

# User Manual



## VACUUM 660 Model 133

CE



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## ***General Information***

This manual provides the necessary information for the installation and operation of the Vacuum 660 unit.

These instructions must be studied before putting the unit into operation.

The information contained in this manual is subject to change without notice.

No part of this manual may be photocopied, reproduced or translated into another language without the prior written consent of EMS Physio Ltd.

The Vacuum 660 unit is designed for use with the Interferential 955 and Multidyne 965, the Primo Interferential 960 and Multidyne 970, and the Primo Combination 860,

The Vacuum 660 unit provides a convenient form of electrode application for interferential therapy. The cup electrodes with their sponge inserts are held in place by a partial vacuum. Both the vacuum and the electrical connection to each cup are provided by a single lead.

It is intended that the Vacuum 660 unit is only used by qualified healthcare professionals such as physiotherapists who have received training in electrotherapy.

## ***Record of Amendments***

ISSUE	COMMENTS	DATE
1	Initial Issue	6/12/2017
2	Corrections	
3	Images updated	22/11/18
4	Ref to EU Rep added	17/04/20
5	Text/Images Updated	14/06/22

## ***Warranty***

EMS Physio Ltd., (hereinafter called the company) product is warranted against defects in materials and workmanship for a period of two years from the date of shipment. The Company will at its option, repair or replace components which prove to be defective during the warranty period, **provided that the repairs or replacements are carried out by the Company or its approved agents.**

The Company will consider itself responsible for the effects on safety, reliability and performance of the product:-

- only if assembly operations, re-adjustments, modifications or repairs are carried out by persons authorised by it,
- only if the product is used in accordance with the instructions for use,
- only if it uses the PSU supplied with the Interferential EMS unit,
- only if the electrical installation of the relevant room complies with the appropriate national requirements.

Should the product be returned to the Company for **repair it must be sent carriage paid.**

Consumable items, for example, electrodes, electrode covers and batteries, are excluded from the above warranty.

## ***Introduction***

The Vacuum 660 unit provides a convenient form of electrode application for interferential therapy. The cup electrodes with their sponge inserts are held in place by a partial vacuum. Both the vacuum and the electrical connection to each cup are provided by a single lead.

This method of electrode application is particularly suitable when treating relatively flat, smooth areas of the body such as the back where the cups may be attached quickly and easily. Also, this method is useful when treating relatively immobile patients, as the electrodes may be applied with the patient in a comfortable position without having to be moved for the application of hook and loop bandages.

With the Vacuum 660 unit, the vacuum may be set to a convenient and comfortable level with a front panel control.

Connection to an interferential unit is made from the socket on the front of the Vacuum 660 unit, using the link lead provided. Two or four pole electrode applications may be used.

A pulsed vacuum mode is provided to further reduce the likelihood of bruising due to the vacuum. Two pulse rates are provided.

## ***Contraindications***

Vacuum electrodes should not be used on elderly patients with thin papery skin leading to contact difficulty and bruising.

Vacuum electrodes are not suitable for patients who are taking steroids because of the likelihood of bruising.

## ***Environmental***

At the end its life, the Vacuum 660 should not be disposed of as unsorted general waste. Advice on appropriate disposal is available from EMS Physio Ltd. (contact details on page 16).

## ***Technical Specification***

### ***General***

Power Input	12 to 20 Vdc
Classification (EN60601-1)	Class 1, Type BF
Fuse	1 x T3.1 A (5 x 20 mm)
Size (height x width x depth)	250 x 218 x 90 mm (including water trap)
Weight	1.2 kg
Vacuum	0 – 0.4 bar ( $\pm 20\%$ )
Vacuum Modes	Continuous, Pulsed I– 0.8Hz to 1.179Hz ( $\pm 20\%$ ) Pulsed II– 1.8Hz to 3.200Hz ( $\pm 20\%$ )

The Vacuum 660 unit is designed to operate from an 18V Primo DC power supply (SLA9000), connected to the 18VDC IN socket at the rear of the unit (if you connect to the 18 VDC OUT it will still function, the 18V input and output are wired in parallel).

All information on model, serial number, and month/year of manufacture is located on the rear panel.

Each Vacuum 660 unit is supplied with a detachable mains power link cable, a set of four 60mm suction cups, corresponding suction leads and pack of 4 sponges, a link lead for connection to an Interferential 960 or a Multidyne 970 unit and this manual.

