Intermittent Suction Unit (ISU)
Service Manual

North American ISU

ISO ISU

This previous version is meant for reference only. Refer to current manual.
User Responsibility

This Product will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts, when assembled, operated, maintained and repaired in accordance with the instructions provided. This Product must be checked periodically. A malfunctioning Product should not be used. Parts that are broken, missing, plainly worn, destroyed or contaminated, should be replaced immediately. Should such repair or replacement become necessary, Ohio Medical recommends that a telephonic or written request for service advice be made to the nearest Ohio Medical Service Office. This Product or any of its parts should not be repaired other than in accordance with written instructions provided by Ohio Medical, or altered without the prior written approval of Ohio Medical’s Safety Department. The user of this Product shall have the sole responsibility for any malfunction which results from improper use, faulty maintenance, improper repair, damage, or alterations by anyone other than Ohio Medical.

Important: Federal law in the U.S.A. and Canada restricts this device to sale by or on the order of a licensed medical practitioner. This device is to be used only by persons who have been adequately instructed in its use.

Important: This document is not to be reproduced in any manner, nor are the contents herein to be disclosed to anyone without the express authorization of Ohio Medical Corporation, Gurnee, IL USA.

Technical Competence

The procedures described in this service manual should be performed by trained and authorized personnel only. Maintenance should only be undertaken by competent individuals who have a general knowledge of and experience with devices of this nature. No repairs should ever be undertaken or attempted by anyone not having such qualifications.

Genuine replacement parts manufactured or sold by Ohio Medical must be used for all repairs.

Read completely through each step in every procedure before starting the procedure; any exceptions may result in a failure to properly and safely complete the attempted procedure.

Abbreviations Used In This Manual

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>in Hg</td>
<td>Inches of mercury</td>
</tr>
<tr>
<td>in</td>
<td>Inch</td>
</tr>
<tr>
<td>ISU</td>
<td>Intermittent Suction Unit</td>
</tr>
<tr>
<td>kPa</td>
<td>Kilo pascals (kPa x 7.50 = mm Hg)</td>
</tr>
<tr>
<td>LPM</td>
<td>Liters per minute</td>
</tr>
<tr>
<td>mm Hg</td>
<td>Millimeters of mercury (mm Hg x .133 = kPa)</td>
</tr>
<tr>
<td>mm</td>
<td>Millimeters</td>
</tr>
<tr>
<td>oz</td>
<td>Ounces</td>
</tr>
<tr>
<td>(Cont)</td>
<td>Continuous (On)</td>
</tr>
<tr>
<td>(Inter)</td>
<td>Intermittent</td>
</tr>
<tr>
<td>O (Off)</td>
<td>Off</td>
</tr>
<tr>
<td>°C</td>
<td>Degrees Celsius</td>
</tr>
<tr>
<td>°F</td>
<td>Degrees Fahrenheit</td>
</tr>
<tr>
<td>N-m</td>
<td>Newton-Meter (N-m x .737 = ft-lb)</td>
</tr>
<tr>
<td>ft-lb</td>
<td>Foot-Pound Force (ft-lb x 1.356 = N-m)</td>
</tr>
<tr>
<td>DISS</td>
<td>Diameter Index Safety System</td>
</tr>
<tr>
<td>OES</td>
<td>Oxequip Suction</td>
</tr>
<tr>
<td>NCG</td>
<td>National Compressed Gases (Chemetron)</td>
</tr>
<tr>
<td>BOC</td>
<td>British Oxygen Corporation</td>
</tr>
<tr>
<td>NPT</td>
<td>National Pipe Thread (USA)</td>
</tr>
<tr>
<td>NPTF</td>
<td>National Pipe Thread Female (USA)</td>
</tr>
<tr>
<td>MPTS</td>
<td>Multi-Purpose Therapy Stand</td>
</tr>
<tr>
<td>I.D.</td>
<td>Inner Diameter</td>
</tr>
<tr>
<td>gal.</td>
<td>gallon</td>
</tr>
<tr>
<td>PTFE</td>
<td>Teflon®</td>
</tr>
<tr>
<td>NG</td>
<td>Naso - Gastric</td>
</tr>
<tr>
<td>PED</td>
<td>Pediatric</td>
</tr>
</tbody>
</table>
1/Precautions .............................................1-1
  1.1 Definitions .......................................1-1
  1.2 Warnings ........................................1-1
  1.3 Cautions .........................................1-2

2/Scope ..................................................2-1
  2.1 North American Vacuum Regulators ..........2-1
  2.2 English Vacuum Regulators ....................2-1
  2.3 French Vacuum Regulators .....................2-2
  2.4 Spanish Vacuum Regulators ....................2-2

3/Description and Specifications .................3-1
  3.1 Description ......................................3-1
  3.2 Specifications ................................3-2

4/Operation .............................................4-1
  4.1 Equipment Set-up ................................4-1
  4.2 Mode Selection ................................4-2
  4.3 Setting the Suction Level ....................4-2
  4.4 Pre-Use Checkout Procedure .................4-3
  4.5 Patient Set-up ................................4-6
  4.6 Setting the Timing Cycles ....................4-6
  4.7 Setting the Intermittent Mode Flow Rate ......4-8

5/Cleaning and Sterilization .......................5-1
  5.1 Cleaning ........................................5-1
    5.1.1 Routine Exterior Cleaning .................5-1
    5.1.2 Internal Component Cleaning ..............5-1
  5.2 Sterilization ..................................5-1

6/Troubleshooting .....................................6-1

7/Service - Disassembly and Assembly ..........7-1
  7.1 Service Tools and Equipment .................7-1
  7.2 ISU and PED ISU ................................7-1
    7.2.1 Disassembly ................................7-1
    7.2.2 Assembly ..................................7-4
  7.3 Regulator Module ................................7-5
    7.3.1 Disassembly ................................7-5
    7.3.2 Assembly ..................................7-6
  7.4 Timing Valves ..................................7-6
    7.4.1 Disassembly ................................7-6
    7.4.2 Assembly ..................................7-6

8/Service Checkout Procedure ......................8-1
  8.1 Set-up ..........................................8-1
  8.2 Leak Test - Supply Side ......................8-1
  8.3 Flow Test .......................................8-2
    8.3.1 Continuous Mode Flow Test ..............8-2
    8.3.2 Intermittent Mode Flow Test ...........8-2
  8.4 Gauge Test .....................................8-3
  8.5 Regulation Test ................................8-3
  8.6 Timing Cycle Adjustment ......................8-3
  8.7 Vacuum Build-up/Bleed-down Test - Intermittent Mode ..........8-3
  8.8 Bleed Test ......................................8-4
  8.9 Leak Test - Patient Side .....................8-4
  8.10 Vacuum Limit Adjustment .....................8-7
    Pediatric ISU ONLY ..............................8-7
  8.11 Visual Check - Pediatric ISU ONLY ..........8-7

9/Maintenance ...........................................9-1
  9.1 General Maintenance of Suction Equipment ....9-1
  9.2 Recommended Maintenance Schedule ..........9-1
    9.2.1 Maintenance Schedule .....................9-1
  9.3 Repair Policy ..................................9-2
  9.4 Technical Assistance ..........................9-2
  9.5 Return Instructions ............................9-2

10/Ordering Information ..............................10-1
  10.1 Illustrated Parts ...............................10-1
  10.2 Service Kits ................................10-3
  10.3 Fittings and Adapters .........................10-4
  10.4 North American ................................10-5
    10.4.1 Regulator Options .........................10-5
    10.4.2 Other Options .............................10-6
  10.5 English Regulator Options ....................10-7
  10.6 French Regulator Options ....................10-8
  10.7 Spanish Regulator Options ....................10-9
  10.8 English, French and Spanish Other Options ......10-10

Appendix ............................................... A-1
  Installation procedure for Adapters/Probes and Fittings .........................A-1
1/Precautions

1.1 Definitions

**Note:** A Note provides additional information to clarify a point in the text.

**Important:** An Important statement is similar to a note but of greater emphasis.

**CAUTION:** A CAUTION statement is used when the possibility of damage to the equipment exists.

**WARNING:** A WARNING statement is used when the possibility of injury to the patient or the operator exists.

1.2 Warnings

The Pre-Use Checkout Procedure must be performed before using this equipment on each patient. If the regulator fails any part of the Pre-Use Checkout Procedure, it must be removed from service and repaired by qualified service personnel.

Connect the Vacuum Regulator to the vacuum source only. Connection to pressure sources even momentarily could injure the patient or operator and damage the equipment.

Always connect the regulator to the vacuum source and check its operation before attaching the patient connection.

The fitting port of the regulator must be occluded when setting the prescribed suction level. This prevents the patient from receiving higher than required suction levels.

Do not use this device in the presence of flammable anesthetics. Static charges may not dissipate and possible explosion hazard exists in the presence of these agents.

After patient use, regulators may be contaminated. Handle in accordance with your hospital’s infection control policy.

Clean and sterilize all multiple use suction equipment if contaminated before disassembly, to ensure service personnel are not exposed to hazardous contamination.

Following sterilization with ethylene oxide, parts should be quarantined in a well ventilated area to allow dissipation of residual ethylene oxide gas absorbed by the material. Aerate parts for 8 hours at 130oF (54oC).

If the Vacuum Regulator is repaired or disassembled in any manner, the Service Checkout Procedure must be performed before using the equipment on the patient.

