ECO-VAC
DRY VACUUM

INSTALLATION, USER, AND SERVICE MANUAL

Revised 3-26

TECH WEST INC.
Manufacturers of Dental Vacuum
and Air Systems

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ECO-VAC
DRY VACUUM

INSTALLATION, USER AND SERVICE MANUAL

This manual is for the installation and service of Tech West's Eco-Vac Dry Vacuum.

CONTENTS

ECO-VAC DRY VACUUM

ENVIRONMENT REQUIREMENTS

Operating

Indoor use at altitudes up to 6562 ft (2000m).
Ambient temperatures 40° to 105°F (-18° to 65°C).

Supply voltage fluctuation of +/- 10% of nominal voltage.

Storage and Transport:

Temperature, 0° to 150°F (-40° to 65°C)

Relative Humidity, 0 to 90%, non-condensing

Atmosphere pressure range of 50kPA to 106kPA

IEC 60601-1 Classification:

Protection against electric shock (6.2):	Class 1
Applied Parts (5.9.1, 8.3):	There are no Applied Parts.
Protection against harmful ingress of water (6.3):	Ordinary, IPXO
Degree of safety in the presence of flammable anesthetics mixture with air or with oxygen or with nitrous oxide (11.4, 11.5):	Not suitable.

ATTENTION USERS:

WARNING: Read & fully understand this operator's manual before using or servicing this machine. Failure to follow instructions could result in injury.

Voir la notice d'installation avant de raccorder au réseau.

Alerts users to important operating and maintenance instruction. Read carefully to avoid any problems.

Warns users that voltage not insulated within the unit may be of sufficient magnitude to cause electric shock.

Warns users of hot surfaces. There is a danger of burns. Work near these surfaces only after they have cooled down.

Tech West Vacuum, Inc.
2657 N Argyle Ave
Fresno, CA 93723

MEDICAL ELECTRICAL EQUIPMENT

WITH RESPECT TO ELECTRICAL SHOCK, FIRE, MECHANICAL AND OTHER SPECIFIED HAZARDS ONLY IN ACCORDANCE WITH ANSI/AAMI ES60601-1: A1:2012, C1:2009/(R)2012 AND A2:2010/(R)2012, CSA CAN/CSA-C22.2 NO.60601.14

I ON
O OFF

Indicates the ON and OFF position for the Equipment power switch.

Indicates protective Earth Ground for the equipment power switch.

ECO-VAC DRY VACUUM

LOCATION REQUIREMENTS

The Eco-Vac Dry Vacuum location should be level, accessible and well ventilated. If the Eco-Vac Dry Vacuum will be located in a confined space, provide adequate ventilation and Install an exhaust fan.

THE EXHAUST VENT ON THE VACUUM UNIT MUST BE CONNECTED TO A LOCATION OUTSIDE OF THE EQUIPMENT LOCATION. THE CONNECTION CAN BE MADE WITH SCHEDULE 40 OR 80 PVC.

1) **The following utilities are required:**
   The vacuum system can be run in the following temperature range.
   Minimum air temperature 40 degrees F./ 4.5 degrees C.
   Maximum air temperature 100 degrees F./37.75 degrees C.

Running the vacuum outside of this range will VOID the warranty and can damage the system.

THE VACUUM SYSTEM MUST BE INSTALLED SO THAT THE DRAIN ON THE SIDE OF THE UNIT IS HIGHER THAT THE WASTE CONNECTION. THIS WILL ALLOW THE UNIT TO GRAVITY DRAIN WHEN THE SUCTION IS SHUT OFF. Provide a floor sink or trapped sewer line to connect the 1 1/4" PVC flex hose included in the hook-up kit. Provide exhaust vent sized according to table 1 below and waste drain that complies with local code.

2) **Waste Disposal:** Provide a floor sink or tapped sewer line to connect the 1 1/4" PVC flex hose included with the hook-up kit provided. An exhaust vent sized in accordance to Table 1 below is required. Be sure the waste drain conforms with local requirements.

3) **Vacuum Line:** The main vacuum line from the operatories must connect to the Eco-Vac tank. Connect to the piping using the 1 1/4" PVC hose provided in the hook-up kit.

4) **Electrical:**

CAUTION- POSSIBLE GROUND CURRENT LEAKAGE

a) Line voltage must be within the limits of table 2 below. (Install a "buck-boost transformer" if the line voltage is not between these values.) Circuit breaker switches must be 20 amp minimum, per motor on the unit. i.e. 2 x 20 for Dual systems and 3 x 20 for Triple systems.

b) Local code may require you to provide a quick disconnect (safety switch) for the vacuum unit.

c) The Eco-Vac is controlled by a 24 volt circuit. For remote switching, provide one 18/3 jacketed cable for the switching on and off each unit. (Dual units need two sets of 18/3 jacketed cable)

TABLE 1

PUMP SIZE	SINGLE	DUAL
EXHAUST VENT (DIA)	2"	2"

TABLE 2

PUMP VOLTAGE	AMPERAGE	MIN. LINE VOLTAGE	MAX. LINE VOLTAGE
230v SINGLE MOTOR	12 AMPS	208v CONSTANT	243v CONSTANT
230v DUAL MOTOR	24 AMPS	208v CONSTANT	243v CONSTANT

ECO-VAC DRY VACUUM
INSTALLATION

Your EcoVac Dry Vacuum should be installed by Qualified Personnel only. Tech West recommends you schedule the installation with the company the unit was purchased from. Tech West Technical Support is available from 7am through 4pm PST Monday through Friday.

The vacuum should be installed in a location that is level without any grade or slope. The area should be easily accessible, well-ventilated, free from any obstructions and clear of any debris. Ensure the unit is connected to an exhaust fan. The area needs to be able to safely support the weight of unit. Please consider sound levels and insulate as needed. Tech West recommends consulting with a professional to ensure compliance with local building codes.

EcoVac Dry Vacuums require adequate ventilation and protection from extreme temperatures. Ambient temperatures in the location of the compressor must not fall below 40 degrees Fahrenheit and must not exceed 100 degrees Fahrenheit. Failure to comply with the guidelines outlined in this section will result in all warrantys being voided.

Upon receiving your EcoVac Dry Vacuum, we recommend you complete the following steps:

1) Check for damages. Inspect the shipping material around the unit for holes, cuts, crushed sections, and any other visible damage. Tech West recommends you notify the both the delivery company and the dealer of any visible damage.

