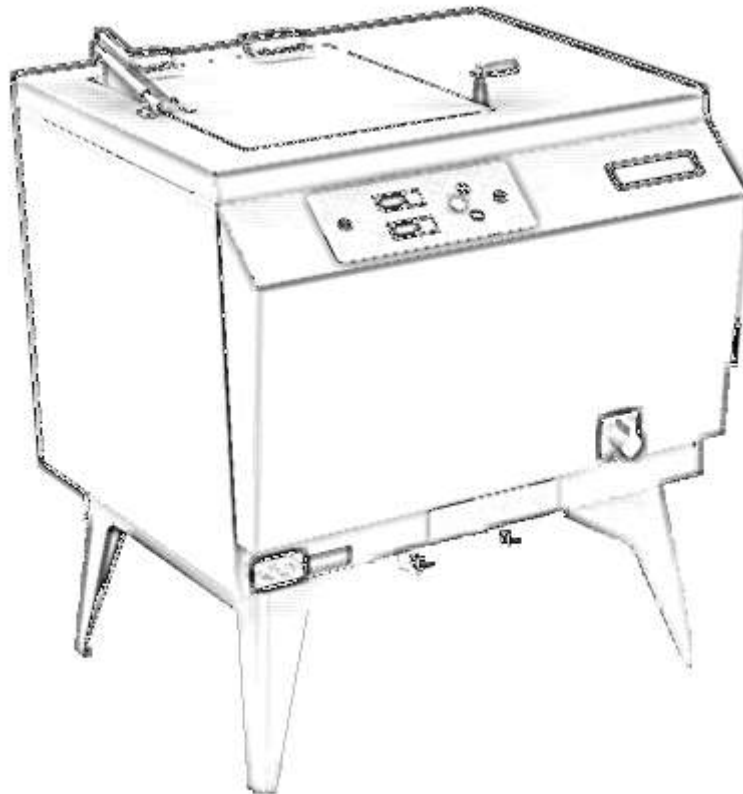




**JAMES H. HEAL**  
& CO. LTD. HALIFAX ENGLAND

**GYROWASH**  
Washing and Dry Cleaning  
Colour Fastness Tester  
Model 815



Covering Serial Numbers  
815/8/08/1001  
815/16/08/1001  
815/20/08/1001  
and upwards

James H. Heal & Co. Ltd.  
Halifax, England

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*James H. Heal & Co. Ltd. Richmond Works, Halifax, England!*



**Founded in 1872**

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JAMES H. HEAL & CO. LTD.  
RICHMOND WORKS  
HALIFAX  
WEST YORKSHIRE HX3 6EP  
ENGLAND

TELEPHONE +44 (0) 1422 366355

FACSIMILE +44 (0) 1422 352440

E-mail [info@james-heal.co.uk](mailto:info@james-heal.co.uk)

Internet <http://www.james-heal.co.uk>



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## 2. INTRODUCTION

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### **Scope**

Gyrowash is used to investigate the colour fastness to washing, dry cleaning and chlorinated water of textiles and leather.

Gyrowash complies with international colour fastness testing standards and is approved by many leading retailers.

The 815 series of instruments can accommodate both small and large test vessels without adaptor plates, making it possible to use one instrument for both European and American Standards.

### **Range**

There are 3 models of Gyrowash to choose from, starting with 8 test vessels with 1 bath, 16 test vessels with 2 baths and 20 test vessels with a single bath.

The choice of model should reflect the volume of testing to be currently carried out and allow for some expansion in the future.

Two bath units offer the ultimate in flexibility.

The baths have completely separate controls and drive systems, so they can be used as *two independent instruments*.

Two sizes of test vessels meet the requirements of the different standards – small (525ml) and large (1200ml).

The Gyrowash is supplied *without* test vessels which must be ordered separately.

To complete the Gyrowash portfolio, there is a comprehensive range of accessories and consumables – in fact, everything required to start testing immediately.

## **Key Features**

### ***Ergonomic layout***

Each bath has a conveniently positioned and easy-to-use control panel. The panel incorporates a programmable, electronic temperature controller and a count-down timer. An illuminated and audible alarm signals the end of a test.

### ***Durability***

Gyrowash is intended for continuous use in a wet environment, the instrument and the test vessels are manufactured from high-grade stainless steel. The PTFE test vessel seals are solvent and chlorine-resistant and are suitable for all types of testing.

### ***Integral stand***

The instruments are supplied with an integral stand, which raises them to a comfortable working height.

### ***Test vessels***

The test vessels are designed for easy and rapid operation.

### ***Safety and reliability***

Safety features include a switch to stop the rotor, if the lid is lifted. With the lid open, the rotor can only be operated by depressing the two jog buttons simultaneously, one with each hand. This ensures that the operator's hands are unable to obstruct the rotor.

Gyrowash has been designed and built to give many years of trouble-free operation. The instrument is built from corrosion-resistant materials and is fitted with long-life bearings and has solid-state heater controls.

### ***Easy installation and maintenance***

Permanent connection to a water supply and drain is strongly recommended. However, the water baths can be filled manually from a hose pipe and subsequently drained into a suitable container.

Permanent connections encourage the operator to refresh the water bath regularly ensuring the instrument remains pleasant to use.

The built-in fill/drain facility has another important advantage – some of the latest test methods, e.g. colour fastness to domestic laundering : oxidative bleach response, specify starting temperatures of 25°C. In such cases, the fill/drain facility of Gyrowash can be used to empty the bath of hot water and refill with cold water, bringing down the temperature quickly and effectively, before the start of the next test.

## **Standards**

Gyrowash fully complies with the following standards:

Small Test Vessel (525ml) (Type 1 canister)

- AATCC TM 61-1A, 132, 151
- EN 20105 C01, C02, C03, C04, C05
- ISO 105 C06, C08, C09, C10, C12, D01, E03, X05
- ISO 11643
- BS 1006: UK-LE, UK-TO
- M&S C4A, C5, C10A, C22, C23, C37, P3B
- FTMS 191 Methods 5610/5621
- NEXT TM 2, 2A, 3, 3A, 5
- WOOLMARK TM 193, 250, 294, 300

Large Test Vessel (1200ml) (Type 2 canister)

- AATCC TM 61-2A, 61-3A, 61-4A, 61-5A, 86





## 3. SAFETY

---

Gyrowash can achieve bath temperatures (up to 95°C) that could cause injury if operated incorrectly. The operator must wear heat-resistant gloves to protect hands and arms when loading and unloading the instrument. Operators must always stand to one side, when opening the lid of the instrument, to avoid any hot water vapour or steam from the bath.

**GYROWASH 815 IS NOT SUITABLE FOR USE AT  
TEMPERATURES IN EXCESS OF 95°C**

Many different solutions can be used in the containers.  
The operator should refer to the safety instructions for the solution being used.

Ensure Gyrowash is isolated from the electrical supply before removing any panels. Access for maintenance is gained by removing the front panel.

These instruments are heavy and must be moved with care.

For care and maintenance requirements please refer to section 5 of this guide.



## 4. INSTALLATION

### ***Unpacking***

Use a forklift truck or hydraulic pump up trolley to move the packing case as near as possible to the final location.

Remove outer case of the packaging leaving the instrument on the base. Remove the four fixings that attach the instrument to the pallet base. Remove the instrument from the pallet base. The Gyrowash instruments are heavy and should be moved with care.

Do not dispose of any packaging material until all standard and optional accessories are accounted for. If there are any discrepancies, please contact your supplier immediately.

