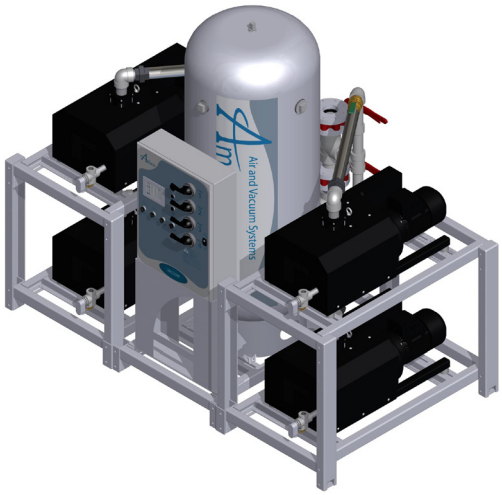
Source Equipment
Vacuum Systems



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Source Equipment

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How to Use This Section

The following section is organized such that the medical vacuum system for a project may be developed and executed in a logical and simple progression. Examples are given whenever possible.

The basic milestones in designing the medical vacuum system are as follows:

- Definitions – Definitions are provided as a general guide that contains terminologies which may be frequently utilized within the Medical Vacuum Systems section. These terms may also be helpful in both understanding & identifying the appropriate medical vacuum system for your medical facility.
- Design – General outline pertaining to procedural involvement in designing your Medical Vacuum Systems.
- Sizing and Selecting the Medical Vacuum System – How to calculate the Peak Calculated Load (PCL) requirements for the medical facility.
- Installation – Steps to building your medical vacuum systems.

Introduction

Medical Vacuum Systems

Medical vacuum in comparison to other medical gas source systems is quite straightforward. The most intricate part of the course comes in the selection of the technology to be used because there exists many competing technologies, each of which has their own appeal and it must be said, their own downfall. NFPA standards have relatively few requirements of which are readily met, thus the decision becomes a balancing of the client's concerns for risk, initial cost vs. life cycle cost and maintenance requirements.

Engineers use the term "vacuum", but clinicians refer to them as "suction" and if you have had the opportunity to speak with the clinicians, you'll find the terminology subtlety different. In addition, although the average clinician cannot articulate it, their major concern is flow. It is quite common to have a maintenance worker, having been called in because of "poor suction", plug in a vacuum gauge and quite accurately tell the complaining nurse "you got all I got". He's right in terms of vacuum level, but the nurse is really referring to the fact that there is a lack of flow.

If we are to design a successful blueprint, we must grapple this problem all the way through the system. Giving a higher ultimate vacuum may be helpful, but it rarely solves the flow problem because only fat pipes are capable of achieving that. Seeking a high vacuum level may actually squander our client's financial resources yet provide no solution to their real problem.

The methods for sizing vacuum sources are always a surprise to new engineers because there are so many methods and because the most commonly used are so poorly documented. The CGA P-2.1 has been withdrawn by its publisher, the Compressed Gas Association. It was essentially unchanged since the 1970's but there is almost nothing but the patina of age to authenticate the numbers it contains. The method we will be using in this design guide follows the latest edition of The National Fire Protection Association Standard (NFPA).

The NFPA method was removed from the NFPA 99 because it was considered out of date. Fortunately, it at least has a research history. We continue to use these two in the US because we have used them for so long that we understand their restrictions and we know from experience that they do work.

The HTM method is published in the HTM 2022 standard, and is the method used in the UK We have included it here as an additional method for comparison.

Steps to Implementing the Medical Vacuum (Suction) System

DISCOVERY

1. Should existing equipment be incorporated along with the Medical Vacuum Systems, determine the dimensions, type, capacity and current loading of the existing equipment. Ensure the existing equipment is compatible with the current standard.
2. Determine the number type and inlet count of all occupancies in the facility which will receive medical vacuum inlets.
3. Determine if there are unusual circumstances which may increase vacuum use. One classic example is within the long term care facility in which wheelchair bound ventilator patients are taught to suction their own airway. Suction demand is enormous as they leave the suction lines open constantly. A system sized using traditional criteria would burn itself out in a matter of months under such a load.
4. Examine the location intended for the exhaust. NFPA mandates the exhaust of the vacuum pump be located outdoor to avoid possible contamination of the intake system (e.g., the medical air intake system). The exhaust shall be located a minimum of 10 ft (3 m) from any other door or openings, 50 ft (15 m) from any mechanical air intake and a minimum of 10 ft (3 m) above grade. The end of the exhaust shall be turned downward and screened. The exhaust piping for a medical vacuum system shall be connected only to the medical vacuum system and not used for any other purpose. Note: consideration should be given to the effects of prevailing winds or accumulated snow on the exhaust(s).
5. Determine a routing for the exhaust piping and note it on the building drawings. Piping for medical vacuum systems shall be routed in such a way that it is not subjected to temperature lower than 40°F (4°C). The exhaust shall be free of loops and dips in order to eliminate the potential of trapping condensate or oil.
6. Ensure the intended location for the vacuum plant is adequately ventilated or is at minimum air conditioned. The plant will emancipate considerable amount of heat into the surrounding. Hence, it must be factored in when selecting a vacuum pump site; determining the adequacy of ventilation; or BTU requirements for air conditioning. (BTU data is furnished in the equipment data sheet).
7. Determine the availability of electrical service.
8. If the vacuum system is not already piped to the intended location, determine the routing for the piping and note it on the building drawings.

DESIGN

1. Follow directions for laying out piped medical gases. This will provide the count of inlets and occupancies which are necessary for the next steps.

PLANT SIZING

There are several methods available for sizing medical vacuum. For the purpose of this design guide, only The National Fire Protection Association (NFPA 99) Method will be discussed.

1. Review the NFPA 99 Standard before sizing a medical vacuum system.
2. Medical-surgical vacuum sources shall consist of two or more vacuum pumps sufficient to serve the peak calculated demand with the largest single vacuum pump out of service.
3. Using the information in Table 1, follow these steps to determine the PCL requirements for the medical facility.

Table 1: The National Fire Protection Association (NFPA) Method for Vacuum Plant Sizing

Available online at www.amico.com

Vacuum							
	Number of Outlets Required	Free Air Allowance, SCFM			Simultaneous	Number of Units Beds, Rooms, Outlets	Vacuum
Location of Outlets		Per Bed	Per Room	Per Outlet	Use Factor (%)		SCFM
Anesthetizing Locations							
Operating Room	3/Room		3.5		100	0	0.00
Cystocscopy	3/Room		2		100	0	0.00
Delivery	3/Room		1		100	0	0.00
Special Procedures (open heart, transplates, etc)	3/Room		4		100	0	0.00
Emergency / Major Trauma Room	3/Room		3		100	0	0.00
Other Anaesthetizing Locations	2/Room		1		50	0	0.00
Evacuation Vacuum	2/Room		1		100	0	0.00
Acute Care Locations (Non-Anesthetizing Locations)							
Recovery Room	3/Bed	1.5			50	0	0.00
Intensive Care Units (except cardiac)	3/Bed	2			75	0	0.00
Cardiac I.C.U.	2/Bed	1			50	10	5.00
Emergency Rooms	2/Bed	1			100	0	0.00
Special Procedure (x-ray, dialysis, etc)	2/Room		1.5		30	0	0.00
Catherization Lab	2/Room		1		10	0	0.00
Surgical Excision Rooms	1/Room		1		10	0	0.00
Neonatal I.C.U.	2/Bed	1			50	0	0.00
Sub-Acute Care Areas (Non-Anesthetizing Locations)							
Patient Room - Surgical	1/Bed	1.5			15	0	0.00
Patient Room - Medical	1/Bed			1	10	0	0.00
Exam & Treatment Rooms	1/Room		1		10	0	0.00
Nursery	1/4 Bassinets			1	10	0	0.00
Nursery Premature	1/4 Bassinets	1			25	0	0.00
Other Patient Rooms							0.00
Respiratory Care Dept	1/Room			1.5	10	0	0.00
Central Supply, Equipment							0.00
Repair/Calibration							0.00
Teaching	1/Room			1.5	10	0	0.00
Autopsy	1/Table			1.5	10	0	0.00
Future Expansion							0.00
						PEAK CALCULATED DEMAND IN SCFM:	5.00
						Altitude above sea level, feet:	0.00
						PEAK CALCULATED DEMAND IN SCFM, ALTITUDE ADJUSTED:	5.00