2) Check the unit for visible damage and alert the delivering company along with the dealer from which the unit was purchased from of any damage noticed. Units are bolted to a pallet for shipping. The pallet can be discarded with the other shipping materials.

3) All units are shipped with an installation kit. Inspect the kit to ensure it contains the following items:

a. Four (4) Isolation Feet
b. Eight (8) inches of PVC Sch 40 pipe, 1-1/4” in diameter
c. Thirty five (35) inches of PVC Sch 40 pipe, 1-1/4” in diameter

TECH WEST RECOMMENDS CONTACTING THE COMPANY THE UNIT WAS PURCHASED FROM TO SCHEDULE THE INSTALLATION OF THE UNIT.

Step 1 - Install mounting feet provided with unit on the bottom of the unit(s).

Step 2 - Using the bolts provided, mount the separator tank onto either the top, or side of the steel frame.

Step 3 - Using the PVC provided, connect the suction hose from the top of the tank to the vacuum.

Step 4 - Make all necessary exhaust vent connections, **WARNING: DO NOT USE PVC PIPE FOR VENTING EXHAUST.**

Step 5 - Connect the main vacuum line by connecting the 1-1/4” hose to the side of the separator tank.

Step 6 - If applicable, using 18/3 jacketed cable, connect the remote control to the relay panel.

Step 7 - Connect line voltage per local code requirements. Refer to the wiring diagram on page 8 for additional information. Upon completion, power the unit on and check for any leaks.

ECO-VAC DRY VACUUM

LINE SIZING REQUIREMENTS

Please note, both the drawing and the size chart are sized to accommodate a vacuum system for 100% use. This is done to produce good vacuum pressure and flow at all times, from all operatories. Tech West recommends to always use this design for proper system performance. Doing so will ensure there is not any suction loss due to improperly sized main or branch lines.

Important: Do not figure or draw any nitrous or sink evacuation terminations until you have a complete system showing termination to high volume evacuation connections which are normally found in dental unit junction box. Additional 3/4" vacuum lines for nitrous oxide scavenge and evacuator sinks can be added without affecting main or branch line sizes.

1) Count the total number of operatories to be plumbed and select the vacuum line size for either PVC or copper pipe using the line sizing chart in figure 1 below

2) The pipe size you have selected will be the starting line or "main line" and begins at the equipment location. The vacuum line will use a main line riser assembly as shown in figure 8 on the following page.

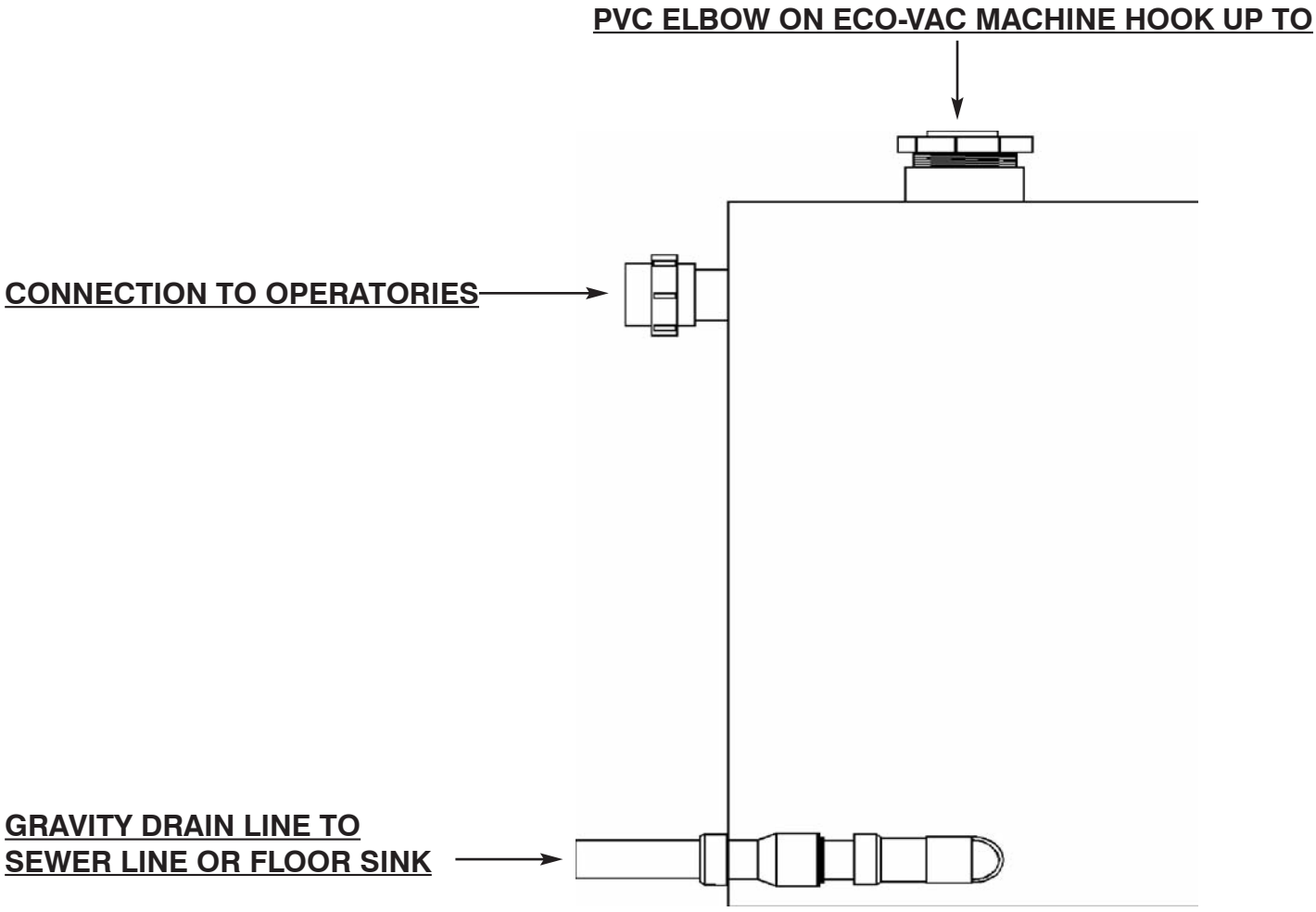
3) After determining the main line-size select the best location to split your piping lines to best accommodate the operatories. Each zone becomes its own system for purposes of sizing the lines properly. If the operatories are in a straight line, zone splitting will not be required.