### ***Moving the instrument on delivery***

**IMPORTANT NOTES TO BE READ  
BEFORE LIFTING THE INSTRUMENT**



Using the 5mm Hexagonal Key supplied, check the Lifting Frame fixing screws are tight after unpacking the wooden case and before lifting.

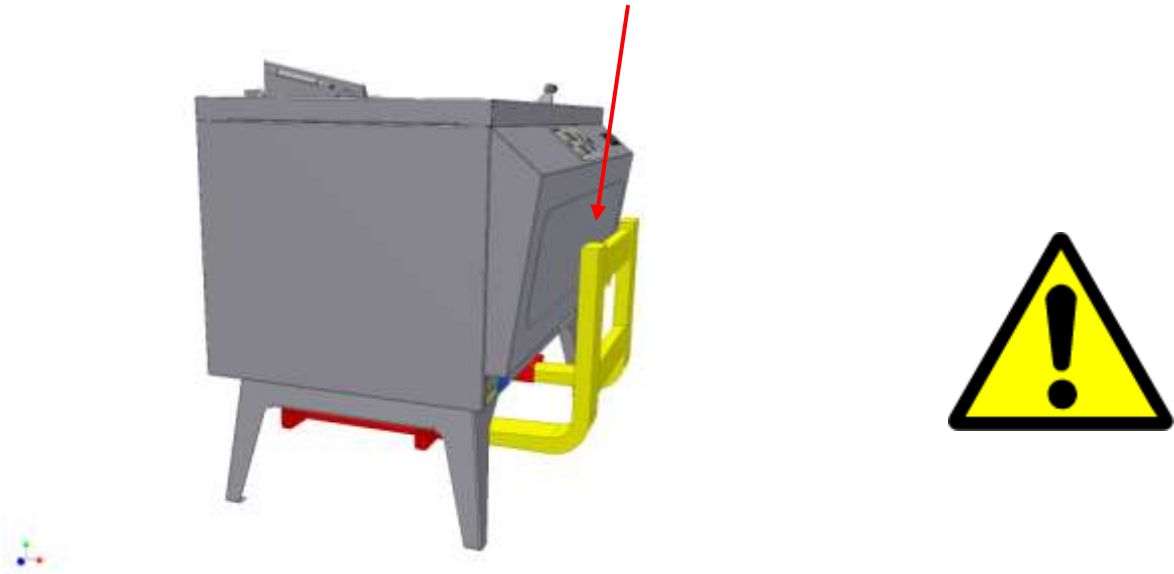


Align the Forklift Truck Legs.

**Figure 1: Moving the instrument on delivery**

Insert the Forklift Truck Legs through the two large channels without contact with the front of the instrument.

Protect the front of the instrument from damage by the FLT.

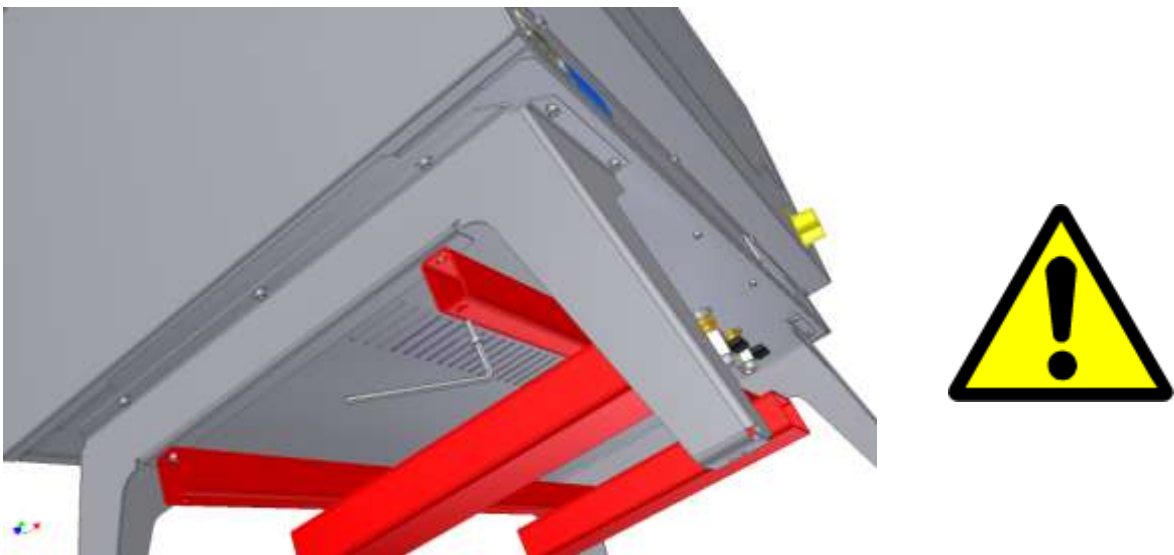


**Figure 2: Protect the instrument from the FLT**

Lift and move the instrument to the required position in the Laboratory.

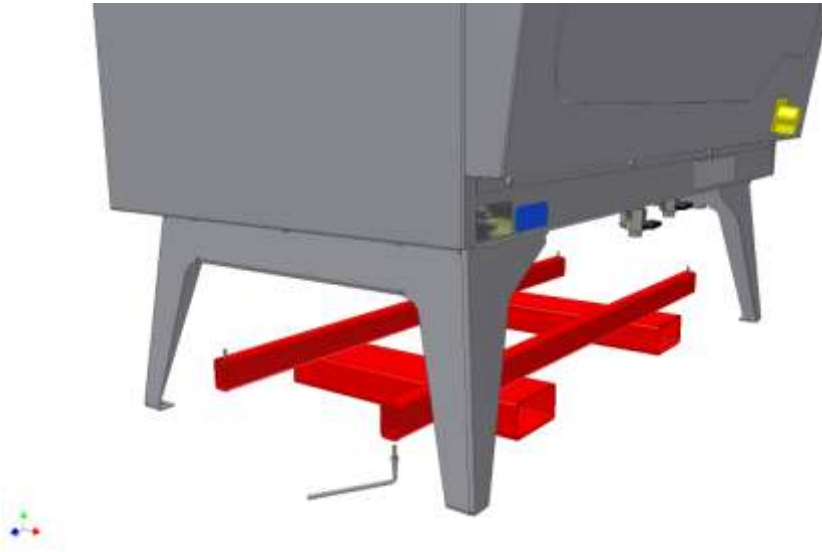
Unbolt and remove the Lifting Frame.

To avoid damage to the underside of the instrument, the Lifting Frame must be supported on both sides when removing. The Lifting Frame weighs 16kg.



**Figure 3: Removing the screws from the lifting frame**

Store the Lifting Frame, screws and 5mm Hexagonal Key should the instrument require moving in the future.



