

Dental Compressed Air System

USER GUIDE

Installation and Maintenance Manual

For 1000 Series with C1 Control

Thank you for selecting a CustomAir_{by RAMVAC} Dental Compressed Air System to serve your dental facility. CustomAir_{by 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.
or
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. Please accept my personal invitation to visit our manufacturing facility in the *beautiful* Black Hills of South Dakota.

Matt Olson
General Manager, RAMVAC® Dental Products, Inc.
(800) 5-RAMVAC
(800) 572-6822



Safety and Regulatory Information

CustomAir_{by RAMVAC} compressors meet the most current and highest safety standards. CustomAir_{by RAMVAC} compressors are UL 60601 classified, comply with NFPA 99C Level 3 gas system requirements, and are manufactured in a FDA Registered, ISO 9001:2000 and 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 CustomAir 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"**
- **Degree of protection against electrical shock: "Type B"**
- **The C1 Control is designated "IPX0" and must be protected from ingress of water.**

The C1 Control label includes safety symbols with special meanings:

	This means there is more information available in this User Guide.		This stands for a "Type B Applied Part", which means the equipment is approved for patient contact.
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CustomAir[®] by RAMVAC[®] 1000 series compressor is a Level 3 dental compressed air system.

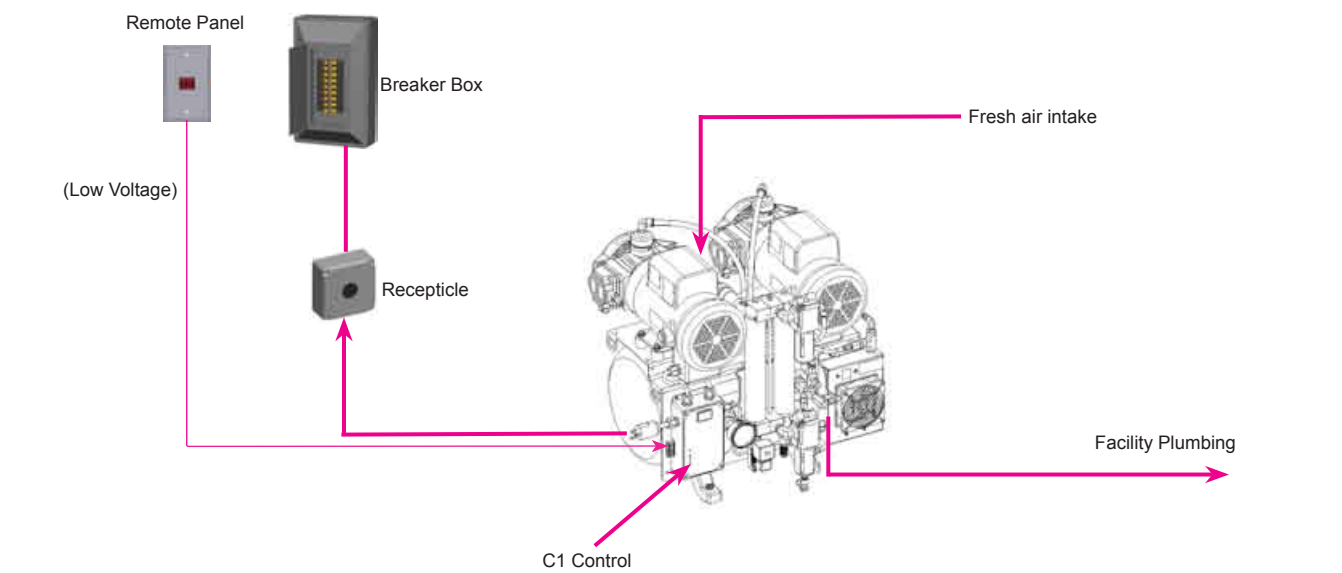
The system is run by a “state of the art” electronic control that provides for continuous operation in a controlled environment.

Our compressors are built to serve the needs of the dental industry, by providing clean dry air and years of reliable service.

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System Schematic



Unpacking Instructions for the CustomAir_{by RAMVAC} Compressor

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 lag screws holding the compressor to shipping pallet.
4. Verify additional parts shipped with the compressor:
 - a. Additional parts shipped with all compressor models:
 - Supply Hose, 1/4"mpt x 3/8"mpt, 6' in length
 - Drain tubing, 3/8" plastic, 4' in length
 - Bushing, 1/2"mpt x 3/8"fpt
 - b. Additional parts shipped with 1022 model only:
 - Air Intake tubing, 1/2" OD plastic, 10' in length

A Sound Reduction Cover is available for most models when installed in a sound sensitive area.

