

**RAMMAC**®



**OWL**  
(On Wall Logic)  
**User Guide**  
and  
**Installation**

Thank you for selecting a RAMVAC OWL to serve your dental facility.

The RAMVAC OWL provides industry leading technology for convenient and efficient control of your utility room equipment. While we've designed the OWL with the ability to control most brands of utility room equipment, its full capabilities are realized when matched with intelligent controllers like those found on RAMVAC manufactured utility room equipment.

Everything you need to install, operate and program your OWL is found in this manual, so here is all you need to do to get started:

1. Take a few minutes to read the OWL Overview and OWL Features sections of this manual, to learn more about the capabilities of the OWL.
2. The Installation section should answer most of your questions on how to locate and install your OWL in your facility. But if you do hit a snag, take comfort in knowing our industry leading Technical Service professionals are just a phone call away and are always glad to help.
3. Once installed, the Operation and Programming sections will make using your OWL a breeze.

We at RAMVAC appreciate your business and take a personal interest in your complete satisfaction. Please let us know how the system is working for you, by giving us a call or dropping by one of our exhibits at any major dental show. Please accept my personal invitation to visit our manufacturing facility if you are ever in the beautiful Black Hills of South Dakota.

Matt Olson  
General Manager, RAMVAC Dental Products, Inc.  
(800) 5-RAMVAC

### Safety and Regulatory Information

RAMVAC's meet the most current and highest safety standards. RAMVAC products are manufactured in an FDA registered, ISO 9001:2000 and ISO 13485:2003 certified facility.

Here is what you need to do to ensure the safety potential of this equipment is achieved:

- **Make sure your equipment is installed according to the instructions found in this manual.**
- **Always use a RAMVAC supplied power source for powering any component in the OWL.**
- **Read and follow all local, state and federal codes and regulations pertaining to these types of installations.**
- **Never connect the OWL to any voltage higher than those recommended in this manual.**

**Table of Contents**

OWL User Interface.....Page 1

OWL and Compatible Controls.....Page 2

OWL Overview.....Page 3

OWL Feature.....Page 3

System Schematics.....Page 4-5

Electrical Connections.....Page 6

Operation and Monitoring

    Main Level Operation.....Page 8-9

    Unit Staus Operation.....Page 10-11

    System Staus Operation.....Page 12-13

    Owl Configuration Operation.....Page 14-15

Multiple Unit System

    Understanding the System.....Page 18

    Low Voltage Electrical Connections.....Page 19

    System Layout for 2 Units.....Page 20

    System Layout for 3-8 Units.....Page 21

    Adjusting Vacuum Pressure.....Page 22

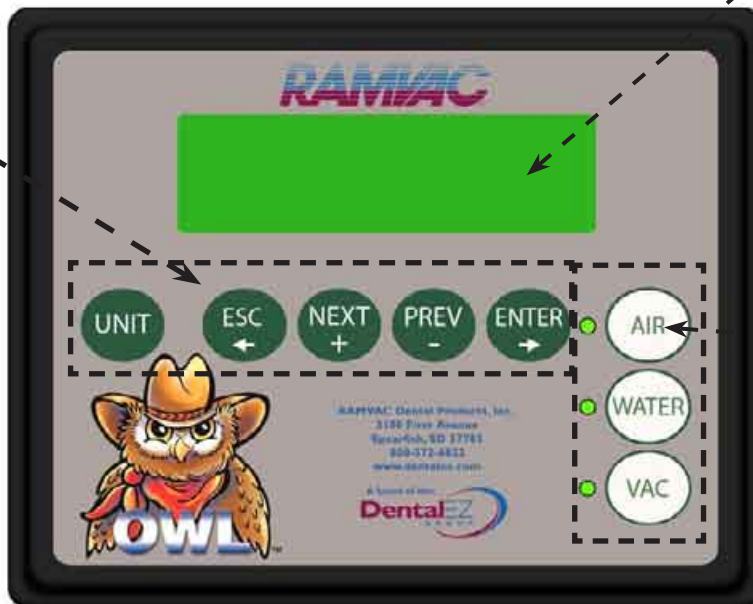
    Overhead Piping Adjustments.....Page 23

RAMVAC Product Support Services.....Inside Back Cover

**OWL User Interface**

**Menu Buttons -**  
Use to navigate the various OWL menus to check utility room equipment status.

**LCD Screen -**  
Displays OWL menus and utility room equipment status



**Run / Stop Buttons & LED Indicators -** Use to start / stop the corresponding utility room equipment. LED Indicators provide equipment status.

**OWL and Compatible Controls**

**OWL**



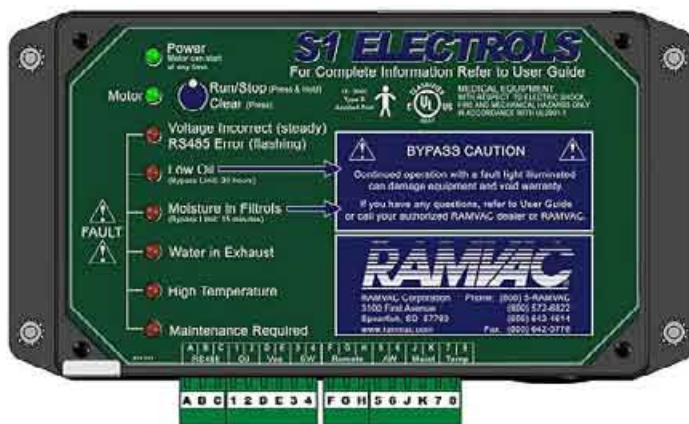
**OWL** – Mounts in any convenient location. Provides user control and interaction with utility room equipment.

**Interface Control**



**Interface Control** – Provides interface / communication between an OWL and non-RAMVAC utility room equipment.

**S1 Electrols**



**OWL** – Mounted controls on the RAMVAC vacuum pumps and communicates with the OWL.

**C1 Control**



**C1 Control** – Mounted controls on the CustomAir<sub>by</sub> RAMVAC air compressor and communicates with the OWL.

## **OWL Overview**

The OWL is a multi-functional, integrated electronic system designed to monitor and control dental utility room equipment from a remote location. When used in conjunction with RAMVAC electronic controls, the OWL provides monitoring, control, and displays alarms. The OWL is also flexible enough to provide start/stop functions for all other brands of utility room equipment. The compact, attractive, easy to mount control panel features an easy to read LCD screen, equipment control buttons, program navigation buttons, and LED indicator lights.

(OWLs are individually programmed at the RAMVAC manufacturing facility to meet the specific requirements of each facility)

## **OWL Features**

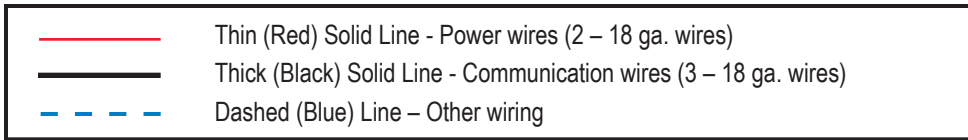
For RAMVAC equipment:

- Automatic, sequential starting and stopping of up to 8 air compressors and 8 vacuum units based on user demand. This feature continually sequences equipment on and off to meet varying system needs. The OWL also simplifies maintenance by apportioning run time on each machine to balance equipment run hours. The OWL can also simultaneously start and stop up to 8 water control valves.
- Programmable shut-off timer stops equipment at user-defined interval.
- Provides alerts when scheduled maintenance is due.
- Provides alerts when equipment has experienced a fault condition.
- Provides historical operating and fault data.
- Monitors run status of individual equipment.

For non-RAMVAC equipment:

- An Interface Control enables remote start/stop functions for up to 8 air compressors, 8 vacuum pumps, and 8 water control valves.
- Programmable shut-off timer stops equipment at user-defined interval.