**Figure 4: Store the lifting frame, screws and 5mm key**

## The Gyrowash 815 range



815 / 8

815 / 20

815 / 8x2

Figure 5: the Gyrowash 815 range

## Identification of parts

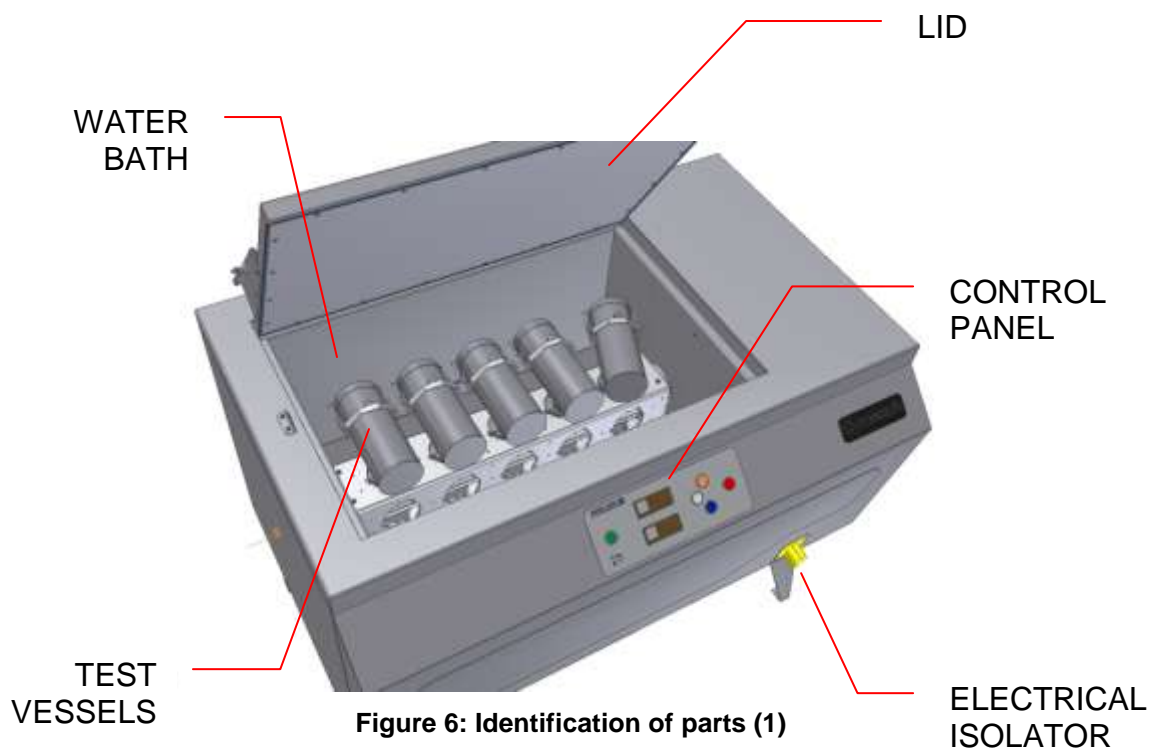
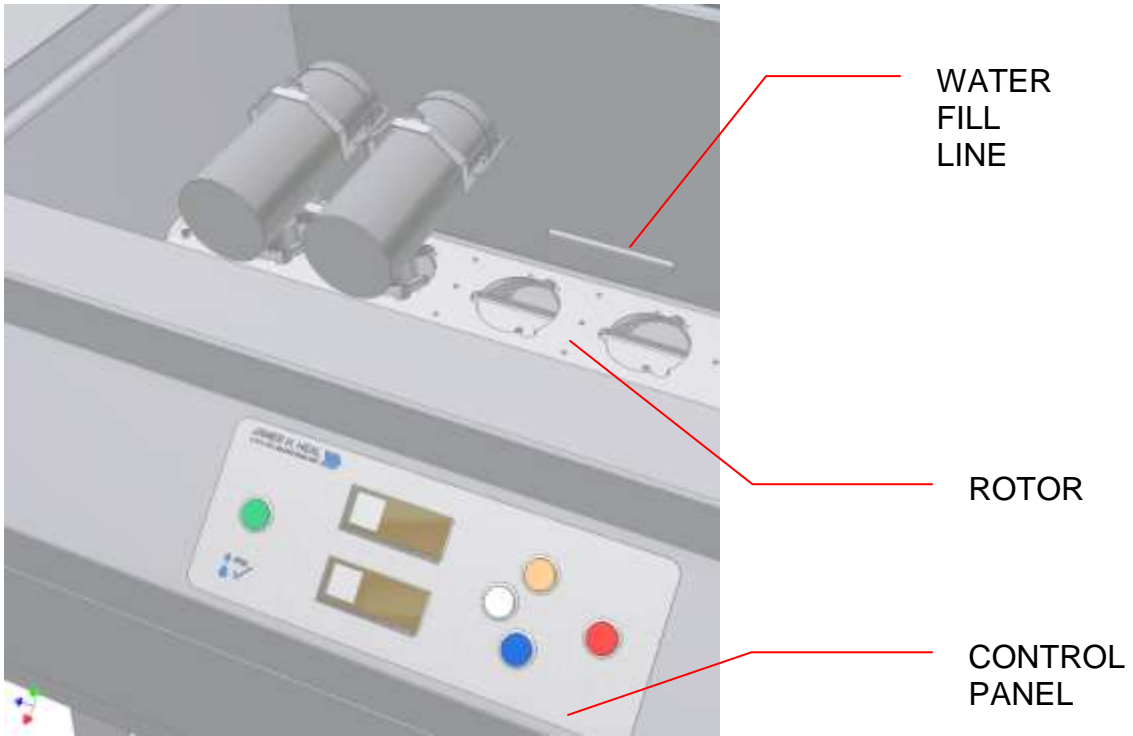
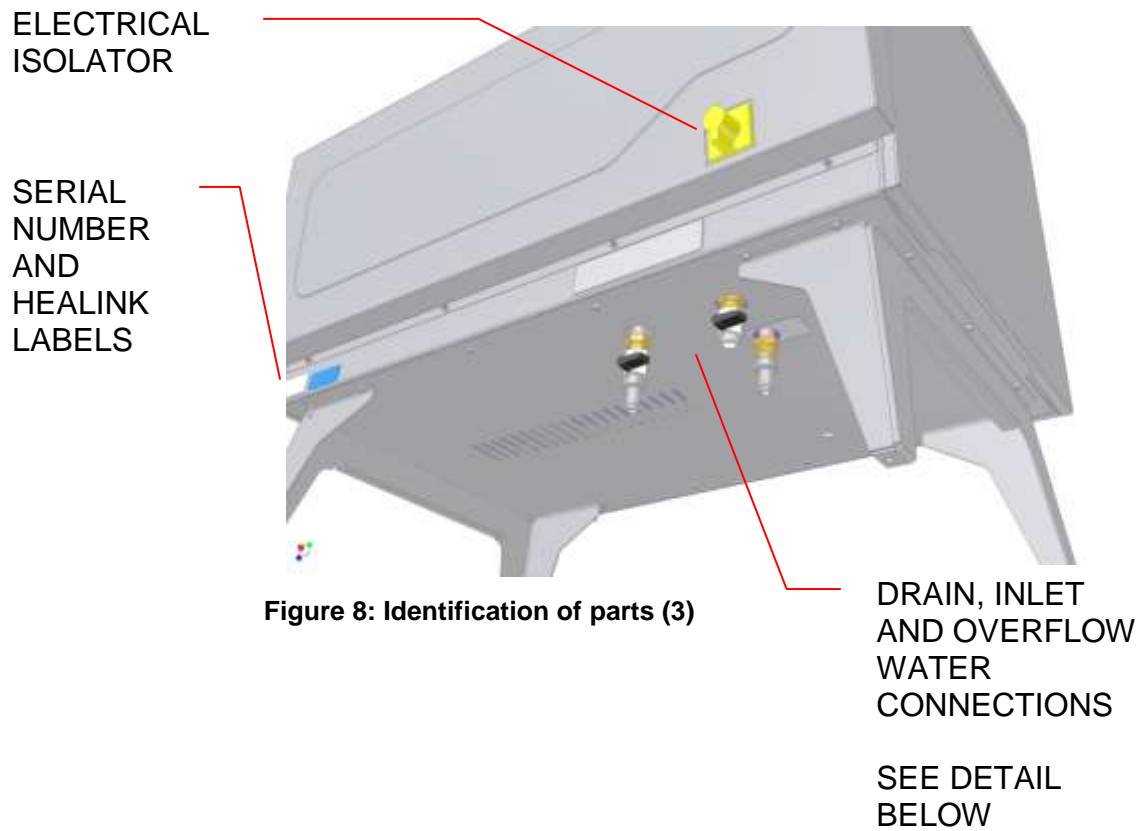