4) Starting from zone split location, count remaining operatories and look at the sizing chart in figure 1 below to select the appropriate branch line diameter.

FIGURE 1. VACUUM LINE SIZING CHART

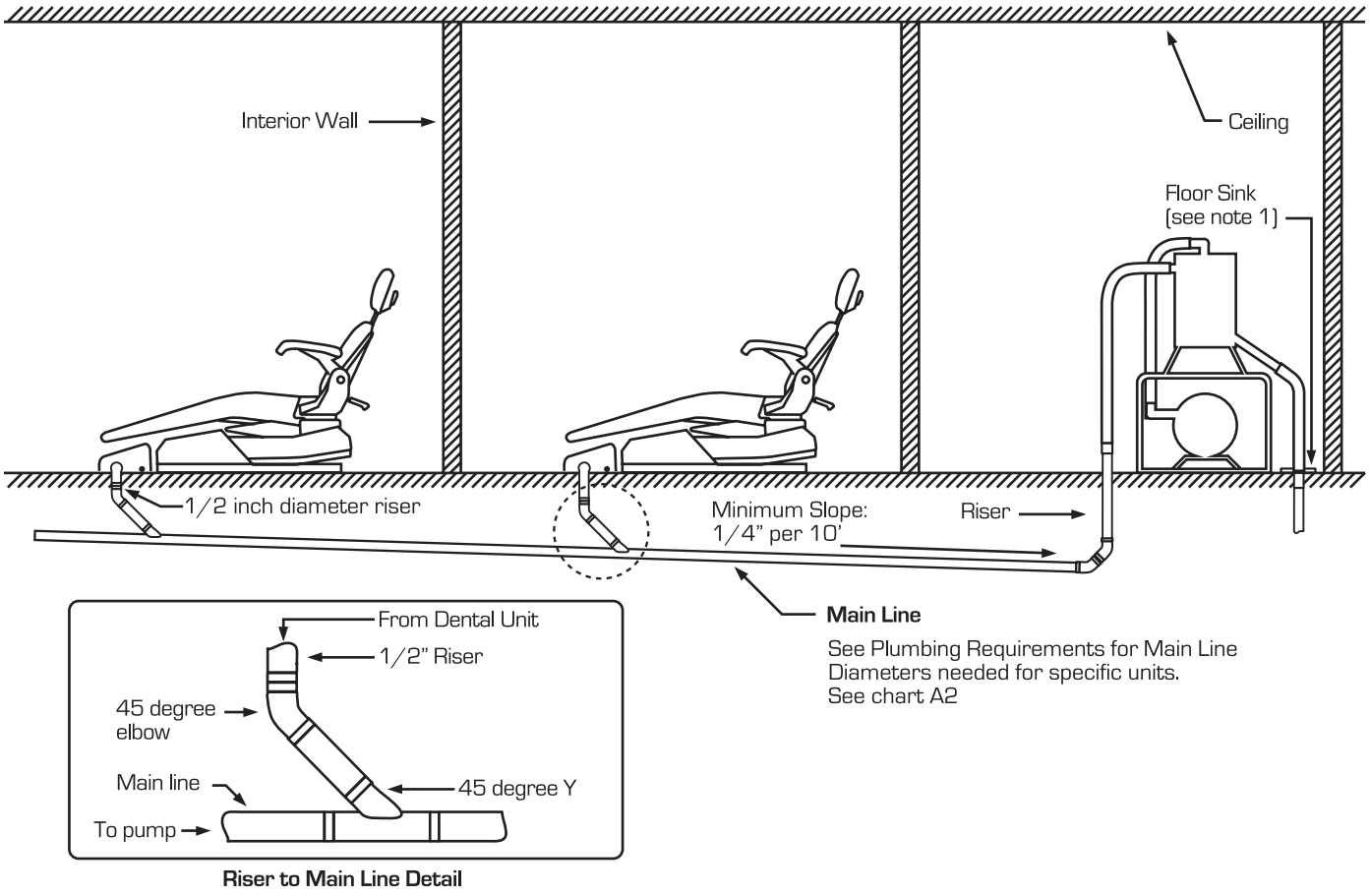
OPERATORIES	PVC sch 40	COPPER
1	3/4"	3/4"
2	1"	1"
3	1 1/4"	1"
4	1 1/4"	1 1/4"
5	1 1/4"	1 1/2"
6	1 1/2"	1 1/2"
7	1 1/2"	1 1/2"
8	1 1/2"	1 1/2"
9	1 1/2"	2"
10	2"	2"
11	2"	2"
12	2"	2"

ECO-VAC DRY VACUUM
PLUMBING AND CONNECTIONS



Plumbing Installation

Sub Floor Installation: The sub-floor plumbing layout shown below is the recommended layout for Tech West Inc. system installations and should be used whenever possible.



Riser to Main Line Detail

Notes:

1 See optional drain connections shown below

2 8 foot maximum height from main line to tank

3 Consult dental unit manufacturer's guidelines for correct reduced size and height of termination of vacuum line inside junction box.