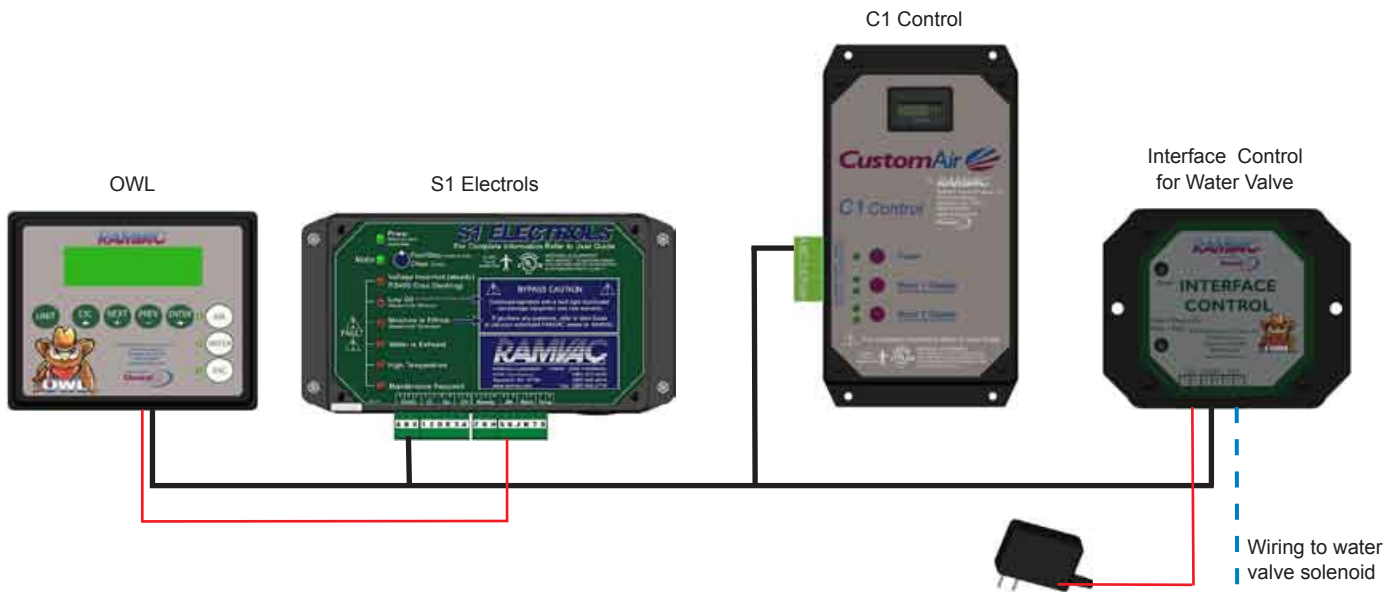
### System Schematics



Typical applications shown

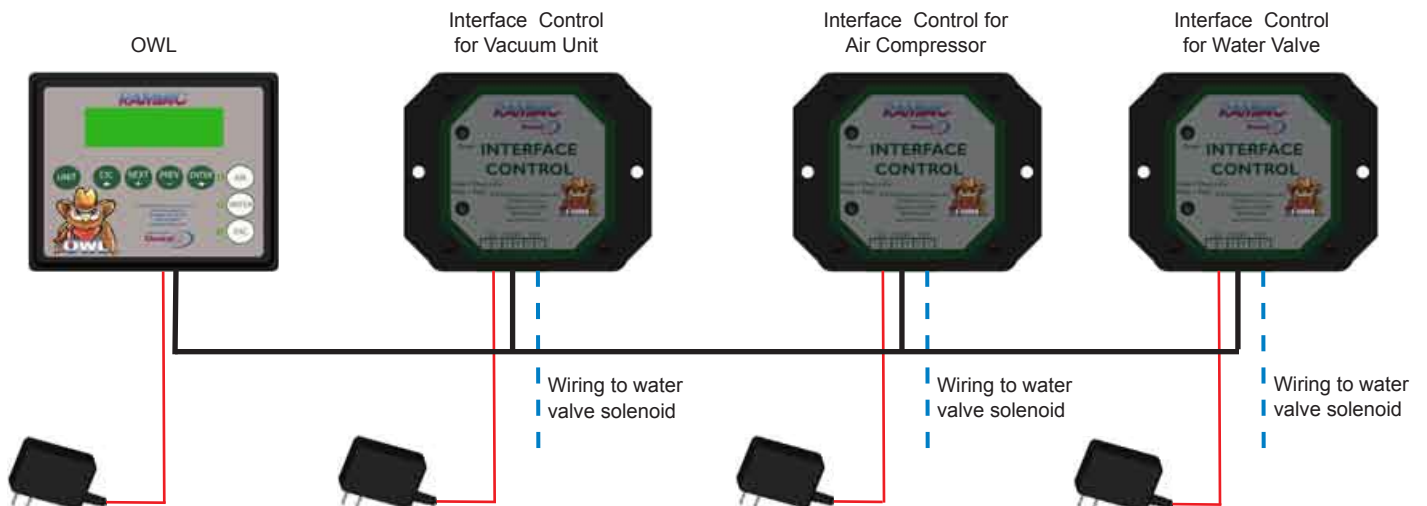
#### Schematic 1: OWL and RAMVAC equipment (with water valve option)

Note: Transformer supplied with Interface Control



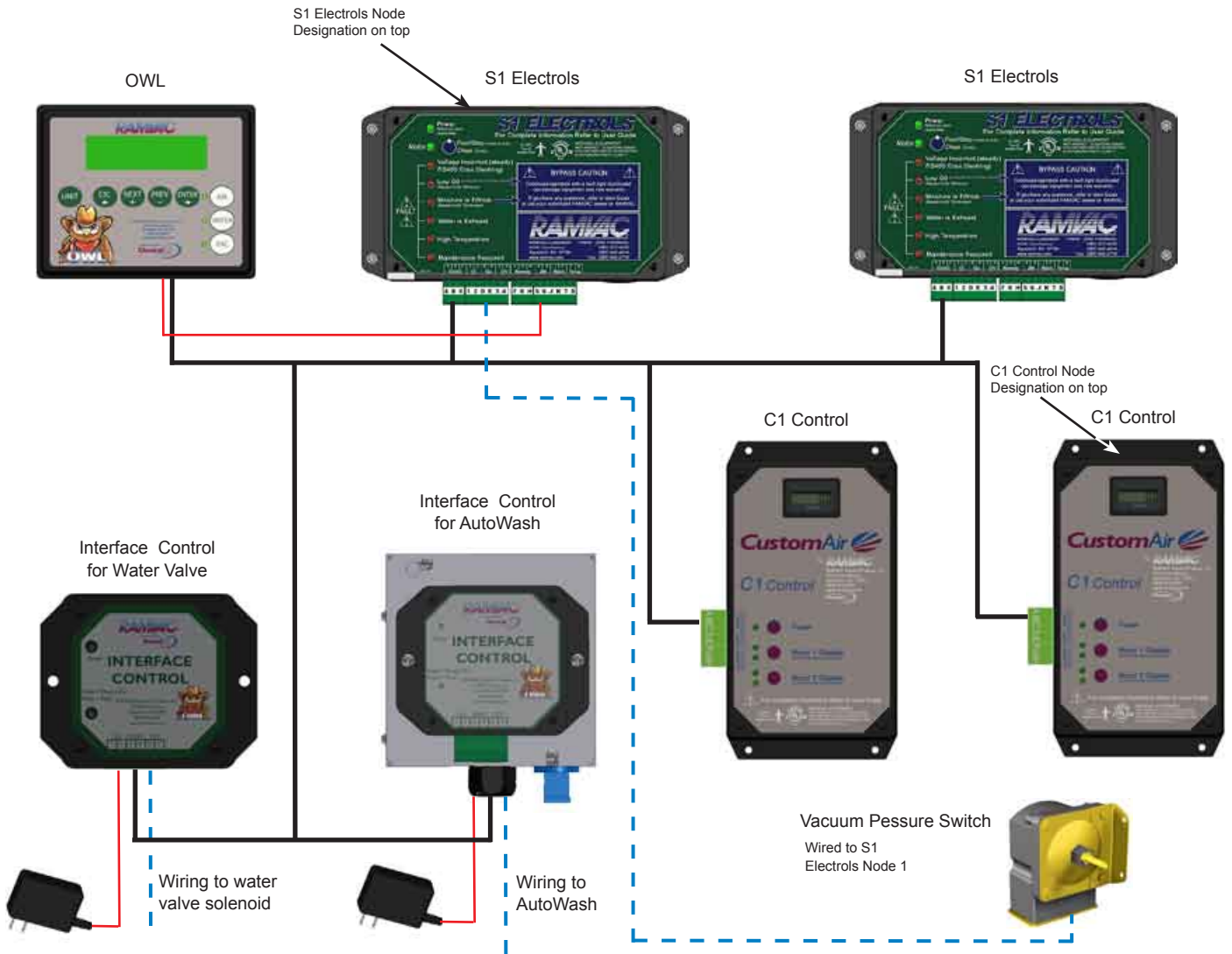
#### Schematic 2: OWL and non-RAMVAC equipment (with water valve option)

