

OSPREY

DENTAL COMPRESSED AIR SYSTEM



**INSTALLATION, MAINTENANCE
AND USER MANUAL**

The Osprey compressors are NFPA99C Level 3 dental compressed air systems. Two versions of the Osprey are available. One, the smart model, is run by a “state of the art” electronic control (C2) that provides for continuous operation in a controlled environment. The other version is the basic model that uses a traditional pressure switch. Our compressors are built to serve the needs of the dental industry, by providing clean dry air and years of reliable service.

Table of Contents

Table of Contents Page 3

Safety and Regulatory Information Page 4

EMC InformationPage 5

NotificationsPage 7

Notifications Page 8

Unpacking Page 9

Installation Page 10

Low Voltage Remote Switching Page 16

B Model Important Features Page 17

S Model Important FeaturesPage 18

Operation

Theory of Operation Page 19

Getting Started Page 19

C2 Control FeaturesPage 20

Maintenance

Maintenance OverviewPage 22

Preventative Maintenace SchedulePage 22

Filter Maintenance Page 23

Inspecting Dryer Page 24

Testing Safety ValvePage 24

Testing Compressor for Leaks Page 24

Specifications Page 25

Warranty Page 26

Thank you for selecting an Osprey Dental Compressed Air System to serve your dental facility. These RAMVAC compressors use proven oil-less technology to set new standards in compressed air system performance, durability and economy.

Invest a few minutes of your time and:

1. Read the "Maintenance" section in this guide. Use these simple preventive procedures that will allow your compressor to reach its service-life potential.
2. Read the "Operation" section in this guide. Find out how to best control your compressor and put its safety features to work for you.
3. Initiate the warranty. Check inside the back cover to review our warranty commitment to you ... and what you need to do to receive warranty coverage.

To initiate the warranty you must:

1. Complete and return the Installation Checklist to RAMVAC.
2. Visit our website at www.ramvac.com and complete the warranty initiation form.

All of us at RAMVAC® appreciate your business and take a personal interest in your satisfaction. Please let us know how the system is working for you. Just give us a call or stop by one of our dental show exhibits.

SAFETY AND REGULATORY INFORMATION









RAMVAC compressors meet the most current and highest safety standards. RAMVAC compressors are certified to ANSI/AAMI ES60601-1:2005(R2012) and certified to CAN/CSA Standard C22.2 No. 60601-1:08, and comply with NFPA 99C level 3 vacuum requirements. They are manufactured in a FDA Registered ISO 13485:2003 certified facility.

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

- Make sure your equipment is installed according to our written instructions and the Installation Checklist is completed.
- If you have purchased your RAMVAC compressor from an authorized dealer, the dealer is responsible for presenting you with the completed checklist.
- Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
- Type of protection against electrical shock: "Class 1"
- The Air System is designated "IPX0" and must be protected from ingress of water.
- NOT intended for use in an OXYGEN RICH ENVIRONMENT.
-

Operating and Shipping Conditions

AMBIENT CONDITIONS: This utility room equipment is designed to operate in the temperature range designated below. The utility room environment may require additional ventilation and HVAC accommodations in order to maintain an acceptable environment. The operating temperature listed is to be maintained under worst case conditions taking into account seasonal temperature changes.

The Osprey labels include safety symbols with special meanings:		
 <p>This means there is more information available in this User Guide.</p>	 <p>This means "hot surface. Be aware of risk of burns if touched".</p>	 <p>Used to advise the operator to consult the accompanying documents.</p>
 <p>This notifies handlers that the box must remain upright at all times.</p>	 <p>This notifies handlers that this box should never be stacked.</p>	 <p>This notifies handlers of the safe temperature range for the contents in box.</p>
 <p>This notifies handlers of the safe humidity range of the contents in the box.</p>	 <p>This warns handlers not to allow the box to be placed on an unlevel surface due to risk of tipping.</p>	

EMC INFORMATION

Medical Electrical Equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this manual.

Portable and mobile RF communications equipment can affect Medical Electrical Equipment.

The use of Accessories, transducers, and cables other than those specified, with the exception of transducers and cables sold by the Manufacturer of this device as replacement parts for internal components, may result in increased Emissions or decreased Immunity of the compressor.

The compressor unit should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, the compressor should be observed to verify normal operation in the configuration in which it will be used.

Floors should be wood, concert or ceramic tile. It is recommended that a higher than 30% relative humidity be established and the operator wear a ground strap before physical contact is attempted.

There may be an instance, in low humidity environments that the user of the Dental Compressed Air System may cause the compressor to stop as a result of electrostatic discharge (ESD) energy. The remedy to be taken, in such an instance, is to push the Start button to activate the compressor.

GUIDANCE AND MANUFACTURER'S DECLARATION –ELECTROMAGNETIC IMMUNITY

The OSPREY family of dental air compressors is intended for use in the electromagnetic environment specified below. The customer or the user of the OSPREY family of dental air compressors should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	± 2 kV contact ± 2 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/ burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	± 2 kV for power supply lines Not applicable. No data I/O lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % U_T (>95 % dip in U_T) for 0,5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 sec	<5 % U_T (>95 % dip in U_T) for 0,5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the OSPREY family of dental air compressors requires continued operation during power mains interruptions, it is recommended that the OSPREY family of dental air compressors be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A / m	Not Applicable	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE U_T is the a.c. mains voltage prior to application of the test level.


GUIDANCE AND MANUFACTURER'S DECLARATION –ELECTROMAGNETIC EMISSIONS

The OSPREY family of dental air compressors is intended for use in the electromagnetic environment specified below. The customer or the user of the OSPREY family of dental air compressors should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group 1	The OSPREY family of dental air compressors uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	
Harmonic emissions IEC 61000-3-2	Not applicable	The OSPREY family of dental air compressors is suitable for use in all establishments other than domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Voltage fluctuations / flicker emissions IEC 61000-3-3	Not applicable	

GUIDANCE AND MANUFACTURER'S DECLARATION –ELECTROMAGNETIC IMMUNITY

The OSPREY family of dental air compressors is intended for use in the electromagnetic environment specified below. The customer or the user of the OSPREY family of dental air compressors should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the OSPREY family of dental air compressors, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m	$d = 2.3\sqrt{P} \quad 800 \text{ MHz to } 2,5 \text{ GHz}$ where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, ^a should be less than the compliance level in each frequency range. ^b Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

^a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the OSPREY family of dental air compressors is used exceeds the applicable RF compliance level above, the OSPREY family of dental air compressors should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the OSPREY family of dental air compressors.

^b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

RECOMMENDED SEPARATION DISTANCES BETWEEN PORTABLE AND MOBILE RF COMMUNICATIONS EQUIPMENT AND THE [EQUIPMENT OR SYSTEM]

The OSPREY family of dental air compressors is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the OSPREY family of dental air compressors can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the OSPREY family of dental air compressors as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	80 MHz to 800 MHz $d = 1.2\sqrt{P}$	800 MHz to 2,5 GHz $d = 2.3\sqrt{P}$
0,01	0.12	0.12	0.23
0,1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

The following 2 pages contains various precautions that are extremely important to your health and safety.

Please read and adhere to these precautions.

