JAMES H.HEAL
& COMPANY LIMITED

Impulse^2
Random Tumble Pilling Tester
Model 816

Covering Serial Numbers
816/10/1001
and upwards

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

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WORLDWIDE SUPPORT
Service and Calibration Division James H.Heal & Co. Ltd.

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

Table of Contents

1: Contents **3**
Table of Contents 3
2: Introduction to Impulse^2 **4**
Standards 5
3: Safety **6**
Health and Safety 6
Compressed Air 6
4: Unpacking **7**
Unpacking 7
Unpacking Check List 7
Identification of Parts 8
5: Setting Up **9**
Connecting to Services 9
Electrical 9
Compressed Air 9
Lining the Test Chambers 10
6: Care and Maintenance **11**
Cleaning 11
Fuses 11
Customer Support 11
7: Operation **12**
Count-down Timer 12
Key Functions 12
Setting the Test Time 12
Operating the Timer 13
Resetting the Timer 13
Timer Reset 13
Loss of Power 13
Air and Lamp Controls 13
Compressed Air Regulator and Gage 13
Test Chamber Door Interlock 13
Basic Operation 14
End of Test 14
Interrupting a Test 14
8: Technical Data **15**
CE Conformity 15
Electrical Scheme 16
Exploded Scheme 17
9: Revision History **18**

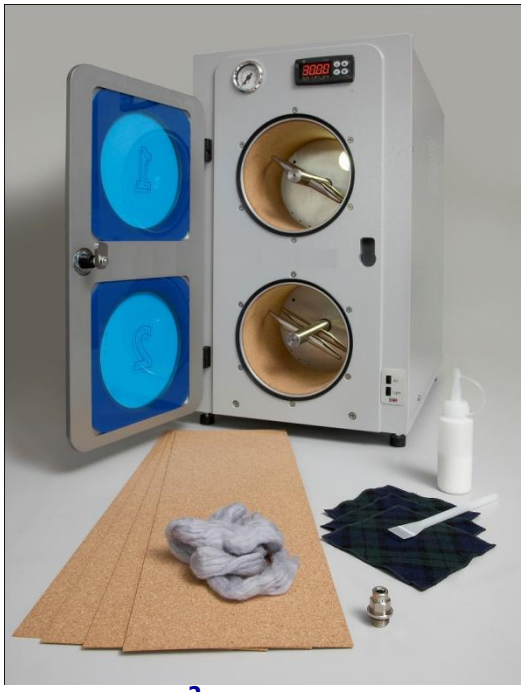
2: Introduction to Impulse^2

James H Heal & Co Ltd have responded to the increasing prevalence of American Standards for testing the propensity to pilling of textile fabrics by introducing **Impulse^2**. Launching **Impulse^2** completes the HEALS' pilling trilogy:

Pilling Box
Modified Martindale Method
Random Tumble

Pilling Box

Modified Martindale



Impulse^2 - Random Tumble

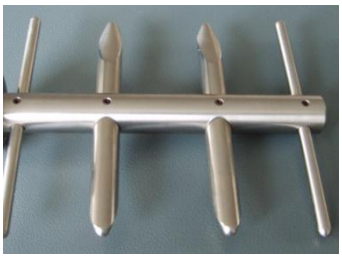
Even in areas where the European Modified Martindale and Pilling Box test methods are strongly established, the American random tumble pilling test is often preferred for certain applications such as shirting fabrics.

The demand for the random tumble pilling test is also likely to increase when ISO 12945-3 test method is published. This is based on the French method, NF G 07-121.

In this type of test, three fabric specimens are tumbled simultaneously by an impeller rotating at 1200 rpm, typically for 30 minutes, in a cork-lined or rubber-lined chamber, with a continuous injection of compressed air to ensure the specimens tumble effectively.

The test chamber has its own integral illumination and safety interlocked access door. Three types of impeller are available:

ASTM D 3512
JIS L 1076 Method D



DIN 53 867

NF G 07-121
NF G 07-132
Draft ISO 12945-3 (2009)

Impulse^2 is supplied with a ASTM D 3512 Impeller fitted by default unless otherwise requested at the time of order. Impellers are not readily interchangeable and careful consideration should be given to the type(s) required before placing your order. Each Test Chamber can be fitted with different Impellers, they are not required to be the same.