Note on Sizing Methods:

All sizing methods are only approximations and should be used judiciously. If an existing vacuum plant is being replaced, the operating characteristics of that vacuum pump can be an important gauge of likely future use. For example, if an existing 5 HP pump provides an ample amount of medical suction, but the sizing table yields much larger requirements, it may be suitable to use a smaller compromise unit in preference rather than to simply rely on the results from the Amico Sizing Guide.

ALTITUDE ADJUSTMENT

If a pump is to be operated at higher elevations, the peak calculated demand from Table 1 should be multiplied by the appropriate correction factor. This method of correction assumes upsizing the pump to hold as close to the standard vacuum level (19 inHgV) as possible and represents the ratio of ACFM at sea level vs. the ACFM at the altitude. (See Table 2).

Note A: Do this calculation after calculating for any future expansion. Pumps may have to be oversized to compensate for altitude.

Note B: This table is provided for informational purposes only. It is not a mandatory part of this standard. The health care facility should determine its own requirements in consultation with its technical and clinical staff, consulting engineer and equipment supplier.

Table 2: Altitude Adjustment Chart

Altitude	Normal Barometric Pressure	Multiplier Used for Required SCFM (Hg)
Sea Level	760 mmHg (29.92")	1.00
500 ft. (152 m)	747 mmHg (29.39")	1.02
1,000 ft. (305 m)	733 mmHg (28.86")	1.04
1,500 ft. (457 m)	720 mmHg (28.33")	1.06
2,000 ft. (609 m)	707 mmHg (27.82")	1.08
2,500 ft. (762 m)	694 mmHg (27.32")	1.10
3,000 ft. (900 m)	681 mmHg (26.82")	1.12
3,500 ft. (1,067 m)	669 mmHg (26.33")	1.14
4,000 ft. (1,219 m)	656 mmHg (25.84")	1.16
5,000 ft. (1,525 m)	633 mmHg (24.90")	1.20
6,000 ft. (1,828 m)	609 mmHg (23.98")	1.25
7,000 ft. (2,133 m)	587 mmHg (23.09")	1.30
8,000 ft. (2,438 m)	565 mmHg (22.23")	1.35
9,000 ft. (2,743 m)	543 mmHg (21.93")	1.40
10,000 ft. (3,048 m)	523 mmHg (20.58")	1.45

COMPENSATING FOR FUTURE EXPANSION

The notion of adding capacity now for any future requirements is wise but extreme caution is also advised. It is common to see very badly oversized vacuum systems which were initially sized to accommodate an expansion that never occurred or that was scaled back and was not compulsory after all. In addition to the waste of investment, it generates problems associated with the operation of the system. The best method in preparing for an anticipated expansion is to opt for a plant which is adequate for the present need in a duplex or triplex system but can also be upsized for future need by simply adding additional pumps as required.

When specifying the unit, require the system to be purchased with provision for the additional pump(s). A representative specification would read: "provide duplex vacuum plant with triplex controls ready for a future third pump". Such a system provides an effective method of expanding system capacity, is more capital-efficient and ensures better operating characteristics and reliability. Nevertheless, it is essentially important that the intake, electrical services and system piping are correctly sized for the entire expected capacity, so these larger values should be used in all calculations.

PLANT SELECTION

Select a preferred technology (see Technology Comparison Chart on Page 6). More specific assistance in selecting a technology may be obtained by contacting your local Amico Source Corporation representative.

Choose a horsepower from the preferred technology with the capacity nearest to (but typically greater than) the Peak Calculated Demand (PCD).

Note that for some technologies, there is more than one plant architecture. Should one or more architecture be available for selection, choose the one best suited to the site condition. If in doubt as to which arrangement is most suitable for a particular situation, contact your local Amico Source Corporation representative for assistance.

Reference the Technology Comparison Chart for the particular system selected. This chart lists all of the essential information regarding the system and should be utilized as a quick reference in the following steps.

GENERAL LAYOUT

1. Place the plant in scale on the plan drawings in the designated location. Ensure that the plant has sufficient space on all sides for maintenance access and proper ventilation. In front, the control cabinet must have 3 ft (0.92 m) clearance, and Amico Source Corporation recommends 2 ft (0.61 m) minimum clearance all around. It is sometimes possible to reduce this clearance with exact knowledge of maintenance access requirements. Consult with your local Amico Source Corporation representative if circumstances allow less space.
2. Place the equipment in elevation views as appropriate.
3. On the plans, finalize the routing for the exhaust.
4. Size the exhaust piping. The sizing process is iterative:
    a. Start with the total actual length of piping and make an estimate for the line size.
    b. By using your estimated size, add equivalent lengths for the fittings employed.
    c. Check that the size of the intake piping is still acceptable at the new equivalent length. If not, re-estimate the next larger size and repeat the steps above. The line may also be more accurately sized by actual calculation. Intake piping must be sized to induce no more than 4 inches (100 mm) water column backpressure at the pump outlet when all pumps are running. (Use total capacity for this calculation NOT NFPA capacity). For unusual lengths or other circumstances, contact your local Amico Source Corporation representative for assistance.
5. Finalize the connection to the distribution piping and size the system piping.

SPECIFICATION

1. Select the sections appropriate to the desired technology and system architecture.
2. Write into the specification any exceptional requirements that are necessary (soft starters, etc.).
3. Schedule on the drawings the vacuum plant selected.

Schedule at least:

a. The capacity per pump (per NFPA) and total system capacity.

b. Horsepower per pump or Kilowatt.

c. Voltage, Hz and phase desired.

TECHNOLOGY COMPARISON CHART

Amico Source Corporation offers several technologies for medical vacuums, each of which has its own advantages and drawbacks. This chart summarizes the features of these technologies as an aid in the selection of the correct technology for your specific application. Please refer to Table 3 for glossary of terms.