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 40° C / 104° F while the compressor is running.
- Maintain minimum 6" clearance on sides, back, and top of all compressors. Maintain 12" clearance in front of compressor.
- On the 1029T compressor maintain a 12" clearance on left side for electrical service.
- Compressors are equipped with 4 adjustable rubber feet, 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.

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

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

Electrical

- Follow NEC, NFPA 99C, and all local codes.
- Compressors are shipped with the appropriate electrical cord with plug.
- Qualified personnel must install a dedicated electrical circuit.
- Motors and C1 Control protection is provided by a 20 amp time delay fuse on each power leg in the C1.
- 1029T compressor motor electrical protection is provided by a 30 amp time delay fuse on each power leg in the Motor Control Box.
- See "Specifications" for more electrical information.

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 plug from outlet when servicing.

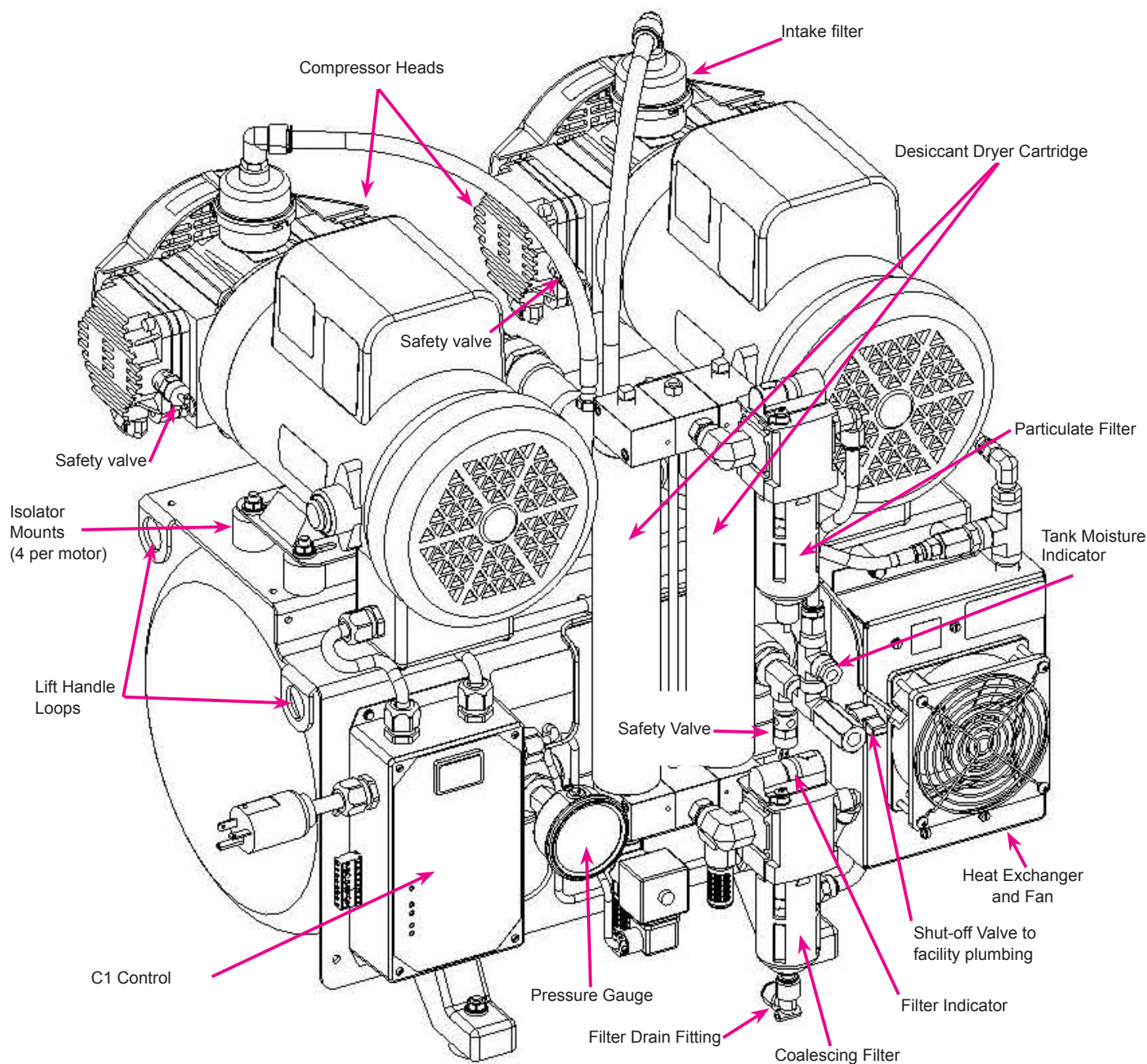
CAUTION: Use of an extension cord is not advisable. *An undersized extension cord will cause a drop in line voltage and loss of power. Overheating will result.*

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 (1/4"npt x 3/8"npt, 6' in length) and if necessary a bushing (1/2"mpt x 3/8"fpt) .
Note: Pressure regulator is customer supplied.
- Connect Fresh Air Intake (uses 1" hose barb) 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.
If vital equipment is used, an alternative air source should be available in case of equipment failure.