Note: Transformer supplied with Interface Control

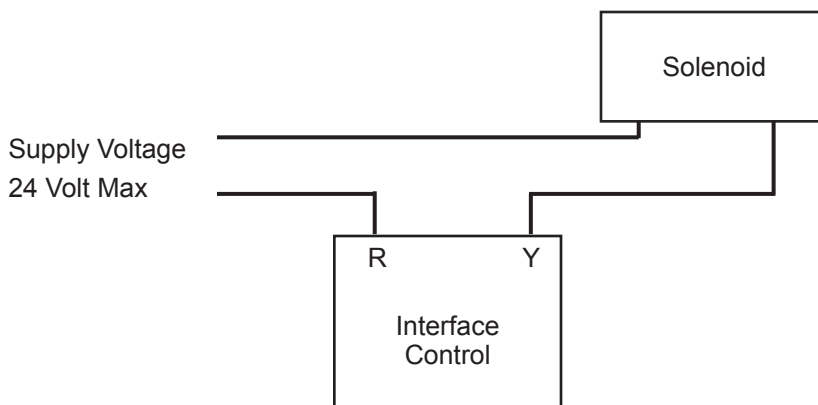


### Schematic 3: OWL and multiple RAMVAC controls (with water valve option and autowash)

Note: Transformer supplied with Interface Control



### Schematic 4: Interface Control Connection for Water Valve



## Electrical Connections

		RAMVAC OWL Connections	RAMVAC S1 Connections	CustomAir <sub>by RAMVAC</sub> C1 Connections	RAMVAC Interface Control Connections
Communication	RS485	A	A	A	A
	RS485	B	B	B	B
	shield / gnd	C	C	C	N/A
DC + Voltage		5	5 <sup>(1)</sup> See Power for Owl	5 <sup>(1)</sup> See Power for Owl	5 <sup>(2)</sup> See Interface Control Wiring
DC Gnd		6	6 <sup>(1)</sup> See Power for Owl	6 <sup>(1)</sup> See Power for Owl	6 <sup>(2)</sup> See Interface Control Wiring
Low Voltage Switching		N/A	N/A	N/A	R Y

### Communication Wires

The OWL communicates to the utility room equipment using a RS485 communication protocol across linked communication wires. RAMVAC recommends using 4 conductor 18 gauge shielded wire, to provide communication and power to the OWL. The A terminal on the OWL must attach to the A terminal on each of the equipment controls in the system. Likewise, the B terminal will connect to the B terminals on the equipment controls. The C terminal on the OWL will connect to the shield on the wire. The shield will then connect to the C terminal on the S1 Electrols and C1 Control, but does not connect to any Interface Controls in the system. Connections A2 and B2 on the OWL are not used.

### Power for the OWL

The OWL requires a 12v DC power source to operate. On most systems (see **Schematic 1**) the power source can be either the S1 Electrols or the air compressor C1 Control. If using the S1 or C1 for power, connect the 5 terminal on the S1/C1 to the 5 terminal on the OWL and the 6 terminal on the S1/C1 to the 6 terminal on the OWL. <sup>(1)</sup> *These wires can be included in the wire bundle with the communication wires, but will be connected to only **ONE** of the RAMVAC equipment controls in the system.*

In systems that do not have RAMVAC controls (see **Schematic 2**), a wall transformer is supplied to provide power to the OWL. Connect the black with white stripe wire from the transformer to the 5 terminal on the OWL and the black wire with text from the transformer to the 6 terminal on the OWL.

### Interface Control Wiring

The communication wires attach to the A and B terminals per the “Communication Wires” section above, but remember the shield does not connect to any terminal on the remote module.

<sup>(2)</sup> *A wall transformer is supplied with each Interface Control as a power source. Connect the black with white stripe wire from the transformer to the 5 terminal on the Interface Control and the black wire with text from the transformer to the 6 terminal on the Interface Control.*

The Interface Control R and Y connections act as a switch to turn on and off any equipment and can handle up to 24 V. See (**Schematic 4**) for a typical attachment to a solenoid. In most applications the interface control can be connected in place of the low voltage remote switch typically used to turn on and off the equipment.

**Note:** *An Interface Control must be used to operate any piece of equipment without a RAMVAC control.*

**Note:** *Systems with the optional AutoWash feature require a special Interface Control to control the AutoWash function. Function of the AutoWash feature is then controlled through the OWL controller instead of the S1 Electrols.*