The Vacuum 660 unit has been designed to meet the requirements of BS EN 60601-1:2006 "Medical Electrical Equipment, Part 1: General requirements for Safety", BS EN 60601-1-2:2015 "Medical Electrical Equipment, Part 1-2: General requirements for safety – Electromagnetic disturbances" and BS EN 60601-1-6:2010+A1:2015 "Medical Electrical Equipment, Part 1-6; General requirements for safety – Usability.

## ***Permissible Environmental Conditions of Transport and Storage***

Temperature	-10 to +35 C
Relative Humidity	5 to 95%
Atmospheric Pressure	500 to 1060 hPa

## ***Permissible Environmental Conditions of Use***

Temperature	10 to +35 C
Relative Humidity	10 to 80%
Atmospheric Pressure	500 to 1060 hPa

## ***Accessories***

<b>Catalogue Number</b>	<b>Description</b>
PMA3075	DC power link lead
PMA3070	Link Lead to Interferential 960 or Multidyne 970 – Din to Din*
PMA3076	Link Lead to Interferential 960 or Multidyne 970 – Din to ODU*
SLA3066	Link Lead to Interferential 955 or Multidyne 965
PMA3072	Pair of red suction cables
PMA3074	Pair of black suction cables
PMA3071	Pair of 60mm suction cups
PMA3074	Pair of sponge inserts for 60mm suction cups

\*See page 11 for which lead can apply

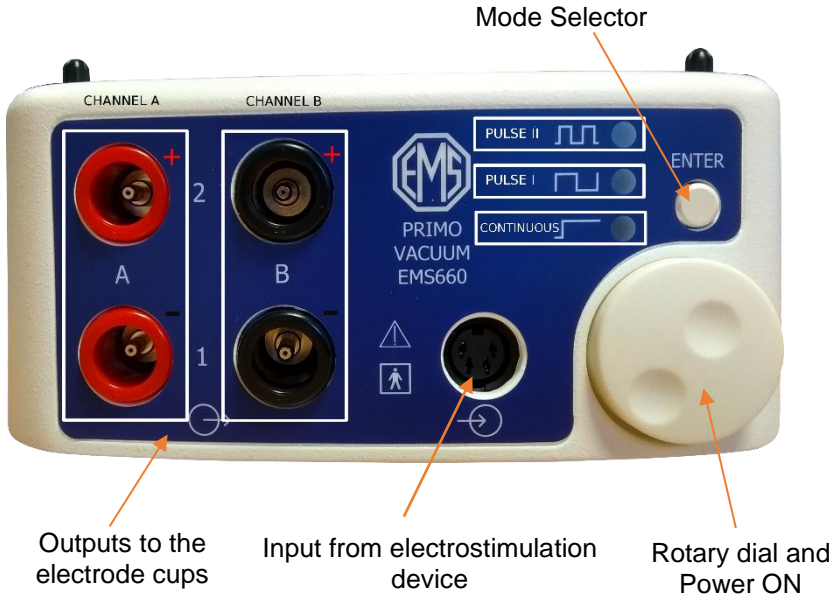
**WARNING:** Use of accessories such as electrodes or mains cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

**WARNING:** Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30cm (12 inches) to any part of the EMS660 including cables specified by the manufacturer, otherwise degradation of the performance of this equipment could result.



# Controls and Markings

## Vacuum 660 Front Panel



The indicator lights above the rotary dial show the current selection.

The input socket is for connection to an interferential unit or muscle stimulator.

# Vacuum 660 Rear Panel

Overflow output, connect tube if water drain is required



Water trap (make sure it is empty before each use)



Power in, 18VDC from the line adaptor

18VDC Power out to the electrostimulation

Serial number and date of manufacture

CE mark showing conformity to 93/42/EEC



## Vacuum 660 Accessories

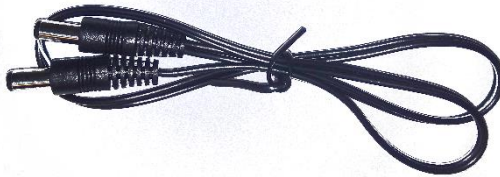
**Link Lead** - (from Vacuum 660 to Primo unit)

PMA3070 (DIN plug to DIN plug) is to be used on Primo units with a serial number prior to 2100810

PMA3076 (DIN plug to ODU plug) is to be used on Primo units with a serial number 2100810 and above.