Figure 6: Identification of parts (1)



**Figure 7: Identification of parts (2)**



**Figure 8: Identification of parts (3)**

COLD  
WATER  
INLET

DRAIN  
*with Hose  
Tail  
connector*

OVERFLOW  
*with Hose  
Tail  
connector*

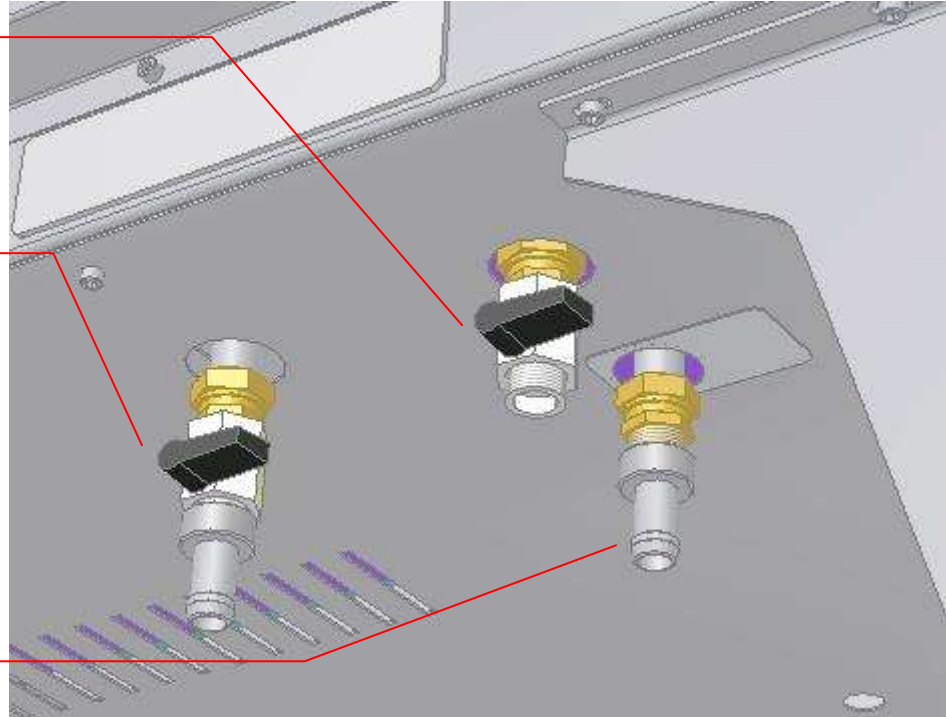


Figure 9: Identification of parts (4)

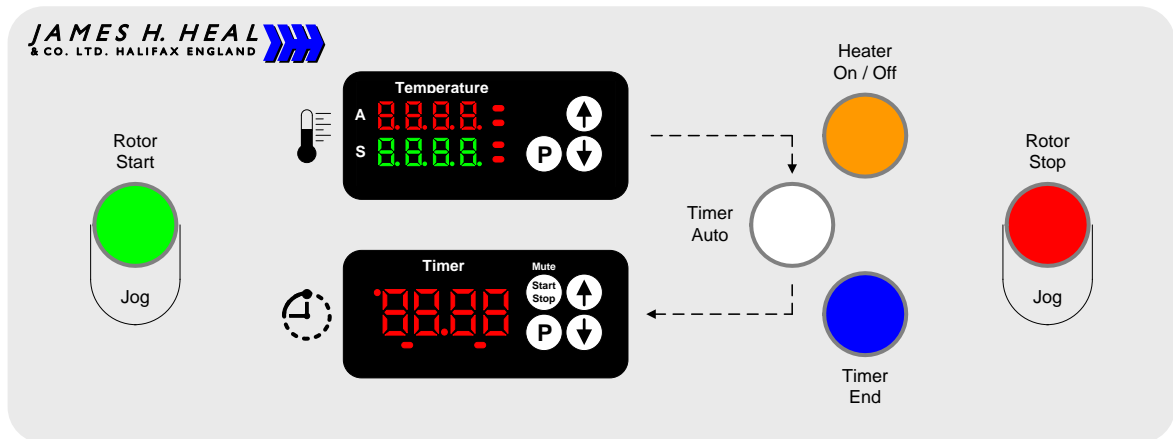


Figure 10: Gyrowash 815 - Control Panel

## Unpacking Checklist

Please check the serial number plate to confirm that the supply voltage and frequency are in accordance with your order. Also, check the items listed in the tables below are present.

Stock Code	GYROWASH one bath	Voltage and Frequency
901-965	815 / 8	220/240 V 50/60 Hz Single Phase
Stock Code	Quantity	Description
327-246	4 metres	Reinforced Hose Ref: RP19-26 19mm I/D, 26mm O/D
393-549	2	Hose Clamp
779-208	1	Blue Inlet Hose
381-108	1	17mm A/F Spanner
381-109	1	5mm Hexagonal Key
290-815	1	815 Operator's Guide
290-815-1	1	815 Quick Start Guide

Stock Code	GYROWASH two baths	Voltage and Frequency
901-966	815 / 8x2	380-420V 50/60Hz 3 phase neutral & earth
901-967	815 / 8x2	220-240V 50/60Hz 3 phase & earth
Stock Code	Quantity	Description
327-246	8 metres	Reinforced Hose Ref: RP19-26 19mm I/D, 26mm O/D
393-549	4	Hose Clamp
779-208	2	Blue Inlet Hose
381-108	1	17mm A/F Spanner
381-109	1	5mm Hexagonal Key
290-815	1	815 Operator's Guide
290-815-1	1	815 Quick Start Guide

Stock Code	GYROWASH one bath	Voltage and Frequency
901-964	815 / 20	380-420V 50/60Hz 3 phase neutral & earth
901-963	815 / 20	220-240V 50/60Hz 3 phase & earth
Stock Code	Quantity	Description
327-246	4 metres	Reinforced Hose Ref: RP19-26 19mm I/D, 26mm O/D
393-549	2	Hose Clamp
779-208	1	Blue Inlet Hose
381-108	1	17mm A/F Spanner
381-109	1	5mm Hexagonal Key
290-815	1	815 Operator's Guide
290-815-1	1	815 Quick Start Guide

In addition, the following sample packs of HEAL'S Quality Assured Consumables are also included:

Stock Code	Quantity	Description
702-510	1	Heal's Multifibre DW - Sample 0.5m
706-659	1	Heals ECE Non-Phos Ref Detergent (A) – Sample 20g
706-658	1	Heal's ECE Phosphate Ref Det (B) – Sample 20g
706-664	1	Heal's Standard Soap WOB – Sample 20g



## **Optional Accessories and Consumables**

The following are NOT supplied with the instrument, unless specifically ordered, but are available at short notice.