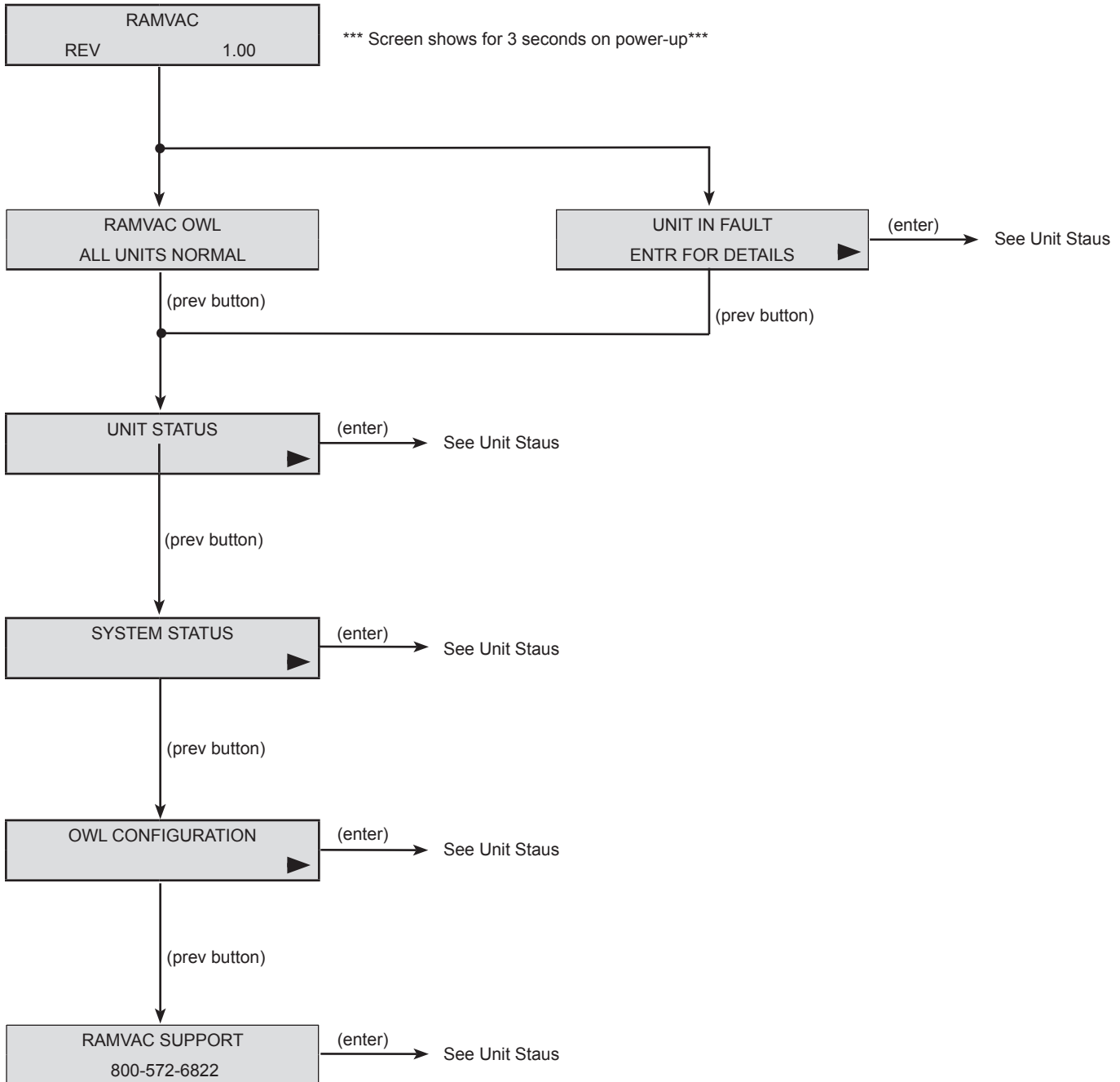


**Notes**

### Main Level Flow Chart

the Enter and Press Esc keys to change levels  
Press the Next and Prev keys to change categories  
Maximum 4 presses on the esc button takes you back to the top level

- ◀ Press Esc button
- ▶ Press Enter button



## **Main Level Descriptions**

1. When power is applied, the OWL will show the OWL name and the revision number for 3 seconds.
2. After self test the OWL display will show one of the following 2 screens.
  - a. ALL UNITS NORMAL
    - i. All units connected are in the normal run or standby condition.
  - b. UNIT IN FAULT
    - i. One or more of the units are in fault and need attention.
    - ii. Select Enter on the keypad for more information. See UNIT STATUS page for FAULT HISTORY.

### **Select the Prev Button**

3. UNIT STATUS
  - a. This path will lead to the individual status of a specified unit.
  - b. Select Enter on the keypad for second level. See UNIT STATUS page.

### **Select the Prev Button**

4. SYSTEM STATUS
  - a. This path will lead to the status of the system as a whole.
  - b. Select Enter on the keypad for second level. See VACUUM SYSTEM STATUS page.

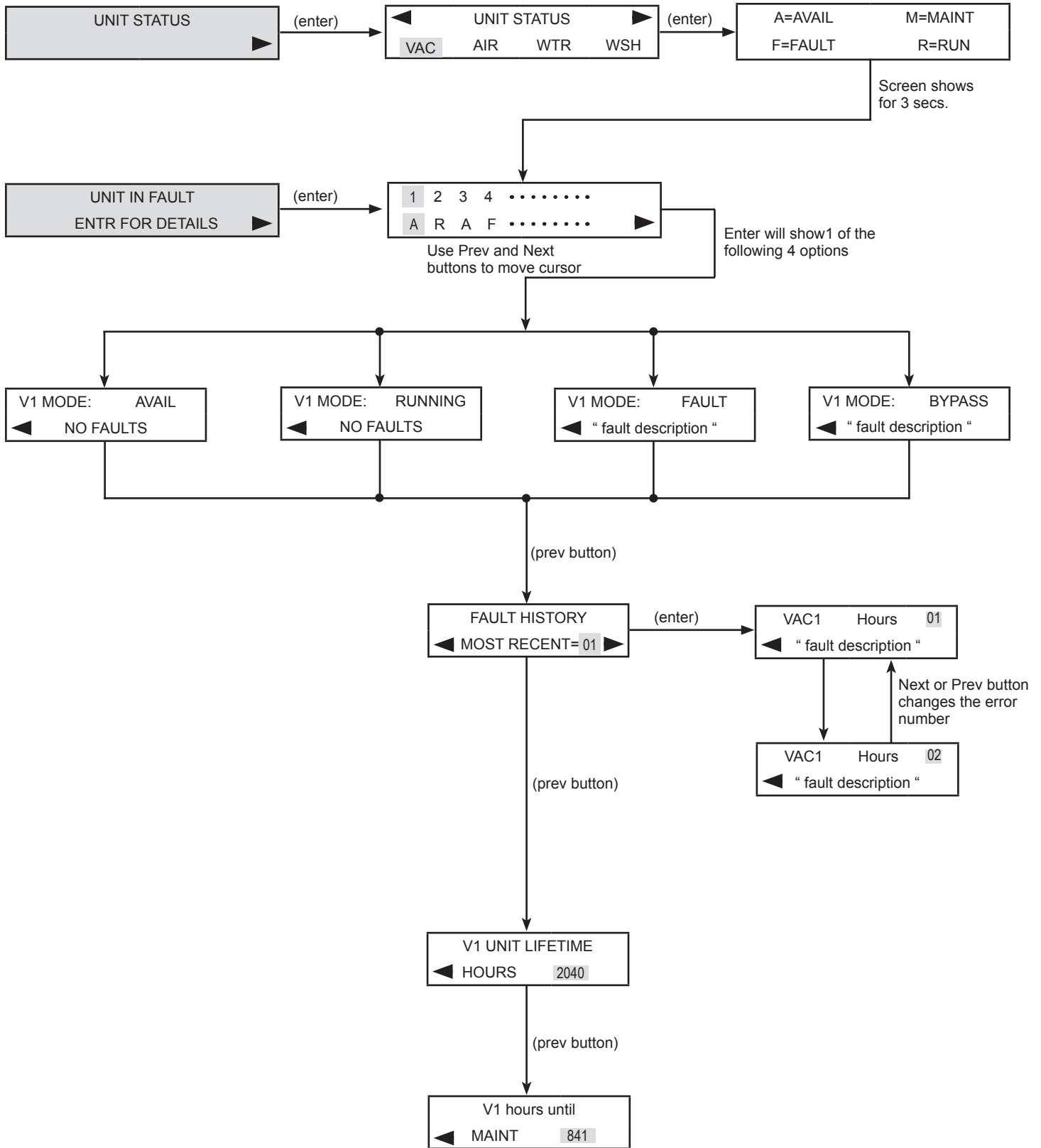
### **Select the Prev Button**

5. OWL CONFIGURATION
  - a. This path shows the total hours of run time for the OWL system.
  - b. Select Enter on the keypad for second level. See OWL CONFIGURATION page.
  - c. Call RAMVAC (800) 572-6822