If using the EMS660 with other models of stimulation unit, please contact EMS Physio to determine a suitable type of link lead.

### Power link (19-63)



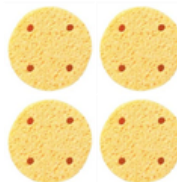
**Suction Lead** (2 Red, 2 Black – PMA3072 and PMA3073)



**Suction Cup**  
(4 grey 2XPMA3071)



**Sponge Inserts**  
Set of 4 PMA3074



## ***Installation***

Upon receipt, check for any visible damage which may have occurred in transit. If any signs of damage are found then retain all packing material and inform the carrier and the Company or its agent from whom the unit was purchased within two working days.

If not already fitted, connect a suitable plug to the mains cable of your current Primo 18VDC adaptor. The plug must have provision for an EARTH (GROUND) connection. The mains cable has the following colour code: BROWN is LIVE (LINE), BLUE is NEUTRAL and GREEN/YELLOW is EARTH.

The Vacuum 660 unit must only be connected to an EMS 18VDC adaptor with a protective earth conductor (SLA9000). If the integrity of the earth connection is in doubt, do not connect the 18VDC adaptor to the mains supply.

The Vacuum 660 is designed to sit under the Primo unit with which it is being used.

### *At the rear of the Vacuum:*

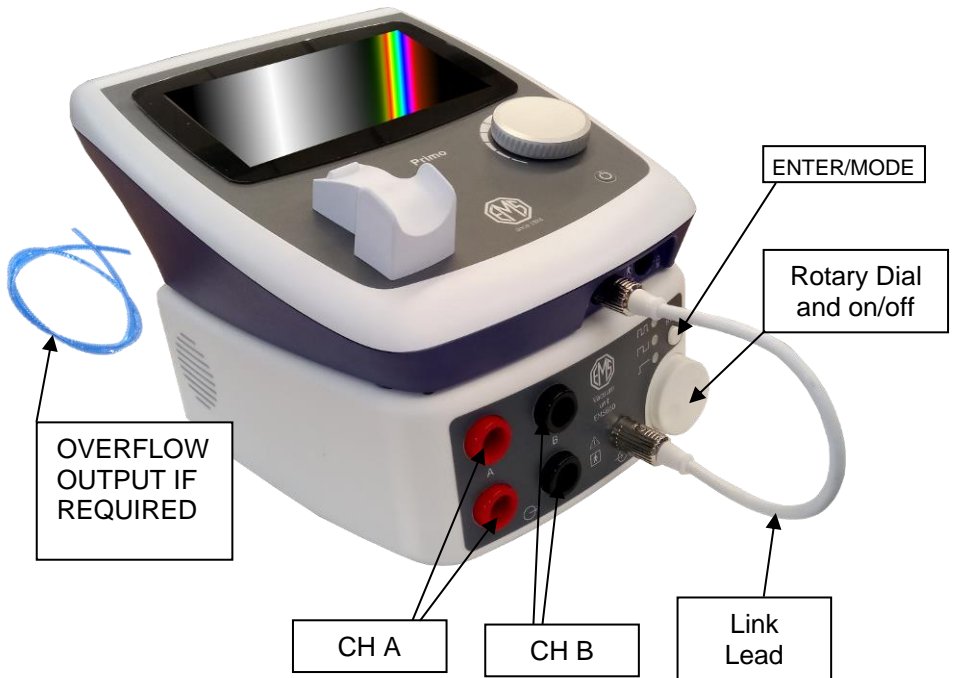
- Connect the Primo 18VDC power adaptor to the 18VDC 'IN' socket.
- Connect the Power Link lead from the 18VDC 'OUT' socket to the power socket on the stimulation device.

### *At the front of the Vacuum:*

- Connect the output socket of the stimulator unit to the input socket on the vacuum using the appropriate link lead.
- The Vacuum 660 unit is supplied with a set of four suction leads and four 60mm auto seal suction cups with sponges. Connect one end of each suction lead to the vacuum outlets on the front of the unit. The RED leads are for channel A and the BLACK leads for channel B. Insert the other end of each lead into the connector at the rear of the suction cups. The connectors at each end of the suction leads are a simple push fit and provide both vacuum and electrical connection to the cups.

Operation of the unit in close proximity (less than 1 metre) to shortwave therapy equipment or radio-frequency mobile communication equipment could result in the stimulation output being affected.