The Gyrowash is supplied *without* test vessels which must be ordered separately.

### **Test Vessels**

718-900	Small (500 ml/1 pt)	Test Vessel/Canister (Type 1)
718-901	Large (1200 ml)	Test Vessel/Canister (Type 2)

Gyrowash 815 accepts Large or Small Test Vessels in any combination. No conversion kits or other parts are required.

### **Calibration**

202-415(1)	<i>UKAS Certificate of Calibration for Gyrowash Single Bath</i>
202-415(2)	<i>UKAS Certificate of Calibration for Gyrowash Two Bath</i>

### **Accessories (ISO)**

766-200	HEAL'S Grey Scale for assessing Change in Colour ISO 105 A02
766-201	HEAL'S Grey Scale for assessing Staining ISO 105 A03
718-164	Non-Corrodible Steel Balls (washing) - pack (100)
718-163	Non-Corrodible Steel Discs (dry cleaning) - pack (50)
794-905	Non-Corrodible Steel Discs (dry cleaning) - pack (50 Discs/4 Cotton Bags)
702-526	Cotton Drill Bags 100 x 100 mm ( ISO 105 : DO1) - pack (50)
718-168	PTFE Rods (ISO 11643) - pack (100)

### **Accessories (AATCC)**

766-512	AATCC Gray Scale for Color Change
766-513	AATCC Gray Scale for Staining
718-164	Non-Corrodible Steel Balls (washing) - pack (100)
718-163	Non-Corrodible Steel Discs (dry cleaning) - pack (50)

### **Consumables (ISO)**

702-500	HEAL'S Multifibre Adjacent Fabric DW - per roll (10m)
702-501	HEAL'S Multifibre Adjacent Fabric DW - per roll (25m)
702-502	HEAL'S Multifibre Adjacent Fabric DW - per roll (50m)
706-657	HEAL'S Standard Soap - per tub (2kg)
203-918	<i>Certificate of Conformity for Standard Soap</i>
706-650	HEAL'S ECE Formulation Phosphate Reference Detergent (B) (Without Optical Brightener) - per tub (2kg)
203-919	<i>Certificate of Conformity for HEAL'S ECE Reference Detergent (B)</i>
706-651	HEAL'S ECE Formulation Phosphate Reference Detergent (B) (Without Optical Brightener) - per box (15kg)
203-919	<i>Certificate of Conformity for HEAL'S ECE Reference Detergent (B)</i>
706-714	Anhydrous Sodium Carbonate - per pack (500 g)

- 706-652 HEAL'S ECE Formulation Non-Phosphate Reference Detergent (A)  
(*Without* Optical Brightener) - per tub (2kg)
- 203-921 *Certificate of Conformity for HEAL'S ECE Reference Detergent (A)*
- 706-653 HEAL'S ECE Formulation Non-Phosphate Reference Detergent (A)  
(*Without* Optical Brightener) - per box (15kg)
- 203-921 *Certificate of Conformity for ECE Non-Phosphate Reference Detergent (A)*
- 706-735 TAED (tetraacetylenediamine) - per pack (250 g)

**Consumables (AATCC)**

- 702-417 Multifiber Adjacent Fabric Style 1 - per pack (1m)  
Multifiber Adjacent Fabric Style 1 - per box (500 pieces) 5 x 10cm
- 702-419 (straight heat sealed edges)
- 702-420 Multifiber Adjacent Fabric Style 10 - per pack (1m)  
Multifiber Adjacent Fabric Style 10 - per box (500 pieces) 5 x 10cm
- 702-421 (straight heat sealed edges)
- 702-403 Multifiber Adjacent Fabric Style 10A - per pack (1m)  
Multifiber Adjacent Fabric Style 10A - per box (500 pieces) 4 x 10cm
- 702-370 (straight heat sealed edges)  
Multifiber Adjacent Fabric Style 10A - per box (500 pieces) 5 x 10cm
- 702-399 (straight heat sealed edges)
- 706-500 AATCC 1993 Non-Phosphate Reference Detergent - per tub (2kg)  
(*With* Optical Brightener)
- 706-501 AATCC 1993 Non-Phosphate Reference Detergent - per box (15kg)  
(*With* Optical Brightener)
- 706-502 AATCC 1993 Non-Phosphate Reference Detergent - per tub (2kg)  
(*Without* Optical Brightener)
- 706-503 AATCC 1993 Non-Phosphate Reference Detergent - per box (15kg)  
(*Without* Optical Brightener)

**Spares**

- 815-spares **2-year Spares Kit for 815 Gyrowash range**

## **Services**

### **Electrical supply**

The instrument is wired, as ordered, that is for single phase, three phase and neutral + earth or three phase + earth supply. Check the details on the label adjacent to the mains cable outlet. Three phase instruments should be connected so that the direction of rotation of the rotor is the top moving away from the operator. Maximum power requirements are tabulated in the Technical Data section.

This instrument has been wired to the European IEC 60446 Regulations as follows:

L1	Brown
L2	Black
L3	Grey
Neutral	Blue
Ground/Earth	Green/yellow stripe

### **Water supply and drain**

We recommend Gyrowash is permanently connected to a potable mains water supply and drain. However, Gyrowash can also be operated independent of a mains water supply and drain if appropriate.

The Gyrowash water supply connection is a 3/4" BSP male fitting, commonly found on European domestic washing machines.

Fitting a mains water shut-off valve local to the Gyrowash is strongly recommended. If splashing occurs when filling an empty bath, reduce the inlet pressure to an acceptable level using the shut-off valve.

Gyrowash has one drain and one overflow per bath. Using the Hose Clamps connect the flexible Reinforced Hose supplied to the Hose Tail connectors and the other end into an appropriately sized waste pipe. Any additional pipe-work for the drain or overflow must have a bore diameter of at least 19 mm to prevent the flow from being restricted.

**AN AIR-GAP SHOULD BE MAINTAINED BETWEEN THE DRAIN PIPE  
AND THE SEWER DRAIN TO PREVENT CONTAMINATION  
OF THE INSTRUMENT FROM THE SEWER.**

### **Location**

Each instrument is supplied complete with a stand. It is not possible to remove the stand.

To allow access for ventilation the rear of the instrument should be a minimum of 100 mm from a wall.



## 5. OPERATION

### ***Water bath***

Before operating the heating controls the operator must ensure the bath is filled correctly to the level indicated in Figure 7, page 14.

The water should be changed if it becomes contaminated or odorous. For instruments in regular use it is normal practice to change the water at least once per week.

**ALWAYS ENSURE THE HEATING ELEMENTS ARE COVERED BY WATER BEFORE SWITCHING THE INSTRUMENT ON.**

### ***Filling the water bath***

The water bath should be filled up to the FILL LINE indicator (Figure 7, page 14). The FILL LINE indicator is located inside the bath on the rear panel. It is not recommended to fill the bath above this indicator.

**THE BATH SHOULD NEVER BE FILLED SO THAT THE LEVEL OF WATER IS ABOVE THE OVERFLOW.**

If the water bath is empty and the heaters are switched on then after a short period of time the safety cut-out will activate to protect the heating elements from damage. If this occurs, allow the heating elements to cool for 30 minutes before adding water to the bath. Adding cold water while the heating elements are very hot may cause permanent damage to the heating elements.

Provided Gyrowash has been connected to a permanent water supply, the bath can be filled via the integral fill valve. The rate of filling is controlled using the right valve, located on the under-side at the front edge of the instrument, see Figure 9, page 15. The bath will begin to fill when the valve lever is vertical, once full the valve should be closed by moving the valve lever to the horizontal position. Twin bath units have independent fill valves.