### **Select the Prev Button**

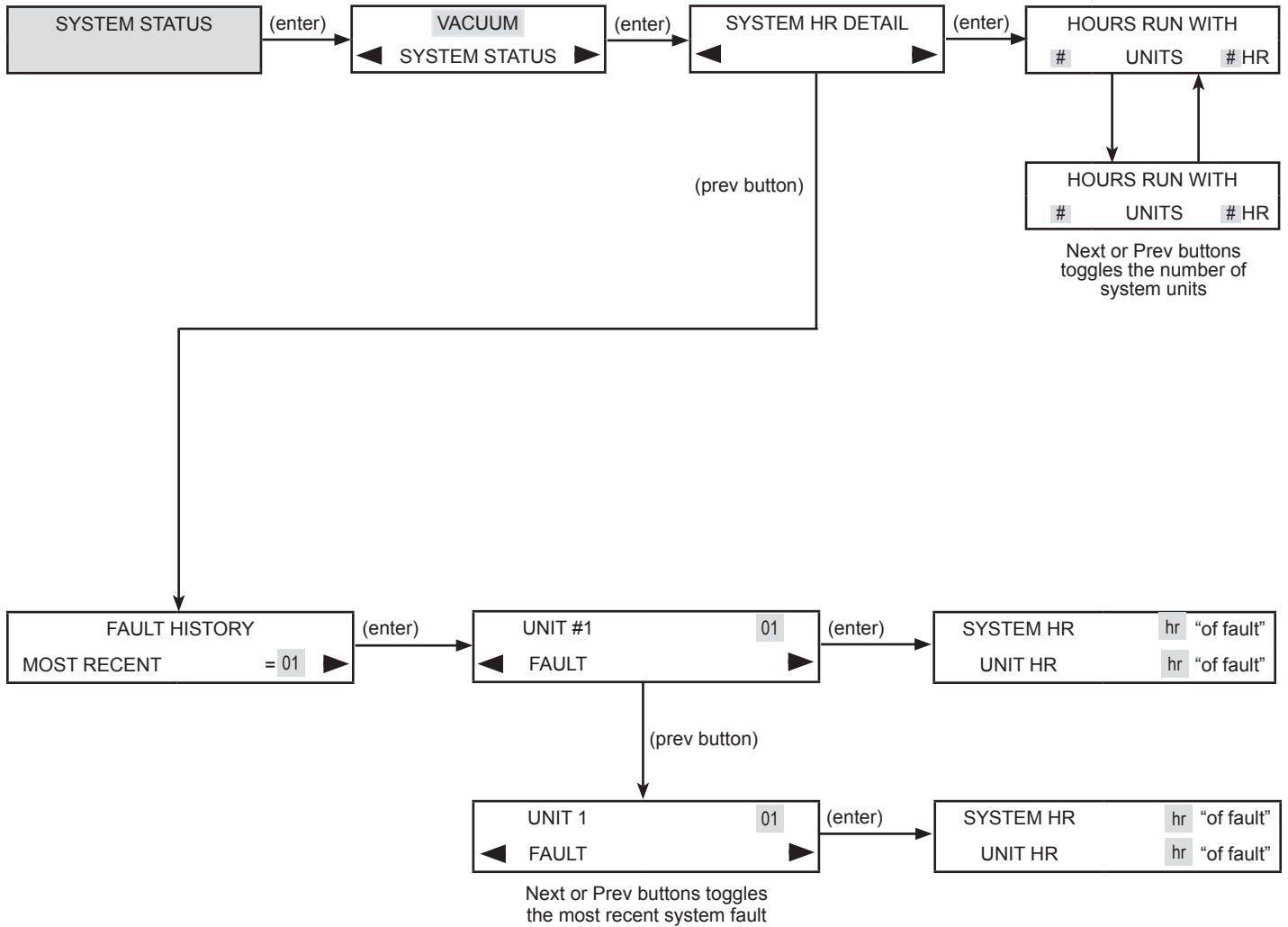
6. RAMVAC SUPPORT

### Unit Status Flow Chart





### System Status Flow Chart



## System Status Description

1. SYSTEM STATUS
  - a. **Enter** from the keypad gives the SYSTEM HOUR DETAIL screen.
  - b. **Esc** from the keypad returns to OWL startup screen.
2. VACUUM SYSTEM STATUS
  - a. **Enter** from the keypad produces the SYSTEM HOUR DETAIL screen.
  - b. **Prev and Next** buttons on the keypad to toggle the system from vacuum system to air system.
  - c. **Esc** from the keypad returns to the System Status screen.

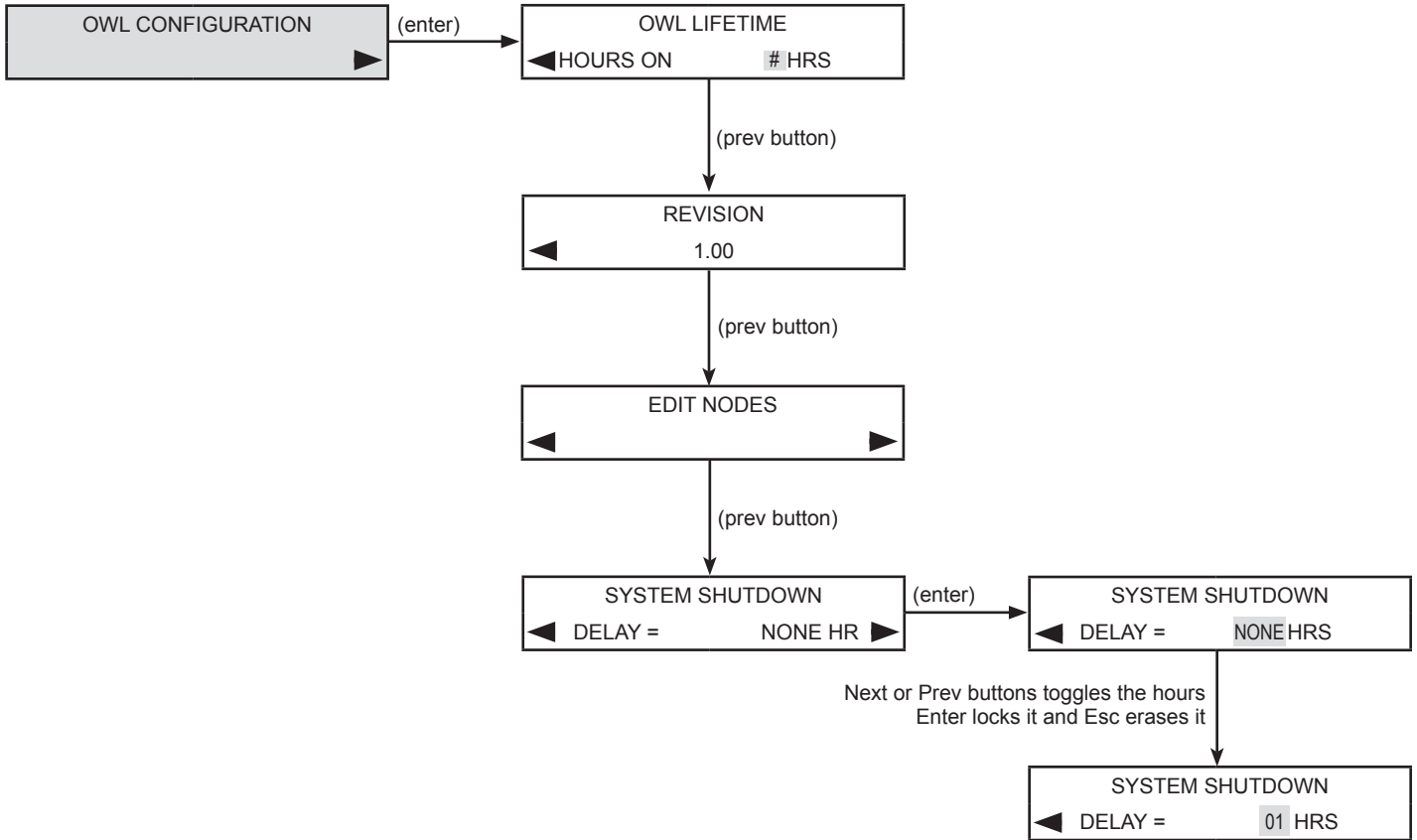
### Select Enter

3. SYSTEM HOUR DETAIL
  - a. **Enter** from the keypad produces a screen that shows the number of hours run by a selected number of units.
    - i. **Next or Prev** button on the keypad to toggle the number of units run from 1 to 8.
    - ii. **Esc** on the keypad returns to the SYSTEM HOUR DETAIL screen.
  - b. **Next or Prev** button on the keypad to go to the FAULT HISTORY SCREEN.
  - c. **Esc** from the keypad returns to the VACUUM SYSTEM STATUS screen.

