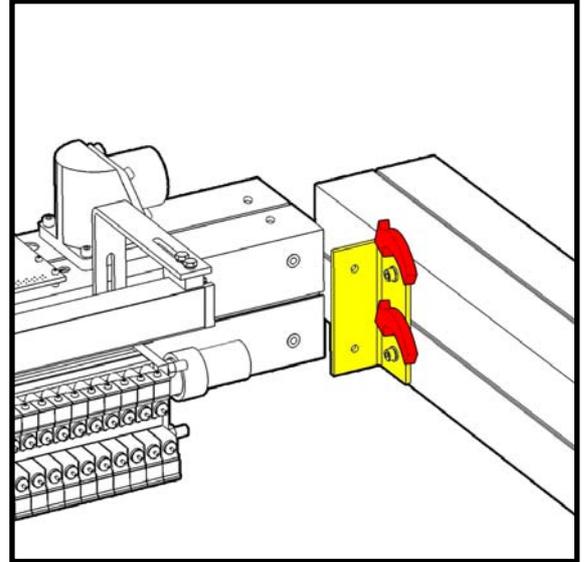


# 08

On the same side pick up the vertical leg and align the bracket with the holes in the crossbar.

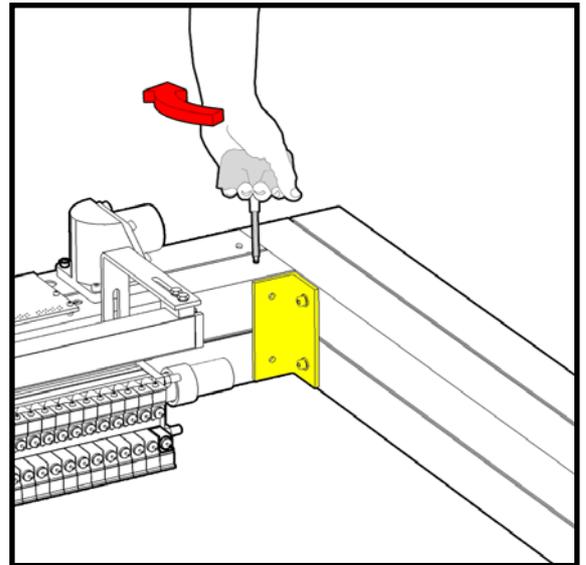
Insert the 25mm bolts provided and tighten all four bolts on that bracket using the Allan key provided with the tool kit.

Tip: Loosen the bracket on the vertical support to make hole alignment easier.



# 09

Use the torx tool to tighten the claw arrangement.

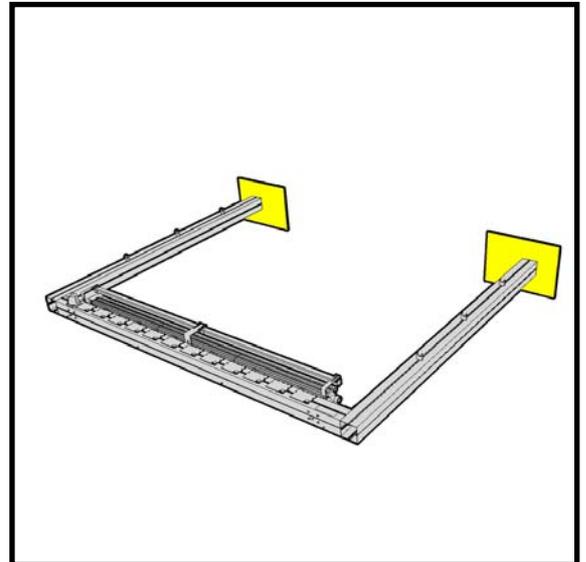
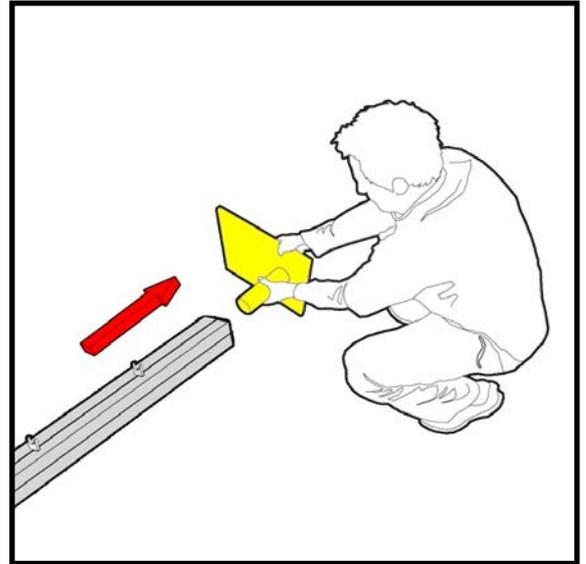


# 10

Repeat steps 7-9 for the other support.

Insert the bases into the vertical supports.

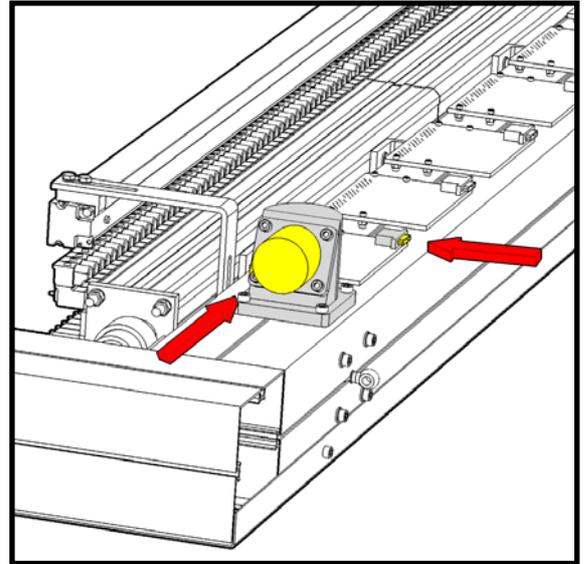
Ensure the long sides of the base point inwards.



# 12

Plug the circular plug of the Power Supply to Crossbar Cable into the Crossbar and Manifold assembly, and the AquaSermo - PC Serial Cable into the circuit board next to the circular plug.

Do not plug in the other end of either cable at this time.



# 13

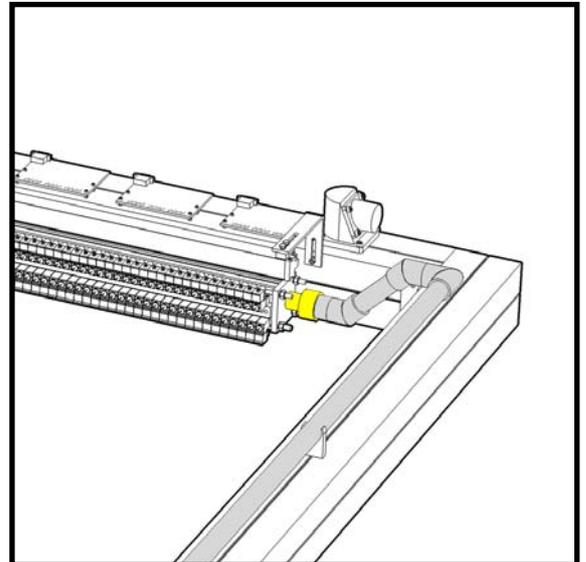
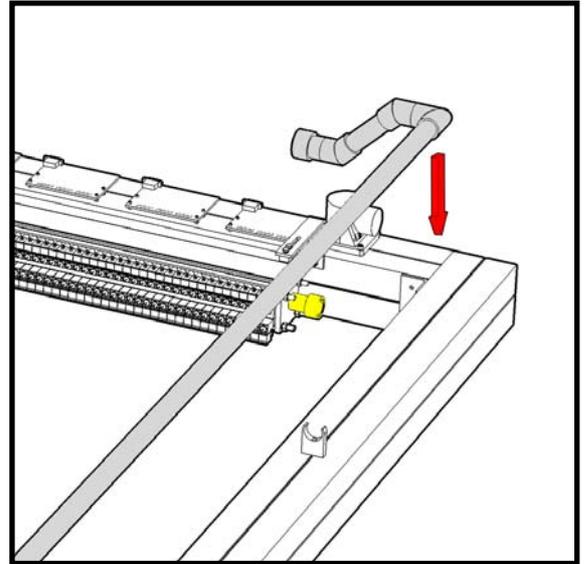
Run both wires and (depending on the model) the two LED wires down the wire trunking on the back of the Vertical Post upright and attach the cover.