Standards

Impulse^2 complies with the following standards:

ASTM D 3512
NF G 07-121
NF G 07-132
DIN 53 867
JIS L 1076 Method D
Draft ISO 12945-3 (2009)

Health and Safety

The instrument weighs approximately 35kg, therefore, assistance from a colleague or suitable lifting apparatus is recommended.
Impulse^2 complies with the CE regulations in full.
As with all Heals' products, Impulse^2 has been designed with operator health and safety as a primary requirement.
This instrument promotes minimal operator stress and fatigue.

Compressed Air

Impulse^2 utilises compressed air. Compressed air is potentially dangerous if misused. Carefully follow the installation guidelines detailed in "Section 5 – Setting Up" when connecting the instrument to the air supply. Never apply compressed air to the surface of the human body.

Unpacking

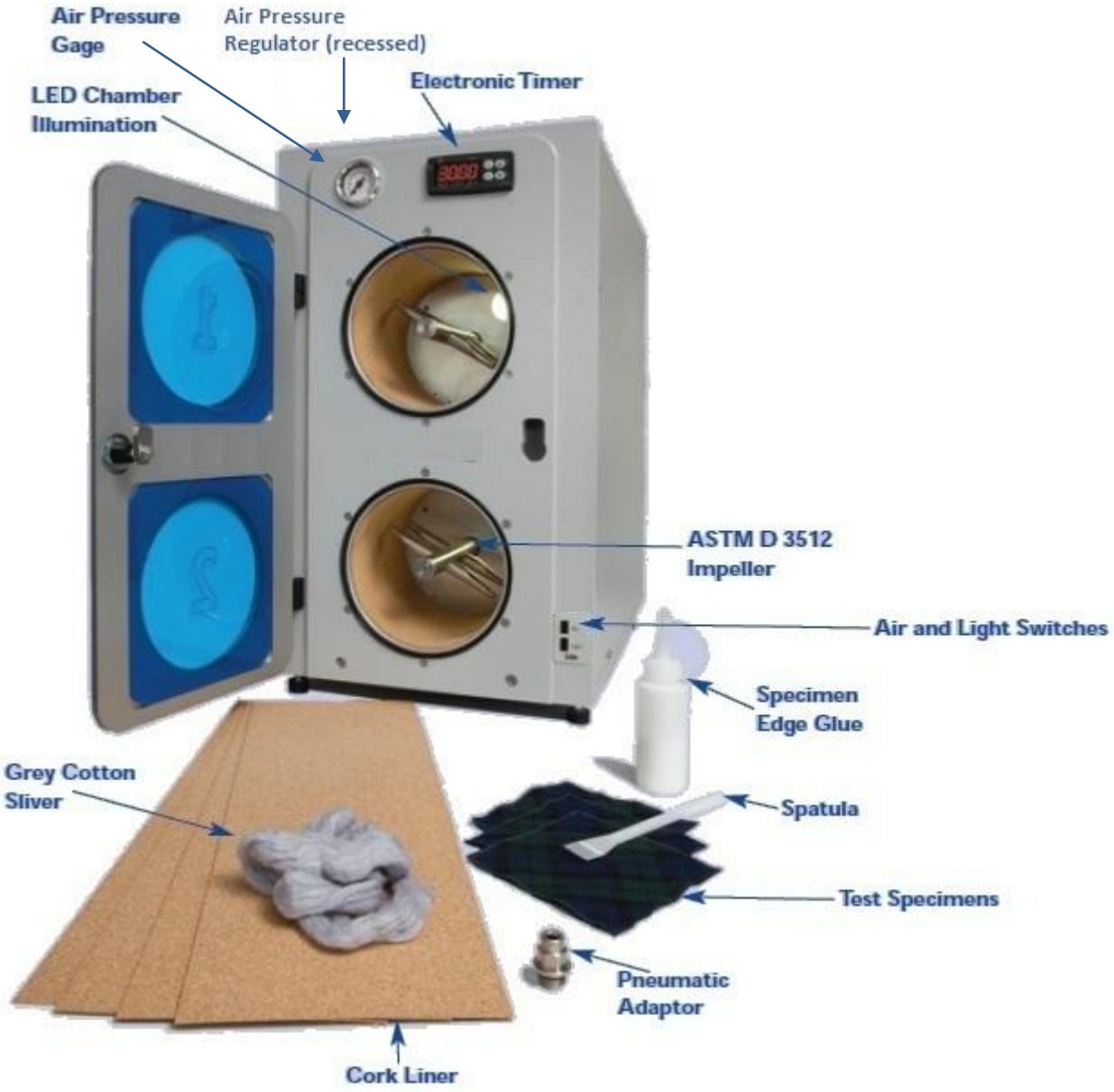
- Remove the tape from the packing case lid and open the lid.
- Carefully remove the packaging and contents from the upper part of the case.
- Note that any accessories ordered with the instrument are packed in this top section.
- Carefully remove the packing from around the instrument.
- Remembering that the instrument weighs approximately 35kg, very carefully lift the instrument out of its case and place it on a firm flat surface.
- Do not dispose of any packaging material until all standard and optional accessories, listed in the table below are fully accounted for. If there are any discrepancies, please contact your agent/supplier immediately.