Characteristics	Contact-Less Claw	Liquid Ring – Water Sealed	Lubricated Rotary Vane	Oil Free Rotary Vane	Rotary Screw
Reliability When Maintained	Good	Excellent	Good	Moderate	Good
Longevity of Pump	Good	Excellent	Good	Moderate	Good
Operating Cost for 150 ACFM at 24 inHg	Low	High	Moderate	High	High
Altitude	Poor (1)	Excellent	No Limit	Poor (1)	Poor (1)
Maintenance	Low, Easy *	Low, Can be Complex	High, Can be Complex	Moderate, Easy	High, Can be Complex
Efficiency	Very High	Low	High	Moderate	Low
VFD Capability	Very High	Low	No	Low	Low
Advantages	• Low operating cost • Excellent choice for dedicated anaesthesia evacuation system • Low maintenance	• Pump life, ambient temperature indifferent • Excellent choice for a dedicated anaesthesia system	• High vacuum • Long vane life • No water and sewage costs • Low noise level • Air cooled design • No rust and scale problems • Low operating cost	• Low maintenance • Low run temperature	• Good for high hp application • Enclosed unit
Disadvantages	• High initial cost • Higher noise level compared to other systems • Higher heat load or higher running temperature	• Dependence on a reliable supply of water • Good water quality is crucial to avoid premature failures due to scale build-up	• High maintenance • Unsuitable for a dedicated anaesthesia evacuation system • Cannot take a slug of water	• Much shorter vane life than lubricated pumps • Lower capacity per horsepower than other designs	• Requires a large footprint • No customization allowed
Sizing Error Tolerance	Good	Excellent	Poor (2)	Good	Good
Suitability for Dedicated WAGD	Excellent (4)	Excellent	DO NOT USE	Poor (3)	DO NOT USE
Ambient Temperature	Limit of 100°F	No Limit if Water is Cool	Limit of 100°F	Limit of 100°F	Limit of 110°F
dB at 10 hp	83	76	76	81	89**
Top Vacuum	22 inHgV**	26 inHgV	29 inHgV	23 inHgV	29 inHgV
Manufacturer	Busch, Elmo Rietschle	Travaini	Becker, Busch, Elmo Rietschle	Becker, Busch	Quincy

* Indicates the Pump is highly recommended where this characteristic is desired.

** At 20 hp

(1) Pumps can be operated at higher elevations if a lower ultimate vacuum is accepted or life of vanes is reduced.

(2) Lubricated rotary vane machines may not easily tolerate being undersized.

(3) Oil free rotary vanes use graphite vanes which are not generally suitable with elevated oxidizer concentrations. Some manufacturers claim they can be rendered.

(4) In the O_2 assured version.

Notes on the Source Sizing Guide

These tables represent standard systems and configurations and do not represent all configurations.

In particular:

Envelope dimensions do not include maintenance space. Amico Source Corporation recommends 36" (92 cm) on all sides but less space may be possible with an understanding of the system maintenance requirements. In all cases the National Electrical Code requires a minimum clearance of 36" (92 cm) in front of the control cabinet.

Contact your local Amico Source Corporation representative should you require fitting the systems in smaller spaces.

All systems listed have the standard receivers. Larger receivers usually change the envelope dimensions.

The modular system's envelope dimensions shown represent a typical arrangement for minimum floor space. However, modular systems are easily located wherever appropriate, which will change the dimensional requirements. Envelope dimensions for modular systems should be used only for informational purposes.

More details on all dimensions will be found on the spec sheets for the system selected and the spec sheet should be consulted when doing final layout.

Medical Vacuum Systems Glossary and Specifications

Table 3: Medical Vacuum Systems Glossary

Definitions	
ACFM	• Actual Cubic Feet per Minute is an expression of actual air volume, generally corrected for and reference to a particular pressure.
Continuous Duty	• Operational reference to compressors operating 24 hours a day, continuously.
Continuous Duty Rated	• Vacuum systems which can operate continuously (24 hours per day) if necessary but normally only operate on demand.
Displacement	• Theoretical physical volume of the air in the pump chamber based upon 100% pumping efficiency, with no allowances made for heat, friction, clearances or other losses in the compression cycle.
Duplex System	• Systems comprised of two (2) pumps, each rated for 100% Peak Calculated Load (PCL) pipeline system.
Intermittent Duty	• Reference to pumps not capable of operating continuously (e.g., pump design requires periodic shut-down for cooling or oil transfer).
LPM	• Abbreviation for Liters Per Minute; a measure of the flow rate of a gas.
NTP	• Normal Temperature and Pressure - generally accepted as 70˚F (20˚C), 14.969 psi/29.92 inHg barometric pressure, and 36% relative humidity.
Peak Calculated Load (PCL)	• The maximum estimated demand a medical facility will require of a medical vacuum system. • Calculated at SCFM at 483 mmHg (20 inHg).
SCFM	• Standard Cubic Feet per Minute is an expression of air at NTP.
Simultaneous Demand	• Operating reference to a condition where all pumps (lead and lag pumps) run simultaneously to satisfy demand in excess of lead pump(s) capability
Source End Vacuum	• The vacuum (negative pressure) level required at the vacuum system source in order to provide the vacuum level at terminal units (outlets) required by the specific suction regulators utilized in the facility.
Timed Alternation	• Lead and lag pumps alternate on a timed basis. In medical vacuum applications, all systems should be able to operate on a timed alternation bases to ensure equal wear of the vacuum pumps.
Triplex Systems	• Medical vacuum system with three compressors (3), each sized for 50% PCL.
Quadruplex System	• Medical vacuum system with four compressors (4), each sized for 33% PCL.

SUMMARY OF NFPA 99 SPECIFICATION (VACUUM SYSTEM)

PART 1 – GENERAL (Medical Vacuum)

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including general and supplementary conditions and Division I specification section, apply to this section.

SUMMARY EXTENT OF WORK

1. This section pertains to all labor, equipment and services necessary for and incidental to the installation of piped medical gas and vacuum systems (PMGVS) including: oxygen, medical air, medical vacuum, waste anaesthesia gas disposal (WAGD), nitrogen, instrument air, nitrous oxide, helium, carbon monoxide, argon, dental air, dental vacuum, laboratory air and mixed gas systems as shown on the drawings and/specified herein.
    a. Oxygen systems shall be complete to the source valve, ready for connection to the bulk gas supply system.
    b. Medical Vacuum and WAGD systems shall be complete, started, tested and ready for use.
    c. Nitrous oxide, nitrogen, carbon dioxide, helium, argon and mixed gas systems shall be complete, tested and ready for use.

PERFORMANCE REQUIREMENTS

1. All materials used shall be new and of the best grade and quality obtainable and workmanship shall be first class in every respect. Contractor shall be responsible for compliance with all local, state or federal codes.
2. Provide all elements and accessories required for complete systems per NFPA 99 most recent edition.
3. Contractor shall make all necessary connections to owner furnished equipment.
4. Install all piping as shown on Drawings described herein and as described in Section 15050, "Basic Materials and Methods": using methods of fabrication, grading, testing, repairing, cleaning and other procedures as described.
5. Electrical power wiring for vacuum pump(s), WAGD producer(s), ceiling columns, alarms, and modular accessories associated with the system(s) shall be part of the electrical contract. Any equipment supplied by this contractor that requires additional electrical services shall be the responsibility of this contractor to provde these services.
6. Perform installer pressure testing, cross connection testing and final testing per NFPA 99's most recent edition and using procedures as specified.

Specifiers; if CONTRACTOR will retain Verifier, use this paragraph;

7. ***Retain a qualified third party verifier acceptable to the engineer and owner to perform and attest to final verification of the systems. Make corrections as needed, including additional testing in order to prevent full and unqualified certification.***

Or, if OWNER will retain Verifier, use this paragraph;

7. ***Coordinate with owner retained verifier for final verification of the systems. Make corrections as needed, including additional testing if necessary to attain full certification.***

COORDINATION

1. Medical Gas Contractor shall coordinate with other trades to ensure timely installations and evade conflicts and interference.
2. Work with metal stud partition installer and/or mason to ensure anchors, sleeves and similar items are provided in sufficient time to avoid delays; chases and openings are properly sized and prepared.
3. Coordinate with owner to ensure medical gas outlets, whether owner supplied or contractor supplied, in walls, ceilings and all equipments are provided by the same Medical Gas Equipment Manufacturer (MGEM) are satisfactory to the owner.
4. Coordinate with bulk cryogenic gas supplier for installation, connection and verification of bulk gas supply systems.
5. Medical Gas Contractor shall supply and install the master alarm system (including the signal wiring). The electrical contractor shall provide power wiring to each alarm panel. Medical Gas Contractor is responsible for proper termination, testing and marking of alarm panels. Termination shall be done by or under the supervision of manufacturer of the alarm panels.
6. Coordinate with Medical Gas Verifier to deliver a complete, tested medical gas installation ready for owner's use.