If the flow control valve is rotated fully clockwise, the ISU will not cycle in the intermittent mode. Drainage will cease.

For the Pediatric ISU, it may be possible to set the vacuum limit to zero. If there is no suction present, rotate set screw counterclockwise and/or check Chapter 6/Troubleshooting.

If the screws on the timing valves are turned all the way clockwise, the ISU will not cycle.

Clean and sterilize all multiple use suction equipment before shipment to ensure transportation personnel and/or service personnel are not exposed to any hazardous contamination.
1.3 Cautions

Cleaning the gauge may result in damage.

Do not lubricate any internal components of the regulator module.

Do not over-tighten the timing valve stem. Needle portion of the valve may be damaged.

Do not steam autoclave the ISU. Severe impairment to the operation of the regulator will result. The only acceptable method of sterilization is with gas (ethylene oxide).

Do not use any 1Loctite® products to seal the fitting and adapter/probe port threads (or products which contain Methacrylate Ester as an active ingredient).

Only competent individuals trained in the repair of this equipment should attempt to service it.

Sterilization with ethylene oxide mixtures may cause crazing (minute superficial cracking) of some plastic parts. Crazing will be more pronounced when mixtures containing 2Freon® are used.

The cap screws can strip the regulator module housing threads if they are screwed in too tight.

The gauge assembly must be handled with utmost care to retain its precision. If the lens is removed, do not rest the gauge on its face.

To help prevent aspirate from entering the regulator, as a result of misuse, an Overflow Safety Trap or a hydrophobic suction filter should be attached prior to its use. Aspirate in the regulator, wall outlet and pipeline system will impair the operation. The use of the Overflow Safety Trap or a hydrophobic suction filter will help prevent this and extend the life of the suction equipment.

To prevent stripping the plastic threads, place the screw in the hole and turn counterclockwise until it drops into the original threads. Tighten screw.

Use of lubricants other than recommended, may degrade plastic or rubber components.

Not for Field or Transport Use**

1Loctite is the registered trademark of the Loctite Corporation.

2Freon is the registered trademark of the DuPont Co.

**The categories of Field and Transport Use are specifically defined in ISO 10079-3 (BS 7259: Part 2). "Field" means use at accidents or emergencies outside a hospital. "Transport" means use in ambulances, cares and airplanes. These situations may expose the equipment to uneven support, water, dirt, mechanical shock and temperature extremes. Ohio Medical suction equipment has not been tested to comply with the specific requirements of these categories.
This service manual contains service, maintenance and parts information on four models of the ISU.

North American - ANSI (2)
International - ISO (2)

2.1 North American (ANSI) Vacuum Regulators

Note: Part numbers given are for Vacuum Regulators without fittings or adapters/probes.

2.2 International (ISO) Vacuum Regulators

Note: Part numbers given are for Vacuum Regulators without fittings or adapters/probes.
3.1 Description

⚠️ **WARNING**: Do not use this device in the presence of flammable anesthetics. Static charges may not dissipate and possible explosion hazard exists in the presence of these agents.

The Intermittent Suction Unit (ISU) is a dual purpose Vacuum Regulators which provides either intermittent or continuous suction. It can be used for N.G. (intermittent) or pharyngeal/tracheal (continuous) suctioning throughout the hospital.

On the Pediatric ISU, the maximum vacuum limit is factory present to 135 mm Hg (18.0 kPa) and the limit may be adjusted between 80 and 150 mm Hg (10.7 to 20.0 kPa). It also has a positive pressure relief. The low gauge and the baby icon on the cover distinguish it from the standard ISU.

Each unit contains a regulator module to regulate and adjust suction, a vacuum gauge which indicates suction supplied, a patented Unilogic Module to silently and reliably switch suction on and off, and timing valves which select and adjust the length of the on and off cycles.

In use, the vacuum source is connected through the regulator module which functions as an automatic valve. Rotating the suction control knob adjusts the position of the regulator module and selects a predetermined level of suction.

![Vacuum Gauge Adapter Port](image)

During use, as the flow requirement increases, the valve automatically opens to maintain suction at the preset level. Conversely, when the flow requirement decreases, the valve automatically closes to maintain suction at the preset level. The same mechanism compensates for changes in supply vacuum to automatically maintain the pre-set suction level.

1. Suction Control Knob - Allows easy adjustment of suction to the patient.
2. Mode Selector Knob - Allows quick and easy mode changes.

Note: In the text of this manual, the international graphic symbol for the intermittent mode normally written as: 

```
 O
```

will be written as \(\text{O|O}\).
3/Description and Specifications

a. IOIOI (INTER) - Suction is intermittent (cycles on and off) and the suction level can be adjusted with the suction control knob.

When used as an Intermittent Suction Unit, both the “On” and “Off” timing cycles are independently adjustable within a range of 3 to 30 seconds. These are pre-set at the factory at a supply vacuum of 450 mm Hg/60 kPa to provide approximately 15 seconds “On” and 8 seconds “Off” for the ISU. If the supply vacuum is different, the timing cycles will vary. Adjustment procedures are outlined in the Operations Section of this manual under the heading “Setting the Timing Cycles”.

b. O (OFF) - No suction is supplied to the patient.

c. I (CONT) - Suction is continuous and can be adjusted with the suction control knob.

3. Vacuum Gauge - The suction level to the patient is displayed during use.

3.2 Specifications

Gauge: Accuracy: ±5% of full scale deflection

Flow Rates: | (CONT) Mode - 0 - 80 LPM without fittings at full increase setting depending on supply vacuum and open air flow

|O|O| (INTER) - 8 LPM with the suction control knob set to 120 mm Hg/16 kPa

Regulated Suction Range: 0 to 200 mm Hg/0 to 26 kPa

Pediatric ISU: 0 to 150 mmHg/0 to 20 kPa

Pre-Set Timing Cycles:
(Intermittent Mode ONLY)

ISU

On time cycle-15 seconds ± 3 seconds

Off time cycle-8 seconds ± 3 seconds

Note: The Pre-set timing cycles are set at a supply vacuum of 450 mm Hg/60 kPa.

Weight: (Less Fittings)

ISU - 28 oz/794 grams

Pediatric ISU: 28 oz/794 grams

Dimensions: (Less Fittings)

Height: 6.6 inches/168 mm

Width: 3.5 inches/89 mm

Depth: 4.8 inches/121 mm

Environmental Specifications

Operating Temperature Range: 40°F (4°C) to 120°F (49°C)

Storage Temperature Range: 0°F (-18°C) to 160°F (71°C)

Operating and Storage Relative Humidity: 5 to 95%
4.1 Equipment Set-up

**WARNING:** Connect the Vacuum Regulator to the vacuum source only. Connection to pressure sources even momentarily could injure the patient or operator and damage the equipment.

**WARNING:** Always connect the regulator to the vacuum source and check its operation before attaching the patient connection.

**CAUTION:** To help prevent aspirate from entering the regulator, an Overflow Safety Trap or a hydrophobic suction filter should be attached prior to its use. Aspirate in the regulator, wall outlet and pipeline system will impair the operation. The use of the Overflow Safety Trap or a hydrophobic suction filter will help prevent this and extend the life of the suction equipment.

If the regulator is equipped with an adapter/probe for wall outlets, insert the adapter/probe into the vacuum wall outlet. If the regulator is mounted elsewhere, connect a vacuum supply hose between the regulator’s adapter/probe port and the wall outlet. Connect the collection canister or liner’s vacuum port to the regulator’s fitting port or Overflow Safety Trap with the appropriate vacuum tubing.

**Note:** For proper installation of Adapters/Probes and Fittings see Appendix.

For standard ISU operation, mount the collection canister or liner above the patient.

Connect the collection canister or liner’s vacuum port to the regulator’s fitting port or Overflow Safety Trap with the appropriate suction filter and vacuum tubing.

Hospital-supplied suction tubing must be used between the catheter and the collection canister or liner. Recommended minimum inside diameter is 0.25 in (6 mm). Select tubing that is collapse and kink resistant.

An Ohio Medical High Flow Disposable Hydrophobic Filter and/or Overflow Safety Trap should be used between the collection canister or liner and the Vacuum Regulator to prevent contamination of the regulator.

ISO 10079-3 (BS 7259: Part 2) states that “the usable volume of the collection container shall be not less than 500 ml (section 5.1.2).

**Suction Filters - Hydrophilic**

<table>
<thead>
<tr>
<th>Pkg of 20</th>
<th>6730-0350-800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pkg of 200</td>
<td>6730-0351-800</td>
</tr>
</tbody>
</table>

**Suction Filters - Hydrophobic Filter**

<table>
<thead>
<tr>
<th>Pkg of 3</th>
<th>6730-0570-800</th>
<th>6730-0580-800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pkg of 10</td>
<td>6730-0571-800</td>
<td>6730-0581-800</td>
</tr>
<tr>
<td>Pkg of 100</td>
<td>6730-0572-800</td>
<td>6730-0582-800</td>
</tr>
</tbody>
</table>
4/Oeation

4.1.1 Attaching the Safety Trap

CAUTION △ To help prevent aspirate from entering the regulator, wall outlet and pipeline system as a result of misuse, an Overflow Safety Trap should be attached prior to its use. Aspirate in the regulator, wall outlet and pipeline system may impair their operation. The use of the Overflow Safety Trap and suction filter will help prevent this and extend the life of suction equipment.