Unpacking Check List

Please check the instrument serial number plate corresponds with your delivery note. The serial number plate is located on the rear left hand side of the instrument.

906-502	**Impulse² Random Tumble Pilling Tester** 85-264V 50/60Hz Equipped as standard with two American (ASTM D3512) Impellers. Other Impellers to special order	1
	Standard accessories supplied:	
785-509	Pack (approx. 1 m) Grey Cotton Sliver	1
393-527	Pack (50) Cork Liners	1
785-116	Bottle (180 ml) Specimen Edge Glue	1
789-368	Spatula	1
794-819	Pneumatic Adaptor 6mm diameter to 1/4 inch BSP	1
	Optional accessories:	
393-527	Cork Liner per pack (50)	
785-509	Grey Cotton Sliver - per pack (approx. 1 m)	
794-654	Specimen Edge Glue - per pack (10 bottles - each 60 ml)	
758-566	Neoprene Liner per pack (5)	
772-116	Cutting Template (ASTM D 3512) 105 mm x 105 mm	
766-450	ASTM D 3512 Photographic Standards consists of 5 photographs, 105 mm square, graded no.1 (very severe pilling) to no. 5 (no pilling)	
758-566	Neoprene Liner - per pack (5) NF G07-121 and ISO 12945-3	
772-115	Cutting Template 100 mm x 100 mm NF G07-121 and ISO 12945-3	
772-116	Cutting Template 105 mm x 105 mm ASTM D3512 and DIN 53867	
902-220	Sample Cutter Model 230/100 NF G07-121 and ISO 12945-3	
770-843	Tachometer Model PH-200L	
816-spares	**2-year Spares Kit,** comprising	
163-004	Electronic Timer	
130-820	Fuse 5A (2 of)	
390-212	Valve Sub Plate	
390-213	N/close Valve	
140-272	Chamber Illumination LED	
324-578	Self Seal Bulkhead Fitting	
395-754	Compression Latch	
	Certification:	
202-816	UKAS Certificate of Calibration for Impulse or Random Tumble Pilling Tester (up to 4 chambers)	
203-526	Certificate of Conformity for Cork Liner (random tumble)	
203-566	Certificate of Conformity for Neoprene Liner	
201-805	ISO Certificate of Calibration for Tachometer PH-200L	
202-230	UKAS Certificate of Calibration for Sample Cutter	
201-650	ISO Certificate of Calibration for American Impeller	