SUBMITTALS

A. Furnish the following as one package:

1. Medical Gas Equipment Manufacturer (MGEM) submittals shall include a minimum of at least one of the following:
    a. Complete specifications for the product intended to be installed, dimensional drawings and wiring schematics where appropriate.
    b. For Medical Vacuum and WAGD plants include:
        - Package drawing indicating package style, dimensions when complete, method of disassembly and sizes of subsections for rigging and installation.
        - Vacuum System and package capacity expressed with CFM.
        - Lubrication method (if any).
        - Drive detail including adjustment method.
        - Motor including frame type, service factor, horsepower, current draw and RPM.
        - Air filters including type and replacement element.
        - Vacuum regulators including type and manufacturer.
        - Sound pressure in dB(A) when operated within the capacity as stated in the NFPA 99 Standard.
        - Heat output in BTU for the equipment.
    c. For other medical gas products include:
        - Outlet keying system.
        - Alarms networking instructions.
    d. Complete installation instructions for the use of the installer.
    e. Statement of specific compliance with paragraphs of NFPA 99 Standards most recent edition as relevant to the equipment and as listed in those sections.
    f. Complete maintenance schedules.

g. Warranty statement which must encompass all system components. Warranties covering only specific components or containing exclusions are not acceptable.

h. Name and contact information for installation assistance, start up, warranty and service.

i. Description of available preventative maintenance programs for owner's review.

j. Information on training programs available to maintenance personnel for owner's review.

B. Medical Gas Verifier Submittals shall include:

1. Name, contact information and reference list. Reference list should include no less than three references on projects of similar size and complexity.
2. A notarized confirmation from the verifier stating that the verifier undertakes to verify this project and thus agrees to disqualify themselves from supplying any equipment which will be included in the scope of their verification. No verifier who supplies equipment shall be permitted to verify that equipment.
3. Statement declaring that the MGEM has no fiduciary interest in the verifier and that the verifier is not an agent or representative of the MGEM.
4. Statement declaring that the installing contractor has no fiduciary interest in the verifier and that the verifier has no fiduciary interest in the contractor.

C. Pre-approval

1. Written pre-approval is required for equipment not exactly matching specifications. Submit the information required under submittals above, attaching a cover letter stating the exact areas of deviation.
2. A request for pre-approval of equipment must be received by the engineer no less than three days (72 hours) prior to bid.

QUALITY ASSURANCE

A. Regulatory Requirements

1. Electrical Control systems and Medical Gas Alarms are to be UL listed as assemblies with label affixed.
2. Medical air, instrument air, medical vacuum and WAGD controls are to be wired in accordance with NEC.
3. MGEM will include with submittals an affidavit attesting to compliance with all relevant paragraphs of NFPA 99's most recent edition including 'D - Verification' on next page.
4. MGEM personnel assembling medical air, instrument air, vacuum and WAGD plant shall meet the latest edition of NFPA 99 section titled "Qualification of Installers" and hold medical gas endorsements as under ASSE 6010.
5. The Contractor shall furnish documentation attesting that all installed piping materials were purchased cleaned and complied with the requirements of NFPA 99 5.1.10.1 and 5.1.10.2.
6. The Contractor shall furnish copies of ASSE 6010 qualifications for all workers installing medical gas piping.

B. Installation and Start-up

1. The MGEM will provide authorized representatives to review installation and perform initial start up of system.

C. Warranty

1. Warranty will be expressly complete, include all components of the system and be the responsibility of the MGEM for record only. Warranties limiting the responsibility of the MGEM for any system component or which pass through the MGEM to another manufacturer are not acceptable.
2. All source medical gas components shall be warranted by the MGEM of record for a minimum of 30 months from date of shipment.
3. Warranties shall include on site repairs including travel, labour and parts.
4. Shipping and installation costs after the first 12 months will be borne by the customer.

D. Verification

1. Medical Gas Contractor shall deliver to the owner a complete system certification.

PART 2 - PRODUCTS

QUALIFICATION OF MANUFACTURER(S)

1. The manufacturer shall supply all of the medical gas systems and equipments to include outlets, valves and gauges, valve boxes, alarm panels, manifolds, medical air, instrument air, vacuum and WAGD sources.
2. The MGEM shall have a product specialist available to periodically check with the contractor during installation of the pipeline systems equipment. MGEM shall provide service support to the hospital after turnover.
3. Approved MGEM of Piping Systems Components and Medical Gas Alarms:
    a. Amico Source Corporation.
    b. Alternate by _____ with pre-approval.
4. MGEM shall have a minimum of 5 years of experience manufacturing medical air and vacuum systems.
5. Written pre-approval is required for all equipment from other manufacturers.

ALL VACUUM TUBING SHALL INCLUDE:

1. Type "L", "M", or ASTM B-280 ACR copper.
2. Brazed with BCuP-5 Brazing alloy or equivalent alloy with at least 1000˚F (538˚C) melting point.

MEDICAL VACUUM PUMPS

Specifier: Determine the size of vacuum plant required and place on the medical gas schedule

1. Provide a complete medical vacuum source, complying with all relevant requirements of the latest edition of NFPA 99 and supplying medical vacuum continuously for the life of the equipment. The unit shall be manufactured by Amico Source Corporation or pre-approved equal.
2. All components shall be at least duplexed and valved (or check valved as provided in NFPA 99) to allow servicing to any components devoid of interruption of vacuum supply to the facility during any maintenance operation or any condition of single fault failure. Each pump exhaust shall be isolated by a union fitting permitting capping for service removal.
3. Furnish a complete plant consisting of pumps, receiver and controls capable of providing the scheduled capacity with one pump out of service. All capacities will be indicated in SCFM at 20 inHG.

4. System is modular or field separable, allowing for ease of shipment and handling on site. System is completely factory assembled, requiring only interconnection between modules on site. Systems requiring on site assembly other than interconnection are not acceptable. Remounting of components removed for shipping is permitted.
5. Each pump will be direct or close coupled to a NEMA rated High Efficiency TEFC motor with a service factor of 1.15.
6. Each pump will include inlet and outlet flex connectors supplied by the MGEM.

A. Pumps

Vacuum pumps shall be provided as follows:

Specifier: select the paragraph below reflecting the preferred technology:

OIL-LESS CONTACTLESS CLAW:

1. Provide non-contacting claw style rotary pumps. Internal construction is friction free and rotors are non-contacting. Air end is oil free and requires no sealants. Each pump is air cooled and continuous duty rated. Pump is provided with a single lubricated gearbox requiring oil change at minimum 20,000 hour intervals. Pump is provided with exhaust silencer. Pumps are provided by Amico Source Corporation or pre-approved equal.

LUBRICATED ROTARY VANE:

1. Provide oil lubricated rotary vane pumps, dynamically balanced heavy-duty multi vane design. Minimum vane life is 30,000 operation hours. Oil recirculation differential pressure with full recirculation and multistage exhaust oil separation rated at no less than 99.998% efficiency. Each pump is provided with an oil non-return valve, filter change indicator for exhaust oil separation filters. Service to the oil filters does not require disconnection of the exhaust piping. The oil lubrication system shall all be enclosed in one module to minimize oil leaks. Systems with external piping for oil lubrication are not acceptable. Systems requiring separate additional external electric motors for oil cooling are not acceptable. Rubber hose flex connectors and hose clamps are not acceptable for assembling package. Pumps are provided by Amico Source Corporation or pre-approved equal.