4 Limit branches. Orient main line under junction box or cabinet

5 When main line is 1 1/2" ID or larger, use 45 degree Y's and elbows only.

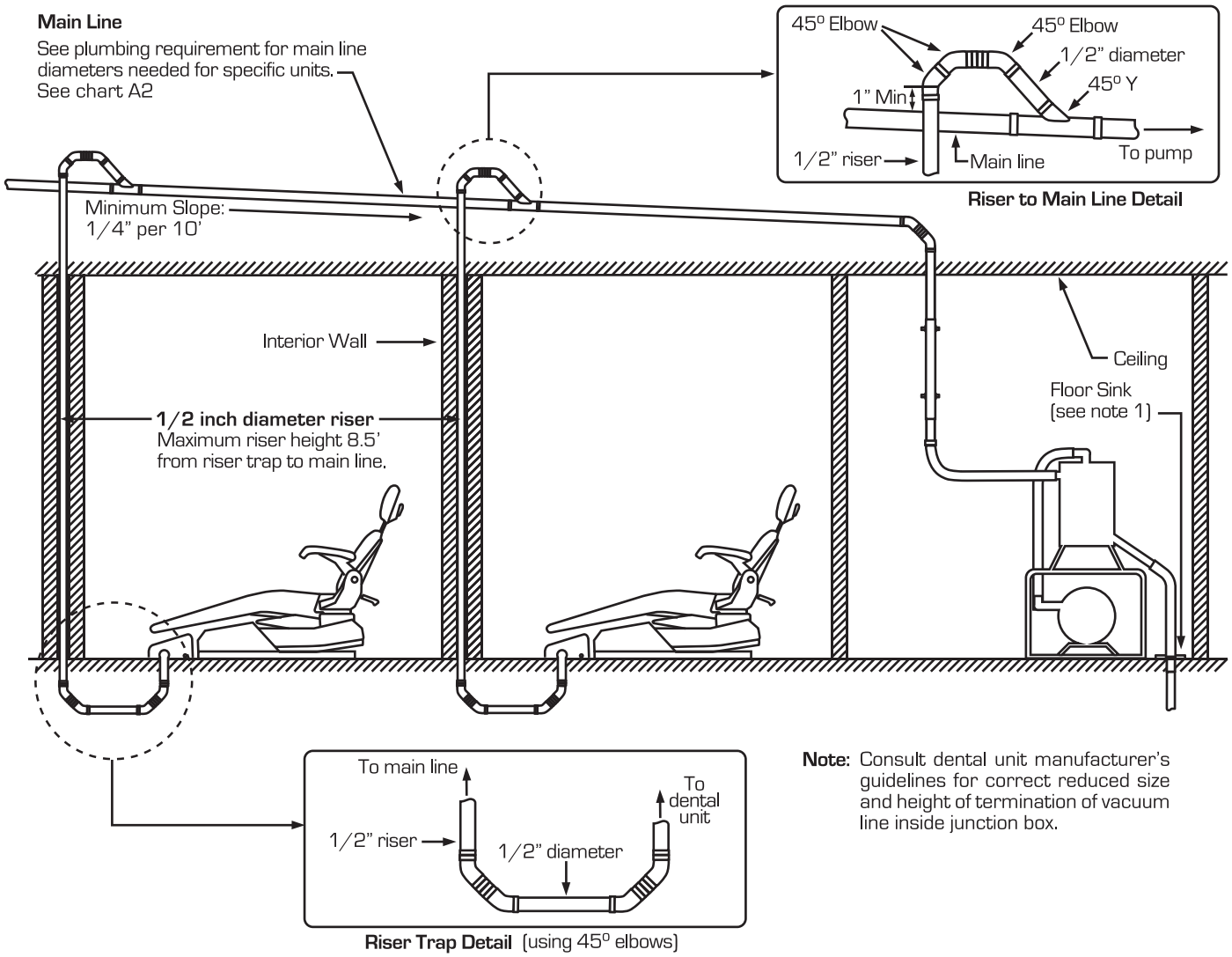
6 Long radium 90 degree elbows can be used as alternates to 45 degree elbows.

7 A total of 8 feet of 1 1/4 inch hose is supplied with Tech West Inc. units. This hose must be shared between inlet and drain.

All installations must conform to local codes

Plumbing Installation

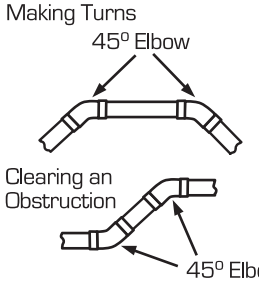
Overhead Installation: The overhead plumbing layout shown below is the alternate layout for Tech West Inc.'s system installation and should be used only when unable to use the sub-floor plumbing layout.



Note: Consult dental unit manufacturer's guidelines for correct reduced size and height of termination of vacuum line inside junction box.

Connection Details All Installations

Main Line

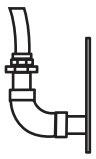


A. Use only 45º elbows or sweeping (sanitary) 90º elbows to make turns in main line.

B. If piping is diverted to clear an obstruction, **DO NOT MAKE A TRAP**.

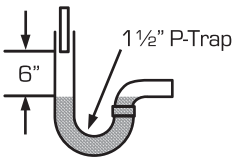
Drain Options

Direct connection to vented drain. No traps before vent.



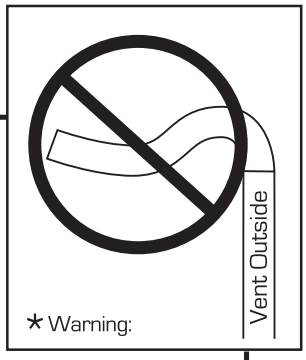
Closed Vented Drain

Indirect connection (Air gap) with a P-trap.



Open Drain Pipe

Target Room Layout



Important Information

A. Safty First -
Always disconnect main power supply before installation.

B. Wire or plug in -
Wire or plug in outlet to building power supply. (see chart A-1 below) NOTE: Buck boost transformers (BT) are only required when voltage drops below 208V or above 240V.

Outside Air Pipe

2-inch pipe for air intake.
Must be protected from rain and animals.

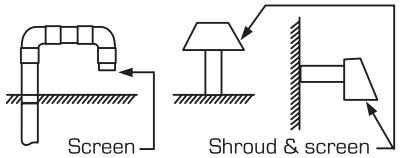


Chart A1

Model	Voltage	Breaker Amps	Plug type
VPD2S2	230 Volt	20 Amps	230 Hard wire / NEMA 6-15P
VPD4D2	230 Volt	2X20 Amps	230 Hard wire / NEMA 6-15P
VPD5S2	230 Volt	20 Amps	230 Hard wire / NEMA 6-15P
VPD10D2	230 Volt	2X20 Amps	230 Hard wire / NEMA 6-15P

Main Vacuum Line

Chart A2 **Vacuum Line Pipe Diameter**

Operatories	PVC sch 40	Copper
1	3/4"	3/4"
2	1"	1"
3	1 1/4"	1"
4	1 1/4"	1 1/4"
5	1 1/4"	1 1/2"
6	1 1/2"	1 1/2"
7	1 1/2"	1 1/2"
8	1 1/2"	1 1/2"
9	1 1/2"	2"
10	2"	2"
11	2"	2"
12	2"	2"

Exhaust Ventilation Connection

Exhaust needs to be vented outside with 2" flexible hose provided.
* Warning: Avoid any bends resulting in a downward slope.
Condensation could cause water to collect in vent pipe.
(See diagram above)