### Select Down Arrow

4. FAULT HISTORY – System
  - a. Enter from the keypad produces a screen which shows the most recent fault is equal to 01.
    - i. **Enter** from the keypad produces a screen with the unit number with the most recent fault, the fault number, and the name of the fault.
      - a. **Enter** from this screen gives the system hour and the unit hour the fault occurred for the selected fault number.
      - b. **Esc** from the keypad returns to the previous screen.
    - ii. **Next or Prev** button on the keypad to toggle through each unit and the fault numbers.
    - iii. **Esc** from the keypad returns to the FAULT HISTORY screen.
  - b. **Esc** from the keypad returns to the VACUUM SYSTEM STATUS screen.

**OWL Configuration Flow Chart**





## OWL Configuration Description

### 1. OWL CONFIGURATION

- a. **Enter** from the keypad produces the number of run hours over the OWL lifetime.

#### Select Prev Button

### 2. REVISION

- a. Gives the revision number of the OWL.

#### Select Prev Button

### 3. EDIT NODES

- a. No user information.

#### Select Prev Button

### 4. SYSTEM SHUTDOWN

- a. **Enter** from the keypad produces the ability to set a timer for the run time of the system. Default is none.
- b. **Next or Prev** buttons on the keypad to change the delay time (number of hours the system will run from 1 to 24 hours).
- c. **Esc** from the keypad returns to OWL CONFIGURATION screen.





The following pages contain information on multiple unit systems that will be used when installing and servicing the system.

Use these pages in conjunction with other applicable guides.

### **Understanding the System**

The OWL multiple unit system is an automated control system for the control of dental utility room equipment from a centralized location, convenient to the dental office staff. The system automatically responds to demand so that clinicians always have the power they need for safe, effortless operation while minimizing energy consumption and hardware use.

Multiple units automatically selected to run by the computer minimize electrical consumption by operating according to demand. Multiple pumps offer the advantage of extending service life by reducing the operating hours of any one pump. Multiplexing inherently adds to backup capacity by decreasing dependency on any one device.

The Owl Controller requires a 12V DC power source to operate. On most systems, power can be provided by an S1 Electrols or C1 Controller already in the system. On systems without an S1 or C1, a wall transformer provides power for the OWL Controller.

In the system, the OWL is connected to one of the **S1 Electrols** mounted to one of the vacuum units or to one of the **C1 Controls** mounted to one of the CustomAir<sub>by RAMVAC</sub> compressors. The system is turned on and off from the OWL panel and automatically selects the pump with the lowest run-time.

With a 15 to 120 second period of “constant low pressure”, an adjustable pressure switch signals the microprocessor to turn on units as needed to maintain desired vacuum strength. After the system returns to a constant “normal vacuum strength” for a period of 15 minutes, unneeded power units are shut down. This “alternation with record keeping” makes sure your pumps get used evenly with no individual pump working longer than the others.

When using the OWL with generic (other than RAMVAC) units, including vacuum pumps, air compressors, or water valves, a RAMVAC Interface Control has to be used. It has the ability to communicate with the OWL to start and stop the generic units but does not have the ability to collect any data. Therefore, for these units the OWL becomes a start/stop switch.

**Low Voltage Electrical Connections**

Recommended wiring for the OWL to the S1 or C1 is a 4 conductor 18 gauge shielded cable.  
 Use 2 conductor 18 gauge shielded cable for communication between all the units.

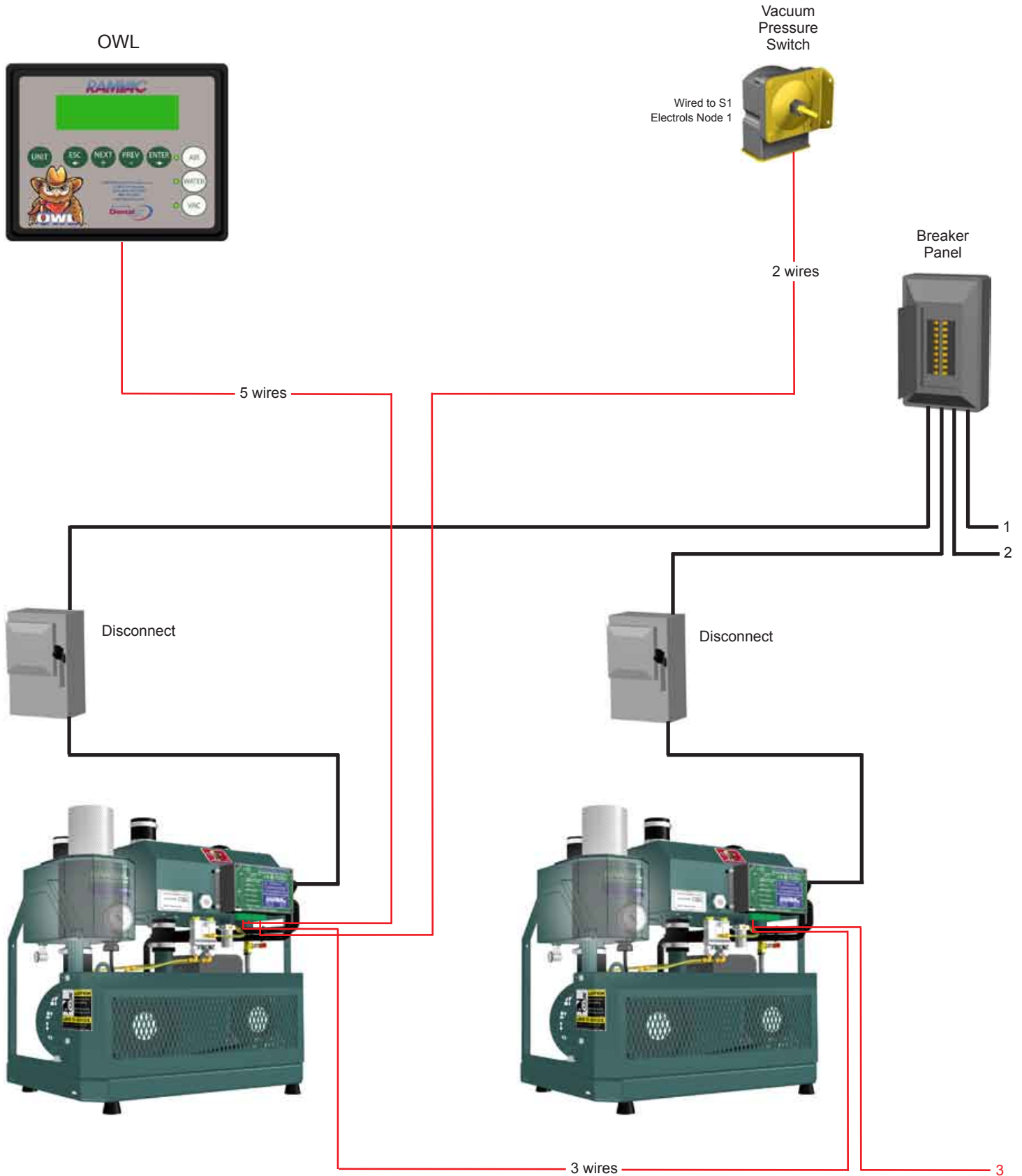
*Note: Communication wire length should be limited to 500 feet total in any wiring run  
 (for example: five sections 100 feet each daisy chained together or one continuous piece equals 500 feet).*