OIL-LESS ROTARY VANE:

1. Provide completely dry pumps equipped with self-lubricating carbon/graphite vanes. Bearings shall be lubricated and sealed. No oil is permitted in the pump. Each pump is completely air-cooled and has absolutely no water requirement. Each pump is fitted with a 5 micron inlet filter and is equipped with a vacuum relief valve, check valve to prevent backflow through off-cycle units, flexible connector, isolation valve and vibration isolators at each mounting location. Pumps are provided by Amico or pre-approved equal.

WATER-SEALED LIQUID RING:

1. Provide oil-free, single-stage positive displacement and non-pulsating liquid ring type pumps. The pump will be fitted with mechanical seals. Each pump will be of all iron construction with a bronze or stainless rotor and carbon steel shaft. Maintenance intervals are calendar based and no hours based maintenance are required. Under normal operation, system shall minimize usage of fresh seal water. The system shall include a minimum of 50% water re-circulation. System is self contained. Pumps are provided by Amico Source Corporation or pre-approved equal.

APPLICABLE TO ALL PUMPS:

1. Each pump shall have a built-in anti-suck-back valve mounted at the pump inlet. Each pump shall be equipped with one pump isolation ball valve, one inlet check valve and one inlet stainless steel flex connector. (Option: one bacterial removal inlet filter. The bacterial filter shall meet the requirements of the D.H.S.S. for infectious disease units with complete bacterial removal to 0.0001% penetration.)
2. Each vacuum pump shall be direct-driven through a shaft coupling by a NEMA C-face motor, TEFC, NFPA approved electric motor wired for operation on a _____ volt, _____ hertz, 3 phase power supply. Belt drives shall not be permitted.

B. Receiver

The receiver is to be made of ferrous and/or non-ferrous materials, be capable of withstanding a gauge pressure of 200 psi and 29.9" gauge HgV. The receiver shall be epoxy-lined sized in accordance with the requirements of the medical vacuum system and in compliance with all the requirements with Section VIII, unfired pressure vessels of the ASME Boiler and Pressure Vessel Code. The receiver shall also include:

1. The inside of the receiver consists of a two-part epoxy coating providing rust protection equal or better than that achieved by galvanizing.
2. Manual drain valves.
3. Liquid level indicator.
4. Source shut off valve.
5. Equipped with a means for bypassing the receiver to allow repair and maintenance.

C. Piping and Control Components

The piping control components for each vacuum pump shall include:

1. Flexible inlet and outlet couplings.
2. Inlet and outlet shut-off valves.
3. Exhaust drip leg.
4. A means of removing the vacuum pump for service or replacement without interruption to the system.

Piping and control components shall have corrosion resistance at least equivalent to that of brass or copper and have a rating consistent with the pressure and flow requirements of the system. Exhaust piping from the vacuum pump to the outlet shall be made of non-flammable, corrosion-resistant materials.

The exhaust of the vacuum pumps shall be outdoors to avoid possible contamination of the intake system (e.g., the medical air intake system) and the exhaust shall be:

1. Located at least 10 ft (3 m) away from any door or operable window, door, air intake or other openings in buildings.
2. At a level different from air intake.
3. Where prevailing winds, adjacent buildings, topography, or other influences that would not divert the exhaust into occupied areas or prevent dispersion of the exhaust.
4. The end of the exhaust shall be turned downward, screened, and otherwise be protected against the entry of vermin, debris, or precipitation by screening fabricated or composed of a non-corroding material.
5. Each pump can be isolated by manual or check valve, blind flange, or tube cap to prevent open exhaust piping when pump(s) are removed for service and consequent flow of exhaust air into the room.

D. Control Panel and Alarm Sensors

The control system is UL labeled. The control system provides automatic lead/lag sequencing and automatic alternation of pumps based on first-on/first-off principle with provision for simultaneous operation if required. Automatic activation of reserve unit, if required, will activate an audible alarm as well as a visual alarm on the display screen.

1. Control Panel Features:

Only panel components that are commercially available and not of propriety design will be considered.

   a. NEMA 12 control panel enclosure.
   b. Full voltage motor starter shall be UL 508 E self-protected combination starters with overload protection and external operators.
   c. Door interlock disconnect switch.
   d. 90 dB alarm buzzer.
   e. Visible indicator of "power on" and "pump running" for each pump.
   f. Two control transformers with secondary circuit breaker.
   g. Hand, Off and Auto selector switches for each pump.
   h. Transducer and RTD based controls.
   i. The RTD will digitally display the running temperature of each discharge port and shall be field set to standard manufacturer's operating parameters.
   j. The calibration of the pressure transducer can be set so a non-standard transducer can be used.

2. Touch screen displays and functions include:

   a. UL listed control panel has a NEMA 12 enclosure.
   b. Externally operable circuit breakers with door interlocks, control circuit transformers with fused primary and secondary circuits, H-O-A switches and magnetic starters with three leg thermal overload protection.
   c. Monochrome touch screen monitor with red background during fault displays the hours of operation of each pump, settings of the system and indicates any faults.
   d. Optional 3.5" (8.9 cm), 5.7" (14.48 cm) or 7.5" (19 cm) multicolor touch screen monitor displays the hours of operation of each pump, settings of the system and indicates any faults.
   e. Lighting on the H-O-A switches indicates which pump is running.
   f. Audible and visual local alarms are included for all alarm conditions.
   g. Manual reset for thermal malfunction shutdown.
   h. All control and alarm functions shall remain energized while any compressor or vacuum in the system remains electrically online.
   i. The lag compressor shall be able to start automatically if the lead compressor fails to operate.
   j. Digital dew point and CO readout integrated on screen, with alarm contacts.
   k. Digital display of the dew point (either in °F or °C) and CO in ppm on the monitor.
   l. Alarm contacts are provided for remote annunciation for all alarm conditions.
   m. Ethernet connection for remote access to panel interface through the use of a web browser. (Multicolor touch screen only)
   n. Language selection: English, French or Spanish.
   o. Available for Duplex systems and above.

3. Options (Multicolor touch screen only):
    a. Alarm logging.
    b. Alarm emailing.
    c. BACNET connection.
    d. Extra alarm points monitoring.
    e. Internet remote panel control via 3G cellular network (Monthly connection fee applies).
    f. Variable Speed Drive (VFD).
    g.
4. Panel designed with selectable options to fully match applications
    a. All system settings shall be user adjustable and accessible with the system in operation and the control panel door closed (password protected).
    b. Adjustments can be made to pressure settings to match the customer's requirements.
    c. All alarms to require manual reset.
5. Standard alarms shall open on failure with local audible and visual alarms with dry contacts for the following conditions:

Specifier: select the section below reflecting the preferred technology:

OIL-LESS CLAW PUMP

a. Lag pump in use
b. Main transformer failure
c. Motor overload
d. High discharge air temperature
e. High inlet vacuum

LUBRICATED ROTARY VANE PUMP

a. Lag pump in use
b. Main transformer failure
c. Motor overload
d. High discharge air temperature
e. Low oil level

DRY ROTARY VANE PUMP

a. Lag pump in use
b. Main transformer failure
c. Motor overload
d. High discharge air temperature

WATER-SEALED LIQUID RING VACUUM PUMP

a. Lag pump in use
b. Main transformer failure
c. Motor overload
d. High water temperature

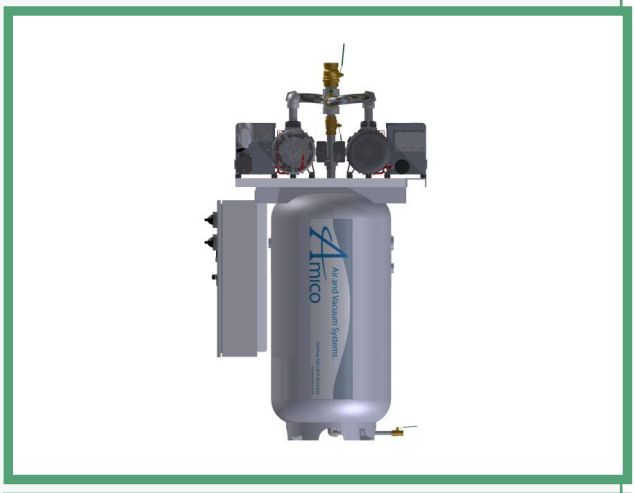
Quick Guide to Configurations

MODULAR STACKING CONFIGURATION

Modular stacking configurations have two pump assemblies stacked on a single stack that are separable for shipping. Vacuum pump assemblies include at least one pump and one motor.