# 14

Take the left hand water pipe, identified by the single sweeping bend at its lower end.

Screw the top end of the pipe into the left hand manifold fitting as shown in the figure (Note, the figure shows the manifold as viewed from behind). Ensure an O ring is located in the groove between them, if not spares are supplied.

Clip the pipe into the clips on the back of the AquaSermo.



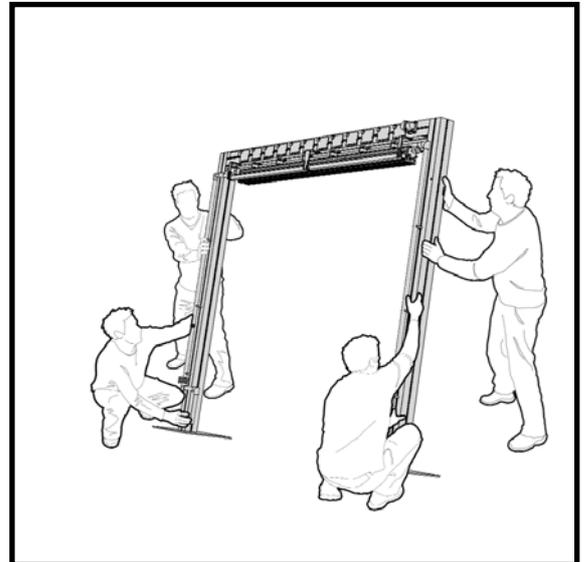
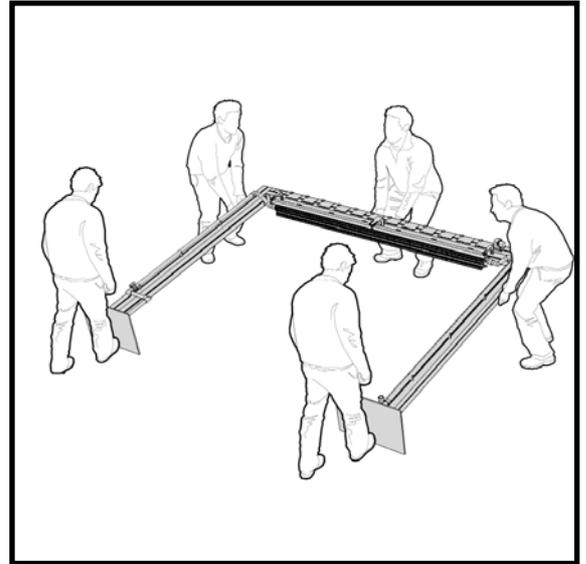
# 15

Repeat step 14 for the right hand side.



It is now time to stand up your AquaSermo.

Before proceeding with this, it is recommended that an actual risk assessment be undertaken by a competent and properly trained individual in accordance with regulations relating to working with heavy loads.



If you have a lifting crane:

Attach it to both eyebolts on top of the crossbar and gently lift the crossbar whilst at the same time walking the feet in. When the AquaSermo is vertical, use a stepladder to remove the hooks from the eyebolts.

If a lifting crane is not available:

The AquaSermo must be 'walked' upright. It is recommended that five people are used for additional safety. One person or appropriate weight needs to be on each base-foot to stop it sliding, one person on each of the top two corners and one in the center of the crossbar. Carefully lift / raise the crossbar and raise the legs slowly until it is upright.

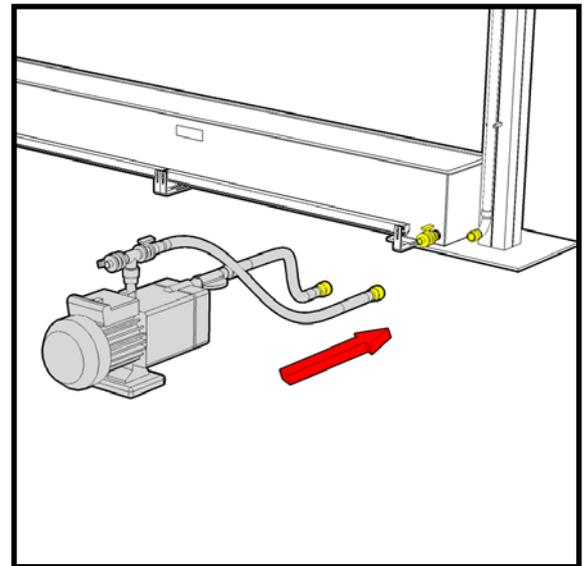
However, it can be done with two people. To do so use 'Wedges' to prevent the feet from slipping forward and then carefully and slowly raise it up.

# 17

Position the trough between the two vertical supports with the piping connection at the back below the circular plug on the crossbar.

# 18

Now attach the pump to the two remaining pipes, the tube connected to the red filter should be connected to the trough and the other tube to the piping running up the post.



# 19

If supplied, take out the remaining set of LED lights and position them behind the trough at the back of the AquaSermo using the brackets provided. Adjust the position of the LED lights until the desired lighting effect is achieved.

# 20

Plug in all the remaining plugs; however do not connect it to the mains electricity system until the unit is ready for use.

Fill the trough with water so the water level is between the marks of the trough, about 5cm above the holes (Ensure the trough is clean prior to filling with water).

Ensure you add the H6 solution to prevent bacteria build up (see Appendix A: Application of water additives)

# Dismantling and Storage

In order to take down the AquaSermo unit, it is recommended that the following steps be taken.

## 01

Adjust the pressure control valve to the fully open position and run the display for two minutes, This will flush the valves through and clear them of debris.

## 02

Turn off the water pump

## 03

Allow the valves to continue to run in open position for two further minutes in order to ensure that they are properly drained.

## 04

Remove the pipes from the pump & filter assembly. Remove the filter bowl from the filter top housing and drain out the water.

Tilt the pump until all the water has drained out. It is recommended at this stage, that the filter elements be checked and cleaned or replaced accordingly as detailed on page 36.

## 05

Turn off the PC.



# 06

Dismantle AquaSermo in the reverse process by which it was assembled.

# 07

Unplug all power cables.

# 08

Before storing the AquaSermo, it is recommended that parts be allowed to dry so that water is not left stagnant within the system. Tilt the manifold/crossbar assembly to ensure any remaining water is drained out

Any water that is left sitting in the system will present a risk of biofilm and bacterial build up as well as possible corrosion issues.

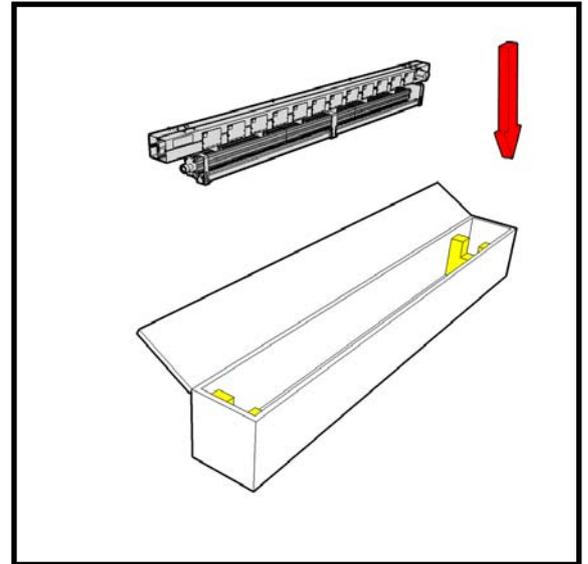
# 09

In order to properly protect the system from any damage during storage and shipment, the original packaging should be used.