Identification of Parts



Connecting to Services

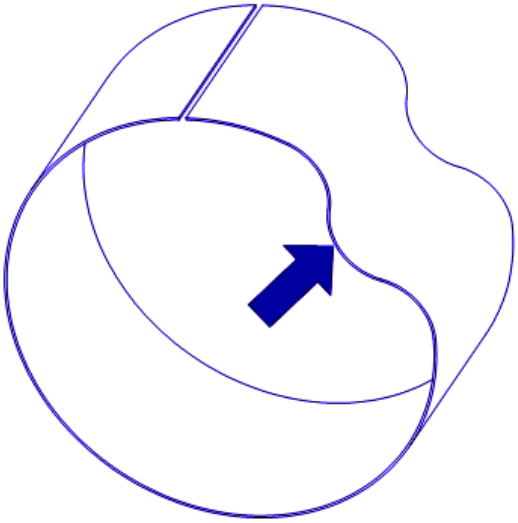
Electrical

- Stand the instrument on a firm and level surface.
- Connect the electrical power supply to the mains input using the lead provided.
- The power rating for **Impulse^2** is 250W.
- Keep the instrument connected to the electrical supply in order to keep the Timer Battery charged. In the worst case, the battery could discharge in 16h if disconnected from the electrical supply. On delivery, the battery requires 24h to fully charge.

Compressed Air

- If Air Injection is to be used with the instrument, connect the air supply to the Compressed Air Input socket on the rear of the instrument (see page 8).
- **Impulse^2** requires a pressure of 2-8 bar, 60 litres/minute (2 cubic feet/minute).
- The pneumatic connection to the instrument is 6mm diameter. An adaptor is supplied to convert 6mm to 1/4 inch BSP.
- The air supply should be capable of delivering air filtered to 5 microns or better.
- Oil lubrication of the factory air supply is not required nor recommended.
- **Impulse^2** is supplied with a 1m length of 6mm Nylon hose for connection to a suitable air supply.
- Ensure all equipment used for connection, including pipes and fittings have a safe working pressure greater than that of supply.
- **WARNING** – do not attempt to *disconnect* any pneumatic pipe without first expelling the excess air from the instrument. To do this, shut off the air supply to the instrument and run **Impulse^2** with Air Injection On, until all air has been expelled.
- When removing the pipe fully depress the locking ring on the pneumatic fitting, towards the instrument while simultaneously withdrawing the pipe. DO NOT FORCE THE PIPE.

Lining the Test Chambers



Select either the cork or neoprene liner as specified by your chosen test method. Roll the liner into an overlapping tube and insert into the chamber, as shown on left. Once positioned in the chamber extend the liner tube so that the edges butt together against the chamber wall. Ensure the liner is secure and flat against the chamber walls.

Butt the edges together then apply even pressure in direction shown.

Each side of cork liners can be used for 60 minutes after which it must be discarded and replaced with a new cork liner.

6: Care and Maintenance

Impulse^2 has been designed utilising materials and components selected to ensure long periods of low maintenance operation. **Impulse^2** requires minimal operator maintenance, although it is recommended that the following checks be made.

Cleaning

Ensure the instrument is clean and free from fibres or debris.
Keep the Test Chambers and the Impellers clean.
Frequently clean the work surface under the instrument – the Air Injection system exhaust is under the instrument (towards the left hand side).

Fuses

Two (2) fuses are fitted, located at the rear of the machine beneath the mains lead socket. To replace a fuse, isolate from the mains supply, place a screw driver blade in the slot of the fuse holder, then press and turn anti-clockwise approximately ¼ of a turn. The fuse holder complete with fuse is now released.

Customer Support

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 a relationship. 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 machine e.g. 816/10/1001. This which is located on the rear left hand side of the instrument.

HEALINK
WORLDWIDE SUPPORT

TELEPHONE +44 (0) 1422 366355
FACSIMILE +44 (0) 1422 352440

E-mail support@james-heal.co.uk
Internet http://www.james-heal.co.uk

The operation of **Impulse^2** is simple. The instrument is controlled using an electronic digital count-down timer, compressed air regulator (recessed in top of instrument) and two (2) on/off switches.

The Count-down Timer controls the test duration.
The on/off switches are for the optional control of the Air Injection during the test and the LED Lamps (chamber illumination).

Count-down Timer

Key Functions

PROG
Selects between hours, minutes and seconds.

+ [plus]
Increments (increases) the selected time range.

- [minus]
Decrements (decreases) the selected time range.

RESET
Resets to start time.

START/STOP
Starts and Stops the count-down timer.

Setting the Test Time

Press the PROG key.
This will cause the hours digits to flash.
Use the plus or minus keys to set the desired number of hours.
Repeat the process to set minutes and then seconds.
To finish press PROG once more.

Keeping the plus or minus key depressed the flashing digit will change upwards or downwards.

Maximum set time is 9 hours 59 minutes 59 seconds.