### ***Draining the water bath***

The bath can be drained via the integral drain valve. The water drain is controlled using the valve, located on the under-side at the front edge of the instrument, see Figure 9, page 15. The bath will begin to drain when the valve lever is vertical, once empty the valve should be closed by moving the valve lever to the horizontal position. Twin bath units have independent drain valves.

## Rotor Operation

The rotor is operated using the Rotor Start and Rotor Stop buttons on the fascia. If the Rotor Stop button is illuminated the rotor is stopped. If the Rotor Start button is illuminated the rotor is rotating.

When the lid is closed the rotor is started by pressing the Rotor Start button. The rotor is stopped by pressing the Rotor Stop button.

When the lid is open the rotor will only rotate when both the Rotor Start / Jog and Rotor Stop / Jog button are pressed simultaneously. This ensures that the operators hands are away from moving parts.

This feature is very useful when loading and unloading test vessels.

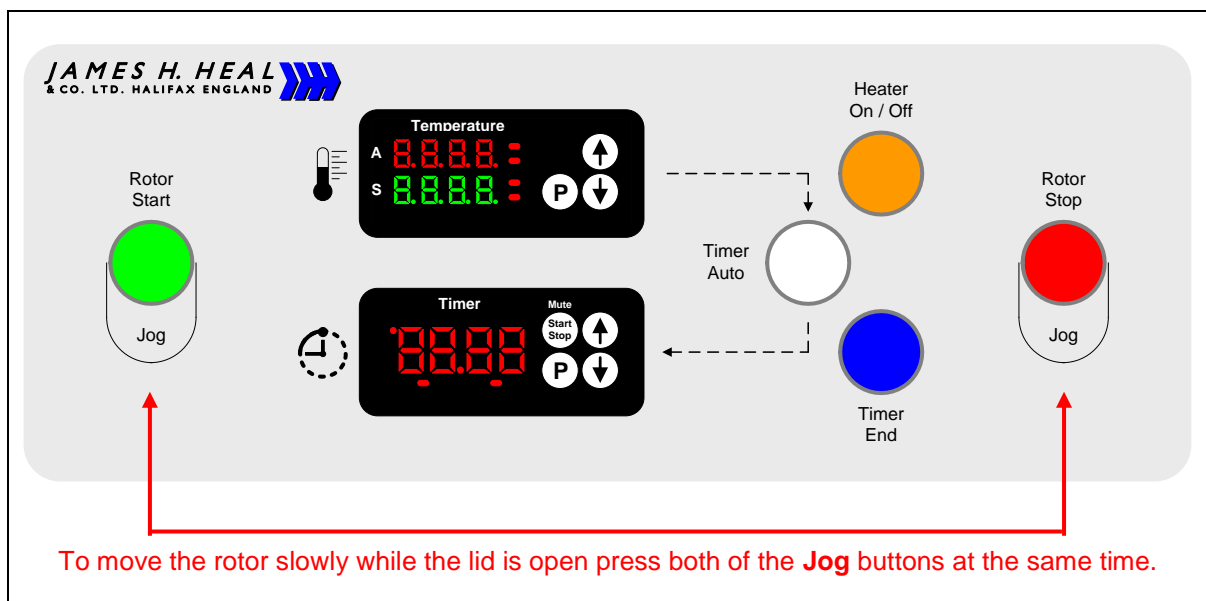


Figure 11: Control Panel - Using the Jog feature

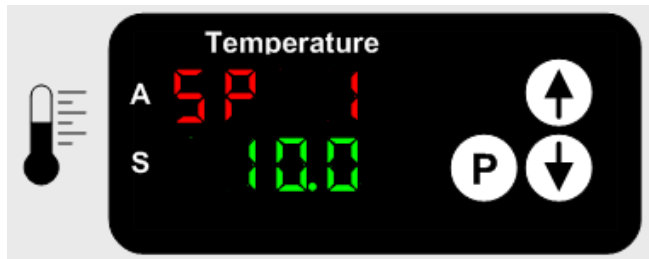
## Temperature and heater operation

The following gives an example of setting temperature and time, and running Gyrowash using the features on the Control Panel.

The Test Vessels should start rotating while heating the water. This aids distribution of heat in the Water Bath.

The Heater button indicates that power is available to the elements, but it is a small red dot on the temperature display that indicates whether the elements are receiving power. While heating from cold the red dot will illuminate continuously. Once the set temperature has been achieved the red dot will pulse intermittently to indicate small periods of heating.

Ensure the bath is filled with water to the fill marker. This will take approximately 3 minutes. Switch on the power and the display quickly goes through a self-test.

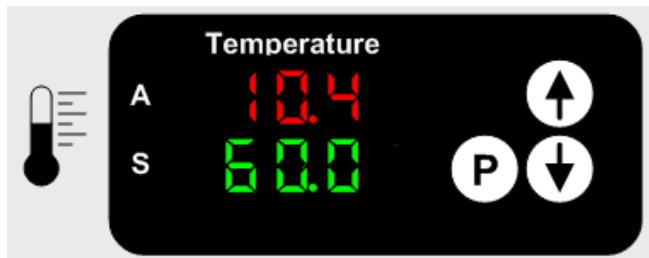


To set the temperature:

Press the **P** button on the Temperature controller.

**SP 1** (set-point) is displayed.

Use the **↑** **↓** buttons to increase or decrease the set temperature.



Press the **P** button again to Program the required temperature set-point.

**A** = Actual temperature of water

**S** = temperature Set-point



To set the time:

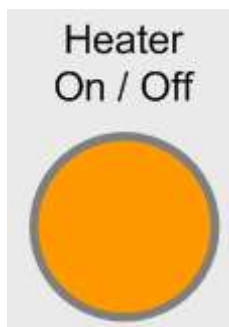
Press the **P** button on the Timer controller.

**t 1** is displayed.



Use the **↑** **↓** buttons to increase or decrease the time.

Press the **Start Stop** button to set the new Timer set-point.



Press the **Heater** button to switch the electric heaters on.

The rate of temperature rise is within the limits  $1.5 \pm 0.5$  °C/min.

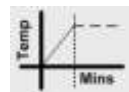
Press the **Rotor Start** button to start the rotor turning in the water bath.

*Note: the rotor will not start if the lid is open.*



To start the Timer automatically when the water bath reaches the set temperature, press the **Timer Auto** button.

This is useful in procedures such as ISO 105 C08 and C09.



To start the Timer manually when the water bath reaches the set temperature, press the **Start Stop** button on the Timer .



The Timer will count down to zero.

The **Timer End** indicator will illuminate and the buzzer will sound to alert the operator.

To silence the buzzer press the **(Mute) Start Stop** button on the Timer.

The heater and rotor continue to operate until stopped by the operator.



Stop the rotor by pressing the **Rotor Stop** button or lift the lid.

Switch the electric heaters off by pressing the **Heater** button.

To move the rotor slowly while the lid is open press both of the **Jog** buttons at the same time (**Rotor Start** and **Rotor Stop**).

Releasing either of the **Jog** buttons will stop the rotor immediately.

## **Test Vessels**

The number of Test Vessels it is possible to fit in Gyrowash depends on the model ordered.

<b>Model number</b>	<b>Maximum number of Test Vessels*</b>
815/8	8
815/8x2	16
815/20	20

Test Vessels have quick-release lids, so that they can be conveniently filled 'in-situ'. The standard blue seals are solvent-resistant fluorocarbon seals, suitable for dry cleaning and chlorinated water fastness testing.

