

# **NEGATIVE PRESSURE CUTANEOUS SUCTION SYSTEM**

***For Dermatological and Allergy Research Studies  
Models NP-2 / NP-4 / NP-V***

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## ***FEATURES.....***

- ***PROVEN OPERATION***
- ***MULTIPLE BLISTERS PER PROCEDURE***
- ***COMPACT SELF-CONTAINED SYSTEM***
- ***MULTI-CHAMBER CAPABILITY***
- ***STANDARD AND CUSTOM ORIFICE PLATES***
- ***ADJUSTABLE VACUUM***
- ***CONTROLLED TEMPERATURE***
- ***OPTIONAL ACCESSORIES***
- ***CUSTOM MODIFICATIONS AVAILABLE***

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***More info and pricing at....***

***[www.electdiv.com](http://www.electdiv.com)***

## **INTRODUCTION**

The Negative Pressure Instrument system was developed by Electronic Diversities as an experimental device to meet specific dermatological research needs.

This system has been in use by major researchers within the United States, as well as abroad, and has been found to be a simple, yet effective, system to operate with high repeatability and reliability.

Since the inception of the Negative Pressure Instrument System, there have been constant improvements and its use has expanded to accommodate the needs of researchers in several medical disciplines.

The information contained in this brochure represents the latest version of the system, incorporating all changes and improvements to date. Since this system is a research tool, it is custom assembled on a per order basis. Without mass production, we are able to easily modify either the instrument console or the chambers to meet a specific research need. Feel free to contact us regarding any special modifications to this system or any other electronic or instrument related development or repair needs. We specialize in unique solutions to difficult and unusual problems!

## **GENERAL DESCRIPTION**

The Negative Pressure Instrument System is a self-contained instrument package that combines all the necessary elements to successfully create suction blisters on a patient's skin. The blisters are created through the use of suction chambers that are attached to the patient's skin. The instrument console contains the power source, vacuum pump, temperature controls and all related controls to operate multiple suction chambers. The suction chambers are connected to the console by a flexible connection. Each of the chambers is controlled by a preset temperature control to provide an optimal skin warming temperature. Both chambers share an adjustable common vacuum source that affects all chambers equally.

## **BLISTER FORMATION**

The blister formation is accomplished by attaching the Negative Pressure System Chamber to the patient's skin using hook & loop fastener straps. The chamber heating system provides a slight warming of the orifice plate, which is in direct contact with the patient's skin surface. The application of a moderate negative pressure from the instrument console, to the chamber interior, causes the patient's skin to be gently drawn through the opening(s) in the orifice plate. The results are typical suction blisters, approximately the size of the opening(s) in the orifice plate. The skin and blister area is generally not damaged and patient discomfort is minimal.

## **NEGATIVE PRESSURE CHAMBER**

The negative pressure chamber is fabricated of mostly plastic components, with two removable threaded caps. The upper cap is fitted with a clear viewing lens so that the actual blister formation can be observed. The opposite end of the chamber is fitted with a removable orifice plate that is placed on the patient's skin. Since this plate is simply threaded onto the chamber end, multiple plates with different opening patterns can be interchanged as desired. A guideline showing the physical parameters of the orifice plate is included in this brochure.

The interior of the Negative Pressure Chamber is warmed and illuminated by an array of low voltage incandescent lamps. This lamp array is controlled from the instrument console temperature controller, cycling as required, to maintain the set point temperature. The heat from these lamps is radiated and conducted to the orifice plate, which then warms the patient's skin.

The chamber is connected to the console via a composite vacuum and low voltage electrical system. Quick connections are used for the vacuum and electrical system to facilitate removal and storage. Since the console is calibrated to each individual chamber, the chamber connections are marked and should not be transposed.

## **INSTRUMENT CONSOLE**

The Negative Pressure Instrument console is a self-contained fan cooled unit which is designed to operate on 120 VAC 60 Hz power. Vacuum is supplied by an industrial quality diaphragm type vacuum pump, capable of a typical vacuum of 20 in Hg (0-65 kpa) at 0 CFM.

## **TEMPERATURE CONTROL**

An analog controller that is preset to 40 degrees Centigrade provides the temperature control for each suction chamber. This provides accurate control of the orifice plate temperature. The instrument console has internal adjustments that allow the user to recalibrate the temperature setting if desired. Other temperatures can be factory preset if desired. A chamber temperature test/calibration kit is available as an accessory.

## **OTHER CONTROLS**

The front panel includes a vacuum gauge and vacuum bleeder adjustment to regulate the vacuum to both chambers. The console front panel also contains the connections for the chamber assemblies.

## **MAINTENANCE**

Since the Negative Pressure Chamber contains electrical components, it should not be cleaned by any process that involves high moisture levels. Gas sterilization is acceptable for the chamber itself. The orifice plate, which is in direct patient contact, can be cleaned by any standard method, including standard autoclave procedures.

## **SUPPLIED COMPONENTS**

Each Negative Pressure Instrument is supplied complete, and ready to operate. The system includes two blister chambers, fitted with type 'A' 10mm orifice plates. These plates are most common and have been used with success. A complete operating manual, containing troubleshooting hints and maintenance procedures, is also included.