CustomAir_{by RAMVAC} Important Features

Model 1025D is pictured. Other models have identical features with the exception of model 1029T, which has a motor control box on the left end.

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 varied between models and provided by the C1 Control. 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. When the air has left the dryer assembly it goes through a particulate filter to remove any remaining particulates from the air. It is then collected in the tank where a pressure gauge displays the tank air pressure. The tank pressure is monitored by a pressure transducer in the C1 Control, which runs the motors on demand. Pressure is factory set to start the compressor at 80 psi and shut off at 100 psi. Pressure settings are not adjustable.

Getting Started

CustomAir_{by RAMVAC} 1000 series compressor is easy to operate and maintain.

Note: If Sound Cover was ordered with the compressor see "Installing Sound Cover" section.

WARNING: DO NOT direct air flow toward the body.

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

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

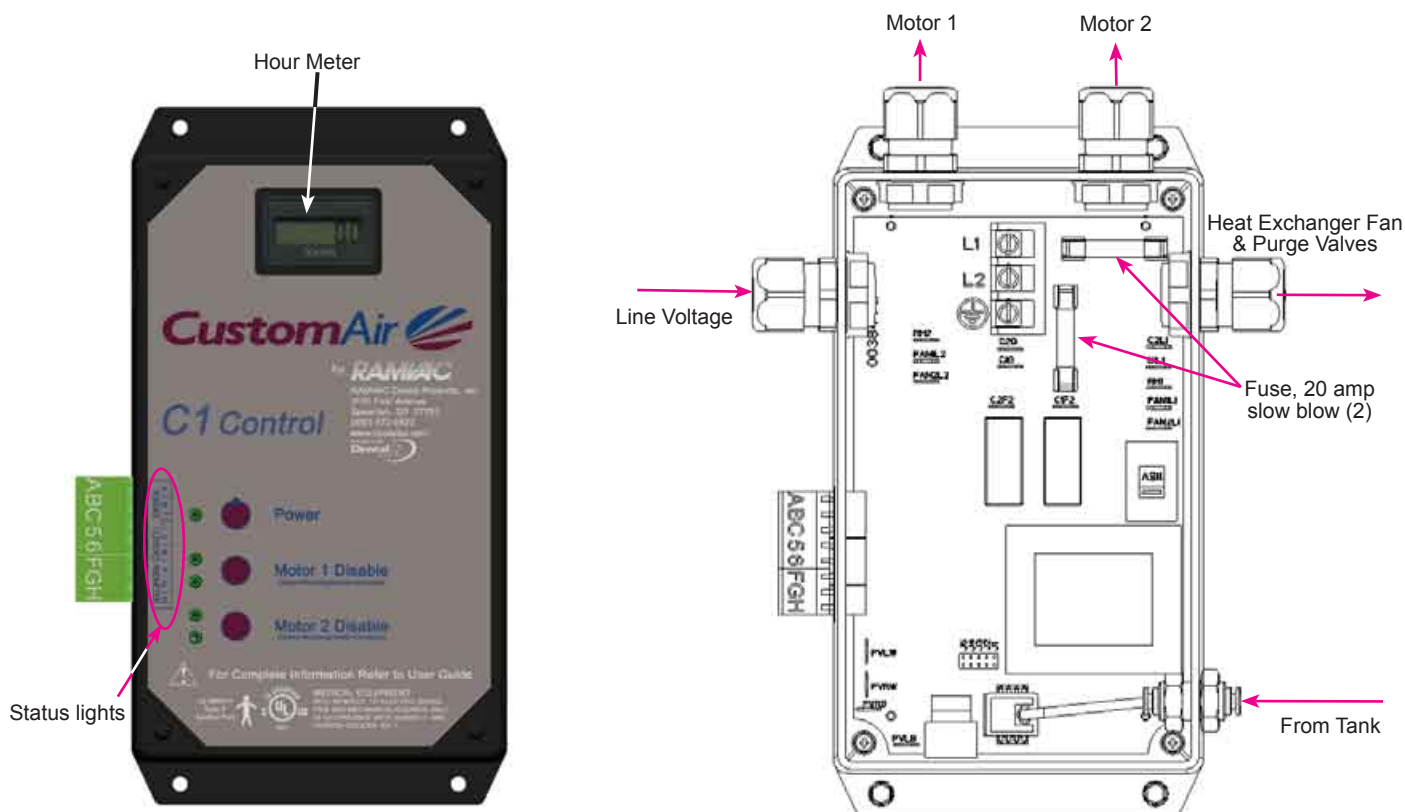
1. Verify the compressor is plugged into a dedicated circuit with an appropriate electrical outlet.
2. Verify the compressor is properly connected to the facility plumbing and fresh air source.
3. Verify the outlet valve is closed.
4. Vent pressure gauge
 - a. Turn yellow tab on top of gauge from closed to open to vent.
5. Push and hold the power button on the C1 Control for approximately 5 seconds to start.