When operating the instrument at temperatures in excess of 60°C, it is necessary to pre-heat the liquor prior to introduction to the test vessels. This procedure minimises pressure build up and prevents leakage of liquor during the test cycle.

**TEST VESSELS SHOULD NOT BE COMPLETELY FILLED.**

If a test vessel is allowed to cool with the lid on it may become difficult to remove the lid due to formation of a vacuum inside the test vessel.

\*Gyrowash 815 accepts Large or Small Test Vessels in any combination. No conversion kits or other parts are required.

### ***Placing the Test Vessels on the Rotor***

#### ***Push and Twist***

Unlike the vessels of most other washwheels, no conversion parts or securing bars are required for fixing them on the rotor.

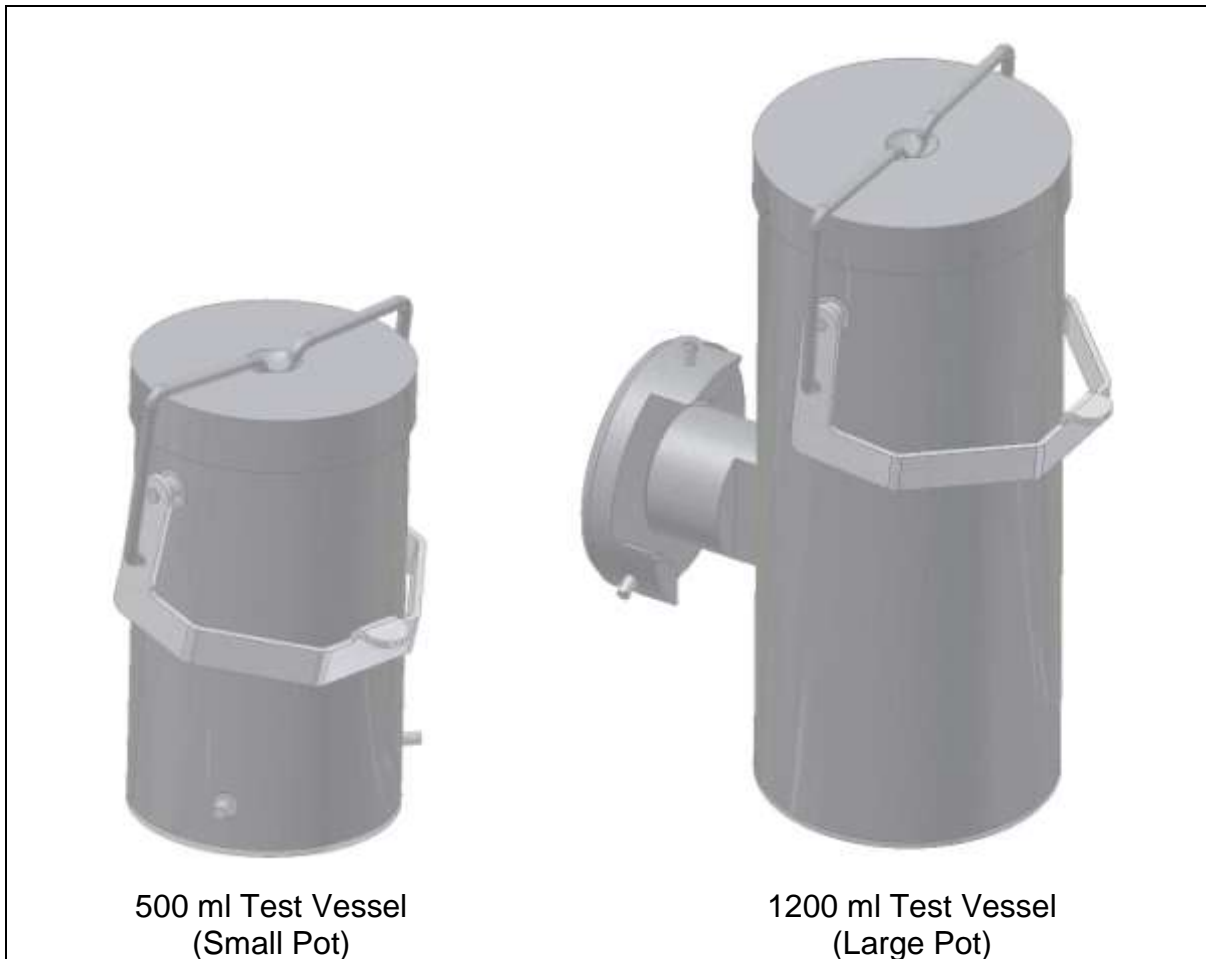
Gyrowash 815 Test Vessels incorporate a *Push and Twist* feature which enables the operator to rapidly remove and replace them on the rotor.

You will notice that each Test Vessel, or Pot, has three (3) pins, equally spaced at 120° apart.

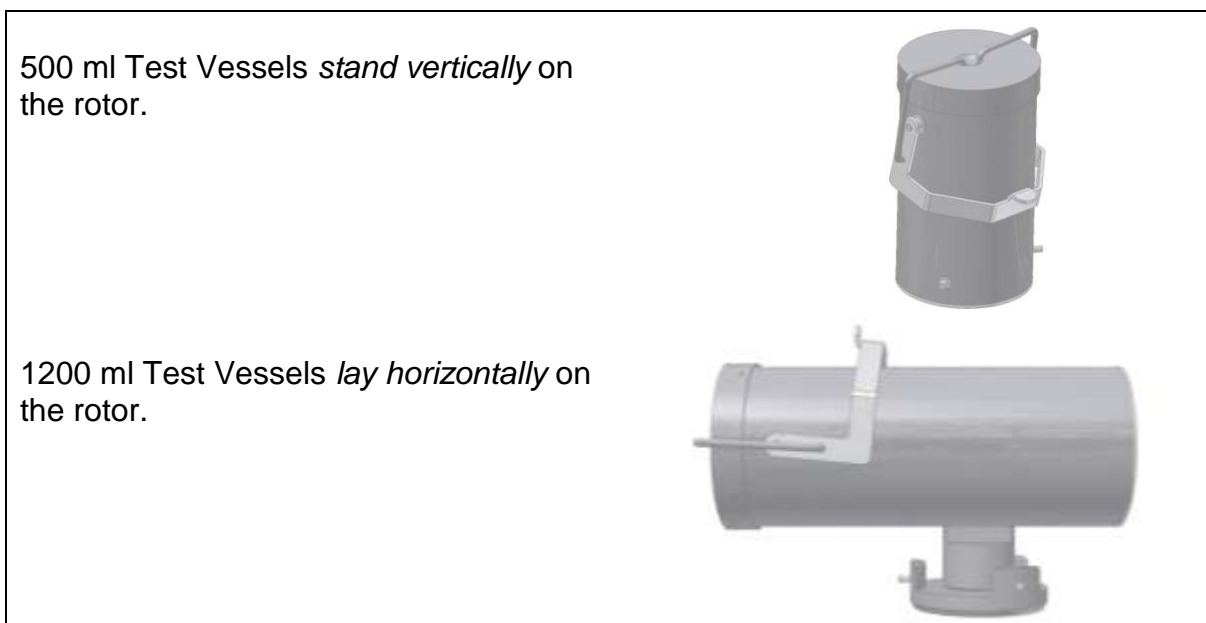
On the 500 ml Test Vessel, the pins are located at the bottom of the cylinder so that the Test Vessel stands upright when fixed on the rotor.