Standard fitting

1. Raise the sleeve and insert the trap into the regulator fitting.
2. Turn the trap clockwise about one and a half turns to engage the threads. The trap does not need to be screwed tight; an O-ring in the regulator fitting provides a vacuum seal. The trap should rotate freely to allow the desired tubing positioning.
3. Lower sleeve to lock trap in position.

DISS fitting

1. Insert trap into the regulator fitting. Situate the tubing in the desired position.
2. Turn the DISS wing nut clockwise to engage threads and tighten (there is no O-ring, so the vacuum seal depends on a tight connection).
4.2 Mode Selection

|O|O| (INTER) - Suction is intermittent (cycles on and off) and the suction level can be adjusted with the suction control knob.

O (OFF) - No suction is supplied to the patient.

| (CONT) - Suction is continuous and can be adjusted with the suction control knob.

4.3 Setting the Suction Level

WARNING: The fitting port of the regulator must be occluded when setting the prescribed suction level. This prevents the patient from receiving higher than required suction levels.

1. Turn the mode selector knob to | (CONT).
2. Clamp the connective tubing to occlude the fitting port.
3. Rotate the suction control knob until the vacuum gauge indicates the required setting.
4.4 Pre-Use Checkout Procedure

⚠️ WARNING: The Pre-Use Checkout Procedure must be performed before using this equipment on each patient. If the regulator fails any part of the Pre-Use Checkout Procedure, it must be removed from service and repaired by qualified service personnel.

⚠️ WARNING: Always connect the regulator to the vacuum source and check its operation before attaching the patient connection.

Before the vacuum regulator is used, it must be tested for correct operation as outlined below. All tests must be performed with the regulator in its normal (vertical) operating position and with a minimum supply vacuum of 15" Hg/51 kPa (380 mmHg) for the ISU and 19.7" Hg/67 kPa (500 mmHg) for the pediatric ISU

1. Turn the mode selector knob to O (OFF). Rotate the suction control knob one full turn clockwise (increase). Clamp the connective tubing to occlude the fitting port. The gauge needle should not move.

2. Turn the mode selector knob to | (CONT). Rotate the suction control knob fully counterclockwise (decrease). Clamp the connective tubing. The gauge needle should not move.
3. Clamp Tubing

**REGULATOR SETTING**

<table>
<thead>
<tr>
<th>REGULATOR</th>
<th>SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISU</td>
<td>Increase the suction to 100 mmHg/13.3 kPa</td>
</tr>
<tr>
<td>Pediatric ISU</td>
<td>Increase the suction to 60 mmHg/8kPa</td>
</tr>
</tbody>
</table>

**Pediatric ISU Only:** Clamp tubing and rotate suction control knob fully clockwise (increase). Check that vacuum reading on gauge is no higher than 160 mmHg/21 kPa to verify this is a limited unit. Slowly open and close the clamped tubing to create various flow rates through the regulator. Check that the suction level is maintained when the tubing is clamped.

4. Turn the mode selector knob to [O][O] (INTER) . Clamp the connective tubing.

For the ISU, ensure that the timing cycles are approximately 15 seconds “On” and 8 seconds “Off” by observing the gauge needle.

5. Reduce the suction level to zero and turn the mode selector knob to O (OFF).
4/Operation

4.5 Patient Set-up

1. Make sure the Pre-Use Checkout Procedure has been performed.

2. Turn the mode selector knob to | (CONT) and clamp the connective tubing.

3. Set the prescribed suction level.

   **WARNING:** The fitting port of the regulator must be occluded when setting the prescribed suction level. This prevents the patient from receiving higher than required suction levels.

4. Turn the mode selector knob to O (OFF)

5. Attach the patient tubing to the collection canister or liner's patient port.

This previous version is meant for reference only. Refer to current manual.
4.6 Setting the Timing Cycles

⚠️WARNING: If the screws on the timing valves are turned all the way clockwise, the ISU will not cycle.

To set the timing cycles, perform the following procedure.

1. Connect the supply vacuum to the adapter port.

2. Pull out the Ohio Medical nameplate wrench from the front of the regulator to access the timing valves.

3. Occlude the fitting port.

4. Turn the selector mode knob to (CONT).

5. Set 120 mm Hg/16 kPa on the regulator gauge or the maximum vacuum, whichever is lower.

6. Turn the mode selector knob to |O|O| (INTER) with the fitting port still occluded.

7. Wait 20 seconds.

8. If the regulator does not cycle “On”, use a flat head screwdriver to rotate the “Off” timing valve stem counterclockwise until the regulator cycles “On”.

9. Wait 20 seconds.

10. If the regulator does not cycle “Off” use a flat head screwdriver to rotate the “ON” timing valve stem counterclockwise until the regulator cycles “Off”.

11. Once the regulator has completed an “On and Off” cycle, fine tune each cycle to the desired time by adjusting the corresponding valve. To increase the time, turn the timing valve stem clockwise. To decrease the time, turn the timing valve stem counterclockwise.
4.7 Setting the Intermittent Mode Flow Rate

**WARNING:** If the flow control valve is rotated fully clockwise, the ISU will not cycle in the intermittent mode. Drainage will cease.

A change in the intermittent mode flow rate is rarely needed. If there is a desire to change the factory set flow rate, perform the following procedure.

1. Connect the supply vacuum to the adapter/probe port.
2. Pull the nameplate wrench from the front of the regulator to access the flow control valve.
3. Occlude the regulator fitting port.
4. Turn the mode selector knob to | (CONT).
5. Set 120 mm Hg/16 kPa on the regulator gauge or the maximum vacuum, whichever is lower.
6. Turn the mode selector knob to O (OFF).
7. Connect the regulator fitting port to the 10 LPM flowmeter.
8. Turn the mode selector knob to |O|O| (INTER).
9. The flow rate must be adjusted during the “On” cycle of the intermittent mode. Using the proper tool, either a Phillips head screwdriver or a ball hex key wrench, adjust the flow control valve to produce a flow rate of 8 LPM. To increase the flow rate turn the valve counterclockwise. To decrease the flow rate turn the valve clockwise.

4.8 Setting the Vacuum Limit - Pediatric ISU ONLY

**WARNING:** It may be possible to set the vacuum limit to zero. If there is no suction present, rotate set screw counterclockwise and/or check Chapter 6/Troubleshooting.

To set the vacuum limit, perform the following procedure.

1. Connect the supply vacuum to the adapter/probe port.
2. Occlude the regulator fitting port.
3. Remove the screw, washer, and black plastic cam from the suction control knob.
4. Turn the mode selector knob to | (CONT).
5. Turn suction control knob until desired vacuum limit is reached. NOTE: Internal adjusting set screw may need to be rotated counterclockwise to reach desired vacuum limit; See Step 6.
6. Place 1/16" hex key wrench through hole in stud to engage with set screw.
7. Hold suction control knob in place and tighten set screw (clockwise) until the end of it bottoms out on the inside of the cap bore.
8. Turn suction control knob counterclockwise and then back to the vacuum limit to test the limit setting.
9. Assemble screw, washer, and black plastic cam on suction control knob.
5.1 Cleaning

⚠️ WARNING: After patient use, regulators may be contaminated. Handle in accordance with your hospital’s infection control policy.

5.1.1 Routine Exterior Cleaning

Routine cleaning of the regulator is recommended as a standard procedure after each use.

Wipe all exterior surfaces with a solution of water and mild detergent.

5.1.2 Internal Component Cleaning

⚠️ CAUTION: Cleaning the gauge may result in damage.

1. Refer to the Service - Disassembly and Assembly instructions.

2. All internal components with the exception of the gauge, may be cleaned with a solution of warm water and mild detergent.

3. Dry all components with a lint free cloth before assembly.

5.1.3 Cold Flush Procedure

If desired, the vacuum regulator can be cold-flushed as part of a cleaning or disinfecting procedure. Set up a collection canister or liner between the vacuum source and the adapter/probe port to receive the flush solution. Suction through the vacuum regulator an adequate amount of cold disinfectant to satisfy the infection control requirements of the hospital. Use only approved cleaning/flushing solutions. Make sure those made from concentrates are newly mixed to ensure effectiveness.

Flush both the continuous and intermittent vacuum circuits thoroughly. Adequately aerate both the continuous and intermittent circuits with vacuum flow or compressed air until all internal channels, switches, gauge ports and regulating mechanisms are dry. Disassemble to check O-rings for adequate lubricant and filters for proper function following any cold flush procedure.

⚠️ CAUTION: Unit failure due to cold flushing is not the responsibility of Ohio Medical and may invalidate the warranty. Failure to adequately dry the product following a cold flush may damage the working parts which are designed for pneumatic air-flow only. Failure to disassemble to check O-ring and filter status may render the unit inoperative. Suction fluids drawn into a vacuum regulator do not stop in the regulator. They proceed through it into the wall outlet and pipeline system. Failure to clean and disinfect the wall outlet and pipeline system may result in damage to this equipment.

⚠️ WARNING: Perform a service checkout procedure following cold flushing. Validate the selected cleaning/disinfection procedure. Failure to do so may result in patient use of a product which is assumed to be clean/disinfected and is not. Body fluids suctioned into a vacuum regulator do not stop in the regulator. They proceed through it into the wall outlet and pipeline system. Failure to clean and disinfect the wall outlet and pipeline system may result in contamination that contributes to nosocomial infection.