Note: The power light will go off when the button is held.
6. Test for leaks. See "Testing Compressor for Leaks".
7. Turn the shut off valve to open.
8. The compressor installation is complete.



C1 Control Features

- **Status Lights**
 - Power Status - Green light is on when line voltage is present. Green light flashes when one motor has been disabled by motor disable button.
 - Motor 1 Status - Green light is on when motor is running. Amber light is on when motor is disabled.
 - Motor 2 Status - Green light is on when motor is running. Amber light is on when motor is disabled.
- Monitors the pressure transducer to start and stop the motors, depending on demand.
 1. Turns motors off at 100 psi.
 2. Turns motors on at 80 psi. 2nd motor will start with a 1 second delay.
- Provides a 24VAC low voltage signal to the remote panel.
- Accepts the remote switch input.
- Controls the dryer purge function.
- Communicates with the RAMVAC OWL™.
- Runs the heat exchanger fan while the compressor motor(s) are on.
- Flashes the maintenance light on the remote switch or OWL™ controller when filter maintenance is due.
- Keeps track of run time hours with the hour meter.
- Motors are protected with a 20 amp slow blow fuse on each leg.

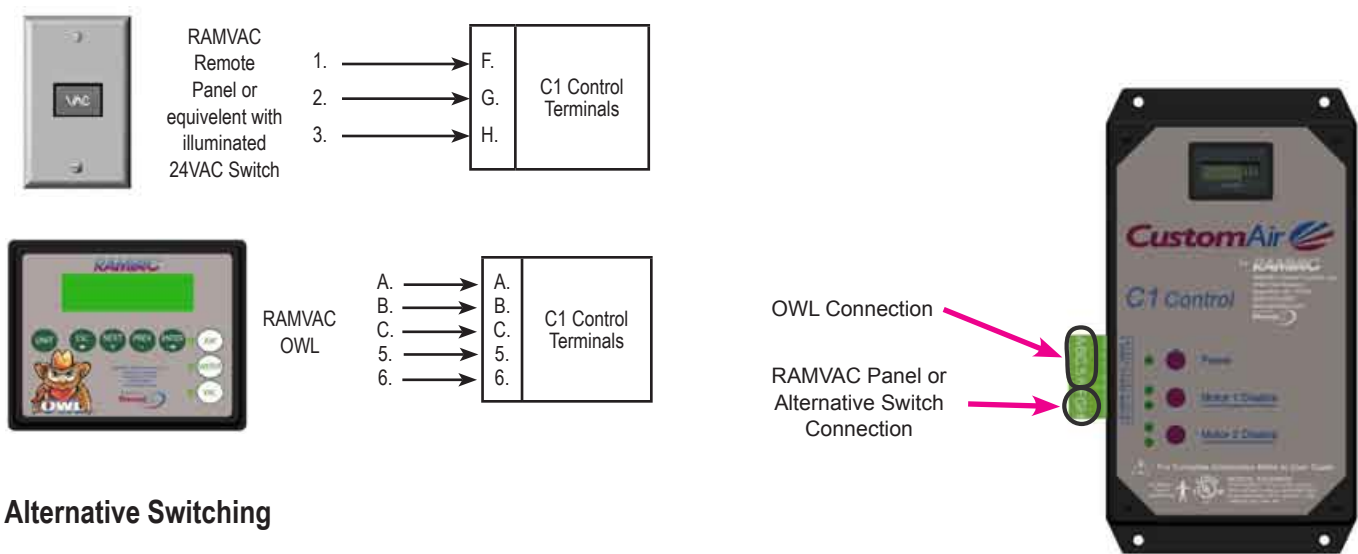


Low Voltage Remote Switching

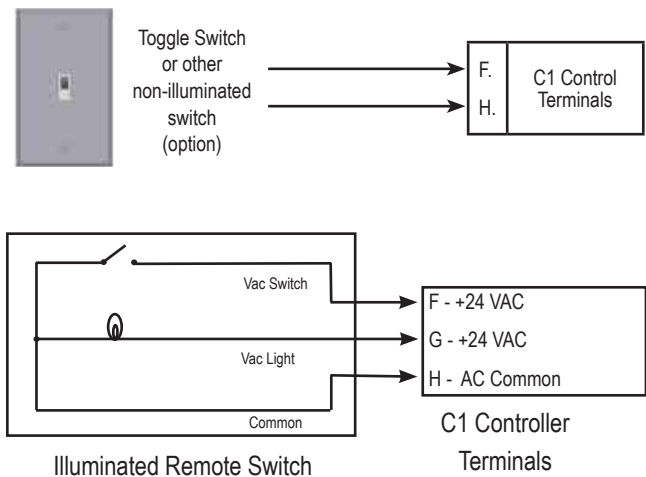
Use to turn system on and off from a remote location