# Packing Crate 01

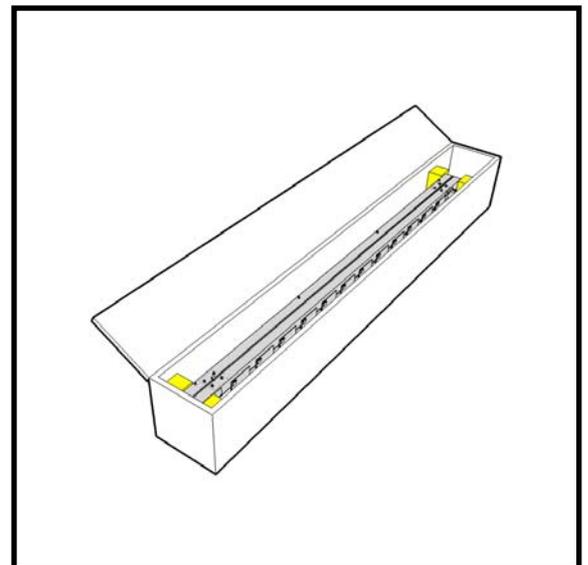
## 01

Lower the crossbar assembly into Crate 01 with the "u" shaped foams already inserted.



## 02

The ends of the crossbar should be supported by the "u" shaped foam.



# 03

Add the ground LEDs, all the wires and the manifold cover to the crate.

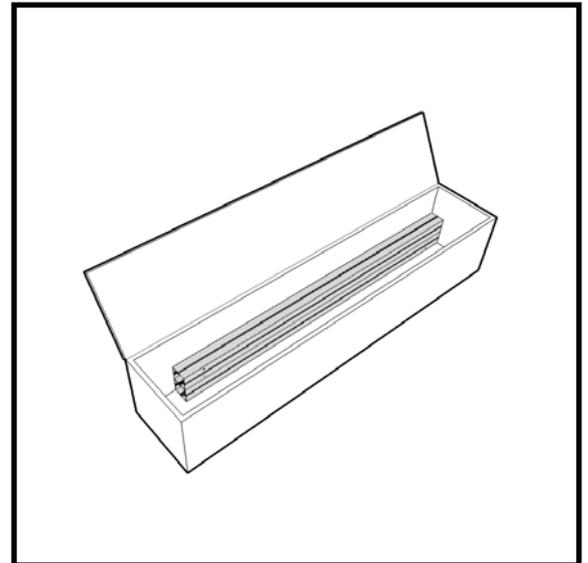
If ordered with a booth: pack the two longest panels and the 6 longest pieces of frame at the top.

## Packing Crate 02

# 01

Use the Allen Key provided to remove the support brackets and place the vertical posts to one side of crate 02.

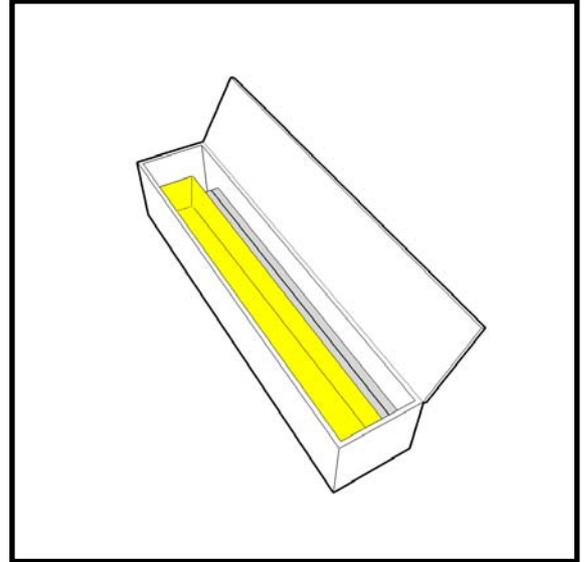
Push both posts into one corner.



# 02

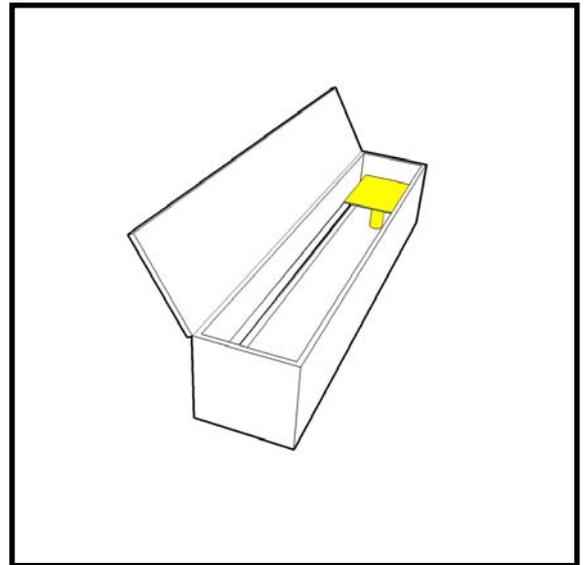
Rotate the trough until the tank connector aligns with the gap left by the vertical posts.

Now place the trough into the crate so it fits between the posts and edge of the box.



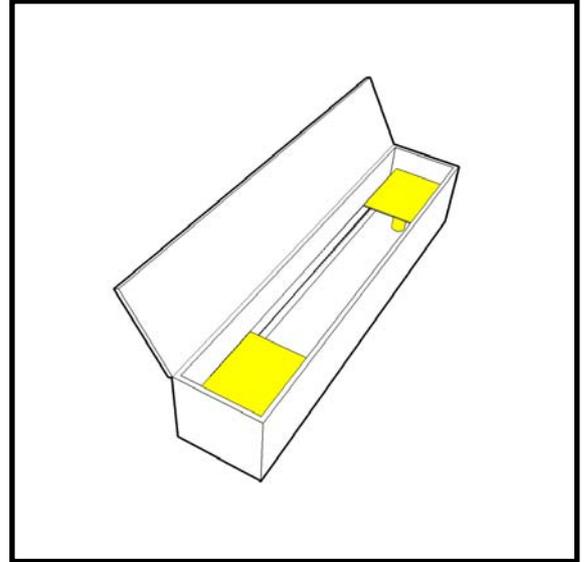
# 03

Place one of the bases upside down in the trough and slide it to one end.



# 04

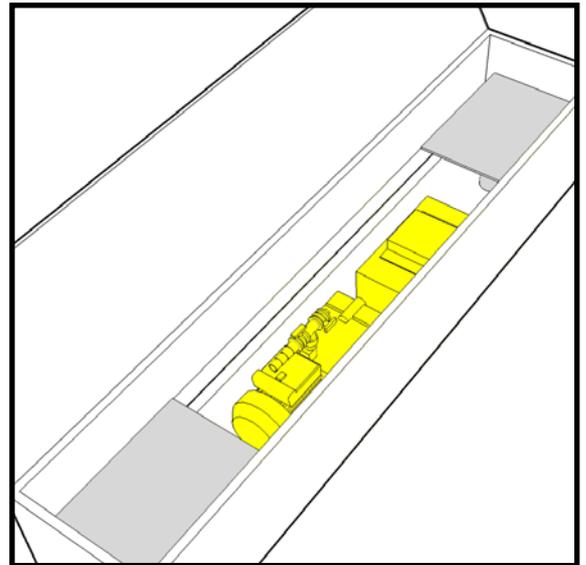
Place the other base upside down in the trough at the opposite end.



# 05

Place the pump and the large power supply box inside the trough.

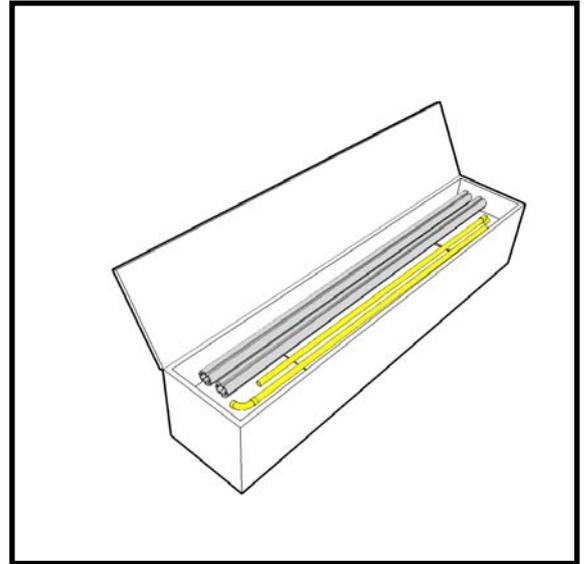
Use the surrounding space to pack any accessories and the tool kit.