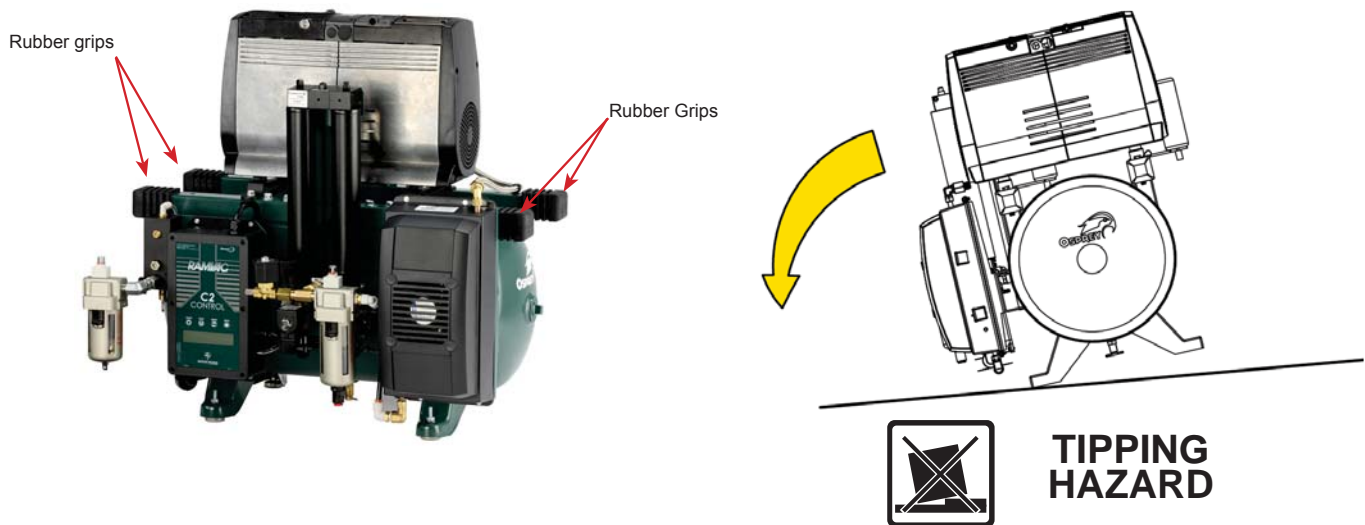
Warranty	This compressor is covered by a limited warranty agreement.
Maximum Temperature	This compressor assembly is designed to provide peak operation at utility room temperatures between 50 and 90 deg F. Prolonged operation above 90 deg F can reduce the life expectancy of this device. Maximum allowable (intermittent) utility room temperature for this compressor is 100 deg F.
Minimum Temperature	This compressor assembly is designed to provide peak operation at utility room temperatures between 50 and 90 deg F. Minimum allowable (intermittent) utility room temperature for this compressor is 35 deg F. Some components could be damaged by freezing of condensate moisture, which is a normally occurring by-product of the compression process.
Humidity in Operation	This compressor assembly is designed to operate in a humidity range of 0% to 95% RH, no condensing moisture.
Tip Hazard	Locate the compressor on a level hard surface capable of supporting the compressor weight. If a level surface is not available, the compressor is equipped with height adjustable feet to level the device. Do not install this compressor on any surface with greater than a 5 degree slope.
Device Front Heavy	The weight distribution of this compressor is un-balanced to the front of the device. Exercise care when lifting to avoid accidental tipping and possible dropping of the device, which could result in damage to the compressor.
Rough Handling	If for some reason you believe the compressor has been damaged during shipping or installation, contact a qualified service technician to inspect the device before and after start-up.
Handles	Handles for lifting the compressor assembly are provided on each end of the device. Lifting the compressor assembly by any other part or location could result in damage to the compressor.
Shields / Moving Parts	The compressor has several guards designed to protect against accidental contact with dangerous components. Do not remove these guards until power has been disconnected/turned-off from the equipment. If service is required with the guard removed and the power on, it should only be performed by a qualified service technician. Always replace any guards that have been removed for service or that may have been damaged.
High Pressure Service	The compressor system may be pressurized, follow the discharge procedures in the owners manual prior to conducting any repairs or maintenance. Working on pressurized components could result in severe injuries or even death, it is recommended any repairs or service be performed by a qualified service technician.
Service of Filters	Basic models will be serviced every year or 700 hours. Smart models will be service when the C2 will notify when it is time to check/replace.
Facility Air Lines New	Installing air lines in a new facility, follow NFPA99 standards and maintain cleanliness throughout.
Facility Air Lines	Prior to or during the replacement of compressors, always verify the cleanliness of the existing air lines in the facility. Old or malfunctioning compressors can cause unhealthy deposits of mold, dust or dirt.
Fresh Air Intake	A source of conditioned fresh air is required for safe operation of this compressor. The air source must be located outside the utility room and away from potential air contaminants.
Shut-off Valve	The compressor is shipped with the shut-off valve in the closed position to limit exposure of the system to humidity. Open the valve after installation.
Air Leaks	An air leakage test should be conducted on the facility air system to ensure no air leaks are present. Excessive air leakage will impact the performance and life expectancy of your compressor.
Breathing Air	This compressor system is designed for dental procedures and powering dental equipment and can be safely used in the oral cavity for such purposes. Under no circumstances should it be supplied or considered as medical/breathing air for a patient.
Inspection	This compressor system when correctly specified for a dental office, should accumulate around 700 hours per year, or run at approximately a 50% duty cycle (3 min. on, 3 min. off). Service and maintenance intervals are calculated accordingly, but could vary greatly depending on the installation. That's why its important to occasionally inspect the compressor for emerging issues or maintenance requirements that may not conform to the average.

Installation	Installation of this device should be conducted by licensed electrical and plumbing contractors and should always follow the instructions found in the various manuals, unless local, state or national building codes specify otherwise. Failure to comply with all applicable codes and installation procedures may result in personal injury, damaged components or reduced life expectancy of this product.
Grounding	This device requires proper electrical grounding for safe operation. A licensed electrician should always complete the electrical portion of the installation process. WARNING: To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth.
Tripping	During installation, always ensure all electrical, plumbing or other utilities are properly located to avoid possible tripping or falling hazards. Always follow all local, state and national building codes, as well as any applicable workplace safety regulations.
Electrical	The disconnection means and overcurrent protection are to be provided by the installer (qualified electrician), in accordance with the applicable local and national electrical codes.
Electrical Existing	This device should always be attached to a dedicated circuit with appropriate wiring and circuit protection. If this device is being installed as a replacement, always have a licensed electrician inspect the existing facility electrical and complete the electrical portion of the device installation.
Plumbing	This device should always be installed with the appropriate plumbing and fresh air intake systems. If this device is being installed as a replacement, always have a licensed plumber inspect the existing facility plumbing and complete the plumbing portion of the device installation.
Flooding	Do not locate this device or its air intake opening in an area that is prone to flooding or has previously flooded. Water can damage components, reduced life expectancy of the compressor or cause serious personal injury.
Elevation	This device may be used at elevations between sealevel and 9,000 ft. The devices performance should be derated by 10% for every 3,000 ft rise in elevation.
Sound Levels	Advertised sound levels for this device are developed in a controlled environment and may not reflect actual values measured in the utility room. Differences in utility room construction materials and device location have a significant impact on the perceived sound level and quality.
Humidity	This device can be transported and stored at humidities between 0 and 95 percent.
Transport	This device can safely be shipped and stored for up to 3 months in temperatures between -20 deg F and 165 deg F. Humidity levels will not have any impact on the appearance of this device. Prolonged direct exposure to salt air may impact the appearance of certain components.
Do Not Stack	This device must not be stacked during transport or storage.
Tank / System Modification	Modification of this air compressor system from its original form is strictly prohibited and could lead to termination of product warranty. And possible injury or death to persons in vicinity. Do not modify this equipment without authorization of the manufacturer. If this equipment is modified, appropriate inspection and testing must be conducted to ensure continued safe use of equipment.
This Side Up	This device must be oriented right side up during transport and storage.
Line Voltage Limitations	This air compressor has been designed to operate within the following voltage ranges; 115V systems - 103 to 126VAC; 230V systems - 208 to 253 VAC. Failure to provide sufficient voltage to this device could result in damage to electrical components and reduced service life.
Service of Components	When servicing this compressor, only use Ramvac approved service parts. Utilizing non-approved components could lead to system damage and possible termination of product warranty. Circuit diagrams, parts lists and other required information is available to service personnel by contacting RAMVAC. (See back cover)
Moisture Indicator	This device is equipped with a moisture indicator near the operator outlet that will change colors based on the dew point level of the compressed air. During normal operation the indicator should be blue. If the indicator turns pink during normal operation, the dryer system of the compressor may be malfunctioning or need service. Contact a qualified service technician if maintenance or service is required.
Grounding (Service)	During the performance of any service procedures that may involve the disconnection of a ground wire, take extra precautions to verify the ground wire has been properly re-connected. Never leave a ground wire disconnected, since this can create a significant safety issue.
Hearing Protection	Some activities such as opening the safety pressure relief valve may create excessive sound levels that could damage hearing. Hearing protection is recommended during service of this device.
Air Safety	Never direct the air stream towards any portion of the body or others in the vicinity. Pressurized air streams can be extremely hazardous to your health and can result in death in certain circumstances.