## View of Complete System



The Vacuum 660 is designed to sit under the Primo unit with which it is being used. The output socket of the stimulator is connected to the input of the vacuum unit with the link lead provided. It is also designed to sit on the EMS trolley (EMS158) which is optional.

## ***Operating Instructions***

As described in the 'Installation' section on page 12, connect the Primo Power supply and Power Link lead as described, to the Vacuum and Stimulator units. Make sure that the Vacuum 660 input is connected to the output socket of the stimulator using the appropriate Link lead.

Insert the suction leads into the outlets on the front of the unit and the suction cups also described in the 'Installation' section of this manual.

Switch on the stimulator being used with the Vacuum 660 and select the required treatment according to its operating instructions. **Do not** energise the output of the stimulator unit at this time.

Wet the suction cup sponge inserts with water and **squeeze until they are wet but not dripping**. In soft water areas it may be necessary to add a small amount of sodium bicarbonate to the water to ensure low contact impedance.

Insert the sponges into the cups ready for application to the patient.

To turn the Vacuum unit 'on', rotate the front dial on the unit clockwise until it clicks. The unit will do a quick self-test and the three green LEDs will begin to 'blink' - this is a reminder to check that the water trap at the rear of the unit is empty before starting any treatment. If water is present, see below.

**To empty the water trap** - twist the clear collection chamber to the left (from L to O) and the chamber will release, pull the chamber down and empty it. Reverse the procedure to lock the chamber back into place.

Confirm the water trap is empty by pressing and holding the 'ENTER' button for a second.

The unit will start in continuous mode - place the cups over the patient and increase the rotary dial till the LED colour turns blue.

When the suction cups have been attached satisfactorily to the patient the vacuum may now be reduced to a comfortable level using the vacuum control. You can also now select any other mode that is required by repeatedly pressing the 'ENTER/MODE' button - Continuous → Pulse I → Pulse II and back again to Continuous.

Having successfully applied the suction cups and set the vacuum mode and level, energise the output of the stimulator.

If the suction cups become detached during treatment the stimulator output must be de-energised before attempting to reconnect the cup electrodes. With the Multidyne 970 and Interferential 960 units set to constant current, the output will normally be terminated when the cups become detached and an alarm will sound. In constant voltage modes the output must be reduced to zero manually.

At the end of treatment, return the output control of the stimulator to its off position before removing the suction cups. With the Multidyne 970 and Interferential 960 units the output is automatically set to zero at the end of the treatment time.

To remove the suction cups, turn the Vacuum rotary dial anticlockwise to the 'off' position. The cups will detach themselves as the vacuum under the cups is released.

Note that the contact area of the 60mm suction cups is approximately 25cm<sup>2</sup>. The maximum recommended current density is 2 mA/cm<sup>2</sup> and hence the current applied with the suction cups should not exceed 50 mA rms. When using interferential therapy units this corresponds to 70mA peak for the 60mm cups.

Excess water from the sponges is captured by the water trap on the rear of the Vacuum 660. It is recommended that the water trap is emptied between treatments. See previous page (14) for instructions on emptying the water trap.

**WARNING – Failure to frequently empty the water trap will result in excess water overflowing from the tube connection port on the rear of the unit. To prevent any spillages, connect the supplied tubing into this port and drain the excess water into any external receptacle. Always empty the water trap after any treatment.**

## ***Maintenance***

The suction cups and sponges may be disinfected using a 70% v/v aqueous solution of isopropyl alcohol. They are NOT suitable for steam sterilisation or treatment with disinfectants containing sodium hypochlorite.

N.B. Isopropyl alcohol is flammable and should be kept away from naked flames. Isopropyl alcohol must not be brought into contact with eyes or mouth.

The Vacuum 660 may be cleaned by wiping over with a clean damp cloth. The use of abrasive materials and cleaning solvents should be avoided.

Regularly (at least monthly) inspect the suction leads, cups, cables and connectors for damage.

The Vacuum 660 should be serviced at least annually by qualified personnel.

If, during set-up, the front panel LEDs all begin to flash in unison, this is an error message implying that the internal pressure sensor has detected an out of range value. Switch the unit off, check that the leads and cups are correctly connected and not obstructed and re-start the unit. If this error message persists, contact qualified service personnel.

**There are no user serviceable parts inside the unit and it should not be opened.**

Full servicing instructions are available on request.

## ***Contact details***

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