# 06

Place the pipes on top.

If supplied with a booth: pack the four vertical posts, the fabric and all of the short pieces of frame on top.



# Product Maintenance

In order to properly care for your AquaSermo and extend its life, there are certain things that you need to be aware of and which we detail below. Please see Appendix E: Spare Parts List and Order Information for information on ordering replacement parts.

Failure to follow these instructions will invalidate your warranty.

## Valve Replacement

As the valves used within the manifold have a finite life (typically over 20 million operations), they will eventually need to be replaced.

One can tell when it is time for this as the valve will no longer open and close properly and will instead start dripping.

Before replacing though, it is first recommended to check and see whether the valve is actually blocked.

One can check this by turning up the water pressure in the pump in order to blow out any blockage. If that does not solve the problem, then the valve will need to be replaced.

To replace the valve, first remove the screw within the valve electrical connector and disconnect. The two screws holding the valve in position may then be removed, releasing the valve, when the valve is removed, ensure the O ring is not lost.

The valve is replaced with the same procedure for valve removal, but in reverse. Care should be taken to ensure that the valve seal is correctly seated.

## Filter Cleaning and Replacement

The AquaSermo unit is equipped with a dual filter system; the primary filter (Red) is intended to prevent debris entering the pump whilst the secondary filter (Blue) should remove particulates that are picked up from the atmosphere by the water.

Should a large build up of debris be seen through the transparent bowl of the primary filter, then it is recommended that the filter elements be inspected and cleaned / replaced as required.

The filter elements are removed from the filter by unscrewing the bowl from the top housing. The primary filter element can be cleaned by washing and back flushing the element under a tap.

The secondary filter element is NOT reusable and must be replaced once it is clogged. Ensure all seals and o-rings are in place when re fitting the filter bowls to the top housings.

# Hard Water

Should you be using the AquaSermo in a region with a hard water supply and using that same water in the AquaSermo, it is likely that over time, limescale will build up in the pipes and valves.

Should such limescale build up occur, it will affect the functioning of the AquaSermo and reduce the life of the valves.

To help guard against lime scale build up it is recommended that a lime scale inhibitor be added to the water.

Details of a suitable additive can be found in Appendix A: Application of water additives.

# Backflow Prevention

The issue of backflow prevention is only important in the following situations:

The AquaSermo water trough will be directly connected to a water mains system for the purpose of filling it up and re-filling as needed, such as in a permanent installation.

During filling of the AquaSermo water trough, a hose that is directly connected to the water mains system will be left in the trough and submerged in the water.

Backflow is, as defined in EN1717 (European Regulation), 'Movement of the fluid from downstream to upstream within an installation' and occurs when either of the following conditions exist:

Back syphonage takes place due to emptying of upstream pipe work and normally happens when the system is drained or a ruptured pipe causes discharge of the water.

Pressure in the downstream pipe work is higher than the upstream pressure; this is caused by a decrease in the upstream pressure or external influences raising the pressure on the downstream side and is known as back pressure.

The danger that this condition presents is that any solution in contact with the discharge pipe can be drawn or pushed back up the pipe and finish up in the clean water supply systems and ultimately be consumed.

As the regulations regarding backflow prevention differ from country to country, it is recommended that a water risk assessment in accordance with the local regulations first be conducted before deciding upon and implementing a solution.

Should a risk of backflow exist, it is then recommended that a Type A or Type AB Air Gap be utilised. An air gap in itself is a device that will prevent any contaminated water from back flowing into the mains water system.



# Biofilm and Bacteria Prevention

As the water in the system will be re-circulated throughout the system, and at times left standing, a biofilm will build up. A biofilm will result in a buildup of bacteria and microorganisms on surface areas within the system that will then act as a food or nutrient source for additional forms of bacteria. In order to control the buildup of this biofilm, it is recommended that the following solution be utilised: Elate H6, which is an HSE (Health & Safety Executive - UK) approved biocide. It is not necessary to use this specific solution, however it is highly recommended that a solution be used that will prevent the buildup of biofilm.

Should nothing be done to prevent the buildup of biofilm, one then runs the risk of harmful bacteria building up and being dispersed via the water droplets, which could then be inhaled. Legionnaires Disease and Pontiacs fever are two such illnesses that can result, both of which can be fatal.

Legionella bacteria are widespread in natural sources of water and as a result, can also be found in man-made systems such as water tanks. If the conditions are favourable, the Legionella bacteria can multiply. Should water droplets be created and then dispersed into the atmosphere, people within the vicinity can then inhale these droplets and be at risk then for developing Legionnaires Disease or Pontiac fever. The old and young, the sick, those with immuno-suppression and smokers are among those most at risk. The conditions favourable to the spread of Legionella are as follows:

- Moisture
- Temperature between 20 C and 50 C
- Presence of nutrients (Sludge, sediment, organic material, scale, rust)
- Presence of biofilm

It is also recommended that a trained official carry out a risk assessment to identify and propose solutions for any water risk present. Should Legionella Awareness Training be required, Norgren can arrange for this with Elate Services Limited, an external water treatment company in the UK.

Should further information be required on the water hygiene issues such as biofilm and Legionnaires disease, the following websites may be of use:

Legionnaires Disease and Pontiacs Fever:

- [www.hse.gov.uk/legionnaires/index.htm](http://www.hse.gov.uk/legionnaires/index.htm)
- [www.hse.gov.uk/research/rrhtm/rr140.htm](http://www.hse.gov.uk/research/rrhtm/rr140.htm)
- [www.legionellacontrol.com/](http://www.legionellacontrol.com/)
- [www.hpa.org.uk/infections/topics\\_AZ/legionella/menu.htm](http://www.hpa.org.uk/infections/topics_AZ/legionella/menu.htm)
- [www.wikipedia.org/wiki/Legionella](http://www.wikipedia.org/wiki/Legionella)
- [www.patient.co.uk/showdoc/27000191/](http://www.patient.co.uk/showdoc/27000191/)
- [www.cdc.gov/ncidod/dbmd/diseaseinfo/legionellosis\\_g.htm](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/legionellosis_g.htm)
- [www.medterms.com/script/main/art.asp?articlekey=25522](http://www.medterms.com/script/main/art.asp?articlekey=25522)
- [www.hpa.org.uk/infections/topics\\_az/pontiac\\_fever/default.htm](http://www.hpa.org.uk/infections/topics_az/pontiac_fever/default.htm)

Biofilm:

- [www.bionewsonline.com/n/what\\_is\\_biofilm.htm](http://www.bionewsonline.com/n/what_is_biofilm.htm)
- [www.wikipedia.org/wiki/Biofilm](http://www.wikipedia.org/wiki/Biofilm)

Health & Safety:

- [www.hse.gov.uk](http://www.hse.gov.uk)

Elate Services Limited:

- [www.elate-ltd.co.uk](http://www.elate-ltd.co.uk)

# Appendix A:

## Application of Water Additives

The following instructions apply only if the supplied Elate H6 Biocide solution is used to prevent build-up of biofilm in the water. The end user will need to test the chemical levels at least once a day for each day that the system is in operation and water is contained within the water trough. A residual chemical level of 20ppm needs to be achieved, should it fall less than 20ppm, than additional chemical (H6 Biocide Solution) will need to be added and then the water will need to be retested.

Norgren, or the authorised distributor, will ship two containers of the H6 Biocide solution in pre-measured purpose built containers and one set of test strips. The test strips come in sets of 100 and will be contained within a pot. There will be a colour-coding chart that goes along with this that will then allow the amount of residual chemicals in the water to be determined. Should more H6 solution or test strips be required, additional units can be ordered directly from Norgren. Please see Appendix E: Spare Parts List and Order Information for ordering information.

Below is a set of instructions to go with the H6 Biocide solution and test strips, however please always check the actual instructions that come with the H6 product.

### 01

At least once a day, once the system has been filled with water, the residual chemical levels should be checked.

### 02

Take one of the test strips from the packet

### 03

Dip it into the water contained within the water trough.



# 04

Compare the colour that the strip turns into with the colour chart that has been provided.