Unpacking Instructions for the Osprey Compressor

IMPORTANT NOTE: It is recommended to leave the unit attached to the shipping pallet during transport until final destination.

1. Carefully remove the shipping carton from the pallet containing the compressor.
2. Visually inspect the entire compressor for shipping damage.
 - a. Visually inspect the motor isolator mounts for tearing.
 - b. If shipping damage is found, immediately contact the freight carrier and supplier.
3. Remove four nuts that retain the compressor to the shipping pallet.
4. For easier handling, there have been four rubber grips installed on the frame of the compressor for lifting.



CAUTION: The compressor is front heavy. When moving with handles, be sure to hold it securely to prevent it from tipping.

5. Verify additional parts shipped with the compressor for use at installation:
 - Osprey Outlet Plumbing Kit.
 - Osprey Coalescing Filter Drain Kit.
 - Osprey Feet Kit.
 - Osprey Doctor's Packet.
 - Osprey Installation Packet.
 - Osprey Maintenance Chart and Head Service Kit.
 - Osprey Low Voltage Wiring Kit

Remember to fill out and mail in the Installation Checklist to initiate the warranty !!!

Placement

- Indoor use only, in a dust free, climate controlled room.
- DO NOT install in an enclosed area where ambient temperature could exceed temperature specifications of below 0° C / 35° F or above 37.7° C / 100° F while the compressor is running.
- Maintain minimum 12" clearance on all sides and on top of all compressors.
- Install 4 adjustable rubber feet supplied, to ensure unit stands firmly on the floor.

WARNING: DO NOT install on surfaces with more than a 5° incline.

WARNING: To prevent tipping during transport securely fasten unit to shipping pallet.

WARNING: Danger of fire or explosion when using flammable substances.

WARNING: Never leave children unattended when compressor is in use.

Electrical

- Follow NEC, NFPA 99C, and all local codes.
- Compressors are shipped with a six foot electrical whip of the appropriate size for the compressor.
- Qualified personnel must install a dedicated electrical circuit of sufficient capacity. (See Specification table)
- See "Specifications" for more electrical information.
- Any means provided to isolate this device from the supply mains shall isolate all poles simultaneously. The disconnection means and overcurrent protection are to be provided by the installer (qualified electrician), in accordance with applicable local and national electric codes. This device should always be attached to a dedicated circuit with appropriate wiring and circuit protection. If this device is being installed as a replacement, always have a licensed electrician inspect the existing facility electrical and complete the electrical portion of the device installation.

WARNING: Electrical shock could occur as a result of improper grounding.
This product must be grounded according to NEC regulations and local codes.

WARNING: Always turn off compressor and remove power from compressor when servicing.

CAUTION: Use of a plug for electrical service is not recommended. Incorrect connections will cause a drop in line voltage and/or loss of power. Overheating could result.

Plumbing Connections

- Attach drain tubing to fitting on bottom of coalescing filter and direct it into floor drain for disposal of water.
- Connect compressor air outlet to facility plumbing with provided supply hose (3/8"mpt x 3/8"mpt, 6 ft in length).
Note: Pressure regulator is customer supplied.
- Install Particulate Filter to the facility shut-off valve using Plumbing Kit connectors provided.
- Install Fresh Air Manifold and connect Fresh Air Intake Kit supplied to external air source per NFPA 99C recommendations.

WARNING: Property damage and / or personal injury may result if directions are not followed or OEM parts are not used.

CAUTION: Connect only equipment suitable for listed maximum pressure of the compressor.

INSTALLATION INSTRUCTIONS OSPREY FEET KIT



SAFETY INFORMATION - READ BEFORE STARTING ASSEMBLY OF FEET

Warning: Handles for lifting the compressor assembly are provided on each end of the device. Lifting the compressor assembly by any other part or location could result in damage to the compressor.

Warning: The weight distribution of this compressor is un-balanced to the front of the device. Exercise care when lifting to avoid accidental tipping and possible dropping of the device, which could result in damage to the compressor or severe injuries to the installer.

Warning: Compressor assemblies are very heavy and may require multiple people to safely lift. Prior to lifting, check the Installation and Maintenance Manual for the weight of this model. Over-exertion could result in serious injuries to the installer.

Warning: This procedure may not comply with all safety requirements of federal, state or local agencies or safety requirements of the installer's employer. If a conflict does exist, follow the requirements set forth by the other organizations.

ASSEMBLY INSTRUCTIONS

Warning: Prior to starting this assembly, read, understand and follow the safety information and the assembly instructions on this document and in the User Guide.

1. Remove the four nuts (7/16" wrench) from the bolts that retain the Osprey compressor legs to the wooden shipping pallet. At this point the bolts can be removed from the legs and the compressor can be removed from the pallet. Do not attempt to install the feet while the compressor is on the pallet, tipping of the pallet and subsequent loss of control may occur.

2. Lift one end of the compressor using the integrated handles and place blocking under the end of the tank to support the compressor (see Photo 1 below). Be careful not to damage the drain valve under the center of the tank. **Never work under a compressor not supported with adequate blocking.**

3. Thread feet into the two elevated legs from the bottom side of the leg (see Photo 1 below). Adjust each foot to approximately the same height then thread a flanged nut (flange side toward the leg) onto each foot (see Photo 2 below). It is not necessary to tighten the flanged nuts at this time. The feet will require further adjustment once the compressor has been placed in its permanent location in the utility room.



4. Lift the compressor and remove the blocking from under the tank end. Repeat steps 2 and 3 for the opposite end of the compressor.

5. After the compressor is in its permanent location in the utility room, adjust each foot using a 7/16" wrench until the compressor is setting level. After adjusting the feet, tighten the flanged nut with a 1/2" wrench to lock the foot into position.

INSTALLATION INSTRUCTIONS OSPREY FILTER DRAIN KIT



SAFETY INFORMATION - READ BEFORE STARTING ASSEMBLY vv

Warning: The bowl on the coalescing filter assembly is under high pressure while the system is running. Allow the compressor to stop running and release the air from the un-loader valve prior to removing the bowl. Failure to allow the system to properly de-pressurize could result in severe injuries.

Warning: Always disconnect the compressor from the electrical power source prior to conducting any maintenance or service of the equipment. The compressor could start unexpectedly resulting in possible injury to the service technician.

Warning: This procedure may not comply with all safety requirements of federal, state or local agencies or safety requirements of the installer's employer. If a conflict does exist, follow the requirements set forth by the other organizations.

ASSEMBLY INSTRUCTIONS

Warning: Prior to starting this assembly, read, understand and follow the safety information and the assembly instructions on this document.

1. To help in determining the routing of the drain hose, read the following tips on proper installation.

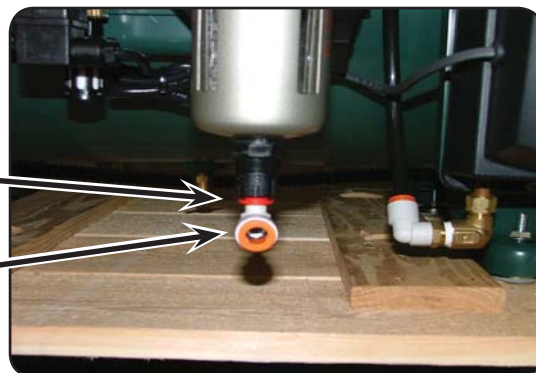
- The connection at the bottom of the coalescing filter is designed to work with either the elbow fitting or the 3/8" hose provided in the kit, depending on space constraints in the utility room.
- The drain hose will require a steady downward slope to the drain.
- Never route the drain hose assembly across traffic areas in the utility room. This could create tripping or falling hazards that could result in injury to personnel.

2. The connections for installing the filter drain are a "push to connect" style of fitting and do not require any tools to install. After determining proper routing, simply insert either the hose end or the elbow fitting into the fitting on the bottom of the coalescing filter bowl. Apply light force until the item stops. Gently pull the opposite direction on the hose or fitting to determine if they have properly seated into the connection. If the fitting or hose comes out with light force, then the hose was not fully seated into the connection and can be re-inserted again.