Your CustomAir[®] by RAMVAC[®] compressor is manufactured to continuously cycle as required throughout the workday. Power off at end of the day.

Illuminated Remote Panel		RAMVAC [®] OWL [™]	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 C1 Control.		<ul style="list-style-type: none">LEDs beside corresponding switch illuminated when 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.

Maintenance Overview

CustomAir_{by RAMVAC} compressor preventive maintenance is simple, clean, and inexpensive.
It can help ensure your system provides years of predictable performance.

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.

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

To reset maintenance light press and hold Motor 1 Disable and Motor 2 Disable buttons at the same time until amber lights blink once.

Filters

Replacing Intake Filter

Note: All models use the same intake filter (1 for each head).

1. Turn compressor off with the power button on the C1 Control.
2. Unplug compressor from outlet.
3. Remove intake filter cap by pressing down and rotating.
4. Remove intake filter and discard.
5. Install replacement filter and filter cap.
6. Plug power cord into outlet.
7. Return compressor to service.

Replacing Coalescing Filter

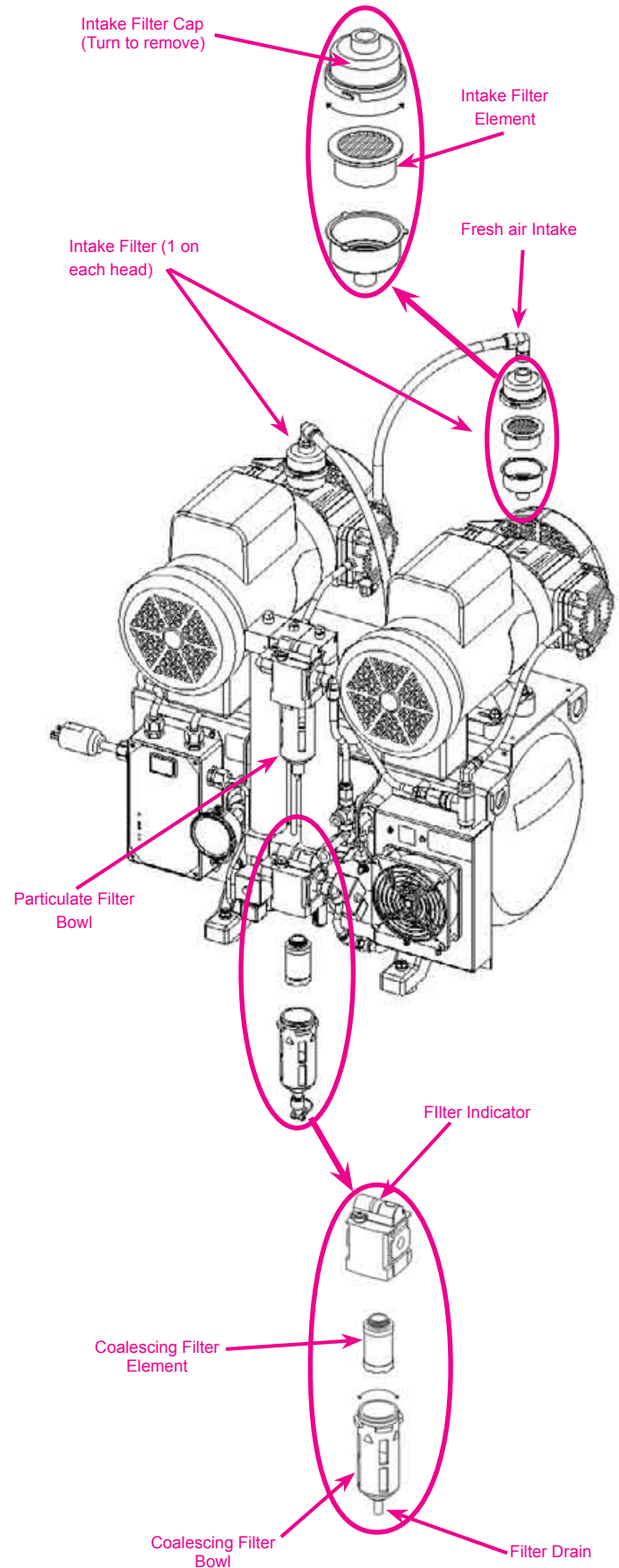
Note: All models use the same coalescing filter.