5.2 Sterilization

Should misuse occur, resulting in accidental flooding of the regulator, the regulator may be sterilized using Ethylene Oxide (ETO). After sterilization, follow the service checkout procedures in Section 8.

⚠️ WARNING: Following sterilization with ethylene oxide, parts should be quarantined in a well ventilated area to allow dissipation of residual ethylene oxide gas absorbed by the material. Aerate parts for 8 hours at 130°F (54°C).

⚠️ CAUTION: Do not steam autoclave or liquid sterilize the ISU. Severe impairment to the operation of the regulator will result. The only acceptable method of sterilization is with gas (ethylene oxide).

⚠️ CAUTION: Sterilization with ethylene oxide mixtures may cause crazing (minute superficial cracking) of some plastic parts. Crazing will be more pronounced when mixtures containing Freon® are used.

Note: ISU should only be sterilized if it is contaminated or maintenance is to be performed.

1. The regulator should be sterilized with the mode selector knob in the \[O\]|O|(INTER) or \[O\]|O| P-P (INTER) position.

2. The only acceptable method of sterilization is with ethylene oxide. Ethylene oxide mixtures can be used at temperatures of 125 to 135°F (52 - 57°C). If this temperature cannot be obtained, room temperature sterilization with 100% ethylene oxide can also be used. Sterilization is not recommended as a standard procedure after each use.

3. After each sterilization check the condition of the internal filters. Replace any shrunken filters before returning the regulator to service.
6/Troubleshooting

Place the regulator in the vertical position and connect to a supply vacuum of 15” Hg/51 kPa (380 mmHg).

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Causes</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. No gauge indication and no suction in any setting</td>
<td>1. No supply vacuum</td>
<td>1. Correct suction problems</td>
</tr>
<tr>
<td></td>
<td>2. Kinked tube</td>
<td>2. Straighten tube</td>
</tr>
<tr>
<td></td>
<td>3. Poor connection</td>
<td>3. Check all connections and seals</td>
</tr>
<tr>
<td></td>
<td>4. Blocked wall outlet</td>
<td>4. Unblock outlet</td>
</tr>
<tr>
<td></td>
<td>5. Blocked adapter port</td>
<td>5. Unblock port</td>
</tr>
<tr>
<td></td>
<td>6. Blocked backplate</td>
<td>6. Clean with soap and water and a pipe cleaner</td>
</tr>
<tr>
<td></td>
<td>7. Loose mounting plate</td>
<td>7. Tighten the 4 mounting screws</td>
</tr>
<tr>
<td></td>
<td>8. Bad or missing mounting plate gasket</td>
<td>8. Replace/Install gasket</td>
</tr>
<tr>
<td></td>
<td>9. Regulator module malfunction</td>
<td>9. See “Regulator module malfunction” under Problem column in this section of the manual</td>
</tr>
<tr>
<td></td>
<td>10. Pediatric ISU – Incorrect vacuum limit adjustment</td>
<td>10. Reset vacuum limit. (See “4.8 Setting the Vacuum Limit”)</td>
</tr>
<tr>
<td></td>
<td>11. Pediatric ISU – Bad or missing positive pressure relief valves</td>
<td>11. Replace/Install positive pressure relief valves</td>
</tr>
<tr>
<td>B. Regulator module malfunction</td>
<td>1. Small o-ring failure or diaphragm rupture</td>
<td>1. Replace rubber components with regulator module replacement kit</td>
</tr>
<tr>
<td></td>
<td>2. Stem screw loose</td>
<td>2. Tighten stem screw</td>
</tr>
<tr>
<td>C. No gauge indication but suction is being</td>
<td>1. Blocked gauge pressure sensing orifice</td>
<td>1. Unblock orifice</td>
</tr>
<tr>
<td></td>
<td>2. Gauge mechanism locked by debris</td>
<td>2. Remove debris</td>
</tr>
<tr>
<td></td>
<td>3. Gauge mechanism damaged</td>
<td>3. Replace gauge</td>
</tr>
<tr>
<td>D. Gauge indication but no suction is being delivered</td>
<td>1. Blocked fitting port</td>
<td>1. Unblock port</td>
</tr>
<tr>
<td></td>
<td>2. Overflow Safety Trap shut-off</td>
<td>2. Reset float/empty Overflow Safety Trap</td>
</tr>
<tr>
<td></td>
<td>4. Blocked fitting</td>
<td>4. Replace fitting</td>
</tr>
<tr>
<td>E. Suction level cannot be adjusted</td>
<td>1. Regulator module malfunction</td>
<td>1. See “Regulator module malfunction” under Problem column in this section of the manual</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible Causes</td>
<td>Remedy</td>
</tr>
<tr>
<td>---------</td>
<td>----------------</td>
<td>--------</td>
</tr>
<tr>
<td>F. Insufficient flow through regulator</td>
<td>1. Partial blockage in wall supply</td>
<td>1. Confirm wall supply open air flow meets minimum hospital requirements&lt;br&gt;Unblock if necessary</td>
</tr>
<tr>
<td></td>
<td>2. Partial blockage in regulator</td>
<td>2. Perform the Flow Test in the Service Checkout Procedure section of this manual&lt;br&gt;Clear blockage if necessary</td>
</tr>
<tr>
<td>G. Inaccurate gauge reading</td>
<td>1. Damaged gauge</td>
<td>2. Replace gauge</td>
</tr>
<tr>
<td>Note: All gauge needles should return to the stop pin when no suction is being supplied</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H. With the fitting port occluded, unable to decrease the suction level and gauge needle does not return to Zero when switched to O (OFF)</td>
<td>1. Blocked filter and/or orifice</td>
<td>1. Clear orifice and replace filter</td>
</tr>
<tr>
<td></td>
<td>2. Damaged gauge</td>
<td>2. Replace gauge</td>
</tr>
<tr>
<td></td>
<td>3. Blocked unilogic module filter</td>
<td>3. Replace filter</td>
</tr>
<tr>
<td></td>
<td>4. Regulator module malfunction</td>
<td>4. See “Regulator module malfunction” under Problem column in this section of the manual</td>
</tr>
<tr>
<td>I. Limited suction in any setting and whistling noise from inside the regulator</td>
<td>1. Selector switch loose or bad selector switch o-rings</td>
<td>1. Tighten selector switch and/or replace o-ring</td>
</tr>
<tr>
<td></td>
<td>2. Missing internal components</td>
<td>2. Disassemble regulator and inspect</td>
</tr>
<tr>
<td>J. Suction is delivered in the</td>
<td>1. Flow control valve blocked or turned full in</td>
<td>1. Turn valve counterclockwise until unit cycles and/or inspect valve seat area</td>
</tr>
<tr>
<td></td>
<td>(CONT) mode but the</td>
<td>2. Timing valves turned fully in and/or clogged</td>
</tr>
<tr>
<td></td>
<td>(INTER) will not cycle</td>
<td>3. Unilogic module malfunction/missing</td>
</tr>
<tr>
<td></td>
<td>4. Missing o-ring in selector switch</td>
<td>4. Install o-ring</td>
</tr>
<tr>
<td></td>
<td>5. Blocked backplate</td>
<td>5. Inspect backplate flow paths Unblock if necessary</td>
</tr>
<tr>
<td>K. Pediatric ISU - Maximum vacuum not limited</td>
<td>1. Incorrect vacuum limit adjustment</td>
<td>1. Reset vacuum limit. See “4.8 Setting the Vacuum Limit”.</td>
</tr>
<tr>
<td>L. Pediatric ISU - Limited suction in any setting and whistling noise from back of regulator</td>
<td>1. Bad or missing positive pressure relief valves</td>
<td>1. Replace/Install positive pressure relief valves</td>
</tr>
<tr>
<td>M. Pediatric ISU - Vacuum limit does not remain constant</td>
<td>1. Loctite® on set screw is breaking down</td>
<td>1. Replace 2.42 Loctite® on set screw. See “7.5 Vacuum Limit”.</td>
</tr>
</tbody>
</table>
7/Disassembly and Assembly

7.1 Service Tools and Equipment

⚠️ CAUTION: Use of lubricants other than recommended, may degrade plastic or rubber components.

The following items should be on hand during any service procedure:

- Supply Vacuum: 500 mm Hg/67 kPa minimum & 50 LPM Open Air Flow minimum
- Supply Vacuum Regulator with Gauge, 760 mm Hg/101.3 kPa Full Scale
- Low Vacuum Calibration Gauge, 225 mm Hg/ 30 kPa Full Scale (Ohio Medical P/N 6700-0353-800)
- 50 LPM Flowmeter (Ohio Medical P/N 6700-0355-800)
- 10 LPM Flowmeter (Ohio Medical P/N 6700-0354-800)
- Phillips Head Screwdriver, No. 2
- Flat Head Screwdriver, 1/4 inch
- Open End Adjustable Wrench
- Ball Hex Key Wrench, 3/16 inch
- Open End Wrench, 11/16 inch
- Pipe Cleaner
- Wooden Toothpick (O-ring Remover)
- Tweezers (Filter Remover)
- 3 Dow® 111 Grease (Ohio Medical P/N 6700-0074-200)
- Tubing Clamp
- 1/2 Gallon Reservoir
- Bubble Leak Tester
- Stop Watch
- Hex Key Wrench, 1/16 inch (Pediatric ISU Only)
- 242 Loctite® (Pediatric ISU Only)

7.2 ISU and Pediatric ISU

7.2.1 Disassembly

⚠️ WARNING: If the Vacuum Regulator is repaired or disassembled in any manner, the Service Checkout Procedure must be performed before using the equipment on the patient.