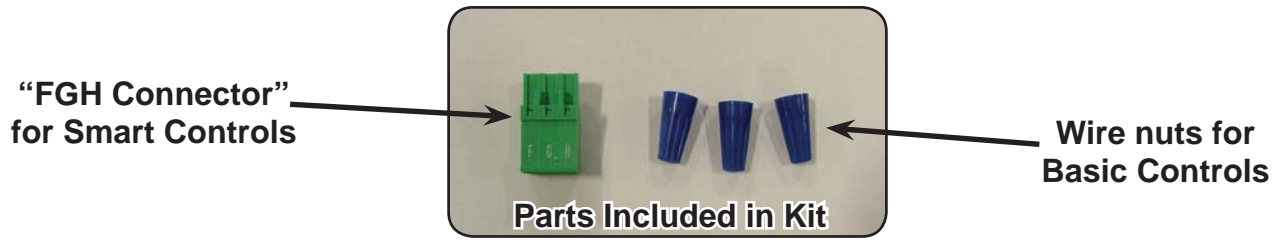
3. If for some reason the fitting or hose needs to be released from the connection, depressing the colored plastic ring (while gently pulling on the hose or fitting) releases the hose or fitting from the connection.

Colored ring: push up to release elbow from drain fitting

Elbow fitting installed in coalescing filter drain



INSTALLATION INSTRUCTIONS OSPREY LOW VOLTAGE WIRING KIT



SAFETY INFORMATION - READ BEFORE STARTING ASSEMBLY

Warning: Always disconnect the compressor from the electrical power source prior to conducting any maintenance or service of the equipment. The compressor could start unexpectedly resulting in possible injury to the service technician.

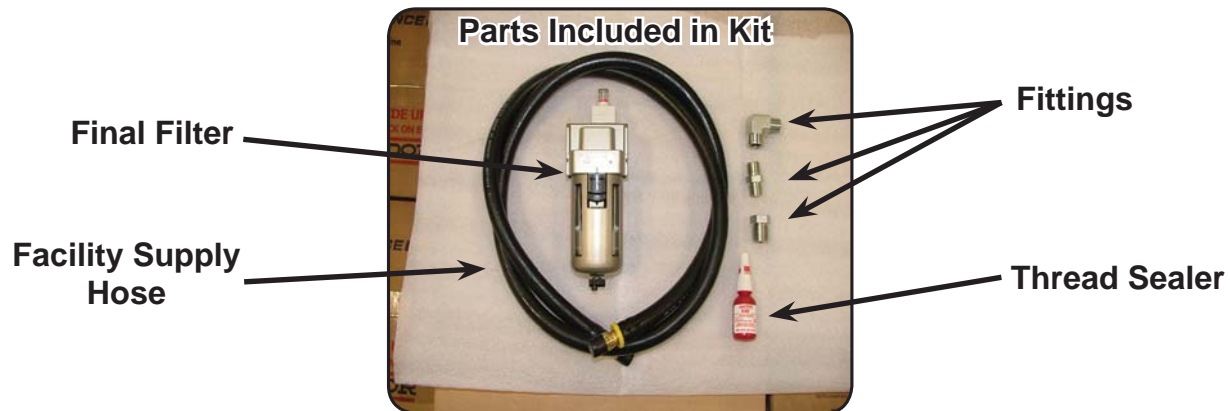
Warning: This procedure may not comply with all safety requirements of federal, state or local agencies or safety requirements of the installer's employer. If a conflict does exist, follow the requirements set forth by the other organizations.

ASSEMBLY INSTRUCTIONS

Warning: Prior to starting this assembly, read, understand and follow the safety information and the assembly instructions on this document.

1. The compressor can be ordered with two different control schemes, Smart or Basic, which influence the method for wiring a low voltage switch. If the compressor has a C2 Control it is considered a smart control, if the electrical box has a plastic cover with the Ramvac logo on it, it is a basic control version. The instructions contain information for wiring both versions, so care is required to make sure the proper instructions are used.
2. This kit contains wire nuts required to make the connections to the Basic control and the FGH connector required to attach the wires to the Smart control.
3. See the Low Voltage Remote Switching page in the User Guide & Installation and Maintenance Manual for the recommended wiring methods for different types of switches.
4. The Basic control will require a strain relief (not included) be added where the low voltage wires from the facility enter the pressure switch. All connections should be housed inside the pressure switch, do not leave wire connections outside the pressure switch.

INSTALLATION INSTRUCTIONS OSPREY OUTLET PLUMBING KIT



SAFETY INFORMATION - READ BEFORE STARTING ASSEMBLY

Warning: The compressor system may be pressurized, follow the discharge procedures in the owner's manual prior to conducting any repairs or maintenance. Working on pressurized components could result in severe injuries or even death, it is recommended any repairs or service be performed by a qualified service technician.

Warning: When installing air lines in a new facility always follow NFPA99 standards (or local codes) and maintain cleanliness throughout.

Warning: Prior to or during the replacement of compressors, always verify the cleanliness of the existing air lines in the facility. Old or malfunctioning compressors can cause unhealthy deposits of mold, dust or dirt.

Warning: This compressor is designed for dental procedures and powering dental equipment and can be safely used in the oral cavity for such purposes. Under no circumstances should it be supplied or considered as medical/breathing air for a patient.

Warning: Installation of this device should be conducted by licensed electrical and plumbing contractors and should always follow the instructions found in the various manuals, unless local state or national building codes specify otherwise. Failure to comply with all applicable codes and installation procedures may result in personal injury, damaged components or reduced life expectancy of this product.

Warning: Never direct the air stream towards any portion of the body or others in the vicinity. Pressurized air streams can be extremely hazardous to your health and can result in death in certain circumstances.

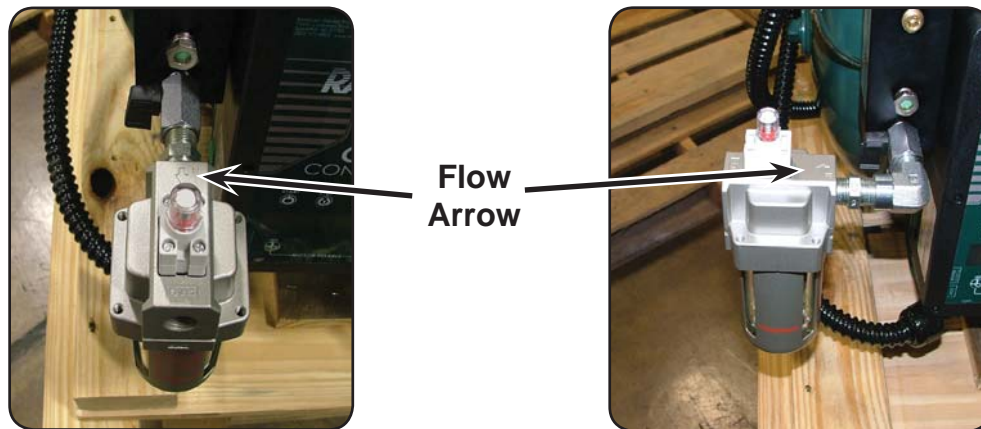
Warning: This procedure may not comply with all safety requirements of federal, state or local agencies or safety requirements of the installer's employer. If a conflict does exist, follow the requirements set forth by the other organizations.

ASSEMBLY INSTRUCTIONS

Warning: Prior to starting this assembly, read, understand and follow the safety information and the assembly instructions on this document and in the User Guide.

1. Determine the best routing for the facility supply hose and the filter assembly. The filter can be mounted in two different directions (see photo's below), depending on the safest and easiest route for the hose. Always use the hose assembly provided to connect the compressor to the facility airlines. If a longer hose is required, be certain the product used is rated to an adequate pressure level and is intended for compressed air systems.

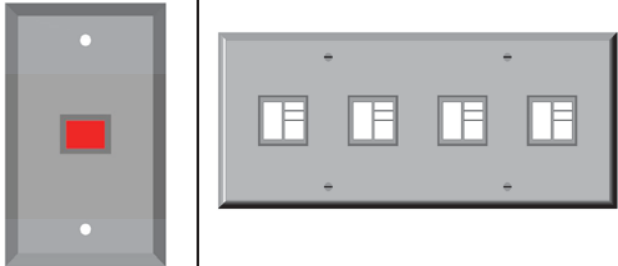


Warning: Never route the facility supply hose across traffic areas in the utility room. This could create tripping or falling hazards that could result in injury to personnel.