1. Turn compressor off with the power button on the C1 Control.
2. Unplug compressor from outlet
3. Bleed air from system.
4. Push up slightly and turn coalescing filter bowl slightly and remove.
5. Remove filter by turning completely out.
6. Install new .5 micron filter.
7. Position filter bowl, push up slightly and turn into place.
8. Plug power cord into outlet.
9. Return compressor to service.

Replacing Particulate Filter

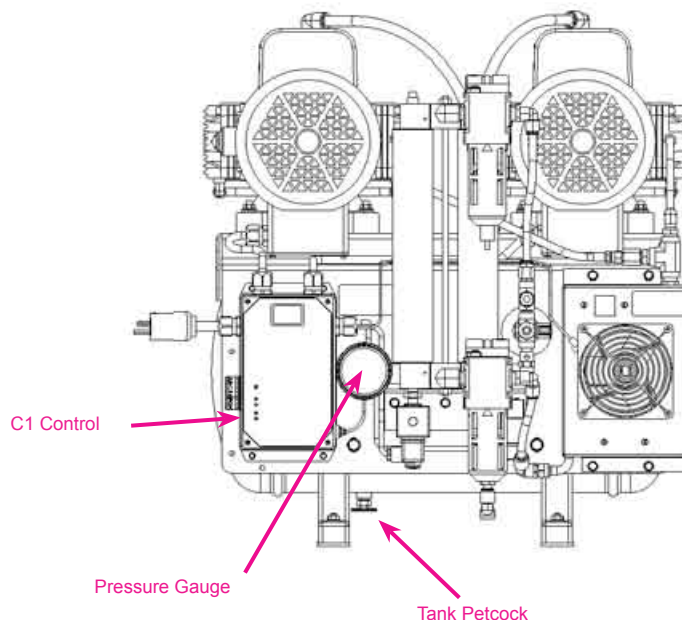
Note: All models use the same particulate filter.

1. Turn compressor off with the power button on the C1 Control.
2. Unplug compressor from outlet
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. Plug power cord into outlet.
9. Return compressor to service.



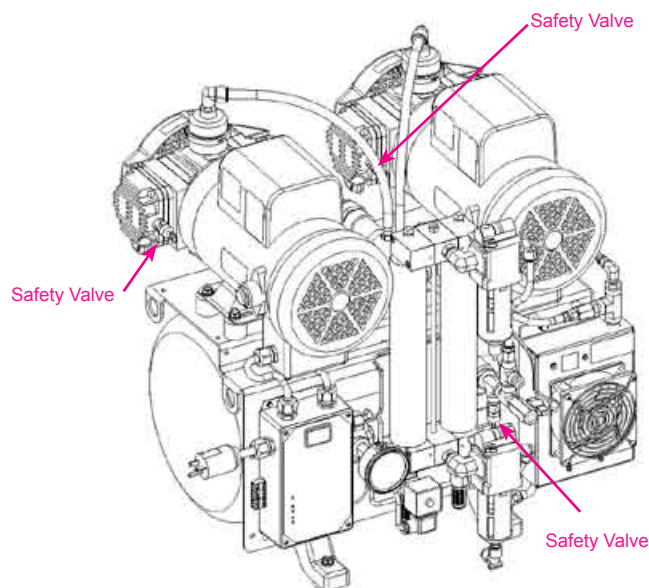
Inspect Dryer

1. Operate the compressor until the pressure of the tank reaches at least 45 psi.
2. Turn the compressor off with the Power button on the C1 Control.
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 Valves

1. Run compressor until 45 psi shows on the gauge.
2. While the compressor is still running, pull ring on safety 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. Repeat procedure for each safety valve. (one for each head plus one at tank inlet)
5. Return compressor to service.



Test Compressor for Leaks

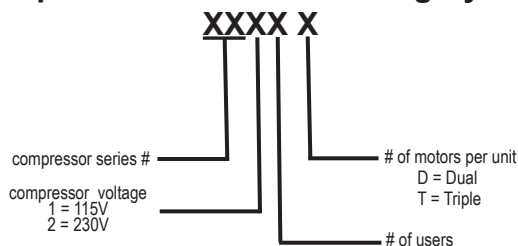
1. Close valve to facility plumbing.
2. Run compressor until it shuts off at 100 psi.
3. Turn compressor off with the power button on the C1 Control.
4. Let compressor set for 5 minutes.
5. If the pressure drop is more than 5 psi in a 5 minute time period, leaks must be repaired.
6. Repair if needed.
7. Open valve to facility plumbing.
8. Return compressor to service.