⚠️ WARNING: Clean and sterilize all multiple use suction equipment if contaminated before disassembly, to ensure service personnel are not exposed to hazardous contamination.

⚠️ CAUTION: The gauge assembly must be handled with utmost care to retain its precision. If the lens is removed, do not rest the gauge on its face.

(*) Accuracy ± of full scale deflection.

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Disassembly and Assembly/7

Description

1. Gauge Assembly (Low) – includes
   - Gauge, O-rings, and Lens
2. Gauge Lens
3. O-ring, 2-012 Buna-N (2)
4. Screw
5. Retaining Washer
6. Spiral Spring Washer
7. Detent Plate
8. Ball (4)
9. Switch Main Valve Body
10. O-ring, 2-010 Buna-N (4)
11. Regulator Module (Pediatric Model Only)
12. O-ring, 2-016 Buna-N
13. O-ring, 2-004 Buna-N
14. Gauge Filter
15. Flow Control Valve
16. Backplate Assembly
17. Cover Screw (3)
18. Nameplate Wrench
19. O-ring, 2-011 Buna-N
20. Timing Valve (2)
21. O-ring, 2-006 (4)
22. O-ring, 2-014 (2)
23. Filter (2)
24. Unilogic Module
25. Filter, Green
26. Filter, Beige
27. Tube (6)
28. Cover & Knob Assembly (w/ Baby Icon – Pediatric Model Only)
29. Mode Selector Knob
7/Disassembly and Assembly

Description

**ISU**
1. Mounting Plate
2. Gasket
3. Serial Number Label
4. Screw (4 or 5)
10. Backplate Assembly

**PED ISU**
34. Mounting Plate (Pediatric Model Only)
35. Gasket (Pediatric Model Only)
37. Positive Pressure Relief Valve (2) (Pediatric Model)

1. Remove all fittings from the regulator and ensure that the mode selector knob is in the O (OFF) position.

2. Remove the three cover screws from the back of the unit.

3. Rotate the suction control knob counterclockwise (decrease) until it is free from the regulator module. Carefully pull the cover and knob assembly off of the backplate.

4. To remove the gauge assembly, grasp the dial mounting bracket and pull straight out. The snap-fit lens cover can also be removed (if applicable) for replacement. Replace Gauge o-rings if required.

Pull down plastic tab with right index finger while holding gauge from with let hand

Snap-fit Lens Removal
7.2.2 Assembly

**CAUTION:** To prevent stripping the plastic threads, place the screw in the hole and turn counterclockwise until it drops into the original threads. Tighten screw.

1. Lubricate all o-rings and the gasket with a small amount of Dow® 111 Grease before assembly.

2. For the ISU Only - Place the lubricated mounting plate gasket onto the holes and install the mounting plate onto the backplate. Ensure the protruding posts on the mounting plate align in to the backplate properly.

3. For the Pediatric ISU Only - Install new positive pressure relief valves by pulling tail of valve through the small hole on the mounting plate. When installed, the three other vent holes should be covered. After valve is installed, clip the tail. Place the lubricated mounting plate gasket onto the backplate. Ensure the protruding posts on the mounting plate align into the backplate properly.

5. Install the flow control valve into its proper location. Use the proper tool to rotate the valve clockwise approximately 3 full turns, taking extra care to ensure that the threads are engaged properly.

6. Place the gauge bleed hole filter into its proper location. Push until it bottoms on the backplate.

7. Mode Selector Switch Assembly
   a. Place the four selector switch o-rings into their proper location on the backplate.
   b. Install the main valve body on the backplate post with the protruding ear at the 3 o’clock position. Ensure the valve body seats on the four o-rings.
   c. Place the four ball bearings on top of the valve body. Place the detent plate on top of the four ball bearings (smooth side down). Place the spiral spring washer on top of the detent plate. Place the flat washer on top of the spiral spring washer.
   d. Install the screw through the washer and into the backplate post. Tighten the screw.
8/Service Checkout Procedure

8. Grasp the main valve body and rotate the switch in all three positions. Ensure that the protruding ear is near the 3 o’clock position after testing the switch.

9. Install the timing valves into their proper locations and push fully in so that the o-rings seats in the backplate.

10. Install the unilogic module by aligning the silastic tubes with the ports on the backplate and push fully on.

11. Install the regulator module into its proper location. Rotate the module so that the protruding ears are at the 5 o’clock and 11 o’clock positions.

12. Install the snap-fit lens by placing one of the retaining tabs over the edge of the gauge face, and then pressing lightly until the other tab snaps onto the gauge face. Rotate the lens to confirm proper installation. If the lens is not the snap-fit type, simply place the lens onto the gauge ensuring it rotates easily and is resting properly.

13. Install the gauge assembly into its proper location so that the o-rings seat fully. Ensure the gauge is properly aligned. For the Pediatric ISU ONLY - The suction control knob is NOT lockable.

14. Place and align the cover and knob assembly onto the backplate with the mode selector knob in the O (OFF) position. Rotate the suction control knob clockwise (increase) until the cover is flush with the backplate.

15. Install the three cover screws.

16. Install all fittings.

Note: For proper installation of Adapters/Probes and Fittings see Appendix.

7.3 Regulator Module

⚠️ CAUTION: Do not lubricate any internal components of the regulator module.

⚠️ CAUTION: The cap screws can strip the regulator module housing threads if they are screwed in too tight.

7.3.1 Disassembly

1. Remove the cap screws (2) and remove the cap.
2. Remove the o-rings (2).
3. Observe the position of the diaphragm convolution to aid in assembly.
4. Withdraw the diaphragm/stem assembly from the housing.
5. Remove the spring.
6. Grasp the stem with your fingers and unscrew the stem screw.
7. Remove the retainer, diaphragm and piston from the stem.

Parts and Descriptions

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-ring, Stem</td>
<td>1</td>
</tr>
<tr>
<td>O-ring</td>
<td>2</td>
</tr>
<tr>
<td>Housing</td>
<td>3</td>
</tr>
<tr>
<td>Stem</td>
<td>4</td>
</tr>
<tr>
<td>Spring</td>
<td>5</td>
</tr>
<tr>
<td>Piston</td>
<td>6</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>7</td>
</tr>
<tr>
<td>Retainer</td>
<td>8</td>
</tr>
<tr>
<td>Stem Screw</td>
<td>9</td>
</tr>
<tr>
<td>Cap</td>
<td>10</td>
</tr>
<tr>
<td>Cap Screw</td>
<td>11</td>
</tr>
</tbody>
</table>
7.3.2 Assembly

1. Return the diaphragm to its original position (convoluted), with the molded number facing the retainer.
2. Assemble the diaphragm onto the retainer by lining up the center holes as shown in the diagram.
3. Insert the piston into the diaphragm and ensure that the retainer mates with the recess in the piston.
4. Insert the stem through the piston.
5. Holding the retainer/diaphragm/piston/stem as an assembly with your fingers, insert the stem screw and tighten.
6. Place the spring in the housing.
7. Insert the retainer/diaphragm/piston/stem assembly through the spring and into the cavity in the housing. Fit the diaphragm bead into the groove in the housing.
8. Install the cap and the two cap screws.
9. Apply a small amount of Dow® 111 Grease to the o-rings only.
10. Install o-rings onto the stem and housing.

7.4 Timing Valves

⚠️ CAUTION: Do not over-tighten the timing valve stem. Needle portion of the valve may be damaged.

7.4.1 Disassembly

1. Remove the o-rings from the valve base and replace if required.
2. Rotate the valve stem counterclockwise until it is removed from the valve base.
3. Inspect the needle and o-ring. Replace o-ring if required.

7.4.2 Assembly

1. Install all o-rings and apply a small amount of Dow® 111 Grease to the o-rings.
2. Carefully insert the valve stem into the valve base and rotate clockwise approximately 5 full turns. The final valve stem position will be set in the Service Checkout Procedure.

### Timing Valve Assembly

|-------------|---------------|-----------|---------------|-----------|-----------|-----------|

Refer to current manual.
7/Disassembly and Assembly

7.5 Vacuum Limit - Pediatric ISU Only

This step is only necessary if the vacuum limit is not holding steady over time.

1. Remove the cover by removing the three cover screws from the back of the unit.

2. Remove the screw, washer, and black plastic cam form the suction control knob.

3. Place 1/16" hex key wrench through hole in stud to engage with the internal adjusting set screw.

4. Hold suction control knob in place and turn the set screw clockwise to remove it out the back. NOTE: Set screw can not be removed by turning it counterclockwise.

5. Place a small drop of 242 Loctite® on the threads near the head end of the set screw.

6. Assemble set screw back into the stud. Insert the hex key wrench through knob and stud and engage head end of set screw. From knob site, turn hex key wrench counterclockwise to start threads. Continue to assemble by turning counterclockwise until the end of the set screw is only protruding a small amount.