# 05

If the colour match indicates that the residual chemicals level is 20ppm or higher, then no action is required.

# 06

If the colour match indicates that the residual chemical level is less than 20ppm, then 1 container of the H6 solution needs to be added in order to increase the level.

# 07

Take 1 container of the H6 Biocide solution and empty it into the water contained within the trough.

# 08

Allow the solution to dissolve into the water for a few minutes.

# 09

After 5 minutes has passed with AquaSermo operating as normal, re-test the water levels again by dipping a new test strip into the water contained within the trough.

# 10

Compare the colour that the strip turns into with the colour chart that has been provided.

# 11

If the colour match indicates that the residual chemicals level is 20ppm or higher, then no action is required.

# 12

If the colour match indicates that the residual chemical level is less than 20ppm, then go back to step #6 and repeat.

# 13

Once a residual chemical level of 20ppm or higher has been reached, no more action is required until the next round of testing.

Testing should be done each day and a record of each testing and addition of H6 Biocide compound should be recorded.

## Safety Precautions:

As H6 is a chemical compound, avoid contact with eyes and swallowing.

Should accidental contact with eyes occur flush your eyes with water for 15 minutes  
Should the chemical be accidentally swallowed, please contact your nearest hospital or Poison Control Agency.

Once the H6 is dissolved within the water, people should not be allowed to drink from it as it could present a health risk.

Minor irritation could occur from the water solution mix to those who put their hands in the falling water. As long as the chemical concentration though is around 20ppm, irritation should be minor and consist mainly of itchy or dry skin.



# 14

Application of scale inhibitor solution.

To guard against lime scale build up Norgren recommends the use of a water soluble, domestic grade scale inhibitor such as Calgon or similar. This should be applied to the water in the AquaSermo trough following the manufacturers instructions on the product packaging.

Care should be taken to ensure that the inhibitor is fully dissolved before running the AquaSermo.

Note: The use of De-Scaling solutions is not recommended, as these are generally corrosive and may present a hazard to spectators.

Should the AquaSermo unit suffer from scale build up, Norgren should be contacted for advise on De-Scaling procedures.

# 15

Application of Water Dyes.

If water dyes are to be used with the AquaSermo, confirmation of compatibility should be sought from Norgren.

Note: Drain Tracing Dyes are not suitable for use in the AquaSermo and should not be used."

## Intended Usage Statement

The AquaSermo is a product intended to be used as a display system that can convey messages, images and logos for entertainment, informing or advertising purposes. Under no circumstances is it to be used as a recreational toy (for instance, letting children play in the falling water).

Examples of events or areas for its intended use:

Trade show events

Conferences

Entertainment & leisure venues

Product Promotions

Other entertainment events or grand opening events

Should the AquaSermo be installed as a permanent display somewhere such as in a hotel lobby or within a nightclub, additional considerations will need to be taken into account regarding water hygiene. Such issues include, but are not limited to the following:

Connecting to a water supply for periodic top up of tank.

Preventing water backflow into mains should it be directly connected to the water mains for re-filling by utilising a Type A or AB Air Gap.

Arranging for outside organization to perform periodic analysis of water samples to test for harmful bacteria such as Legionella.

Periodic inspection of water tank to ensure that it is not leaking, it is in good condition and no harmful build-up such as biofilm is occurring.

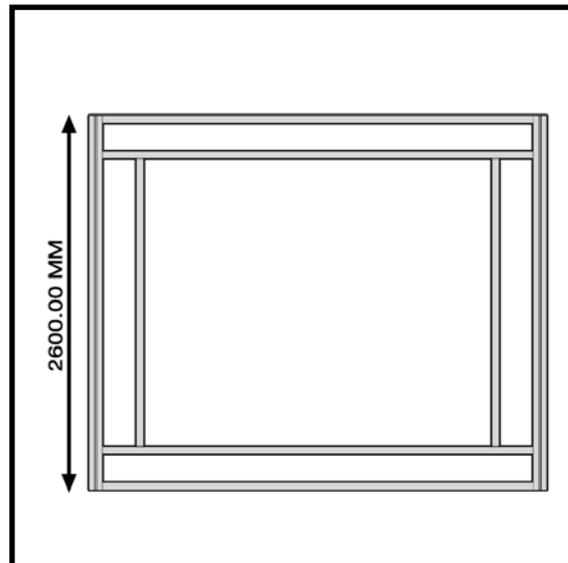
Performing a risk assessment in relation to water issues.



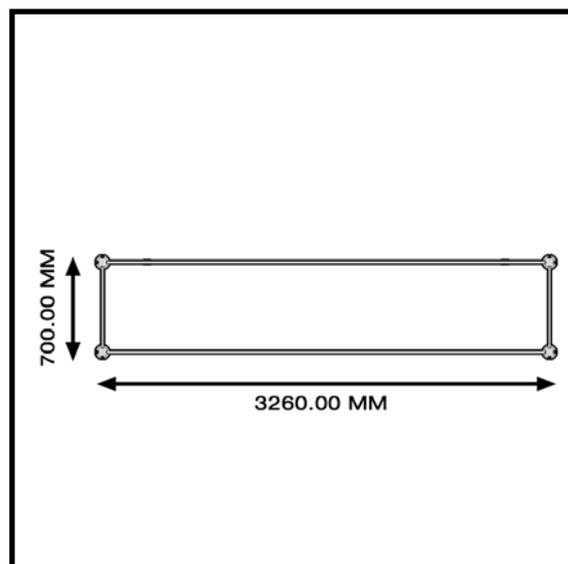
# Appendix C:

## Booth Assembly Instructions (If Supplied)

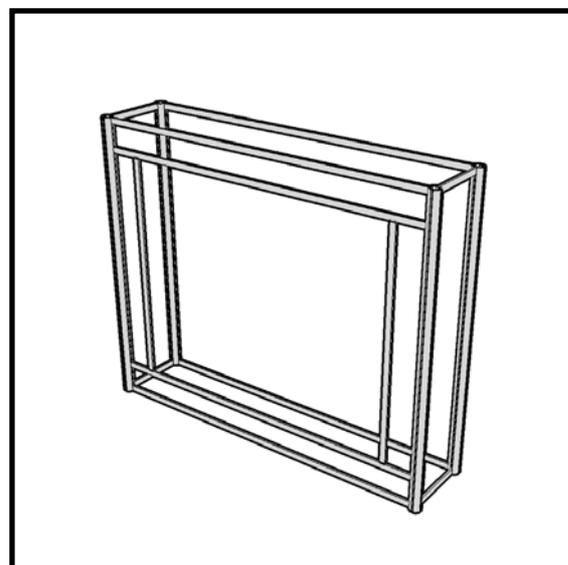
Front View of Standard Booth.