Specifications

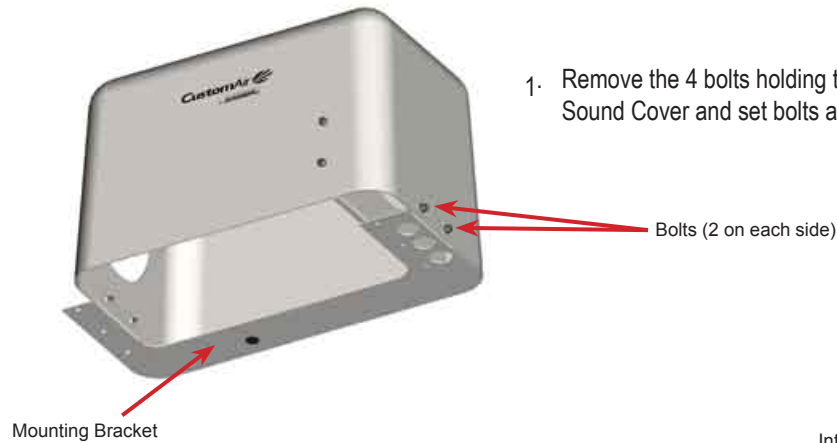
MODEL		1022	1013D/1023D	1025D	1027D	1029T
MAX USERS		2	3	5	7	9
MOTOR	Motor per Unit	1	2	2	2	3
	Hp per motor	1 hp	½ hp	¾ hp	1 hp	1hp
VOLTAGE		230V (208 - 253)	115V / 230V (208 - 253)	230V (208 - 253)	230V (208 - 253)	230V (208 - 253)
(Recommended) BREAKER SIZE		20 amp	20amp	20 amp	20 amp	20amp
(Recommended) Fusetron Size		FRN 8	FRN 25	FRN 8	FRN 8	FRN 25
UNIT POWER CONSUMPTION		5.1 amps	12.0 amps / 5.9 amps	8.4 amps	9.5 amps	15.4 amps
UNIT DIMENSIONS (w x d x h)	WO / SOUND COVER	24" x 20.5" x 28"	24" x 20.5" x 26.5"	24" x 20.5" x 26.5"	24" x 20.5" x 26.5"	27" x 22" x 36"
	W / SOUND COVER	25" x 20.5" x 30"	30" x 27" x 30"	30" x 27" x 30"	30" x 27" x 30"	N/A
WEIGHT		136 lbs.	166 lbs.	174 lbs.	182 lbs.	238 lbs.
TANK SIZE		10 gallon	10 gallon	10 gallon	10 gallon	10 gallon
Db LEVELS	WO / SOUND COVER	70	73	75	77	78
	W / SOUND COVER	58	61	63	65	N/A
SCFM @ 100 lbs		3.15	3.30	4.39	6.13	9.04

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

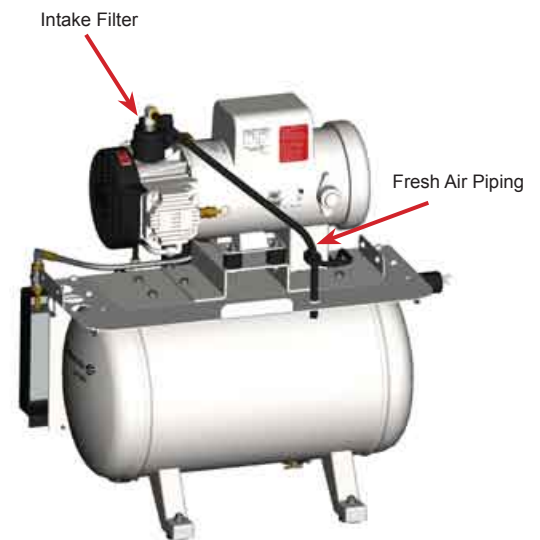
Compressor Model Numbering System



Sound Cover Installation on Single Head Compressor

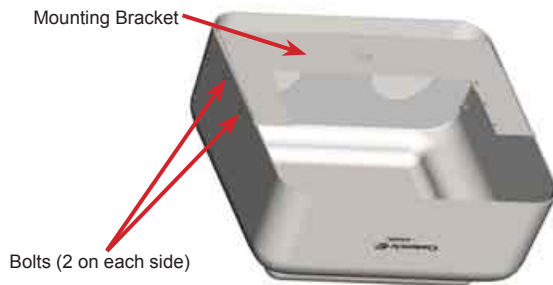


2. Remove Fresh Air Intake piping if present.
3. Secure Mounting Bracket with 4 bolts to the compressor base.
4. Thread Fresh Air Intake piping through hole in the Mounting Bracket and attach to intake filter.