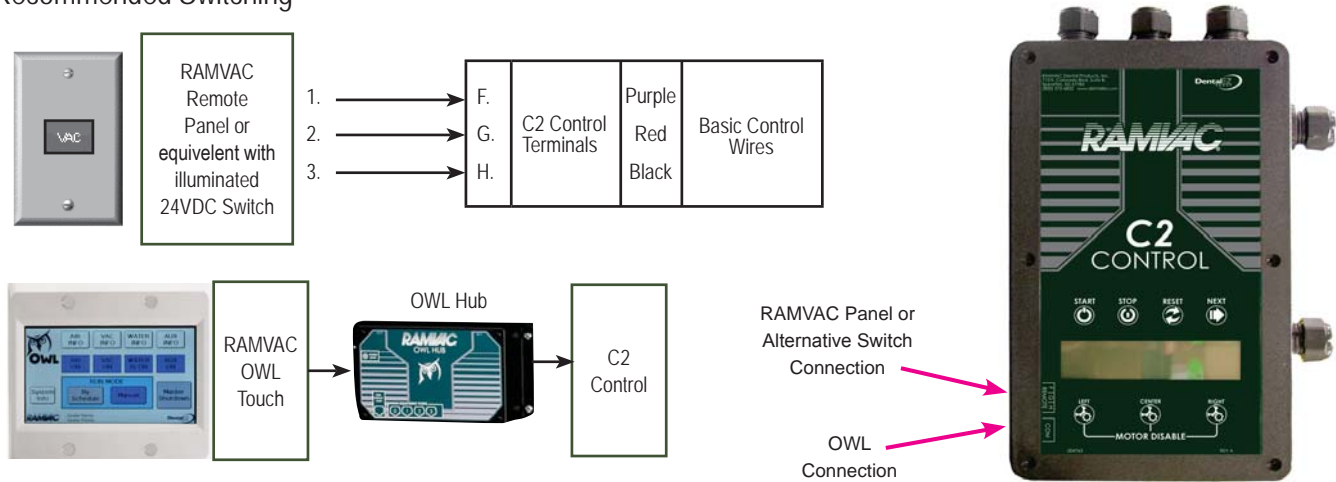
2. Utilize the fittings provided to mount the filter assembly in the orientation determined in step one. A small tube of thread sealer has been provided in the kit. Do not over-apply the thread sealer, just a couple of drops on the male threads of all the fittings will provide an adequate seal. Tighten fittings as needed.
3. Thread the final filter onto the fittings and tighten it into the desired position. Note the final filter has to be installed in the correct flow orientation.
4. Thread the facility supply hose into the final filter and tighten. Both ends of the hose have swivel fittings to make installation easier.
5. Attach the other end of the hose to the facility piping. The kit contains an adapter bushing to adapt the 3/8 pipe thread on the end of the hose to a 1/2 pipe thread on the facility piping if it is required.
6. Upon completion of the air compressor installation, always check to ensure the shut off valve on the pressure manifold is in the open position.
7. After the system has been pressurized perform the following checks:
 - Check each joint for leaks using a soap and water mixture. Tighten any joints that may be leaking.
 - Check the facility plumbing for leaks, either by inspection or by completing a pressure decay test. Repair any leaks in the facility plumbing.

Low Voltage Remote Switching

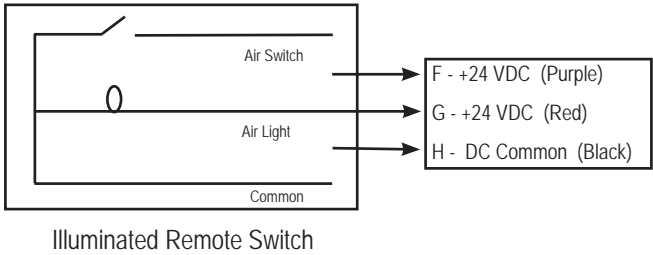
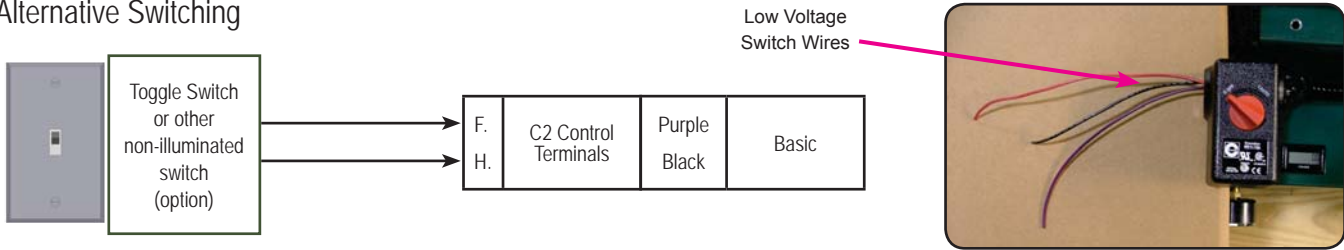
Use to turn system on and off from a remote location
Your Osprey compressor is manufactured to continuously cycle as required throughout the workday. Power off at end of the day.

Illuminated Remote Panel		RAMVAC® OWL™ Touch	Non-Illuminated remote Switches
			
<ul style="list-style-type: none">• Switch light is steady-on when system is running normally.• Switch light flashes for maintenance or one of the heads has been disabled by the disable button on the C2 Control.		<ul style="list-style-type: none">• Touch Pad illuminates while equipment is running.• OWL gives complete breakdown of data on selected equipment	<ul style="list-style-type: none">• Non-illuminated switches provide no indication for system status.