7. Assemble screw, washer, and black plastic cam on suction control knob.

8. Assemble cover onto unit. See "7.2.2 Assembly, Step 14".

9. Reset vacuum limit. See "4.8 Setting the Vacuum Limit".

---

Refer to current manual.
WARNING: If the Vacuum Regulator is repaired or disassembled in any manner, the Service Checkout Procedure must be performed before using the equipment on the patient.

Important: This entire procedure must be performed in numerical order.

8.1 Set-up
1. Verify that a minimum of 500 mm Hg/67 kPa vacuum exists at the supply vacuum gauge.
2. The supply open flow must be 50 LPM minimum.

8.2 Leak Test - Supply Side
1. Connect the supply vacuum tubing to port “A” of the Bubble Leak Tester.
2. Connect port “B” of the Bubble Leak Tester to the regulator adapter/probe port.
3. Set the supply vacuum to 300 mm Hg ± 30 mm Hg/40 kPa ± 4 kPa on the supply vacuum gauge.
4. Turn the mode selector knob to O (OFF). Allow the fitting port to be open to air.
5. Wait 5 seconds.
6. No more than 5 bubbles should appear in the Bubble Leak Tester for the next 10 seconds.

Important: Prior to venting Port “A” of the Bubble Leak Tester to atmosphere (ie: turning the Supply Regulator off) ensure the tubing from Port “B” has been disconnected from the adapter/probe port of the Vacuum Regulator.
8/Service Checkout Procedure

8.3 Flow Test

1. Remove the Bubble Leak Tester from the supply vacuum connection and connect the supply vacuum directly to the regulator adapter port.

2. Set the supply vacuum to 450 mm Hg ±25 mm Hg/60 kPa ±3.3 kPa on the supply vacuum gauge.

8.3.1 Continuous Mode Flow Test

1. Connect the regulator fitting port to the 50 LPM flowmeter.

2. Turn the mode selector knob to | (CONT).

3. Rotate the suction control knob fully clockwise (increase).

4. Verify that the flow rate exceeds:
   - ISU: 35 LPM
   - Pediatric ISU: 25 LPM

8.3.2 Intermittent Mode Flow Test

1. Using the proper tool, rotate the flow control valve two turns counterclockwise from its seat.

2. Clamp the fitting port tubing.

3. Set 120 mm Hg/16 kPa on the regulator gauge or the maximum vacuum, whichever is lower.

4. Connect the regulator fitting port to the 10 LPM flowmeter.

5. Turn the mode selector knob to |O|O| (INTER).

6. During the “On” cycle, adjust the intermittent mode flow rate to 8 LPM ± 1 LPM. To increase the flow rate, turn the valve counterclockwise. To decrease the flow rate, turn the valve clockwise.

**Note:** If the regulator does not cycle “On” after 20 seconds in the intermittent mode, use a flat head screwdriver and rotate the “Off” timing valve stem counterclockwise until it cycles “On”.

This previous version is meant for reference only. Refer to current manual.
8.4 Gauge Test

Note: All Ohio Medical Gauges are supplied with an accuracy of ±5% of full scale deflection throughout their range. The ISU vacuum gauges have an accuracy of ±10 mm Hg/1.3 kPa.

Note: All gauge needles should return to the stop pin when no suction is being supplied. Gauges which do not comply may be out of calibration.

When checking gauge accuracy, be sure that the calibration gauge has an accuracy of 1% of full scale deflection or better.

1. Connect the regulator fitting port to the low vacuum calibration gauge with tubing.
2. Turn the mode selector knob to | (CONT).
3. Assure that the regulator gauge is in agreement with the low vacuum calibration gauge within the ±10 mm Hg/1.3 kPa tolerance. Recommended test points are:
   - ISU: 40, 80, 140 and 200 mm Hg (5, 10, 18 and 26 kPa)
   - Pediatric ISU: 40, 80 and 120 mm Hg (5, 10, and 16 kPa)
4. Rotate the suction control knob fully clockwise (increase) and verify the gauge’s reading is in the FULL VAC range.
5. Rotate the suction control knob fully counterclockwise (decrease) and verify the gauge’s reading decreases to zero.

8.5 Regulation Test

1. Disconnect the low vacuum calibration gauge from the regulator fitting port.
2. Occlude the fitting port.
3. ISU: Set 90 mmHg/12 kPa on the regulator gauge.
   Pediatric ISU: Set 60 mm Hg/8 kPa on the regulator gauge.
4. Open and close the fitting port several times.
5. Check that the regulator gauge reads between: ISU: 80 mmHg/10.7 kPa and 100 mmHg/13.3 kPa when the regulator fitting port is occluded. Pediatric ISU: 50 mm Hg/6.7 kPa and 70 mm Hg/9.3 kPa when the regulator fitting port is occluded.

8.6 Timing Cycle Adjustment

⚠️ WARNING: If the screws on the timing valves are turned all the way clockwise, the ISU and the Pediatric ISU will not cycle.

Factory Settings:
- “On” Cycle: 15 seconds +/- 3 seconds
- “Off” Cycle: 8 seconds +/- 3 seconds

To set the timing cycles, perform the following procedure.

1. Occlude the fitting port.
2. Turn the selector mode knob to | (CONT).
3. Set 120 mm Hg/16 kPa on the regulator gauge or the maximum vacuum, whichever is lower.
4. Turn the mode selector knob to |O|O| (INTER) with the fitting port still occluded.
5. Wait 20 seconds.
6. If the regulator does not cycle “On”, use a flat-head screwdriver to rotate the “Off” timing valve stem counterclockwise until the regulator cycles “On”.
7. Wait 20 seconds.
8. If the regulator does not cycle “Off” use a flat-head screwdriver to rotate the “ON” timing valve stem counterclockwise until the regulator cycles “Off”.
9. Once the regulator has completed an “On and Off” cycle, fine tune each cycle to the desired time by adjusting the corresponding valve. To increase the time, turn the timing valve stem clockwise. To decrease the time, turn the timing valve stem counterclockwise.
10. Use Ohio Medical VACUTIMER (P/N 6700-0428-800) to digitally adjust timing cycles.

8.7 Vacuum Build-up/Bleed-down Test - Intermittent Mode

1. Connect the regulator fitting port to the 1/2 gallon reservoir.
2. During the “On” cycle, check that the suction increases to the preset 120 mm Hg/16 kPa on the regulator gauge or the maximum vacuum, whichever is lower, in 5 seconds or less.
3. During the “Off” cycle, check that the suction decreases to zero on the regulator gauge (zero stop pin) in 5 seconds or less.

4. If the regulator fails either of the build-up or bleed-down tests, replace the regulator module.

**8.8 Bleed Test**

1. Turn the mode selector knob to I (CONT).

2. Occlude the regulator fitting port and set the vacuum level to 120 mm Hg/16 kPa or the maximum vacuum, whichever is lower.

3. Turn the mode selector knob to O (OFF) and observe the gauge needle. It must return to zero within 10 seconds.

**8.9 Leak Test - Patient Side**

1. Turn the mode selector knob to O (OFF).

2. Connect the regulator fitting port tubing to port “A” of the Bubble Leak Tester.

3. Rotate the suction control knob fully counterclockwise (decrease).

4. Turn the mode selector knob to | (CONT).

5. Wait 5 seconds.

6. No bubbles should appear in the Bubble Leak Tester for the next 10 seconds.

**8.10 Vacuum Limit Adjustment - Pediatric ISU ONLY**

WARNING: It may be possible to set the vacuum limit to zero. If there is no suction present, rotate set screw counterclockwise and/or check Chapter 6/Troubleshooting.

To set the vacuum limit, perform the following procedure.

1. Occlude the regulator fitting port.

2. Remove the screw, washer and black plastic cam from the suction control knob.

3. Turn the mode selector knob to | (CONT).

4. Turn suction control knob until desired vacuum limit is reached. Factory set to 135 mmHg +/- 10 mmHg (18 kPa +/- 1.33 kPa). Maximum vacuum level shall be no greater than 160 mmHg/120 kPa.

   Note: Internal adjusting set screw may need to be rotated counterclockwise to reach desired vacuum limit; See Step 6.

5. Place 1/16" hex key wrench through hole in stud to engage with set screw.

6. Hole suction control knob in place and tighten set screw (clockwise) until the end of it bottoms out on the inside of the cap bore.

7. Turn suction control knob counterclockwise and then back to the vacuum limit to test the limit setting.

8. Assemble screw, washer and black plastic cam on suction control knob.
9.1 General Maintenance of Suction Equipment

⚠️ WARNING: The Pre-Use Checkout Procedure must be performed before using this equipment on each patient. If the regulator fails any part of the Pre-Use Checkout Procedure, it must be removed from service and repaired by qualified service personnel.

⚠️ WARNING: Clean and sterilize all suction equipment if contaminated before disassembly, to ensure service personnel are not exposed to hazardous contamination.

ISUs and Pediatric ISUs should be kept in use or used on a rotating basis. Internal parts of unused equipment may tend to deteriorate.

Maintenance of the vacuum piping system is as important as maintenance of the suction equipment. The use of collection canister with reliable shut-off valves, Overflow Safety Trap assemblies and disposable suction filters will protect the regulator, wall outlet, and piping system. The flow rate at the wall outlet should be checked on a yearly basis and suitable cleaning of the outlets should be performed. The flow rate measurement should meet NFPA and/or ISO standards.

Routine maintenance and inspection are important to the performance of suction equipment. The following is a recommended list for care of suction equipment after each patient use.