		RAMVAC OWL Connections	RAMVAC S1 Connections	CustomAir <sup>by RAMVAC</sup> C1 Connections	RAMVAC Interface Control Connections
Communication	RS485	A	A	A	A
	RS485	B	B	B	B
	shield / gnd	C	C	C	N/A
Vacuum Pressure Switch <i>(connect to vacuum node 1)</i>		N/A	D E	N/A	N/A
DC + Voltage		5	5 <sup>(1)</sup>	5 <sup>(1)</sup>	N/A
DC Gnd		6	6 <sup>(1)</sup>	6 <sup>(1)</sup>	N/A
Low Voltage Switching		N/A	N/A	N/A	R Y
12 VDC transformer Black/white stripe wire	+	5 <sup>(2)</sup>	N/A	N/A	5
12 VDC transformer Black/lettering wire	-	6 <sup>(2)</sup>			6

(1). These wires can be included in the wire bundle with the communication wires, but will be connected to only one of the RAMVAC equipment controls in the system.

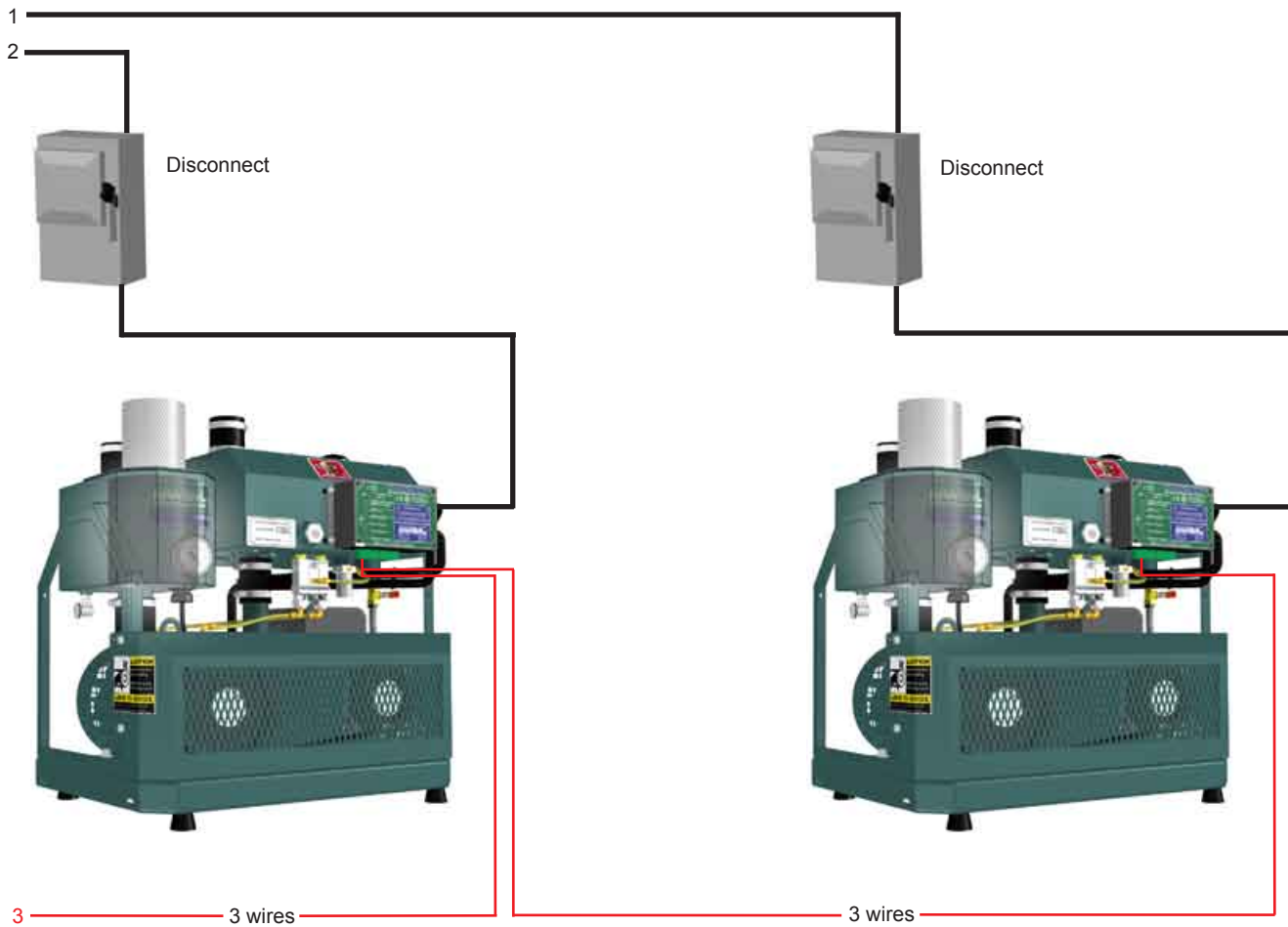
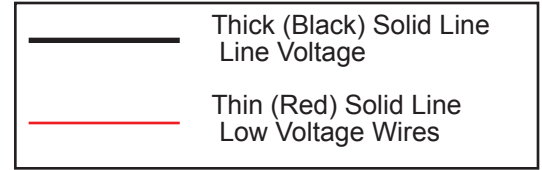
(2). A separate transformer is used on OWL only if the 12VDC is not supplied by the S1 or C1.

### System layout for 2 Units



### System layout for 3 to 8 Units

Simply add the unit power and the communication wires for up to 8 units.



## Adjusting Vacuum Pressure

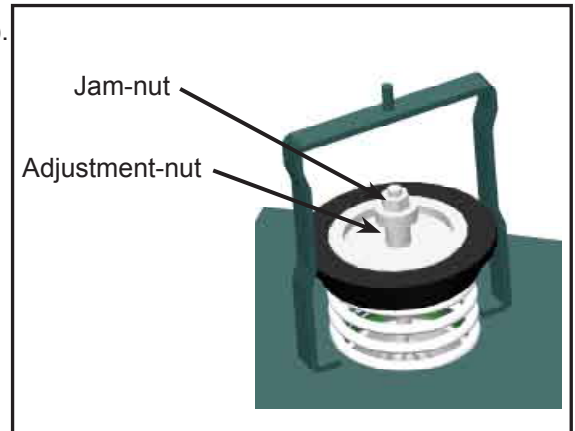
### Do NOT Adjust the Vacuum Controller if:

- Any vacuum devices are open.
- Your system has vacuum leaks.
- Vacuum is weak only when more than 2/3 of the rated number of vacuum devices are open.

**WARNING: You can damage equipment by making improper vacuum controller adjustments. Do not exceed motor full load amperes. Please contact RAMVAC if you are at all uncertain about this adjustment.**

### Adjusting the Vacuum Controller

1. Close all vacuum valves (high volume evacuators, saliva ejectors, surgical suctions) and close any other treatment room vacuum devices (nitrous oxide scavengers, vacuum sinks, vacuum cuspidors).
2. Disconnect inlet line to vacuum unit and cap off inlet.
3. Remove vacuum controller filter and loosen jam-nut.
4. Manually turn vacuum unit on and turn adjustment nut to raise or lower vacuum pressure.
5. When vacuum gauge reaches desired reading, tighten jam-nut and replace filter.
6. Manually turn unit off.
7. Uncap inlet and reconnect inlet line to vacuum unit.
8. Repeat steps 1 to 7 for each vacuum unit and then adjust Vacuum Pressure Switch.