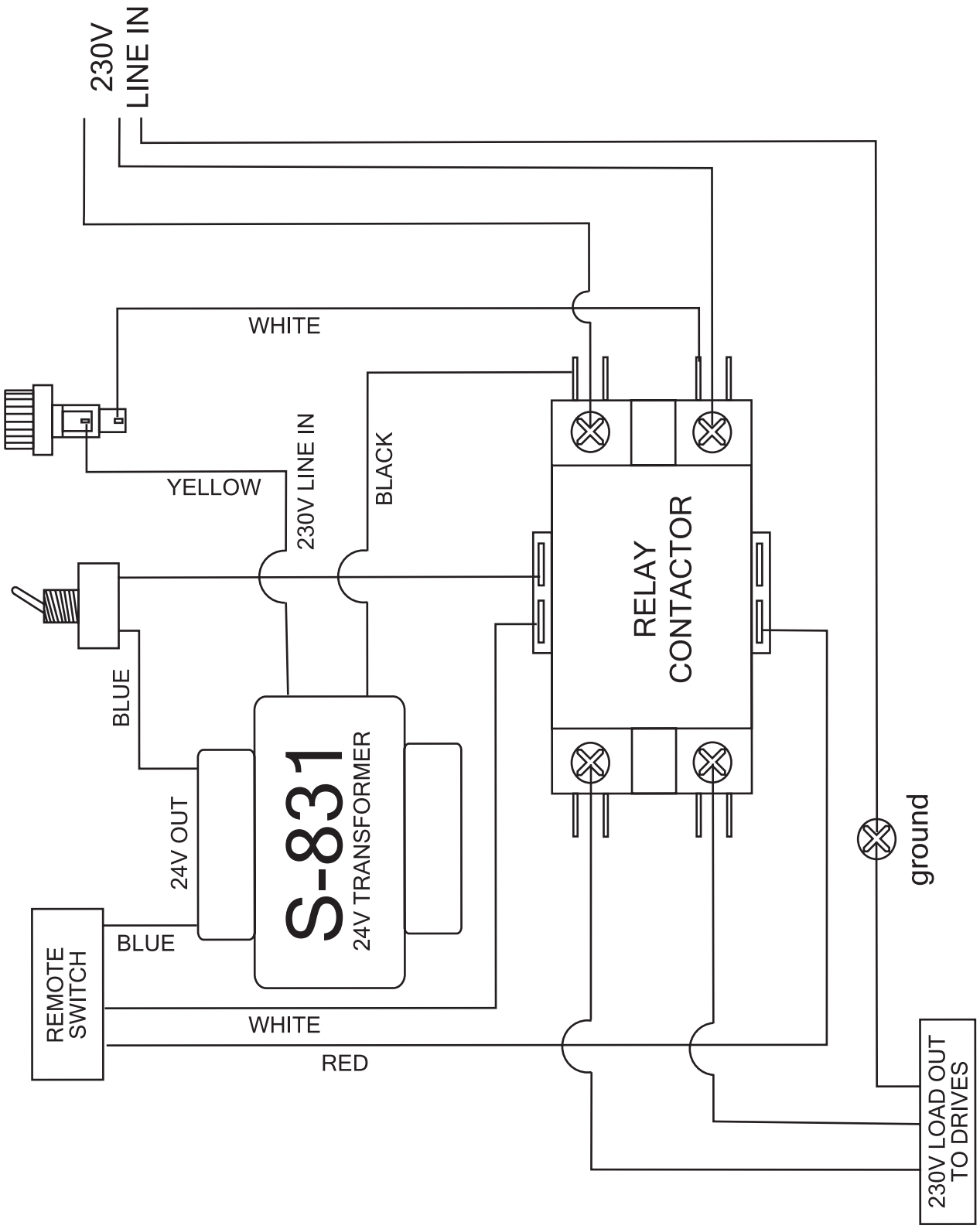
Open floor sink - use 3/8" clear hose to exhaust drip leg.

Ambient Tempertures

H. Must not exceed 105°F Must remain above 41°F

ELECTRICAL WIRING DIAGRAM

ECO VAC WIRE DIAGRAM



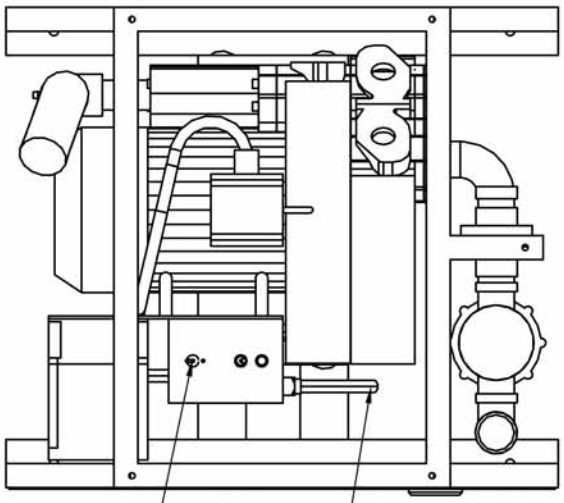
ECO-VAC DRY VACUUM

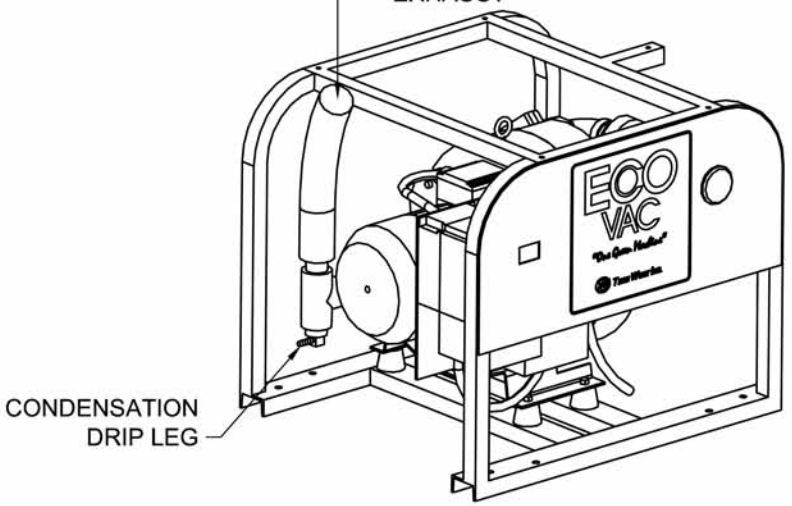
PARTS BREAKDOWN
(MODEL: VPD2S2)