1. Perform a thorough cleaning by washing all bottles, tubing, metal connectors, etc, and removing all residue.
2. Wipe all exterior surfaces with a solution of water and mild detergent.
3. Perform a careful visual inspection.
4. Check that the High Flow Disposable Suction Filter is clean and in good condition.
5. Check that all tubing is in good condition and connected securely to the correct ports.
6. Check the floats in the Overflow Safety Trap and Collection Canister for correct operation.
7. Perform the Pre-Use Checkout Procedure.

9.2 Recommended Maintenance Schedule

Ohio Medical vacuum regulators function for decades. They are proven to provide trouble-free service with minimum care.

We recommend the following to determine the maintenance schedule appropriate for each facility:

1. Periodically (as required, but no less than annually) inspect the overall condition of the vacuum regulator. Test gauge accuracy (section 8.4 Gauge Test) and perform the Pre-Use Checkout Procedure (section 4.4). If the regulator does not pass, refer to Troubleshooting (Section 6).
2. Determine a maintenance schedule based on data from your periodic inspections. Following the guidelines below.

9.2.1 Maintenance Schedule

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimum Frequency</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Checkout Procedure</td>
<td>Every 12 months</td>
<td>If the regulator does not pass, refer to Troubleshooting (Section 6).</td>
</tr>
<tr>
<td>Elastomeric parts, O-rings, gaskets, diaphragms, positive pressure safety relief valves (Pediatric ISU ONLY), internal filters.</td>
<td>As required</td>
<td>Cleaning, lubrication and replacement interval depends on hours of usage and environmental conditions. Replace, and repair as needed.</td>
</tr>
</tbody>
</table>
9.3 Repair Policy

⚠️ WARNING: Clean and sterilize all multiple use suction equipment before shipment to ensure transportation personnel and/or service personnel are not exposed to any hazardous contamination.

⚠️ CAUTION: Do not steam autoclave or liquid sterilize the ISU. Severe impairment to the operation of the regulator will result. The only acceptable method of sterilization is with gas (ethylene oxide).

⚠️ CAUTION: Only competent individuals trained in the repair of this equipment should attempt to service it.

Do not use malfunctioning equipment. Make all necessary repairs. Have the equipment repaired by qualified service personnel or by Ohio Medical. Parts listed in this service manual may be repaired or replaced by a competent, trained person who has experience in repairing devices of this nature. After repair, perform the Service Checkout Procedure to ensure that it is functioning properly, and complies with the manufacturer’s published specifications.

9.4 Technical Assistance
If technical assistance is required, contact Ohio Medical technical support or field operations listed on the back cover.

9.5 Return Instructions

1. Clean and sterilize the Vacuum Regulator.

2. Package the Vacuum Regulator securely for protection, preferably in the original container.

3. Include a letter describing in detail any difficulties experienced with the Vacuum Regulator. Include the person, title, and telephone number to contact for functional questions.

4. Ohio Medical now offers a ten year warranty on vacuum regulators sold on or after July 1, 2005. If the vacuum regulator was purchased on or after July 1, 2005 and is less than ten years old or if the vacuum regulator is covered under the previous warranty and is less than five years old, include the warranty information that came with the device and a copy of the invoice.

5. Include a purchase order to cover repair of a regulator not under warranty.

6. Ship the Vacuum Regulator prepaid. Write your return address and billing address information on the package or letter that comes with the package.

For U.S.A. Warranty Repairs (purchased on or after July 1, 2005 and is less than ten years old form the purchase date or if the vacuum regulator is covered under the previous warranty and is less than 5 years old from the purchase date) mail the package to:

Ohio Medical Corporation
1111 Lakeside Drive
Gurnee, IL 60031-4099 For U.S.A.

Non-Warranty Repairs (more than ten years older under the new warrant or more than five years sold under the previous warranty) mail the package to:

Ohio Medical Corporation
1111 Lakeside Drive
Gurnee, IL 60031-4099

In other locations contact your nearest Ohio Medical office or authorized Ohio Medical distributor.
## 10.1 Illustrated Parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
<th>Part Number</th>
<th>Qty/Pak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge Assy.</td>
<td>6700-0050-200</td>
<td>0205-8689-870</td>
<td>4</td>
</tr>
<tr>
<td>North American Std, 0-200 mmHg</td>
<td>6700-0050-202</td>
<td>0205-8689-870</td>
<td>4</td>
</tr>
<tr>
<td>International Std, ccw, 0-200 mmHg</td>
<td>6700-0095-200</td>
<td>0205-8689-870</td>
<td>4</td>
</tr>
<tr>
<td>International Low, ccw, 0-60 mmHg</td>
<td>6700-0055-205</td>
<td>0205-8689-870</td>
<td>4</td>
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<tr>
<td>O-ring, 2-012 Buna-N</td>
<td>6700-050-500</td>
<td></td>
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<tr>
<td>Screw</td>
<td>6700-050-400</td>
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<td>Retaining Washer</td>
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<td>Spiral Spring Washer</td>
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<tr>
<td>Detent Plate</td>
<td>0214-323-B-300</td>
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<td>Ball</td>
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<td>Switch Main Valve Body</td>
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<td>O-ring, 2-01B Buna-N</td>
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<tr>
<td>Regulator Module</td>
<td>6700-0225-800</td>
<td>0700-0026-700</td>
<td>6</td>
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<tr>
<td>Diaphragm</td>
<td>6700-0685-850</td>
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<td>O-ring, 2-012 Buna-N</td>
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<td>O-ring, 2-004 Buna-N</td>
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<td>Gauge Filter</td>
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<td>Flow Control Valve</td>
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<td>O-ring, 2-01B Buna-N</td>
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<td>Timing Valve</td>
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<td>0207-8298-670</td>
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<td>O-ring, 2-006 Buna-N</td>
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<td>O-ring, 2-014 Buna-N</td>
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<td>Filter</td>
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<td>Unilogic Module</td>
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<td>Filter, Beige</td>
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<td>Tube</td>
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<tr>
<td>Backplate Assy.</td>
<td>6700-0426-850</td>
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<td>North American</td>
<td>6700-0426-850</td>
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<tr>
<td>International</td>
<td>6700-0427-850</td>
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<td>Backplate Assy, w/Mount Plate</td>
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<td>0700-0093-700</td>
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<tr>
<td>Cover Screw</td>
<td>0207-0635-400</td>
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<td>Ohmeda Nameplate Wrench</td>
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<td>Cover &amp; Knob Assy.</td>
<td>6700-0009-700</td>
<td>0700-0091700</td>
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<tr>
<td>Mode Selector Knob</td>
<td>0221-5897-300</td>
<td>0221-5852-870</td>
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<tr>
<td>Suction Control Knob</td>
<td>0221-5898-300</td>
<td>0221-5853-870</td>
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<td>Mounting Plate, Std SU</td>
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<td>Mounting Plate, Ped SU</td>
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<td>Gasket</td>
<td>6700-0030-500</td>
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<td>Mounting Plate, Ped SU</td>
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<td>Screw</td>
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<td>Positive Pressure</td>
<td>6700-0887-850</td>
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<tr>
<td>Relief Valves (Low SU Only)</td>
<td>6700-0689-850</td>
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<tr>
<td>Service Manual</td>
<td>6700-0895-700</td>
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</table>

*Kits contain the noted quantities of items in the corresponding rows

---

This previous version is meant for reference only.
Refer to current manual.
10/Ordering Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mounting Plate, ISU</td>
<td>6700-0053-400</td>
</tr>
<tr>
<td>2. Gasket</td>
<td>6700-0030-500</td>
</tr>
<tr>
<td>3. Serial Number Label</td>
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</tr>
<tr>
<td>4. Screw (4 or 5)</td>
<td>6700-0151-400</td>
</tr>
<tr>
<td>10. Backplate Assembly</td>
<td>6700-0043-500</td>
</tr>
</tbody>
</table>

(*) These parts are available as service kits. See section 10.2.

10.2 Service Kits

1. Regulator Module Replacement Kit .............................................. 6700-0030-700
   Includes the following parts:
   - O-ring, Stem
   - O-ring
   - Diaphragm
   - Stem Screw
   - Cap Screw (2)
   These parts are available only in kit form. If other parts are needed for replacement, the entire Module must be ordered. (6700-1225-800)

2. Complete Filter and O-ring Replacement Kit .................................. 0221-5887-300
   Includes all O-rings (16) and Filters (5) for servicing the regulator

3. Complete O-ring Replacement Kit ................................................. 0210-0474-870
   Includes all O-rings (16) for servicing the regulator

4. Complete Filter Replacement Kit ................................................. 0221-5884-870
   Includes all Filters (5) for servicing the regulator

5. Mode Selector Knob Replacement Kit ............................................. 0221-5897-300
   Includes the following parts:
   - Mode Selector Knob
   - Extension
   - Hardware

6. Suction Control Knob Replacement Kit ......................................... 0221-5898-300
   Includes the following parts:
   - Suction Control Knob
   - Threaded Stud
   - Hardware

7a. ISU Backplate Replacement Kit, North American ............................... 6700-0002-700
    Includes the following parts:
    - Backplate Assembly
    - Gasket
    - ISU Mounting Plate
    - Screw (4)