Note: After starting the count-down, the PROG key is disabled until counting is finished.
Note: See Chapter 5 – Setting Up – Connecting to Services - Electrical Supply

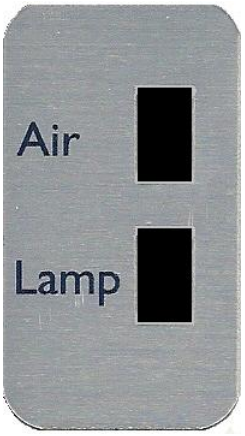
Operating the Timer
Pressing the START/STOP key begins the count-down in one (1) second steps.
If the START/STOP key is pressed again during the count-down period, the Impeller will stop and the time remaining is shown on the display.
When the set time reaches zero the timer emits an audible signal and the set time is indicated on the display.
Note: If the START/STOP key is pressed and the time is zero, a bell symbol is shown in the display.

Resetting the Timer
Pressing the RESET key will set the timer back to the start time.

Timer Reset
Pressing all three (3) keys together will set the timer to zero.

Loss of Power
On loss of power the count-down will stop.
The time remaining is stored and the display will show **-:--** to indicate loss of power.
When power is resumed the remaining time will be shown on the display and the timer will need to be restarted.

Air and Lamp Controls



These are simple on/off toggle switches.
To switch the option on, the button is depressed.
To toggle to the off state, press the button again and the button will stand proud of the fascia.

The Lamp function is for the operator's convenience and is useful to observe the specimens during testing.

Compressed air is required by many standards and operator should establish if Air is required or not.

Compressed Air Regulator and Gage

Close the Test Chamber Door.
To set the Air Injection pressure pull the knob upwards until it clicks. Rotate to increase or decrease pressure. A typical pressure setting is between 2 and 3 PSI. The maximum pressure is 2 bar but should be ideally set to one third of a bar. Press down once adjusted.

Test Chamber Door Interlock

The Test Chamber Door is interlocked for operator safety. When the door is opened, the instrument immediately stops operation. To lock the door turn the door knob fully clockwise. To unlock and open the door, turn the door knob fully counter-clockwise.
When the door is open, the Timer display will show **-:--**.

Basic Operation

Place the test specimens in the Test Chamber.
Enter a test time.
Close the Chamber Door.
If the test requires Air Injection, ensure the Air switch is depressed and set the required pressure (e.g., 2-3 PSI) on the Air Pressure Gage using the Air Pressure Regulator.
Press the START/STOP key on the Timer.

The Impeller will run and the test time will begin counting down, in seconds.
At any point during the test, the Air or Lamp can be manually turned On or Off by using the corresponding button.

End of Test

When the Time has elapsed the Impeller will stop and the alarm will sound for 2s.
If Air Injection was On, then the Air will automatically be turned Off.

Hint! The last cycle time can be recalled by pressing the RESET key.

Interrupting a Test

A test may be interrupted by pressing the START/STOP key or opening the Chamber Door.
The Impeller will stop almost instantly and the Timer will pause.
To continue the test, first close the Chamber Door then press the START/STOP key.

Hint! If the Air is enabled then it will turn Off automatically when the Chamber Door is opened, to stop dust and debris from being blown out of the test chamber.