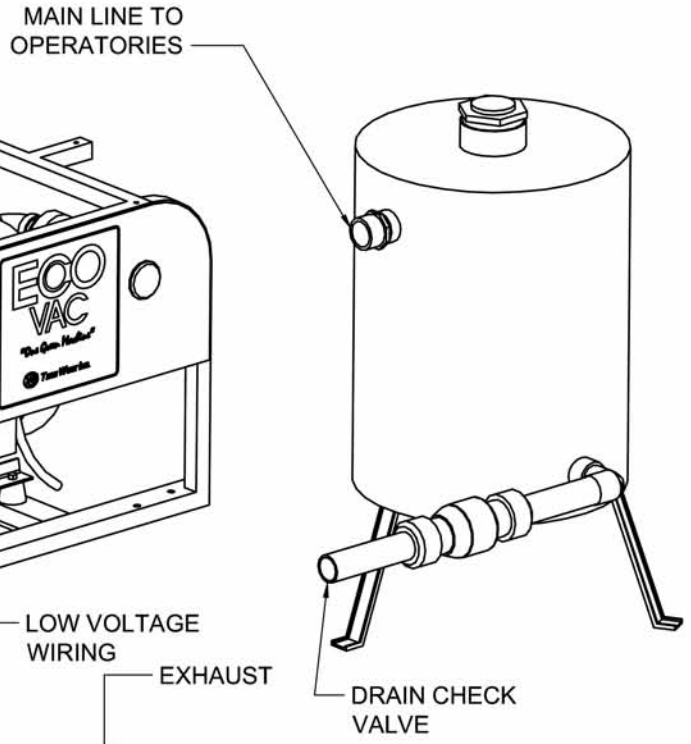
PART	DESCRIPTION	CAT	QUANTITY
VFD-2-5 (2HP) / VFD-2-2 (1.5HP)	VFD DRIVE ASSEMBLY	A	1
EVRC-100	ECOVAC RELAY CONTROL	R	1
EVTC-14	ECOVAC GRAVITY TANK 14G	R	1
DVHK-1.25-S	DRY VAC HOOKUP KIT	R	1
VT-100	TRANSDUCER SUB ASSEMBLY	A	1
CVS-1.25	PVC CHECK VALVE 1-1/4”	R	1
DV-CLAMP	DRY VAC CLAMP	R	2
RIC-GAST	RUBBER MOUNTING FEET	R	4
DVEH-2	DRY VAC EXHAUST HOSE 2”	R	8
DVRC-2X1.25	DRY VAC REDUCER COUPLING	R	1
GC-1.25	GALV COUPLING 1-1/4”	R	1
GN-1.25-CL	GALV NIPPLE 1-1/4” CL	R	1
FPH-1.25	PVC FLEXIBLE HOSE 1-1/4”	R	9

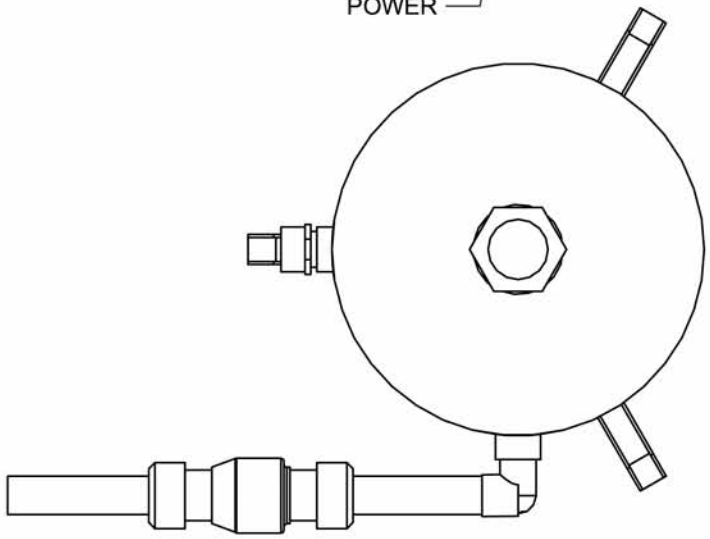
SPECIFICATIONS AND DIMENSIONS

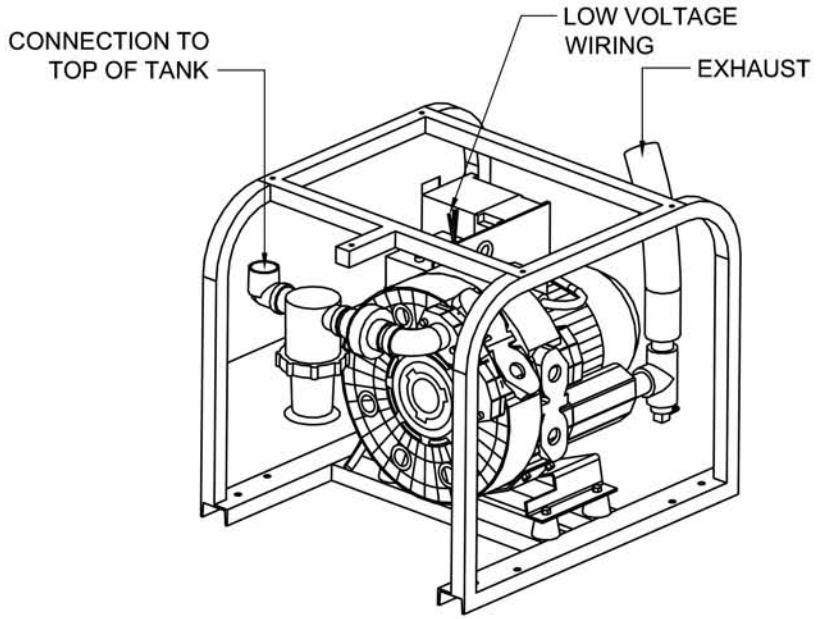
MODEL #	MAX USERS	# OF HEADS	TOTAL H.P.	CFM @ 8 HG	TANK GALLONS	VOLTAGE	TOTAL AMPS	BREAKER SIZE	DB(A)	EQUIP. WEIGHT	EQUIP. HEIGHT	EQUIP. WIDTH	EQUIP. DEPTH	SHIP. WEIGHT	SHIP. HEIGHT	SHIP. WIDTH	SHIP. DEPTH
VPD2S2	2-3	1	2	20	14	208/203	5	20	60	166	52	23	20	224	44	42	30
VPD2S2-N	2-3	1	2	20	N/A	208/203	5	20	60	146	23	23	20	182	44	42	30
VPD5S2	5-7	1	2	45	14	208/203	7	20	62	166	52	23	20	224	44	42	30
VPD5S2-N	5-7	1	2	45	N/A	208/203	7	20	62	146	23	23	20	182	44	42	30
VPD4D2	4-6	2	4	40	14	208/203	10	2X20	62	296	39	40	20	355	44	42	30
VPD10D2	10-14	2	4	90	30	208/203	14	2X20	62	362	39	40	20	330	44	42	30
VPD10D2-14	10-14	2	4	90	14	208/203	14	2X20	62	282	40	43	20	355	44	42	30
VPD10D2-NT	10-14	2	4	90	N/A	208/203	14	2X20	62	282	23	43	20	330	44	42	30
VPD15T2	10-14	3	6	110	40	208/203	21	3X20	62	417	60	40	20	417	44	42	31