7b. ISU Backplate Replacement Kit, International .................................. 6700-0003-700
    Includes the following parts:
    - Backplate Assembly
    - Gasket
    - ISU Mounting Plate
    - Screw (4)
This previous version is meant for reference only. Refer to current manual.
1. Diamond Adapter ........................................... .0221-2685-802
2. NCG Adapter (Round) ........................................... .0221-0204-802
   NCG Adapter (Rectangle) ........................................... .0221-0205-800
3. Schrader Adapter ........................................... .0221-0690-731
4. DISS Union Nut & Gland ........................................... .6700-0094-700
5. DISS Hand-I-Twist Nut & Gland ........................................... .0204-6717-800
6. OES Adapter ........................................... .0221-0152-300
7. Puritan Adapter ........................................... .0221-0106-300
8. Medstar Adapter ........................................... .0221-0163-300
9. 90° Tubing Nipple ........................................... .6700-0095-700
10. Drager Adapter ........................................... .6700-0051-700
11. BOC IV Adapter ........................................... .6700-0057-700
12. Air Liquide Adapter ........................................... .6700-0091-400
13. 45° Locking Gland * ........................................... .6700-0143-700
14. 45° Threaded Locking Gland * ........................................... .6700-0141-700
15. Tubing Nipple ........................................... .0204-9020-535
16. Locking Gland ........................................... .6700-0144-700
17. Threaded Locking Gland ........................................... .6700-0142-700
18. DISS Male ........................................... .0204-7989-535
10.4 North American

10.4.1 Regulator Options

Instructions: Select the adapter, vacuum regulator, and fitting to form an 11-digit part number.

Example: 6701-1251-901 =

- **Adapters 67XX**
  - 6700: 1/8” NPT Female
  - 6701: Ohio Diamond
  - 6702: Hand-I-Twist
  - 6703: DISS Nut & Gland
  - 6704: Schrader
  - 6705: NCG Rectangle
  - 6706: NCG Round
  - 6707: Puritan-Bennett
  - 6708: OES
  - 6709: MedStar
  - 6711: 90° Tubing Nipple

- **Regulator 12XX**
  - 1251: Intermittent Suction Unit (ISU)

- **Fittings 9XX**
  - 900: 1/8” NPT Female
  - 901: Tubing Nipple
  - 902: Tubing Nipple and 1/2 Gallon Bottle, with Wall Slide (Straight)
  - 903: Locking Gland and 1/2 Gallon Bottle, with Floor Bracket
  - 904: Locking Gland
  - 905: Locking Gland and Overflow Safety Trap
  - 906: Locking Gland and Overflow Safety Trap and 1/2 Gallon Bottle, with Wall Slide (Straight)
  - 907: DISS Male
  - 908: DISS Male & Overflow Safety Trap, DISS Wing Nut & Gland
  - 909: DISS Male, Overflow Safety Trap and 1/2 Gallon Bottle, with Wall Slide (Straight)
10/Ordering Information

10.4.2 Other Options (North American)

Instructions: Select the desired configuration and write down the first four and the last three digits of the part number. Select the vacuum regulator desired (below) and insert the middle four digits in the “XXXX” section of the selected 11-digit part number.

Example: 6713-1251-907 = Intermittent Suction Unit with Rail Bracket and DISS Male fitting

Regulator 12XX Options for Multi-Purpose Therapy Stand (MPTS) and Additional Accessories

<table>
<thead>
<tr>
<th>Regulator</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1251</td>
<td>MPTS, Regulator, MPTS Slide Bracket (2) &amp; Retaining Clips (2), Overflow Safety Trap 6711-XXXX-914</td>
</tr>
<tr>
<td>1271</td>
<td>Regulator, Bracket, and 1/4 Gallon Bottle, 45° Locking Gland 6711-XXXX-916</td>
</tr>
</tbody>
</table>

Regulator with 30° Fitting, Overflow Safety Trap 6711-XXXX-930

Regulator & MPTS (Slide) Bracket, Overflow Safety Trap 6711-XXXX-913

Regulator & MPTS (Slide) Bracket, Threaded Gland, 45° Fitting, Overflow Safety Trap 6711-XXXX-915

Regulator with Ceiling Mount, DISS Male 6712-XXXX-907

Regulator and Rail Bracket, DISS Male 6713-XXXX-907

Regulator and Locking Gland (Threaded) 6711-XXXX-919

Regulator with 45° Locking Gland (Threaded) 6710-XXXX-910

1251 Intermittent Suction Unit (ISU)

1271 Pediatric Intermittent Suction Unit (PED-ISU)
10.5 International (ISO)

10.5.1 Regulator Options

Instructions: Select the vacuum regulator and fittings to form an 11-digit part number.

Example: 6700-1253-901 = Intermittent Suction Unit (ISU) with Tubing Nipple

### Adapters

<table>
<thead>
<tr>
<th>6700-12XX-9XX</th>
<th>Inlet Fittings 6700-12XX-9XX</th>
<th>Probes</th>
</tr>
</thead>
<tbody>
<tr>
<td>6700-1253-9XX</td>
<td></td>
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</tr>
<tr>
<td>Intermittent Suction Unit (ISU)</td>
<td>6700-12XX-900 w/o Inlet Fittings</td>
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</tr>
<tr>
<td></td>
<td>6700-12XX-901 w/Tubing Nipple</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6700-12XX-902 w/Tubing Nipple, 12&quot; Tubing, 1/2 gal. Bottle, Cap &amp; Float Assembly and Wall Slide (Straight)</td>
<td></td>
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<tr>
<td></td>
<td>6700-12XX-904 w/Locking Gland</td>
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<tr>
<td></td>
<td>6700-12XX-905 w/Locking Gland and Overflow Safety Trap</td>
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</tr>
<tr>
<td></td>
<td>6700-12XX-906 w/Locking Gland, Overflow Safety Trap, 12&quot; Tubing, 1/2 gal. Bottle, Cap &amp; Float Assembly and Wall Slide (Straight)</td>
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<tr>
<td>6700-1273-9XX</td>
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<tr>
<td>Pediatric Intermittent Suction Unit (PED-ISU)</td>
<td>6700-12XX-911 w/Locking Gland, Overflow Safety Trap, 12&quot; Tubing, 1/2 gal. Bottle, Cap &amp; Float Assembly and Wall &quot;V&quot; Slide (International)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6700-12XX-912 w/Tubing Nipple, 12&quot; Tubing, 1/2 gal. Bottle, Cap &amp; Float Assembly and Wall &quot;V&quot; Slide (International)</td>
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### Probes

- 0221-2685-802 Diamond
- 0204-6717-800 Hand-I-Twist
- 0221-0205-800 NCG (Rectangle)
- 0221-0204-802 NCG (Round)
- 0221-0106-300 Puritan
- 6700-0051-700 Drager
- 6700-0057-700 BOC IV
- 6700-0091-400 Air Liquide
- 0221-0163-300 MedStar
- 0204-9020-535 Tubing Nipple
- 0221-0152-300 OES
- 0221-0690-731 Schrader
- 6700-0094-700 DISS Nut & Gland
- 6700-0095-700 90° Tubing Nipple

Refer to current manual.
10/Ordering Information

10.4.2 Other Options (North American)

Instructions: Select the desired configuration and write down the first four and the last three digits of the part number. Select the vacuum regulator desired (below) and insert the middle four digits in the "XXXX" section of the selected 11-digit part number.

Example: 6713-1253-913 = Intermittent Suction Unit with MPTS (Slide) Bracket and Overflow Safety Trap

Regulator 12XX

Options for Additional Accessories

Regulator with 30° Fitting, Overflow Safety Trap
6711-XXXX-930

Regulator and Dovetail Bracket, Overflow Safety Trap
6711-XXXX-935

Regulator & MPTS (Slide) Bracket, Overflow Safety Trap
6711-XXXX-913

6700-1253-9XX
Intermittent Suction Unit (ISU)

6700-1273-9XX
Pediatric Intermittent Suction Unit (PED-ISU)

This previous version is meant for reference only. Refer to current manual.
Installation procedure for Adapters/Probes and Fittings.

All adapters/probes and fittings should be sealed and installed properly to prevent leaks and to support the equipment when mounted. Both vacuum regulator ports are 1/8-27 NPTF tapered pipe threads. It is important to note that adapters/probes and fittings seal on the thread and may have threads exposed after they have been tightened properly.

Prior to installing the adapter/probe or fitting, seal the thread with 4Teflon® (PTFE) tape or one of the following lubricants:

**CAUTION:** Do not use any Loctite® products to seal the threads (or products which contain Methacrylate Ester as an active ingredient).

The torque range for installing adapters/probes and fittings is 4.0 ft-lb (5.4 N-m) minimum to 10.0 ft-lb (13.6 N-m) maximum.

Adapters/probes and fittings which are not keyed for specific orientation, should be torqued to approximately 6.0 ft-lb (8.1 N-m).

Adapters/probes and fittings that are keyed to specific orientation, must be torqued initially to 4.0 ft-lbs. Additional torque is applied only until orientation is correct.

Dow® 111 (Ohio Medical P/N 6700-0074-200)
5 Ball Vac-Kote (37951M) (Ohio Medical P/N 0220-0091-300)
Ohio Medical Corporation
Authorized Representative
(OxygenCare Ltd.)
Corrig Road
Sandyford Industrial Est.
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Ireland
Phone +35 31 295 3421

North America

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Sales and Service
Equipment Service Center

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www.ohiomedical.com

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Refer to current manual.