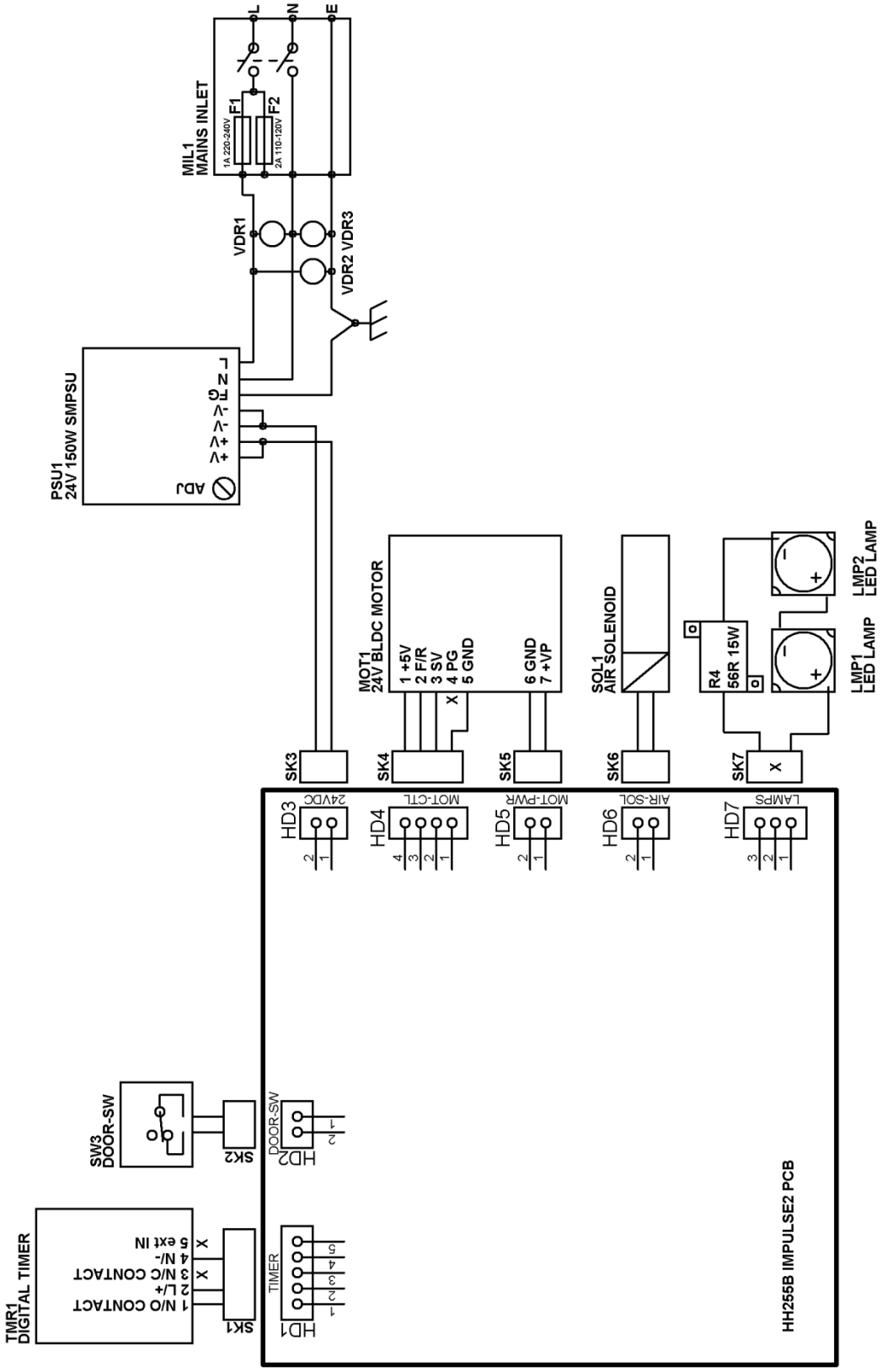
Standards	ASTM D 3512 JIS L 1076 Method D DIN 53 867 NF G 07-121 NF G 07-132 Draft ISO 12945-3 (2009)
User Interface	Microprocessor based digital electronic count-down timer
Alarm	Piezo audio buzzer signals end of test
Impeller	Stainless steel; Rotational Speed: 1200 rpm
Calibration Service	UKAS accredited (based on ISO 17025)
Dimensions	W: 300mm x D: 520mm x H: 500mm
Weight	35 kg (approx)
Power Supply	85 – 264 VAC 50/60 Hz
Power Rating	250 W maximum
Air Supply	Clean and dry, 2 – 8 bar, 60 litres/min (2 ft^3/min)
Air Connection	6mm (6mm to ¼ inch BSP adaptor supplied)

CE Conformity

Impulse^2 is CE marked.
It therefore complies with the following directives:

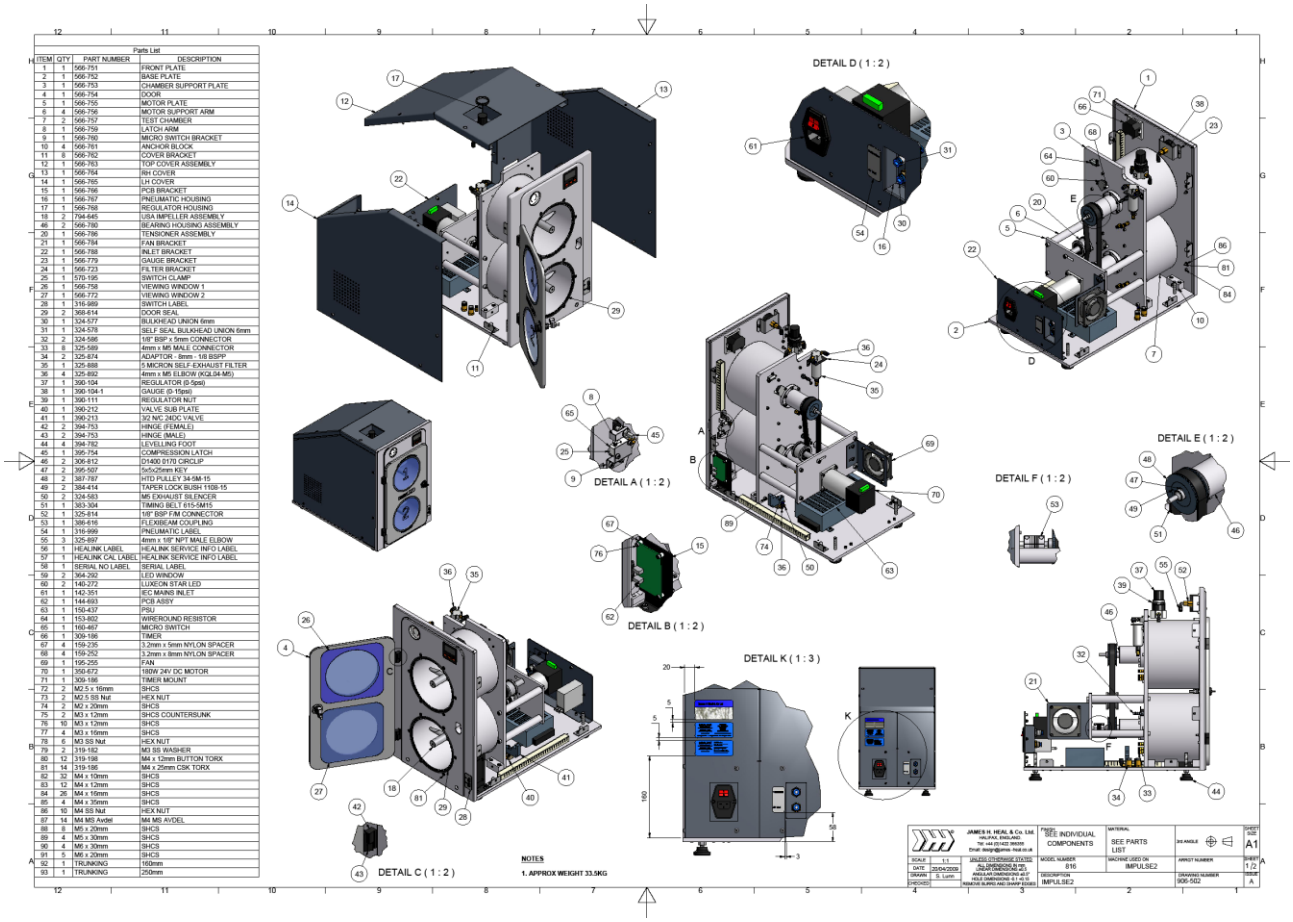
- Machinery Directive 2006/42/EC
- Low Voltage Directive 2006/95/EC
- Electromagnetic Compatibility Directive 2004/108/EC

Electrical Scheme



Exploded Scheme

Use the "zoom" feature to view greater details.



9: Revision History

See front cover for Publication number, e.g., 290-816-1$C.

Rev	Date	Originator	Details of revision
A	16-02-10	PG	First release
B	02-03-10	PG	Rear View added. Power rating changed to 250W.
C	27-05-10	PG	Added Exploded Scheme to page 16
D	06-06-10	PG	Extended "Connecting to Services" section in Chapter 5 to include statement on charging timer battery.