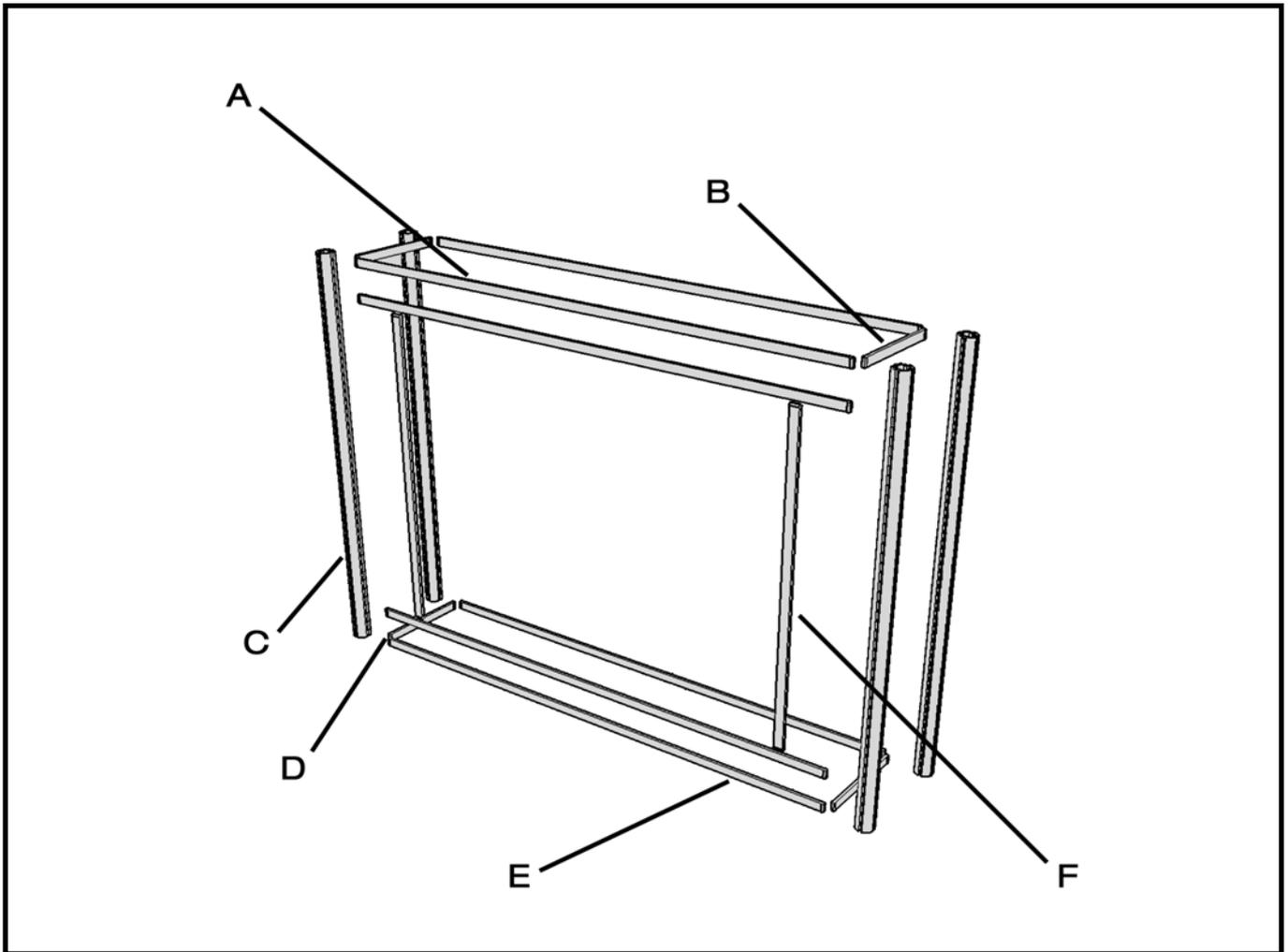


Top View of Standard Booth Option.



Front Elevation View of Standard Booth Option.





A	Z4000 Ceiling Beam	3044.00 MM	
B	Z400 Beam	5040.00 MM	(Slots for Ceiling Beam)
C	M1222 upright	2600.00 MM	
D	Z400 Beam	540.00 MM	
E	Z400 Beam	2980.00 MM	
F	Z400 Upright Beam	2000.00 MM	

These drawings show the standard booth supplied with an Aquasermo.

The instructions will describe how to lock each part together, the best way to insert the panels between the frame and how to put the canvas roof, back and sides up.

Firstly sort the booth framework into the four cylindrical posts and the three different lengths of extrusion.

Now lay out two of the four cylindrical posts parallel to each other about 3.5 meters apart.

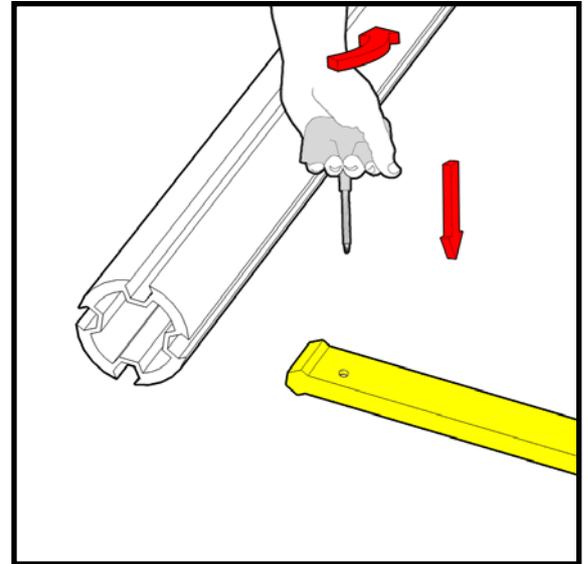
# 03

Take two 2980mm lengths and place them between the cylinders, lock one of the ends to the bottom of one of the cylinders and then repeat for the other end onto the other cylinder at the bottom. To lock an end in position follow these steps.

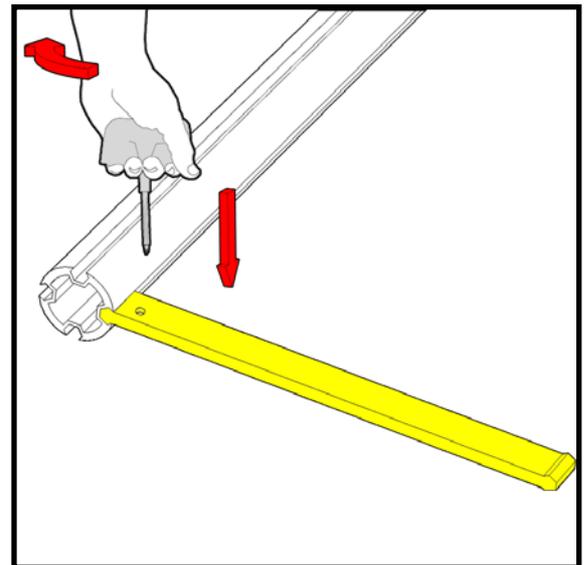
Check the claw on both ends is completely loosened.

To do this, take the torx tool, insert it into the socket and turn anti clockwise to open it.

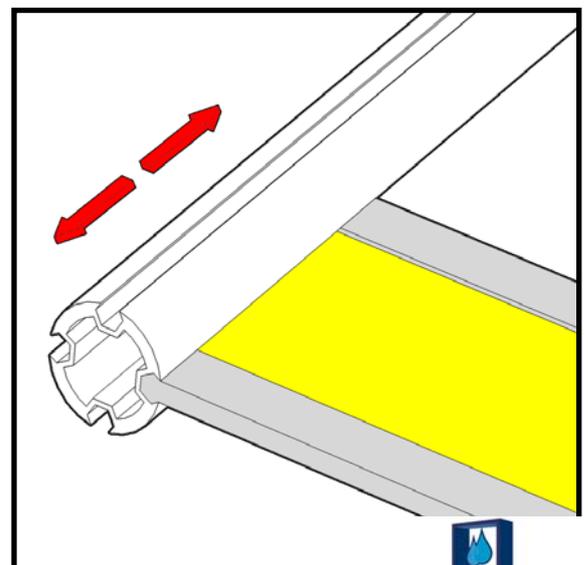
Insert the claw into the slot as far as it will go.



Insert the torx tool into the socket and rotate clockwise till it will not turn anymore.



Check they have locked together by trying to slide them against each other.

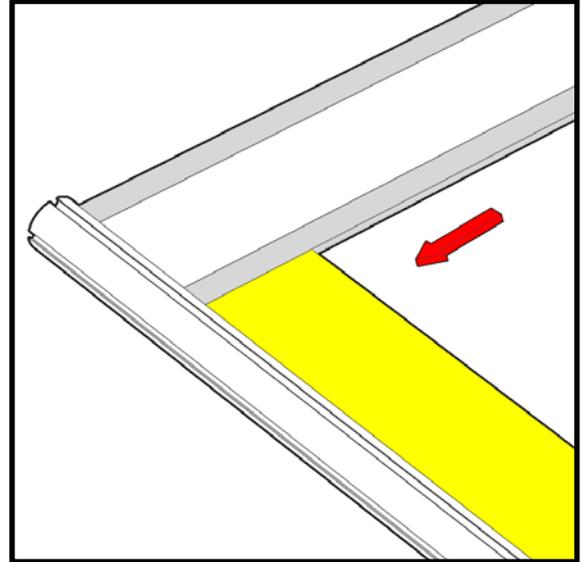


# 03

Insert one of the two long panels into the slot just created by putting the horizontal bar across.