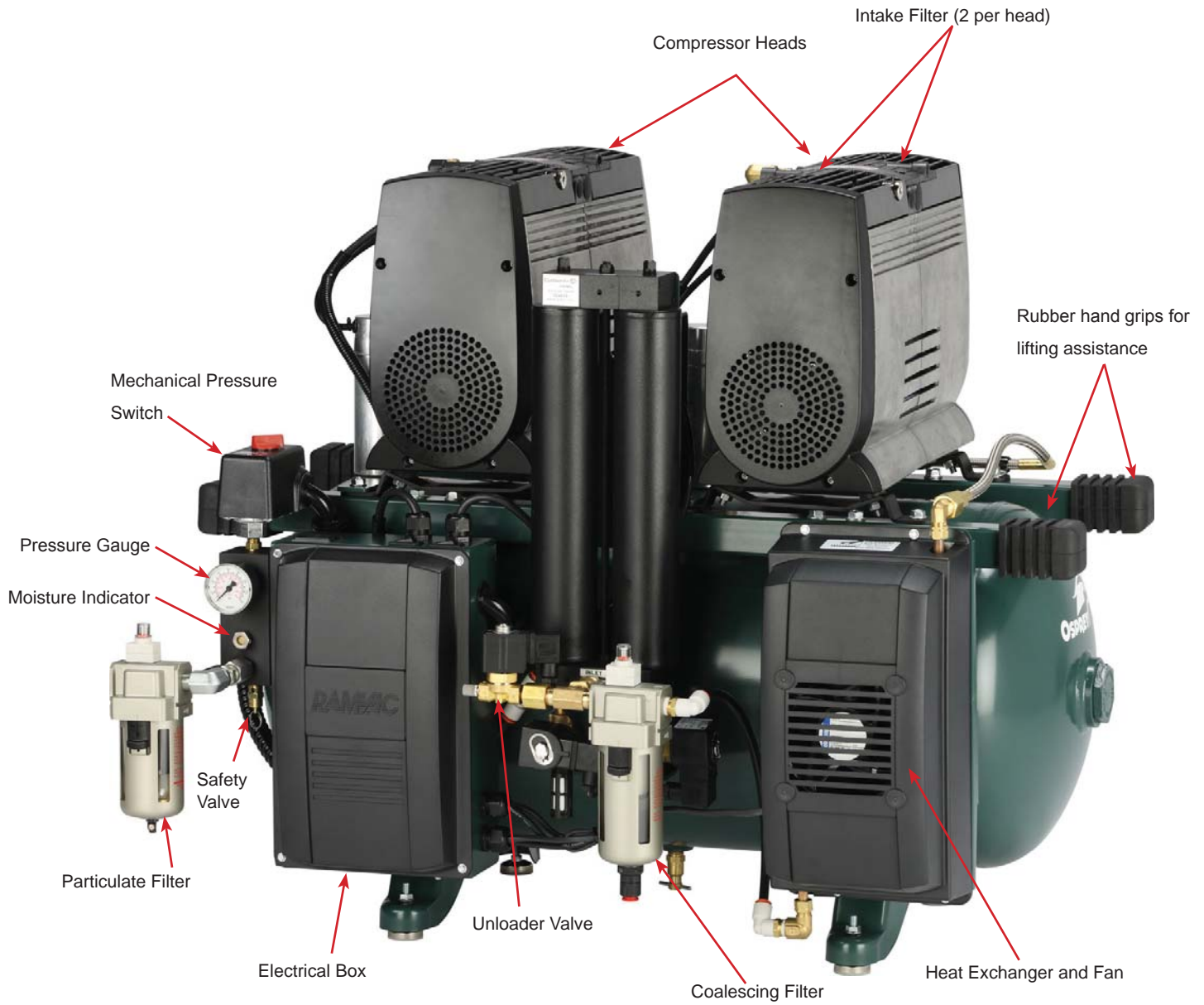
Recommended Switching



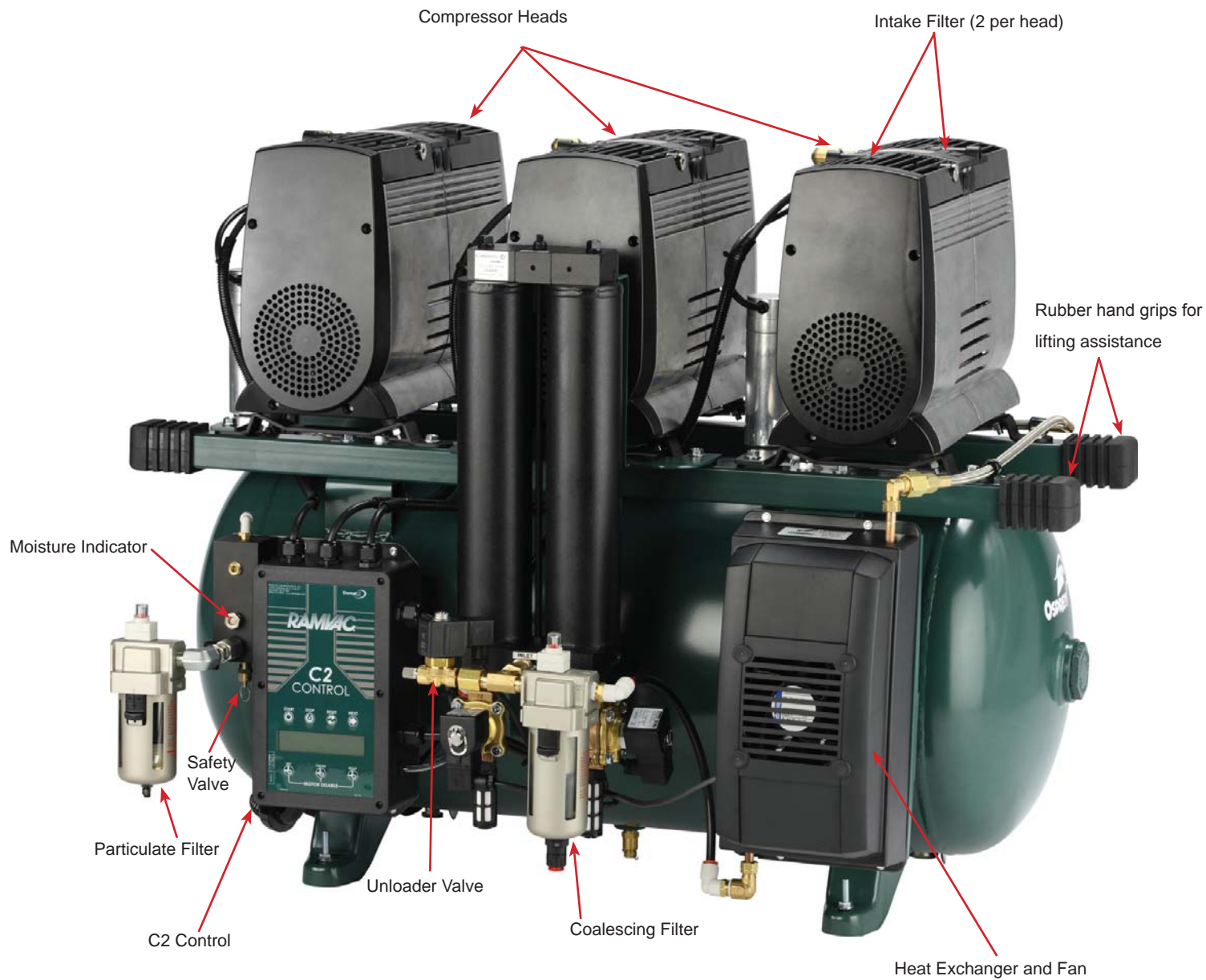
Alternative Switching



- Note:** Maximum wire length for low voltage 18 gauge wire : 500 feet
- Note:** High Voltage switching is an option but not recommended. Contact RAMVAC.
- Note:** OWL to C2 connection must be made with Cat 6 shielded cable using RJ45 connectors.



OSP25B Compressor
(view from normal operating position)



OSP28S Compressor
(view from normal operating position)

Theory of Operation

When power is applied, fresh air is taken in through air filters and compressed by the pump pistons. The compressed air is very warm and is cooled for use by the heat exchanger and fan. Air is then delivered to coalescing filter to remove most of the moisture. The coalescing filter is equipped with a automatic draining feature that allows the draining of the excess moisture. The cool air enters the desiccant style dryer assembly to complete the moisture removal by removing 99.7% of the water vapor from the air. Air is directed into the dryer cartridges, from one to the other, by electronically controlled solenoid valves. The timing for the solenoid valves is provided by a electronic timing board in the Basic models or the C2 Control on the Smart models. While the air is moving through one cartridge, the desiccant in the other cartridge is being dried by air directed through an orifice in the outlet shuttle valve. This valve cycle will be noticeable by a short burst of air from the purge valves. It is then collected in the tank where it is stored for future use. A pressure gauge on Basic models and the C2 display on the Smart models, displays the tank air pressure. When air is called for to run equipment in the facility it goes through a particulate filter to remove any remaining particulates from the air. The tank pressure is monitored by a pressure switch on the Basic models with the operating pressure from 85 psi to 115psi. Pressure adjustment is not recommended and will void the warranty. The Smart models are monitored by a pressure transducer in the C2 Control, which runs the motors on demand. Pressure is factory set from 85 psi to 115 psi and is not adjustable.

Getting Started

The Osprey compressor is easy to operate and maintain.

1. Verify the compressor is connected to a dedicated circuit.
2. Verify the compressor is properly connected to the facility plumbing and a fresh air source.
3. Verify the shut-off valve is closed.
4. Start the compressor.
 - a. Basic Model - Turn the pressure switch toggle from off to auto.
 - b. Smart Model - Push the start button on the C2.

NOTE: If the compressor is controlled by the OWL Touch, it cannot be started by the C2.