## **CONTROL CONSOLE OPTIONS**

### **NEGATIVE PRESSURE CUTANEOUS SUCTION SYSTEM**

The system includes the Instrument Console, calibrated for a 40°C set point, two Suction Chambers with straps, two type 'A' 10mm orifice plates and an Instruction manual.

### **EXTERNAL VACUUM**

Occasionally, a medical facility has a central vacuum system that will provide adequate vacuum for the Negative Pressure Instrument. To utilize this vacuum source an external vacuum option is available that allows connection and control of the external vacuum. This option must be ordered when the instrument is purchased.

### **POWER CORD**

Some medical facilities require a hospital grade power cord for all equipment for enhanced patient safety. This option replaces the standard cord with a Hospital Grade cord .

### **OPERATION FROM A FOREIGN VOLTAGE SOURCE**

All instruments are fabricated to operate with a 120 VAC/ 60 Hz. Electrical supply. For foreign voltage operation, a step down transformer is provided at additional cost. Since this transformer is a heavy item, shipping costs are sometimes prohibitive. We will supply complete information on the required transformer so that you may obtain it locally if desired. Many electrical and electronic suppliers will stock a suitable unit at a lower cost than our cost plus shipping.

### **SPECIAL TEMPERATURE CALIBRATION**

The temperature controllers are calibrated at 40°C as standard. A calibration point other than 40°C can be provided at the time of fabrication.

## **BLISTER CHAMBER OPTIONS**

### **STANDARD ORIFICE PLATES**

A chamber orifice drawing sheet is included with this brochure showing the standard configurations of the orifice plate assembly. A standard 10mm circular opening has been determined to be optimal for most uses. This is the size that is included with the instrument.

### **CUSTOM ORIFICE PLATES**

The chamber orifice sheet also shows the physical limitations of the orifice plate assembly for a custom orifice assembly. Any diameter circular opening can be provided within the physical limitations of the plate area. Special shaped openings will be quoted upon request. We can also supply blank orifice plates, with no openings, for machining by the customer

### **STRAPS**

Additional hook & loop straps of different lengths are available for special needs. These are priced by the foot and are supplied with the snap fasteners. The standard strap is 12 inches, which will adequately encircle a diameter of 8 inches.

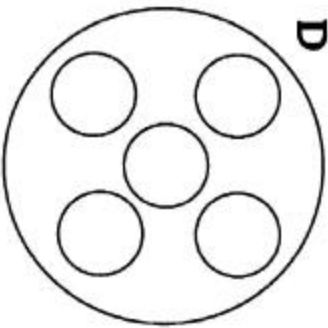
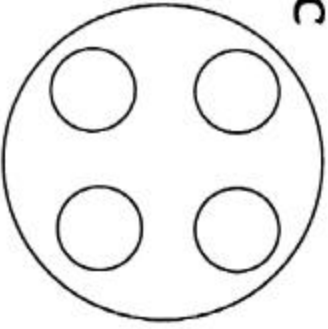
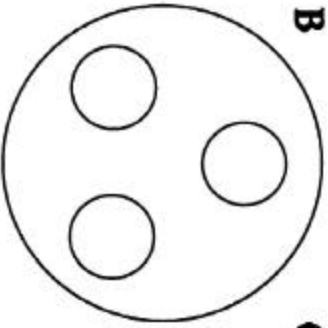
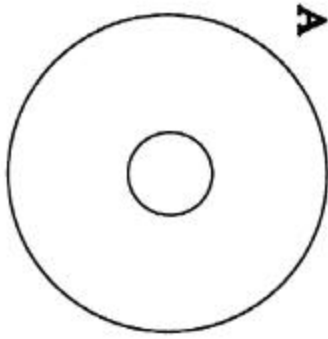
### **TUBING**

The tubing that connects the blister chamber to the console is a composite, consisting of a vacuum tube and electrical circuits. The standard tube length is 48 inches (1.2M) This connecting tubing can be fabricated to any length desired and is priced by the foot(.3M) This must be ordered at the time of fabrication and cannot be added later.

### **SEAL KIT**

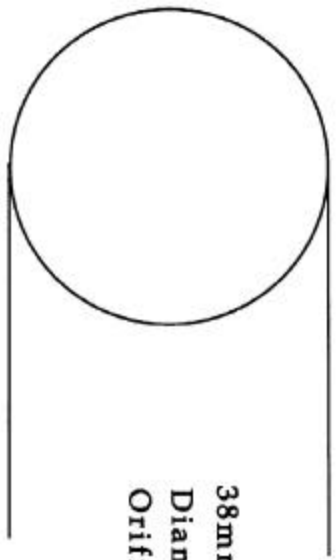
This is a kit of chamber seals that are user replaceable. One kit contains all seals necessary for repair of two chamber assemblies. Since chamber design has changed in recent years, some seals that are supplied will not be used in all chambers.

**STANDARD ORIFICE PLATES**  
ALL ARE 38mm DIAMETER WITH 10mm ORIFICES



**TYPE X**

SHOW ALL  
ORIFICES  
AND SIZES



38mm Maximum  
Diameter for  
Orifice openings

**NEGATIVE PRESSURE INSTRUMENT ORIFICE PLATES**

**NOT TO SCALE**

FOR ILLUSTRATIVE PURPOSES ONLY



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