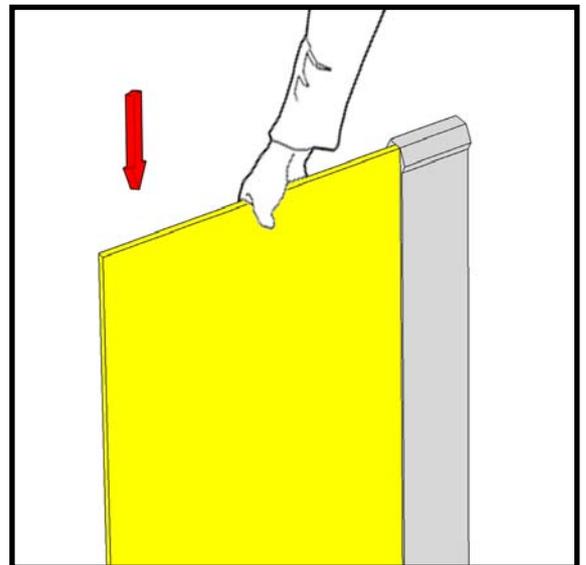
The best way to insert panels is:

Slide one corner into the slot on the frame.



Now work outwards from that corner slipping more of the panel in as you work along. Take care to keep the original corner in.

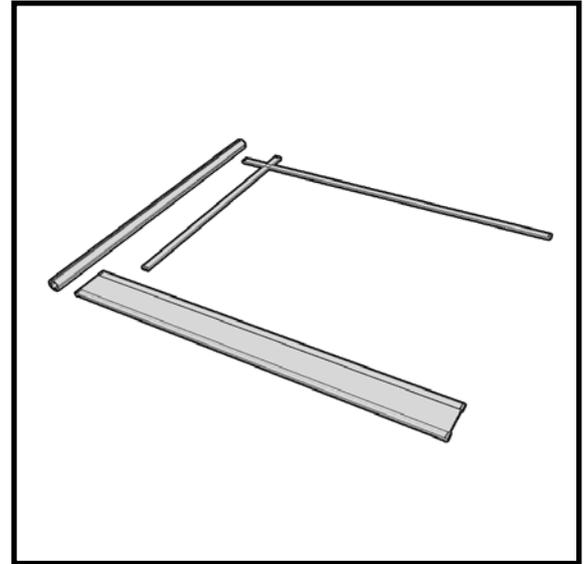
Put pressure on the panel to keep it in position until the next piece of framework has been locked in place.



# 05

Place another 2980mm length on the top of panel just slotted in.

Push the length down as far as it will go and ensure the panel has properly gone into the slot. Lock both ends.



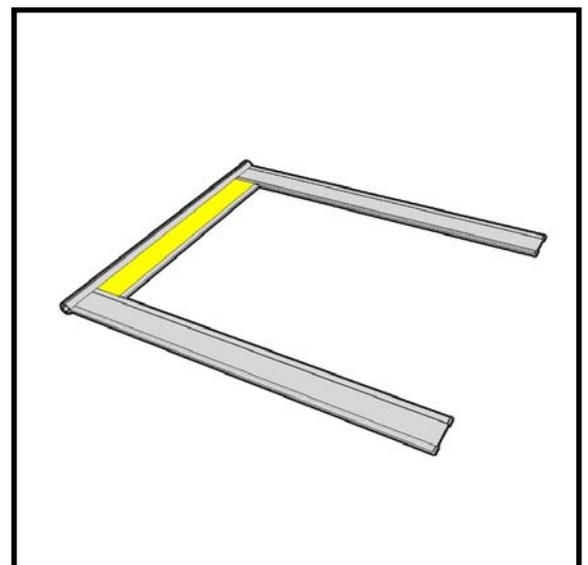
# 06

Pick up one of the shorter pieces of panel.

Using the same method as before position it so that the longer side is parallel with the cylinder and inserted into it. Then slide it down to the 2980mm length and insert into the slot.

# 07

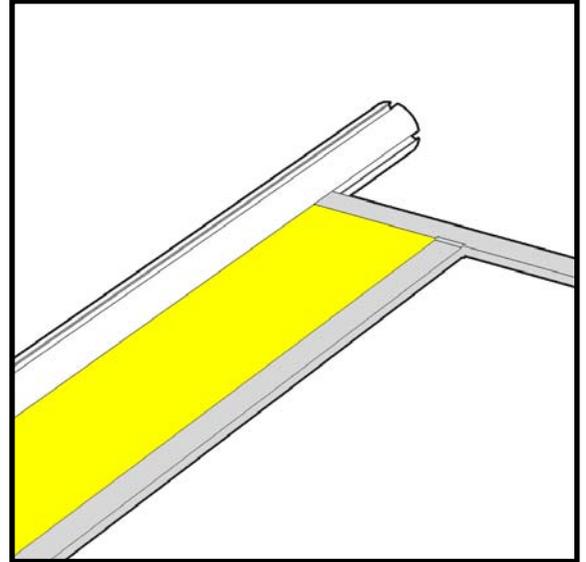
Pick a 2000mm piece of frame and connect it to the panel and lock it to the 2980mm piece.



# 08

Pick another 2980mm piece and place that across the top of the short panel between the two cylinders.

Lock it in position.



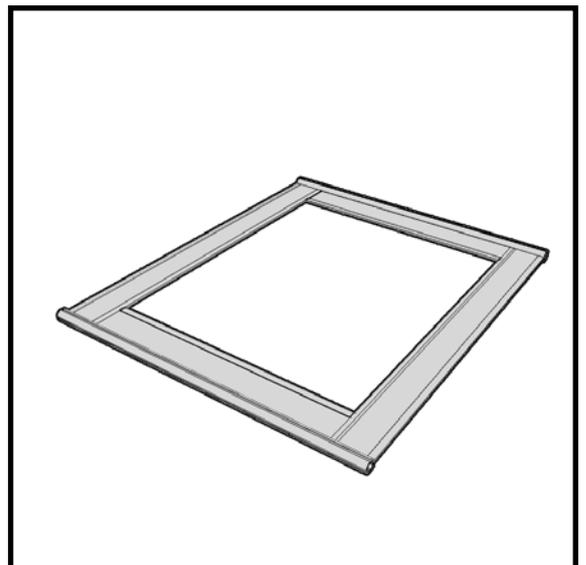
# 09

Repeat steps 6-7 for the other side.

The 2980mm piece placed in step 8 may get in the way, in which case unlock the end currently being worked on and gently move the end up until there is room. Take care not to undo what was achieved in steps 6 and 7.

# 10

Finally place the last remaining panel across the top and put another 2980mm piece across that.

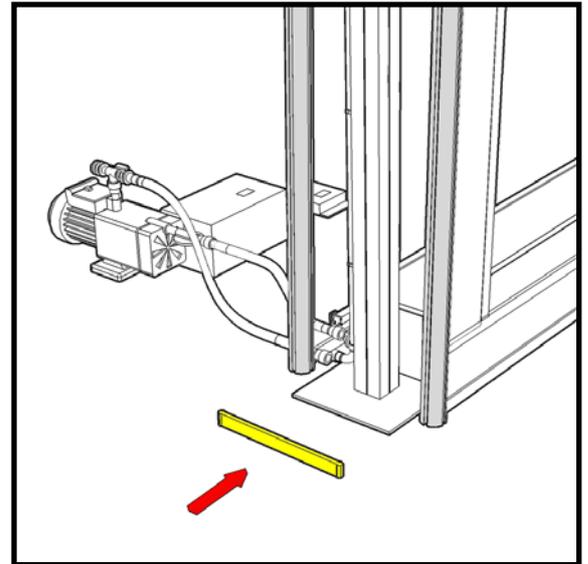


# 11

Two people must now lift up the front panel just constructed and take it to the front of the Aquasermo.