The 1200 ml Test Vessel on the other hand, has the pins on an adaptor fixed to the side of the cylinder so that the Test Vessel lays on its side when fixed on the rotor.





**Figure 12: Small and Large Test Vessels**



**Figure 13: Orientation of Test Vessels**

***Balancing Test Vessels on the Rotor***

Ensure that the number of Test Vessels on each of the four (4) sides of the rotor is balanced. There should be a minimum of four (4) Test Vessels equally spaced around the rotor. If there is only one (1) test, the other three (3) should contain only water.

***Your safety***

When handling Test Vessels at 60°C and above, it is recommended to use water proof and heat resistant protect gloves.

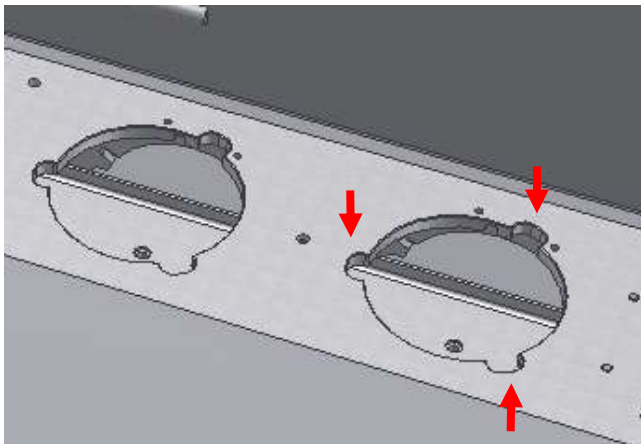
Take care when opening Test Vessels. Heat will cause the contents of the Test Vessel to become pressurised. When the Test Vessel is opened small particles of liquid may be ejected. Eye protection is therefore recommended.

When operating Gyrowash at temperatures above 60°C take care when opening the lid. Steam and water vapour may be released towards the operator. Open the lid at arms length.



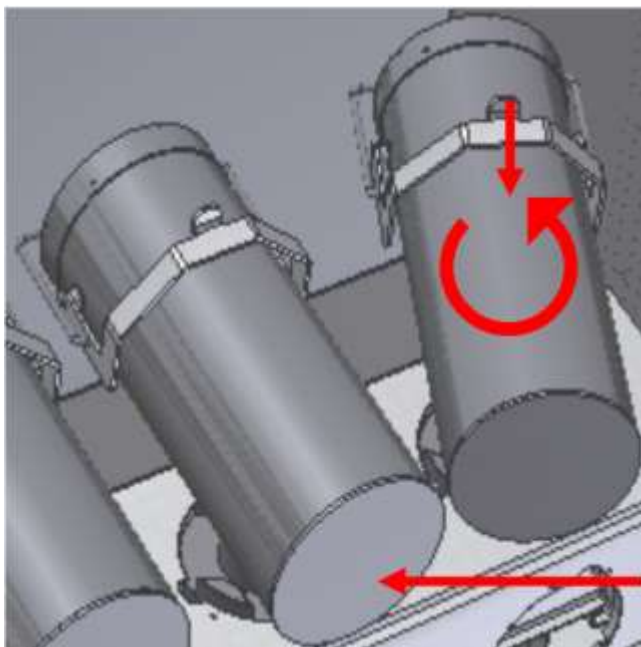
When standing in front of Gyrowash, load the Test Vessels from the left-hand side.

This illustration shows two (2) 1200 ml Test Vessels already fixed horizontally on the rotor of a Gyrowash model 815/20.



The rotor will have 8 or 20 positions for Test Vessels.

Each position on the rotor has three (3) cut-outs to allow the pins on the Test Vessel to be inserted.



Place the pins in the cut-outs.

*Push* (press) down against the spring.

*Twist* (turn) the Test Vessel to the left and release.

The Test Vessel will lock in to position.

To remove the Test Vessels, reverse the above process.

**Figure 14: Loading Test Vessels on the Rotor**



## 6. CARE & MAINTENANCE

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Servicing and calibration are available Worldwide.  
Contact our **HEALINK** Department for further details.

**HEALINK** is a totally comprehensive, worldwide support programme.  
When you buy instrumentation from us, it is the beginning rather than the end of an association.

Our aim is simple : to provide precisely the services you need to maintain and protect the value of your investment.

In all communications please quote the serial number of your instrument e.g. 815/8/08/1001.

Between service and calibration visits no regular maintenance is required.  
Simply keep the instrument free from dust and debris and regularly change the water in the bath.

Additional support is available via on our web site <http://www.james-heal.co.uk>  
or email [support@james-heal.co.uk](mailto:support@james-heal.co.uk)



# 7. TECHNICAL DATA

EXTERIOR DIMENSIONS		Width	Depth	Height including legs	Height with lid open	Weight
815/8		810 mm (31.9 inch)	785mm (30.9 inch)	1035 mm (40.7 inch)	1510 mm (59.4 inch)	210 kg (463 lb)
815/8x2		1255 mm (49.4 inch)	785mm (30.9 inch)	1035 mm (40.7 inch)	1510 mm (59.4 inch)	250 kg (550 lb)
815/20		1255 mm (49.4 inch)	785mm (30.9 inch)	1035 mm (40.7 inch)	1510 mm (59.4 inch)	250 kg (550 lb)
Lifting frame						+ 16 kg (35 lb)

BATH DIMENSIONS		Width	Depth	Height	Bath Volume	Liquid Medium
815/8		370 mm (14.6 inch)	490 (19.3 inch)	515 mm (20.3 inch)	35 litres	Water
815/8x2		760 mm (29.9 inch)	490 (19.3 inch)	515 mm (20.3 inch)	35 litres (each)	Water
815/20		760 mm (29.9 inch)	490 (19.3 inch)	515 mm (20.3 inch)	70 litres	Water

ELECTRICAL OPTIONS		Power (kW)	Current (A)
815/8	220-240V, single phase, 50/60Hz	5.1	22
815/8X2	380-420V, 3 phase, neutral & earth 50/60Hz	11.2	20 per phase
815/8X2	220-240V, 3 phase & earth 50/60Hz	10.2	32 per phase
815/20	380-420V, 3 phase, neutral & earth 50/60Hz	10.5	16 per phase
815/20	220-240V, 3 phase & earth 50/60Hz	10.5	25 per phase

## INSTALLATION

Cold water connection	¾ inch BSP
Drain	¾ inch BSP hose tail
Overflow	¾ inch BSP hose tail

## OPERATION

Max bath temperature	95 °C (203 °F)
Rate of temperature rise	1.5 °C/min (2.7 °F/min)
Temperature control	± 1 °C (1.8 °F)

## TEST VESSELS (CANISTERS)

Small (Type 1)	500ml
Large (Type 2)	1200ml
Rotational Speed	40 ± 2rpm

## STANDARDS

AATCC	61-1A, 132, 151 (Type 1 canister)
AATCC	61-2A, 61-3A, 61-4A, 61-5A, 86 (Type 2 canister)
EN 20105	C01, C02, C03, C04, C05
ISO 105	C06, C08, C09, C10, C12, D01, E03, X05
ISO 11643	C4A, C5, C10A, C22, C23, C37, P3B
M&S	191 Methods 5610/5621
FTMS	2, 2A, 3, 3A, 5
NEXT TM	193, 250, 294, 300
WOOLMARK TM	