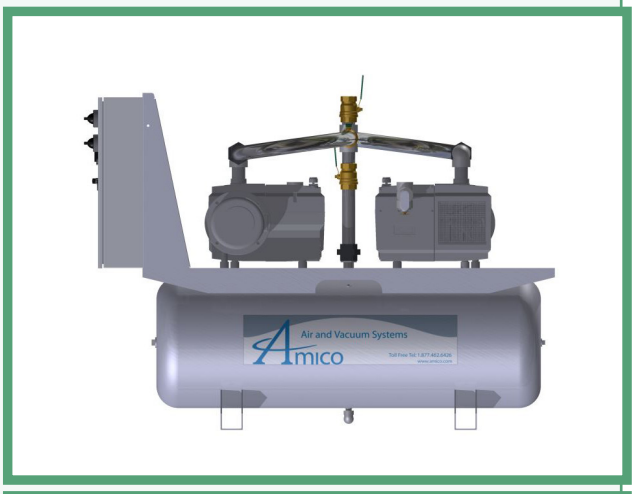
SPACE-SAVER CONFIGURATION

Vertical configurations have two pumps stacked on a single vertical tank. This configuration is only suitable for smaller vacuum pumps or pumps with very little inherent vibration such as Contact-less Claws. It is the most space-efficient of all medical vacuum configurations.



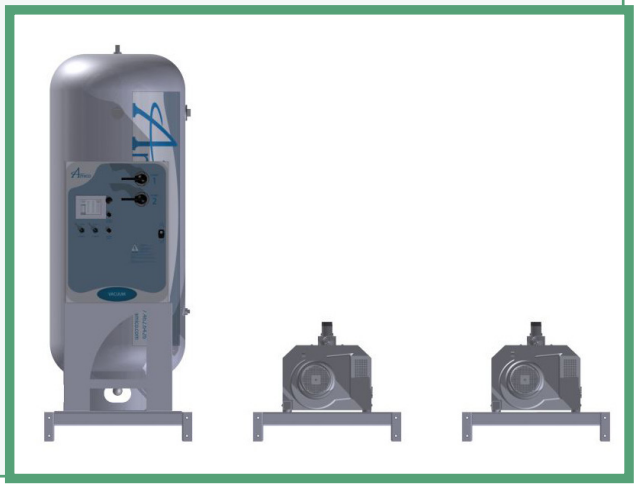
HORIZONTAL TANK MOUNT

The vacuum pumps are mounted on a horizontal tank which is large enough to accommodate bigger pumps and accessories than the Space-Saver. The system is factory piped and wired to a single inlet, outlet and electrical connection.



SKID MOUNT

These systems are mounted on separate skids. This configuration is suitable for larger vacuum pumps. This type of vacuum system is also designed for ease of transportation.



Notes:

The location and number of vacuum terminal units in a system must be determined by consultation with the medical and hospital staff having knowledge of the requirements for and the utilization of vacuum in each space or patient location. Often individual state requirements will dictate specific numbers and locations for vacuum outlets.

The usage factor is a function of the anticipated procedure(s) and apparatus which could be encountered simultaneously and may vary from one facility to another.

* see NFPA 99 Standard

Medical Vacuum System Exhaust

Below is a summary of the requirements for the medical vacuum system exhaust locations.

1. Locate the medical vacuum exhaust outdoors in a manner that will minimize the hazards of noise and contamination to the hospital and its environment. The exhaust shall be located remote from any door, window, air intake or other openings in buildings with particular attention given to separate levels of intake and discharge. Care shall also be exercised to avoid discharge locations contraindicated by prevailing winds, adjacent buildings, topography and other influences. Outdoor exhausts shall be protected against entry of insects, vermin, debris or precipitation. Exhaust lines shall be sized to minimize back pressure. Discharge piping shall be free of dips or loops that might trap condensate or oil. If such discharge piping is unavoidable, a trapping drip leg shall be installed to keep the piping free of fluid buildup. The exhaust shall be located at least 30 ft (10 m) from any door or operable window, 50 ft (15 m) from any mechanical air intake and a minimum of 10 ft (3 m) above grade.
2. Medical vacuum exhausts for separate pumps shall be permitted to be joined together to one common exhaust, provided such intake is appropriately sized.
3. Discharge of pumps utilizing a common exhaust pipe shall be fitted with a check valve, or a manual value (locked open) or arranged to permit capping of the active pipe when removing or servicing the pump.
4. Install a drip leg at the base of each pump exhaust line riser.
5. Minimum exhaust pipe sizing required based on the medical vacuum system horsepower, configuration and the total pipe length (including elbows) in the medical vacuum exhaust line (see Table 4).
    a. The medical vacuum exhausts are joined together to one common exhaust.
    b. Minimum pipe size must be maintained for the total length of exhaust pipe.
    c. Use the next larger size pipe in the event the minimum size is not available.