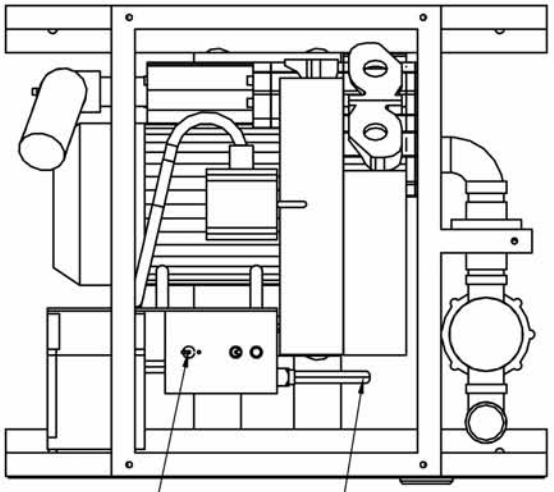

LOW VOLTAGE
WIRING
POWER

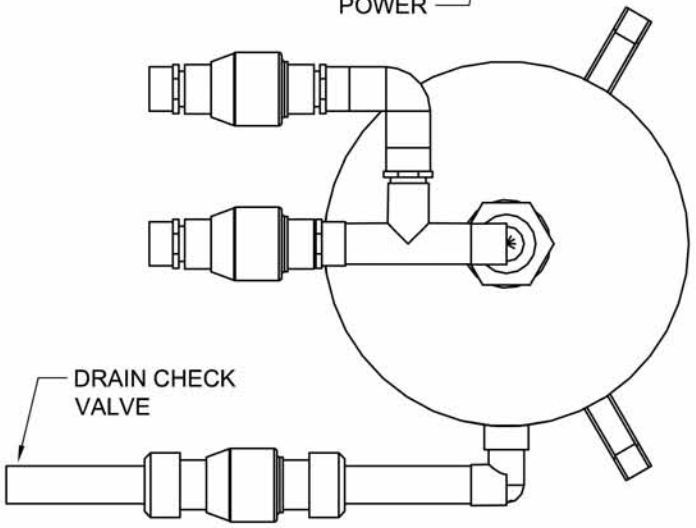

EXHAUST
CONDENSATION
DRIP LEG
ECO
VAC

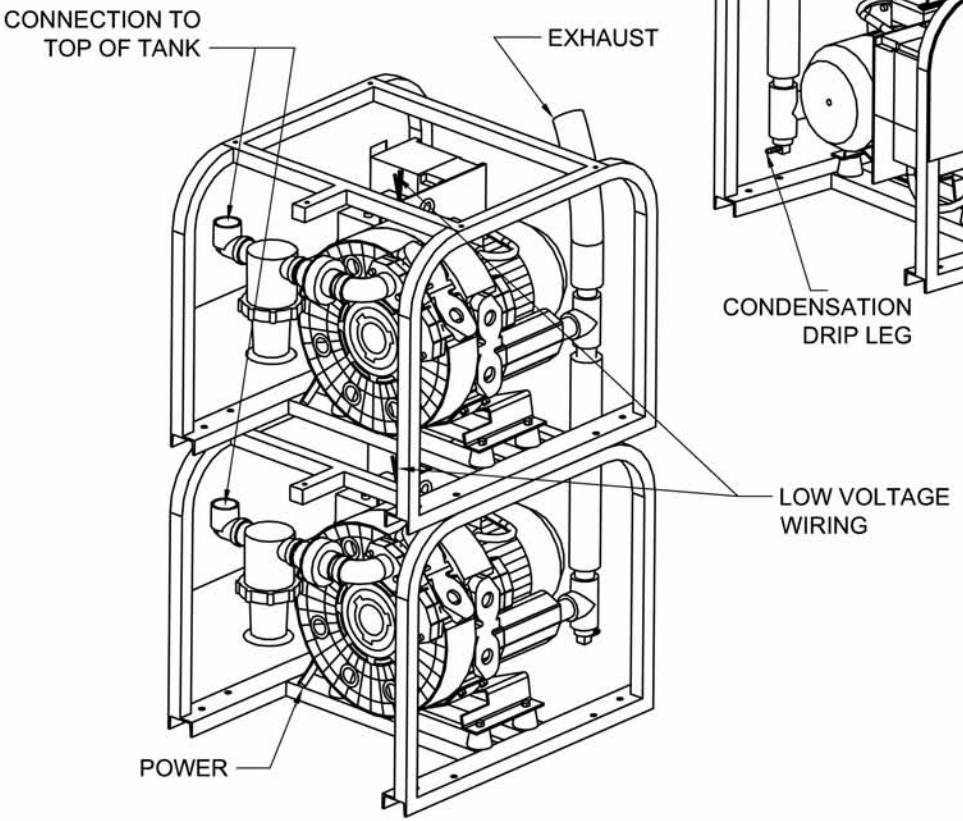

MAIN LINE TO
OPERATORIES
DRAIN CHECK
VALVE

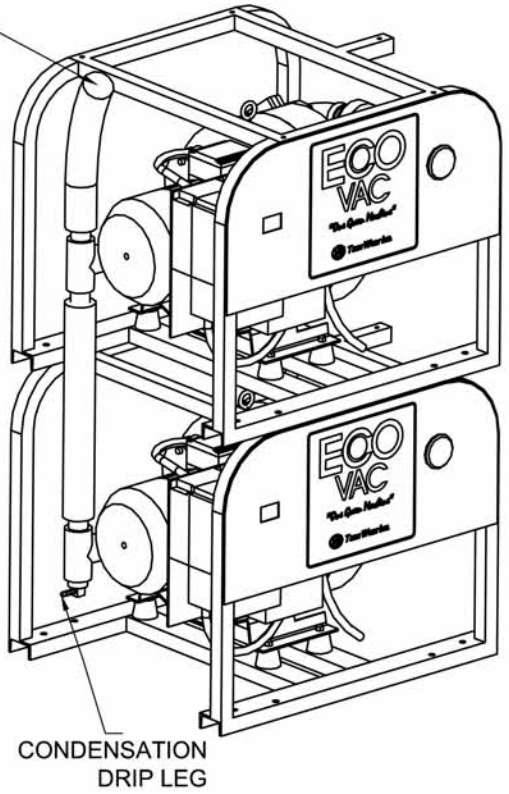



CONNECTION TO
TOP OF TANK
LOW VOLTAGE
WIRING
EXHAUST


LOW VOLTAGE
WIRING
POWER


DRAIN CHECK
VALVE


CONNECTION TO
TOP OF TANK
EXHAUST
LOW VOLTAGE
WIRING
POWER


EXHAUST
ECO VAC
ECO VAC
CONDENSATION
DRIP LEG

GENERAL SERVICE INFORMATION

Please review the following safety precautions before using and servicing the vacuum.

1. Use caution when operating the unit. Keep all fingers, appendages, foreign objects and clothing free from operating surfaces, enclosures, and motor(s).

2. Always disconnect power before performing service or maintenance of any kind.

NEVER ATTEMPT TO SERVICE A UNIT WHILE POWERED ON OR RUNNING.
DO NOT USE THIS UNIT NEAR EXPLOSIVE ATMOSPHERES.
FAILURE TO COMPLY WILL VOID ALL WARRANTIES AND MAY RESULT IN EQUIPMENT FAILURE, INJURY, OR DEATH.

The Tech West EcoVac Dry Vacuum system is essentially maintenance free. There are no traps to clean and no oil to check or change.

Tech West does recommend a weekly cleaning of the vacuum lines to reduce the potential for build-up or blockages.

Build-up and blockages are the leading factors of reduced performance. Tech West recommends using our EcoStar Evacuation Cleaner (Part Numbers ESC-KIT, ESC-16, ESC-32).

IMPORTANT; ONLY USE AN APPROVED NON-FOAMING CLEANER AND FOLLOW THE INSTRUCTIONS ON THE LABEL.

Please contact Tech West Technical Support for additional information on service and maintenance.

Standard Warranty Period

The Tech West EcoVac Dry Vacuum comes with a warranty of 5 years or 10,000 hours, whichever occurs first, on the motor. All other components have a 2 year warranty.

Warranty Claims Process

If you believe the unit is in need of repair, please call your preferred dental dealer and speak with a qualified technician.

Warranty Disclosures

- Improper installation without adequate ventilation will void all manufacturer warranties.
- Improper installation in spaces where temperatures will exceed manufacturers recommendations will void all warranties.
- Improper installation of air and or water lines will void all warranties.
- Improper connections for intake and exhaust will void all warranties.
- Improper installation without adequate voltage and electrical connections will void all warranties.
- Failure to adhere to manufacturers recommendations for installation and service will void all warranties.
- Units purchased in error are subject to a 15% restocking fee plus applicable freight charges.

Return Policy