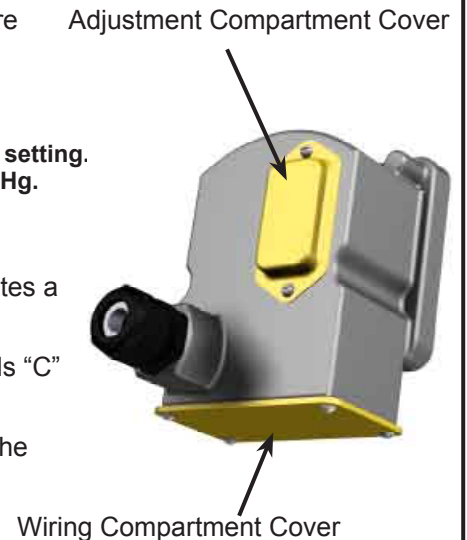


### Adjusting The Vacuum Pressure Switch

For typical Vacuum Stabilizer Control Installations, the included Vacuum Pressure Switch is set from the factory at 6 inches of mercury. For atypical installations requiring higher vacuum, such as those with overhead piping, you may need to adjust the switch to a higher setting.

**Note:** \*\* Adjust the pressure switch to 1" below the Vacuum Controller pressure setting.  
\*\* 1/2 turn of the adjustment screw adjusts switch level approximately 5" Hg.

1. Disconnect "12DE34" connector on S1 Electrols.
2. Open treatment room vacuum devices until the Filtrols' vacuum gauge indicates a vacuum setting 1" below the Vacuum Controller setting.
3. Open wiring compartment cover and apply a continuity tester across terminals "C" and "NC."
4. Open adjustment compartment cover and adjust pressure switch by turning the adjustment screw until the C to NC circuit closes as indicated on your tester.
5. Close the adjustment compartment and wiring compartment covers.





### Overhead Piping Adjustments


In order for the Vacuum Stabilizer Control to work properly, the correct adjustment must be set on the:

1. Power Unit's Vacuum Controller
2. Vacuum Pressure Switch

The factory settings are correct and should not be changed for installations with:

1. Below grade piping with a "Maximum Lift Height" to the separating tank of 6.5 feet or less.
2. Overhead piping with a "Maximum Lift Height" of 6.5 feet or less.

Note:  
Adjustments to this page can only be made to Pressure Switch shown below.



Contact RAMVAC if you do **not** have a switch that looks like this.

#### What's "Maximum Lift Height"?

It's the greatest vertical distance water must travel **uphill** in the vacuum system.

To determine "Maximum Lift Height," measure the greatest distance water must travel **uphill** from the lowest point to the highest point in the system.

Be sure to check the height of all piping and hoses in the mechanical room and all treatment rooms.

For below grade piping with a lift height to the Separating Tank greater than 6.5 feet, or overhead piping with a lift height greater than 6.5 feet...  
... the following adjustments must be made:

<p><b>Adjust the Vacuum Controller:</b></p> <ol style="list-style-type: none"> <li>1. Measure the maximum lift height</li> <li>2. Adjust vacuum controllers to correspond with "Maximum Lift Height" as shown in the chart to the right.</li> <li>3. See "Adjusting the Vacuum Controller and Adjusting the Vacuum Pressure Switch," on previous page.</li> </ol> <p><b>Warning: Do not exceed motor full load amperes.</b> Please contact <b>RAMVAC</b> if you are at all uncertain about this adjustment.</p>	Maximum Lift Height	Vacuum Controller Settings
	7 feet	7.5" Hg
	8 feet	8.3" Hg
	9 feet	9.2" Hg
	10 feet	10.2" Hg
	11 feet	11.0" Hg
	12 feet	12.0" Hg



**RAMVAC® Product Support Services**

The DentaleZ Group and its employees are proud of the products we provide to the dental community. We stand behind these products with a warranty against defects in material and workmanship as provided below.

In the event that you experience difficulty with the application or operation of any of our products, please contact our customer service department at our expense at (866) DTE-INFO.

If we cannot resolve the issue by telephone, we will arrange for a representative to contact you or suggest that the product be returned to our factory for inspection.

If product return or repair is required, we will provide you with a **Return Authorization** number and shipping instructions to return the product to the proper facility. If the product is under warranty we will ask you to provide proof of purchase such as a copy of your invoice. Please be sure to include the **Return Authorization** number on the package you are returning. **Products returned without a return authorization number cannot be repaired.**

Freight costs for product returns are the responsibility of the customer. Products under warranty will be repaired or replaced, at our sole discretion, and returned at our expense. Products outside the warranty limits will be repaired and returned with costs invoiced to the customer. We are not responsible for shipping damages. We will, however, help you file a claim with the freight carrier. Written repair estimates are available.

DentaleZ warrants all equipment and parts to be free of defects in material and workmanship, under normal usage, under the following terms:

**RAMVAC Products:**

- RAMVAC® Dental Vacuum System
- RAMVAC® Vacuum Pumps only
- RAMVAC® OWL™
- CustomAir® by RAMVAC®

**Warranty Period:**

- 2 Years from date of installation\*
- 10 Years from date of installation\*
- 2 Years from date of installation\*
- 6 Years / 4200 hours from date of installation\*

Please note the following additional terms of our warranty and return policy:

- Warranties cover manufacturing defects only and do not cover defects resulting from abuse, improper handling, cleaning, care or maintenance, normal wear and tear or non-observance of operating, maintenance or installation instructions. **Failure to use authorized parts or an authorized repair facility voids this warranty.**
- **Liability is limited to repair or replacement of the defective product at our sole discretion. All other liabilities, in particular liability for damages, including, without limitation, consequential or incidental damages are excluded.**
- This warranty is in lieu of all other warranties, expressed or implied, including ANY IMPLIED warranties of merchantability or fitness for a particular purpose. no employee, representative or dealer is authorized to change this warranty in any way or to grant any other warranty.

**WARRANTY REPAIRS:**

Parts repaired or replaced on a product that is in warranty will be warranted for the duration of that product's original warranty.

**NON-WARRANTY REPAIRS:**

The warranty on parts either repaired or replaced on an out-of-warranty product will cover the repaired part only and will be for the timeframe of a new parts warranty period.

**PRODUCT RETURN:**

Opened products or product returns more than a year old cannot be returned for credit. There will be a 15% (\$25.00 minimum) restocking charge on all items authorized for return.

\*When installed, operated and maintained in accordance with written instructions.

*RAMVAC, Bison, Bulldog, FLOWCHECK, Ramclean and VACHECK are registered trademarks and InfiniTank, OWL and SlugBuster are trademark of RAMVAC Dental Products, Inc.*



3100 First Avenue  
(800) 5-RAMVAC

Spearfish, SD 57783  
FAX (605) 642-3776

[www.ramvac.com](http://www.ramvac.com)

© 2008 RAMVAC Dental Products All rights reserved.

No part of this publication may be copied or distributed,  
transmitted or transcribed in any form or by any means  
without the expressed written permission of  
RAMVAC Dental Products, Spearfish, SD 57783

*EXCLUSIVELY FROM*



**ISO 9001:2000 certified facility**

**ISO 13485:2003 certified facility**

3100 FIRST AVENUE, SPEARFISH, SD 57783

TOLL FREE: 800-5-RAMVAC (800-572-6822)

PHONE: (605) 642-4614 • FAX: (605) 642-3776

e-mail: [ramvac@ramvac.com](mailto:ramvac@ramvac.com)

website: [www.ramvac.com](http://www.ramvac.com)

*A Brand of the*



The Integrated Supplier  
PHONE: (866-DTE-INFO)  
[www.dentalez.com](http://www.dentalez.com)

---