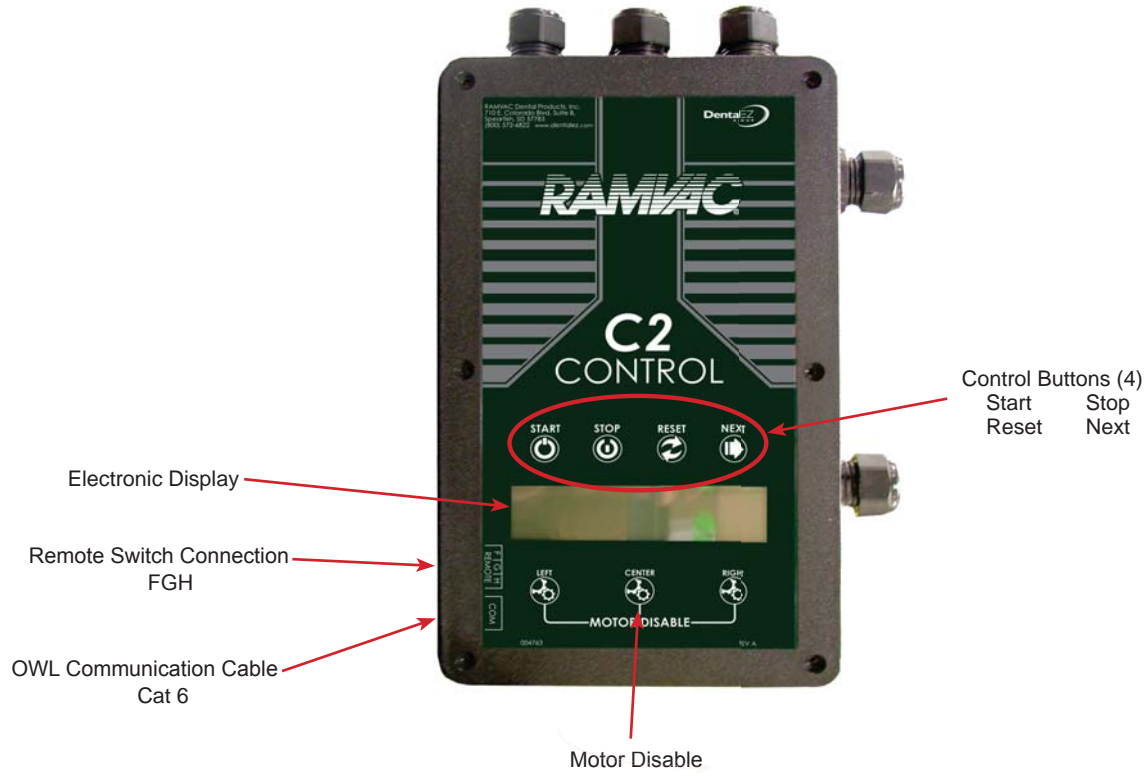
5. Test for leaks. See "Testing Compressor for Leaks".
6. Turn the shut-off valve to open.
7. The compressor installation is complete.

NOTE: Periodically during startup from ZERO PSI the dryer shuttle valve may be out of sync from the previous cycle. This is noted by the sound of air being released out of the dryer purge valves. This minor interruption causes no harm to the dryer or air system. The dryer shuttle valve will relocate itself to the correct position after 35 seconds, and after which the dryer will cycle normally.

WARNING: DO NOT direct air flow toward the body.

WARNING: Always turn off compressor and remove power when servicing. (Turn off power at disconnect or circuit breaker

CAUTION: DO NOT attempt to operate the compressor at ambient temperature below 0° C / 35° F or above 40° C / 104° F.



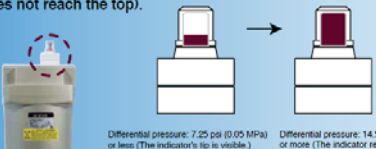
Display Screens and Meanings

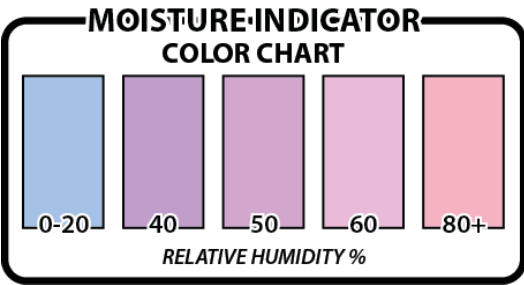
SCREEN 1	LEFT CENTER RIGHT OFF ON DIS	⇒ Head motor control status.
		⇒ Head status: ON-Running, OFF-Not running, DIS- motor disabled, N/A- No head in this location.
SCREEN 2	TWR1 TWR2 UNLDR OFF ON DIS	⇒ Solinoid Valve location.
		⇒ Valve Status: ON/OFF. NOTE: TWR1 & TWR2 status will toggle back and forth as system runs.
	POWERUP OVERRIDE ON	⇒ Only shown when powerup override selected on board.
	AVG REGEN XXXSEC	⇒ Average time (last 60 cycles) to pump up from 85 psi to 115 psi.
	AVG DRAIN XXXXSEC	⇒ Average time (last 60 cycles) to drain the system from 115 psi to 85 psi.
SCREEN 5 All models	LEFT XX.X AMPS	⇒ Instantaneous amp reading.
	LEFT XXXXX HRS	⇒ Hours of runtime for each head. (not system hrs) Can be reset when motor is replaced.
SCREEN 6 Models with 2 or 3 motors	CENTR XX.X AMPS	⇒ Instantaneous amp reading.
	CENTR XXXXX HRS	⇒ Hours of runtime for each head. (not system hrs) Can be reset when motor is replaced.
SCREEN 7 Models with 3 motors	RIGHT XX.X AMPS	⇒ Instantaneous amp reading.
	RIGHT XXXXX HRS	⇒ Hours of runtime for each head. (not system hrs) Can be reset when motor is replaced.

SCREEN 8	FLTR MAINTENANCE IN XXXX HRS	⇒ Factory set to count down from 700 hrs. Alert given when reaches zero. Re-set counter with reset button when filters are replaced
SCREEN 9	DRYR MAINTENANCE IN XXXX HRS	⇒ Factory set to count down from 3500 hrs. Alert given when reaches zero. Re-set counter with reset button when dryer desicant is replaced
BOOT UP	DENTALEZ C2 REV XXXXX XXXXX 2.X	⇒ Boot up screen with software version and unit model. ⇒ Model number
INCORRECT CONFIGURATION	DENTALEZ C2 REV SW1 ERROR XXXX	⇒ Wrong dip switch setting. Invalid model selected.
SYSTEM FAILURE	SERIOUS SYSTEM FAILURE	⇒ Hardware malfunction.
	LOCAL STAND-BY	⇒ Unit in stand-by based on input from C2 Control.
	OWL STAND-BY	⇒ Unit in stand-by based on input from remote Owl Touch system.
	TANK XXX.X PSI	⇒ Tank pressure in pounds per sq. inch.
ALARM SCREENS	Line 1 HIGH PRESSURE	⇒ Tank pressure reading higher than expected. Troubleshoot for malfunction.
	or HIGH AMP LEFT	⇒ Motor amps above high level set point.
	or HIGH AMP CENTER	
	or HIGH AMP RIGHT	
	or LOW AMP LEFT	⇒ No amps or lower amps than expected.
	or LOW AMP CENTER	
	or LOW AMP RIGHT	
	or OWL COMM LOST	⇒ Lost connectivity with Owl Hub. Check cable and connections.
	or SYSTEM XXXXX HRS	⇒ System hours counted only when unit is actively running.
MAINTENANCE SCREEN	FILTER MAINTENANCE DRYER MAINTENANCE	⇒ Perform filter maintenance and reset timer by holding "re-set" button for 5 seconds ⇒ Perform dryer maintenance and reset timer by holding "re-set" button for 5 seconds

Filter with Element Service Indicator

Know when to replace your elements.
Replace an element when the indicator turns fully red.
(Replace an element every 2 years even if the red indicator does not reach the top).





MAINTENANCE OVERVIEW

Osprey compressor preventive maintenance is simple, clean, and inexpensive. It can help ensure your system provides years of predictable performance.

While most maintenance tasks can be performed by the user, RAMVAC recommends having all service and maintenance conducted by a dealer service technician.

- KEY POINTS FOR TROUBLE-FREE OPERATION:**
- Check the Coalescing and Particulate filter indicator every month.
 - Keep compressor clean and free of dirt.
 - Keep area surrounding compressor free of debris.
 - Maintain a controlled ambient temperature between recommended levels.
 - High temperatures will shorten the life of the air compressor.
 - Follow the recommended preventative maintenance schedule

- CLEANING INSTRUCTIONS**
1. Always disconnect the power from the equipment prior to cleaning.
 2. Some parts/components on the compressor get hot during operation. Provide the equipment ample time to cool prior to cleaning.
 3. All components can be safely wiped down with a damp cloth, wet with water. We do not recommend using any cleaners or harsh chemicals to clean this equipment since their potentially harmful effects have not been evaluated.
 4. Do not heavily wet electrical components
 5. Allow equipment to air dry or dry with clean, soft cloth.