No returns are authorized without first acquiring a Returned Merchandise Authorization (R. M. A.) All returns are subject to a 15% restocking fee. No returns are authorized after 60 days from the date of shipping.

IMPORTANT SAFETY INFORMATION & WARNINGS

Installation Warnings:

- Manufacturer recommends installation to be performed by qualified service personnel.
- See page 11 for a breakdown of gross weight by model.
- Manufacturer recommends using a forklift or pallet jack to move and set unit(s).

FAILURE TO USE PROPER EQUIPMENT TO MOVE AND INSTALL UNIT(S) COULD RESULT IN INJURY

Potential Hazards:

- Only components meeting IEC safety standards are used to assemble unit(s).
- Manufacturer recommends using appropriate signage to warn of potential hazards.
- Power cord should be routed along the wall and away from walkway to avoid tripping.
- All components are selected and engineered to prevent overloading of any kind to the unit(s) and are within the acceptable industry standard temperature limits.
- Design of the unit(s) ensures that enclosures and other components meet the requirements as mentioned in IEC-60601-1
- See Page 1 of this manuel for information related to Environmental Operating Conditions.
- Humidity testing has been performed asper IEC60601-1
- All components are mounted securely and protected by suitable means such as screws, nuts, bolts, UL approved sheaths, crimping etc. per the assembly instructions.
- Adhere to all manufacturer warning and safety labels located on unit(s).

Electrical Safety Information:

- Electrical safety testing has been performed per IEC 60601-1
- Disconnect power to unit(s) from main power source prior to performing any service or maintenance.
- All critical components are approved with minimum flammability rating of V2.
- Motors are provided with Class B insulation. Thermal overload protection and current protection.
- Transformer is provided with Class A insulation and is protected with a slow blow 0.25A fuse.
- Temperature tests have been performed and found to be in the acceptable range per IEC 60601-1 standards.
- Design tolerates single fault failure and fails in safe mode.
- All terminals are pre-wired to meet electrical specifications at manufacturers warehouse and will not need to be accessed during installation.
- Units are tested to ensure proper connection and grounding before being shipped.
- System is fused to shut off power to unit in the event of excess current draw from a short circuit caused by liquid spill.

FAILURE TO ADHERE TO THE WARNINGS LISTED ABOVE COULD RESULT IN INJURY AND WILL VOID ALL WARRANTIES

ATTENTION: POUR NE PAS COMPROMETTRE LA PROTECTION CONTRE LES RISQUES D'INCENDIE, REMPLACER PAR UN FUSIBLE DE MÉME TYPE ET DE MÉMES CARACTÉRISTIQUES NOMINALES.

TECH WEST INC.

Manufacturers of Dental Vacuum
and Air Systems

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