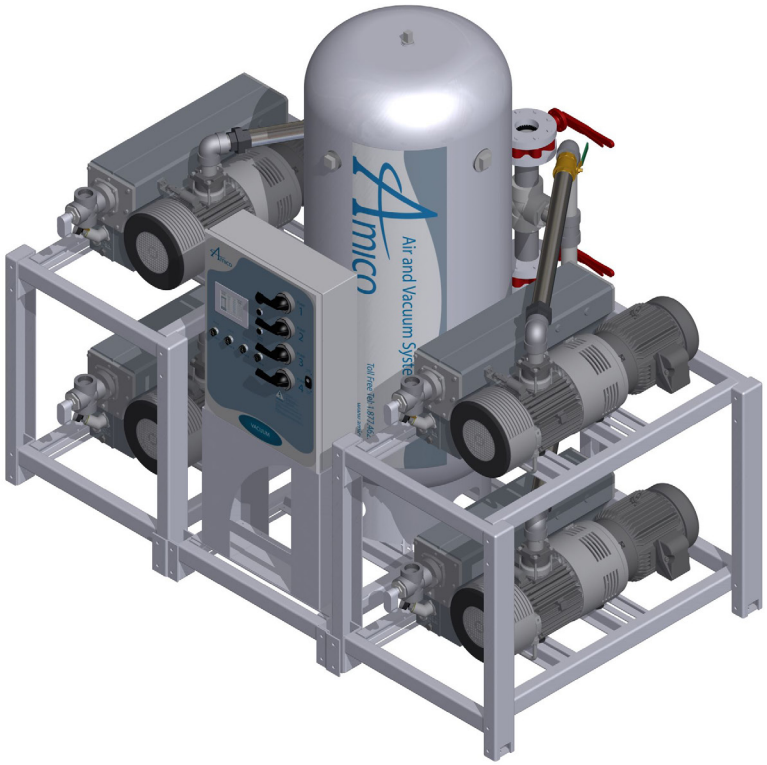
Table 4: Exhaust Pipe Sizing

Available online at www.amico.com

Unit	Flow Basis SCFM@50 PSI (LPM@345kPa)	Allowable Equivalent Run (Feet)							
	Nominal Pipe Size:	1.5"	2.0"	2.5"	3.0"	4.0"	5.0"	6.0"	8.0"
Duplex 1.5 Hp	12	450							
Duplex 2 Hp	LPM 20	170	700						
Duplex 3 Hp	36	65	250	800					
Duplex 5 Hp	74	16	65	200	475				
Duplex 7.5 Hp	138			60	150	600	1,900		
Duplex 10 Hp	178			45	100	425	1,200		
Duplex 15 Hp	240				55	225	675	1,600	
Duplex 20 Hp	272				45	180	525	1,300	
Duplex 25 Hp	336				25	110	325	800	
Triplex 5 Hp	113		30	50	225	900			
Triplex 7.5 Hp	207				75	300	900		
Triplex 10 Hp	267				45	180	550	1,400	
Triplex 15 Hp	375					100	300	700	
Triplex 20 Hp	409					80	250	600	
Triplex 25 Hp	504					60	175	425	
Quad 7.5 Hp	275				45	190	550	1,400	
Quad 10 Hp	355					110	325	800	
Quad 15 Hp	478					65	190	450	
Quad 20 Hp	542						50	150	350
Quad 25 Hp	670						35	170	425

Lubricated

Rotary Vane Vacuum System



Control Panel Specifications

- UL listed control panel has a NEMA 12 enclosure.
- Externally operable circuit breakers with door interlocks, control circuit transformers with fused primary and secondary circuits, H-O-A switches and magnetic starters with three leg overload protection.
- Touch screen monitor displays the hours of operation of each pump, settings of the system and indicates any faults.
- Lighting on the H-O-A switches indicates which pump is running.
- Audible and visual local alarms are included for all required alarms and manufacturer recommended alarms.

- All control and alarm functions shall remain energized while any compressor in the system remains electrically online.
- The lag compressor shall be able to start automatically if the lead compressor fails to operate.
- Alarm contacts are provided for remote annunciation for all alarm points.
- Alarm logging within the control panel PLC (premium only).
- Ethernet connection for remote panel control (premium only).

Lubricated
Rotary Vane Vacuum System

Specifications

- Meets or exceeds the requirements of NFPA 99.
- Package contains: lubricated rotary vane vacuum pumps, associated piping and valves, one ASME air receiver and one control panel.
- System intake, exhaust and power connection at the control panel are the only field connections required.
- Air inlet and electrical shall be completely pre-piped and pre-wired to a single point service connection.
- All interconnecting piping and wiring are completed and operationally tested prior to shipment.
- Liquid tight conduit, fittings and junction boxes for all control and power wiring are provided.

Vacuum Pump

- The medical vacuum pump shall be of the rotary vane air-cooled design with integral, fully recirculating oil supply with sight glass to indicate oil level.
- The oil separation system shall be integral and shall consist of no less than three stages of internally installed oil and smoke eliminators.
- This system shall be capable of removing 99.9+ percent of all oil and smoke particles from the exhaust. Each pump shall include a built-in, anti-suck-back valve mounted at the pump inlet and each pump shall be equipped with three non-asbestos vanes.

Vacuum Pump Drive

The vacuum pump shall be direct driven. Torque is transmitted from the motor to the pump through a shaft coupling.

Vibration Isolation System

The pumps and motor are fully isolated from the package base by means of rubber mounts.

Vacuum System Accessories

Inlet and discharge flexible connectors, inlet check valves, inlet isolation valves, gauge exhaust tee with drip-leg and drain cock valve as well as poly tubing with DISS fitting for vacuum transducer.

Intake Piping

- Each vacuum pump shall have a factory piped intake with integral flex connector, isolation valve and check valve.
- Interconnecting piping shall consist of iron/galvanized pipe and fittings.

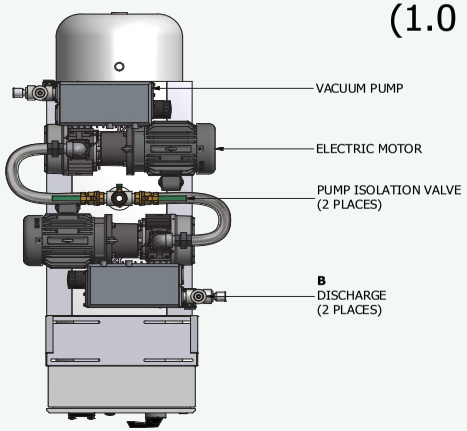
Vacuum Receiver

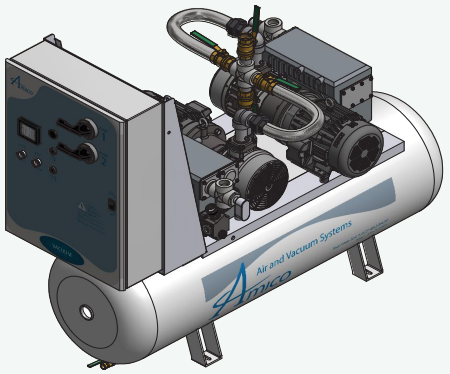
- ASME construction.
- The receiver shall be rated for full vacuum service and shall be equipped with a manual valve drain.
- Rated for a minimum 200 psig design pressure.

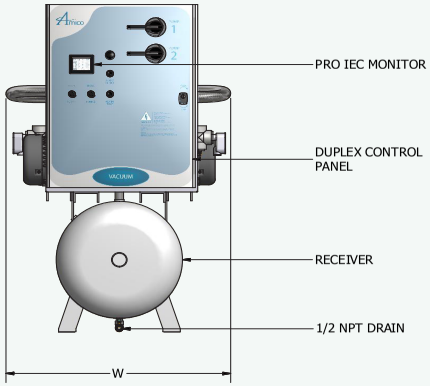
Furnish and install, where shown on the drawing, a prefabricated desiccant air treatment system as manufactured by Amico Source Corporation.

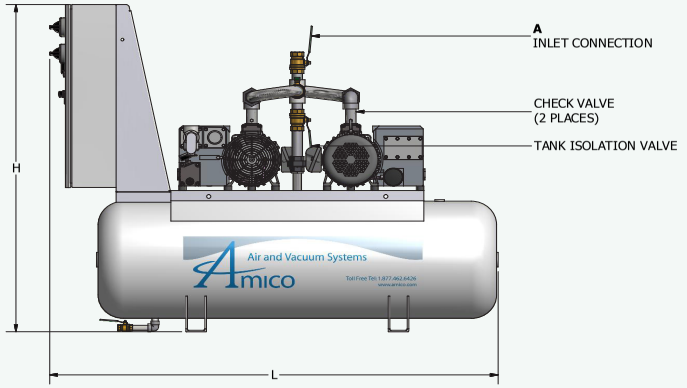
The service of a factory trained representative shall be made available at job site to check installation and start up as well as train operating personnel in proper operation and maintenance procedures. A start-up form shall be completed at the time of start-up by a factory trained representative.