PREVENTIVE MAINTENANCE SCHEDULE	
This is a recommended schedule for a compressor in a clean, dry environment. Any site other than specified will decrease the maintenance time exponentially	
Test for Air Leaks	1st Week and Annually
Replace Intake Filters	Annually
Replace Coalescing Filter	Replace annually or when filter indicator moves to completely red when unit is running
Replace Particulate Filter	Replace annually or when filter indicator moves to completely red when unit is running
Inspect Dryer	Annually
Test Safety Valves	Annually
Replace Dessicant Cartridges	Every 5 years

OSPREY SMART MODELS: Reset the 2000 hour maintenance light by navigating to the maintenance screen on the C2 and press the reset button.

OSPREY BASIC MODELS: There is no maintenance alarm.

Replacing Intake Filter

Note: All models use the same intake filter .

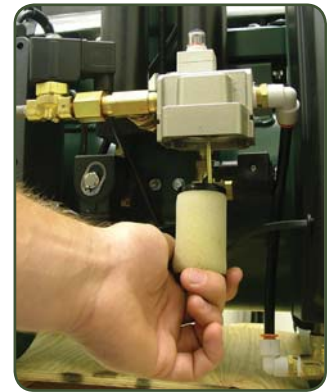
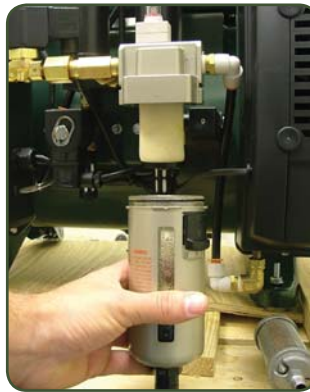
1. Turn compressor off.
 - a. For Smart models use the stop button on the C2 Control.
 - b. For Basic models use the switch toggle turning it to off.
2. Remove power from the compressor.
3. Remove intake filter cap by removing 2 screws.
4. Remove intake filter and discard.
5. Install replacement filter and replace filter cap.
6. Return power to the compressor.
7. Return compressor to service.



Replacing Coalescing Filter

Note: All models use the same coalescing filter.

1. Turn compressor off.
 - a. For Smart models use the stop button on the C2 Control.
 - b. For Basic models use the switch toggle turning it to off.
2. Remove power from the compressor.
3. Pull tab down and turn coalescing filter bowl slightly right and remove.
4. Remove filter by turning completely out.
5. Install new .3 micron filter.
6. Position filter bowl, push up slightly and turn left into place. Tab will snap down into place.
7. Return power to the compressor.
8. Return compressor to service.



Replacing Particulate Filter

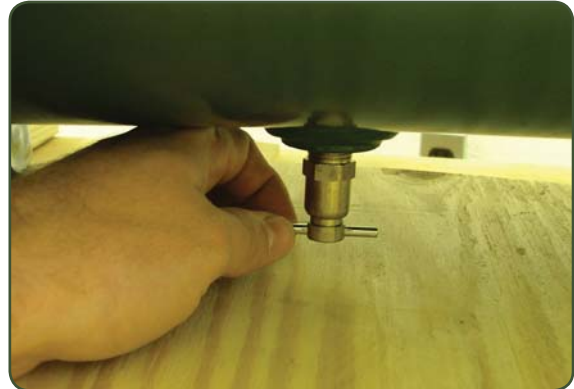
Note: All models use the same particulate filter.

1. Turn compressor off.
 - a. For Smart models use the stop button on the C2 Control.
 - b. For Basic models use the switch toggle turning it to off.
2. Remove power from the compressor.
3. Bleed air from system.
4. Push up slightly and turn particulate filter bowl slightly and remove.
5. Remove filter by turning completely out.
6. Install new .01 micron filter.
7. Position filter bowl, push up slightly and turn into place.
8. Return power to the compressor.
9. Return compressor to service.



Inspect Dryer

1. Operate the compressor until the pressure of the tank reaches at least 45 psi.
2. Turn the compressor off.
 - a. For Smart models use the stop button on the C2 Control.
 - b. For Basic models use the switch toggle turning it to off.
3. Carefully open the tank petcock .
4. If no water drains from the tank when the valve is opened the dryer is working and go to step 6.
5. If water drains from the tank when the valve is opened the dryer is not working. See "Dryer Service Procedure" on web at www.ramvac.com or contact RAMVAC® at 1-800-572-6822.
6. Return compressor to service.



Test Safety Valve

1. Run compressor until 45 psi shows on the gauge.
 2. Pull ring on safety valve.
- NOTE: Safety valve located below the facility shut off valve.
- NOTE: A loud burst of escaping air will be heard when air is released from the safety valve.
3. If no air comes out of safety valve, the valve is defective and valve must be replaced immediately.

CAUTION: Bleed air from system before servicing.

4. Return compressor to service.



Test Compressor for Leaks

1. Close valve to facility plumbing.
2. Run compressor until it shuts off at 100 psi.
3. Turn compressor off.
 - a. For Smart models use the stop button on the C2 Control.
 - b. For Basic models use the switch toggle turning it to off.
4. Let compressor set for 5 minutes.
5. If the pressure drop is more than 5 psi in a 5 minute time period, leaks must be repaired.
6. Repair if needed.
7. Open valve to facility plumbing.
8. Return compressor to service.

Depressurize Air System

1. Remove the power from the air system.
2. Close the outlet to the shut off valve
3. Open the petcock to drain any air in the tank

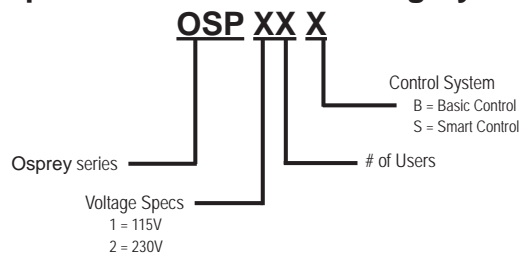
DO NOT pull the pressure relief valve to depressurize the air system.

Specifications

MODEL	OSP22B/ OSP22S	OSP13B/ OSP13S	OSP23B/ OSP23S	OSP24B/ OSP24S	OSP25B/ OSP25S	OSP28B/ OSP28S
MAX USERS	2-3	3-4	3-4	4-6	5-7	8-11
MOTOR PER UNIT	1	2	2	2	2	3
HP PER MOTOR	2	1.25	1.25	LEFT 1.25 RIGHT 2	2	2
VOLTAGE	230V (208-253)	115V (103-126)	230V (208-253)	230V (208-253)	230V (208-253)	230V (208-253)
BREAKER SIZE (recommended)	20 amp	30 amp	20 amp	20 amp	30 amp	40 amp
FUSETRON SIZE (recommended)	FRN 15	FRN 25	FRN 15	FRN 20	FRN 25	FRN 40
UNIT POWER CONSUMPTION	10.5 amps	23 amps	11.5 amps	16.3 amps	21 amps	32 amps
UNIT DIMENSIONS (W x D x H)	29" x 21" x 29"	29" x 21" x 29"	29" x 21" x 29"	35" x 25" x 30"	35" x 25" x 30"	41" x 29" x 32"
WEIGHT	160 lbs	190 lbs	190 lbs	250 lbs	260 lbs	385 lbs
TANK SIZE	12 gallon	12 gallon	12 gallon	20 gallon	20 gallon	30 gallon
dB LEVELS	N/A	N/A	N/A	N/A	N/A	N/A
CFM @ 80 PSI	6.0	6.6	6.6	9.3	12.0	18.1
OPERATING PRESSURES	586 kpa/85 psi to 793 kpa/115 psi with ± 2% Total Error Band	586 kpa/85 psi to 793 kpa/115 psi with ± 2% Total Error Band	586 kpa/85 psi to 793 kpa/115 psi with ± 2% Total Error Band	586 kpa/85 psi to 793 kpa/115 psi with ± 2% Total Error Band	586 kpa/85 psi to 793 kpa/115 psi with ± 2% Total Error Band	586 kpa/85 psi to 793 kpa/115 psi with ± 2% Total Error Band

Note: All motors used are 1 phase, 60Hz motors.
Ensure compliance with all National and Local codes.

Compressor Model Numbering System



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:	Warranty Period:
RAMVAC® Dental Vacuum System	2 Years from date of installation*
RAMVAC® Vacuum Pumps only	10 Years from date of installation*
RAMVAC® OWL™	2 Years from date of installation*
RAMVAC® Osprey	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.

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