# 12

One person must support the front whilst the other connects a 540mm piece of framework to the bottom of the cylindrical post at right angles to the front panel

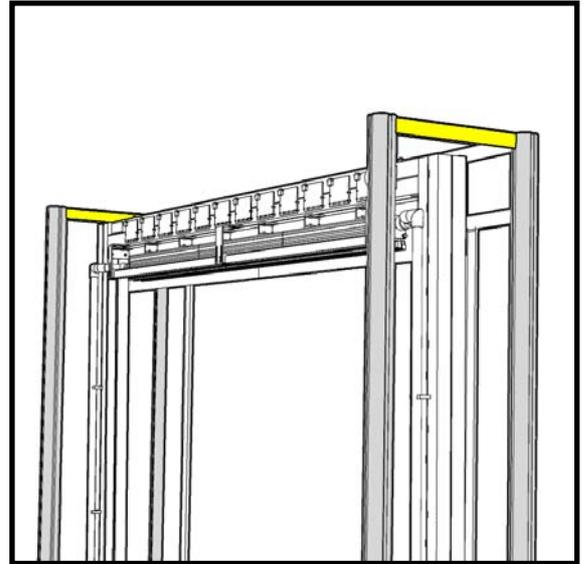


# 13

Repeat step 12 for the other side and use a stepladder to do the same for the top of cylindrical posts.

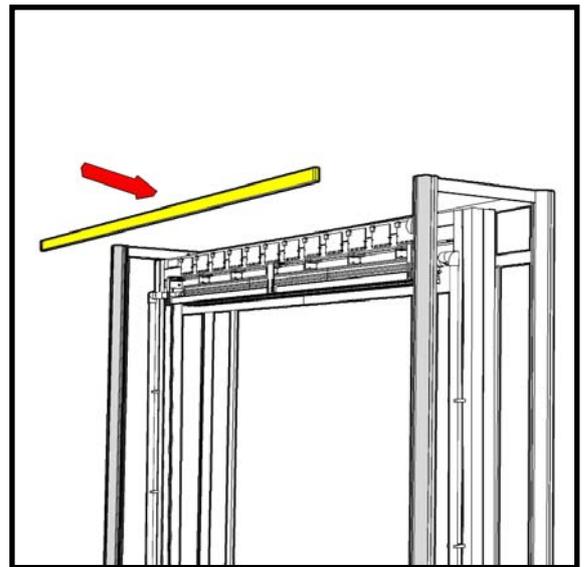
# 14

Now attach the remaining two cylindrical posts to the 540mm pieces.



# 15

Use the remaining two 2980mm lengths to connect the two posts at the back, top and bottom.



# 16

The fabric must now be stretched across the remaining gaps in the frame not including the window at the front. Match each size of fabric up with the gaps.

# 17

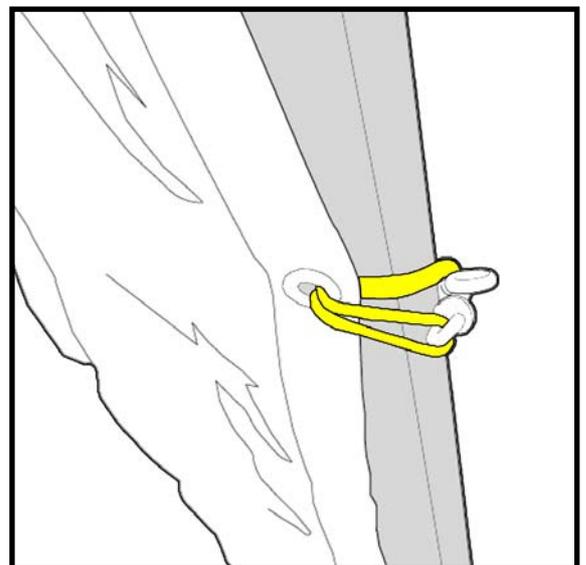
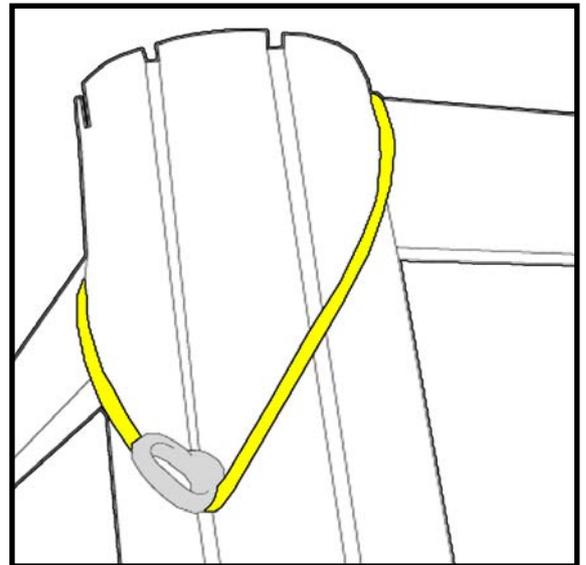
The fabric is attached to eyebolts inserted into the metal frame, to do this simply push the eyebolt into a slot and turn clockwise until it is tight.

# 18

To attach the fabric to the eyebolt use the bungees provided.

Thread the bungee through the eyelets and then loop around or through the eyebolts.

The bungees can also be used to hold different pieces of fabric together and close up any gaps by threading them through corresponding eyelets on different pieces of fabric.



Attach all the remaining fabric and the assembly process is complete.

## Fault Finding Guide

The following is a checklist of items to check in the case of non-operation before calling for technical support:

Problem	Items to check
Unit has no power.	<p>Have all power cords been plugged in properly?</p> <p>Are the actual outlets turned on?</p> <p>Check all fuses. If a fuse has been installed incorrectly, is loose or needs replacing, please see below.</p> <p>If the Fuses are in good working order, then check the RCD units. Are they connected correctly?</p> <p>In order to reset the RCD unit, please see below.</p>
Water pump is not working.	<p>Is the power connected properly and are all fuses functional?</p> <p>Is the water in the trough filled to the minimum level?</p> <p>Check the supply to the pump for blockage.</p> <p>Check filter to see if it needs cleaning or replacing. Please see below for more information on the filter.</p>
Images are not forming in the water:	<p>Is the PC connected properly and running and is the software open and running properly?</p> <p>Has the right option been chosen and has the right program been opened?</p> <p>Try restarting the software. If that does not solve the problem, try restarting the PC.</p> <p>Is the water pump working properly?</p> <p>Are all wires and cables properly connected?</p> <p>Has the restrictor valve been set properly? In order to check or reset, please see the Valves section. Check the Pressure Valve, if it is fully closed and there still is no pressure then it could be a blocked filter or air bubbles.</p>

# Fault Finding Guide

Problem	Items to check
The valves are not functioning properly.	<p>First check that the software appears to be running properly.</p> <p>Are the valves blocked? In order to check the valves for blockage, please follow the steps found in the Valves section.</p> <p>If it is a case of a faulty valve, replace it. In order to replace, please see the Valves section.</p>
The LED's are not lighting up	<p>Is the power connected properly?</p> <p>Has a fuse blown?</p> <p>Has a light bulb burnt out?</p>
Water additives are not working properly.	<p>Has the correct dosing been used? Check instructions.</p> <p>Too much light is being reflected: If this is the situation, the water additive is too concentrated within the water and not only is it reflecting too much light, there is also a risk of the valves becoming blocked. In this situation, the water will need replacing.</p>



## Spare Parts List and Order Information

The following is a list of parts that can be ordered if needed:

### Part Number

VA60001  
PU60000  
PU60001  
FL60000  
FL60001  
FL60002  
TO60000  
TO60001

### Part

Valves (Set of 5)  
Water Pump 240V  
Water Pump 110V  
Primary Filter  
Secondary Filter Housing  
Secondary Filter Element  
Elate H6 Biocide Solution  
Elate H6 Chemical Testing Strips

To order new parts then use the following contact details:

**Norgren Limited,**  
PO Box 22,  
Eastern Avenue,  
Lichfield, WS13 6SB.

Tel: **01543 265000**  
Fax: **01543 265811**

Web: **[www.norgren.com](http://www.norgren.com)**

Email: **[advantage@norgren.com](mailto:advantage@norgren.com)**



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**Norgren Limited,**  
PO Box 22,  
Eastern Avenue,  
Lichfield, WS13 6SB.

Tel: **01543 265000**  
Fax: **01543 265811**

Web: [www.norgren.com](http://www.norgren.com)

Email: [advantage@norgren.com](mailto:advantage@norgren.com)