5. Align the Sound Cover over the compressor and attach to the mounting bracket using the 4 bolts previously set aside.

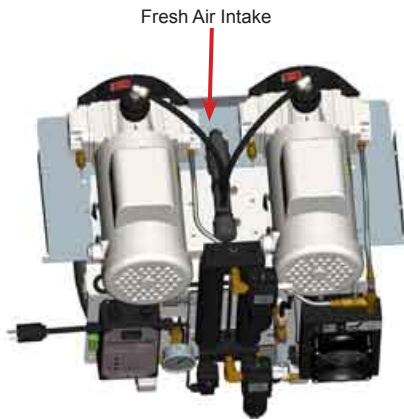
Notes

Sound Cover Installation on Dual Head Compressor

1. Remove the 4 bolts holding the mounting bracket to the Sound Cover and set bolts aside to reuse.

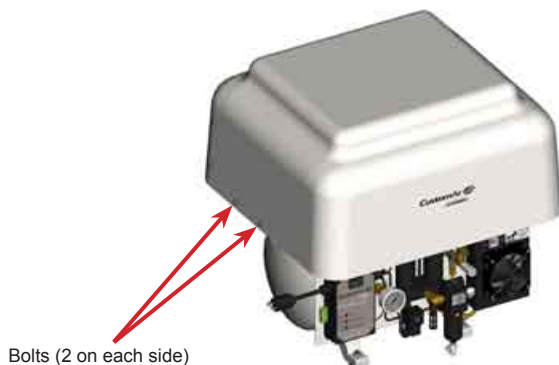
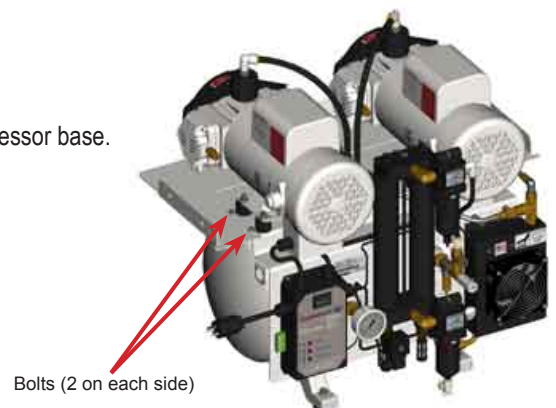


2. Remove Fresh Air Intake piping if present.
3. Loosen bolts on fresh air intake.



4. Tilt the mounting bracket slightly downward and slide onto the base of the compressor, under the fresh air intake.
5. Line up the fresh air intake to the hole in the mounting bracket.

6. Secure mounting bracket with 4 bolts to the compressor base.
7. Tighten bolts on fresh air intake.
8. Attach Fresh Air Intake piping.



8. Align the Sound Cover over the compressor and attach to the mounting bracket using the 4 bolts previously set aside.

Notes

Symptom	Possible Cause(s)	Solution
Compressor does not start. No power light on C1 Control.	1. No line voltage. 2. Blown fuse(s) in the C1 Control or motor box(on 1029T).	1. Restore line voltage. a. Check the power cord to make sure it is plugged in. b. Check the fuse or breaker panel. 2. a. Check fuse(s) in the C1 Control or motor control box.
Compressor runs but pressure does not increase.	1. Leaks in compressor fittings. 2. Leaks in facility air lines. 3. Dirty intake filters. 4. Dryer malfunction. 5. Valves sticking.	1. See "Test Compressor for Leaks" 2. Test facility air lines for leaks 3. Replace intake filters 4. Contact RAMVAC® 5. Contact RAMVAC®
Compressor gets too hot	1. Ambient temperature exceeds 40°C/ 104°F. 2. Compressor not shutting off.	1. Lower ambient temperature 2. See symptom "Compressor runs but pressure does not increase."
Compressor runs when pressure is not being used.	1. Leaks in compressor fittings 2. Leaks in facility air lines.	1. See "Test Compressor for Leaks" 2. Test facility air lines for leaks.
Compressor starts and shuts off more frequently than normal.	1. Condensate in tank. 2. Leaks in compressor fittings. 3. Leaks in facility air lines.	1. Contact RAMVAC® 2. See "Test Compressor for Leaks" 3. Test facility air lines for leaks.

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.

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