ROTARY VANE - LUBRICATED DUPLEX TANK MOUNTED VACUUM SYSTEM
(1.0 HP - 10.0 HP)









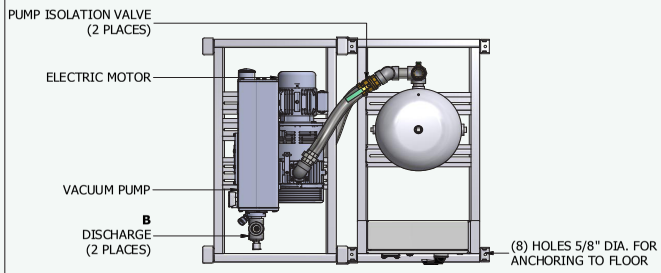
DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

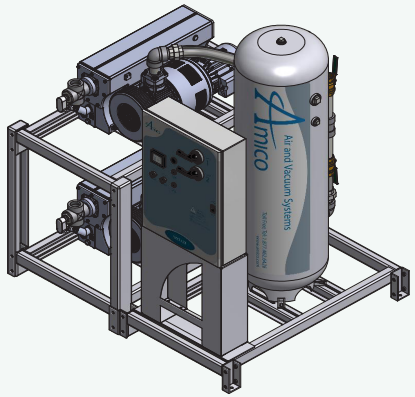
MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)				SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V					
V-RVL-D-080P-TH-N-010	1 (0.75)	0.75	0.75	80 (303)	4.6 (130)	5.5 (156)	4.6 (130)	5.5 (156)	839 (381)	15.1 (1.40)	7	7	4	4	2,545	72	32 (0.81)	68 (1.73)	60 (1.52)
V-RVL-D-080P-TH-N-015	1.5 (1.12)	1.25	1.25	80 (303)	5.8 (165)	7.0 (198)	5.8 (165)	7.0 (198)	1064 (482)	19.4 (1.81)	10	8	5	4	3,818	70	40 (1.02)	70 (1.78)	60 (1.52)
V-RVL-D-080P-TH-N-020	2 (1.49)	1.25	1.25	80 (303)	9.2 (260)	11.0 (311)	9.2 (260)	11.0 (311)	1041 (472)	16.5 (1.54)	12	11	6	5	5,091	70	34 (0.86)	70 (1.78)	60 (1.52)
V-RVL-D-080P-TH-N-030	3 (2.24)	1.25	1.25	80 (303)	14.2 (401)	17.0 (481)	14.2 (401)	17.0 (481)	1213 (550)	20.8 (1.94)	18	16	9	8	7,636	70	40 (1.02)	75 (1.91)	60 (1.52)
V-RVL-D-120P-TH-N-050	5 (3.73)	2.0	2.0	120 (454)	30.8 (873)	37.0 (1048)	30.8 (873)	37.0 (1048)	1795 (814)	30.9 (2.87)	29	26	15	13	12,727	79	57 (1.45)	78 (1.98)	66 (1.68)
V-RVL-D-120P-TH-N-075	7.5 (5.59)	2.0	2.0	120 (454)	43.3 (1227)	52.0 (1472)	43.3 (1227)	52.0 (1472)	1941 (880)	30.6 (2.84)	42	41	24	20	19,091	79	55 (1.40)	80 (2.03)	65 (1.65)
V-RVL-D-120P-TH-N-100	10 (7.46)	2.0	2.0	120 (454)	64.2 (1817)	77.0 (2180)	64.2 (1817)	77.0 (2180)	2204 (100)	32.2 (2.99)	53	51	30	26	25,455	81	58 (1.47)	80 (2.03)	65 (1.65)

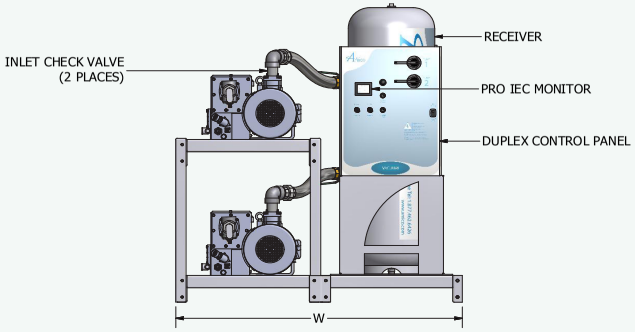
ADDITIONAL MODELS AVAILABLE UPON REQUEST

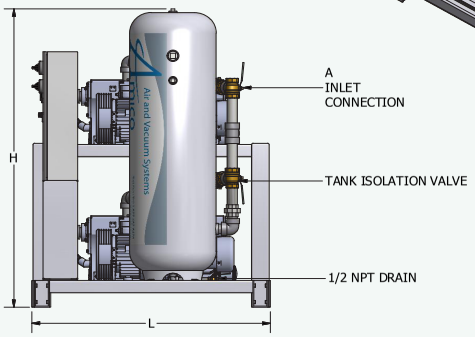
Amico
www.amico.com
85 Fulton Way, Richmond Hill
Ontario, L4B 2N4 Canada
71 East Industry Court
Deer Park, NY 11729
Direct Tel: 905.764.0800
Tel: 1.877.462.6426
Fax: 1.866.440.4986

ROTARY VANE - LUBRICATED DUPLEX STACK MOUNTED VACUUM SYSTEM
(1.0 HP - 50.0 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)				SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V					
V-RVL-D-200P-SS-N-010*	1 (0.75)	0.75	0.75	200 (757)	4.6 (130)	5.5 (156)	4.6 (130)	5.5 (156)	1349 (612)	25.7 (2.37)	7	7	4	4	2,545	72	66 (1.70)	56 (1.42)	91 (2.31)
V-RVL-D-200P-SS-N-015*	1.5 (1.12)	1.25	1.25	200 (757)	5.8 (165)	7.0 (198)	5.8 (165)	7.0 (198)	1523 (691)	25.7 (2.38)	10	8	5	4	3,818	70	66 (1.68)	56 (1.42)	91 (2.31)
V-RVL-D-200P-SS-N-020*	2 (1.49)	1.25	1.25	200 (757)	9.2 (260)	11.0 (311)	9.2 (260)	11.0 (311)	1551 (704)	25.7 (2.38)	12	11	6	5	5,091	70	66 (1.68)	56 (1.42)	91 (2.31)
V-RVL-D-200P-SS-N-030*	3 (2.24)	1.25	1.25	200 (757)	14.2 (401)	17.0 (481)	14.2 (401)	17.0 (481)	1655 (751)	25.7 (2.38)	18	16	9	8	7,636	70	66 (1.68)	56 (1.42)	91 (2.31)
V-RVL-D-200P-SS-N-050	5 (3.73)	2.0	2.0	200 (757)	30.8 (873)	37.0 (1048)	30.8 (873)	37.0 (1048)	2262 (1026)	26.1 (2.42)	29	26	15	13	12,727	79	67 (1.70)	56 (1.42)	91 (2.31)
V-RVL-D-200P-SS-N-075	7.5 (5.59)	2.0	2.0	200 (757)	43.3 (1227)	52.0 (1472)	43.3 (1227)	52.0 (1472)	2408 (1092)	26.1 (2.42)	42	41	24	20	19,091	79	67 (1.70)	56 (1.42)	91 (2.31)
V-RVL-D-200P-SS-N-100	10 (7.46)	2.0	2.0	200 (757)	64.2 (1817)	77.0 (2180)	64.2 (1817)	77.0 (2180)	2688 (1219)	26.1 (2.42)	53	51	30	26	25,455	81	67 (1.70)	56 (1.42)	91 (2.31)
V-RVL-D-200P-SS-N-150*	15 (11.2)	3.0	3.0	200 (757)	92.5 (2619)	111.0 (3143)	92.5 (2619)	111.0 (3143)	4039 (1832)	51.1 (4.75)	81	75	45	37	38,182	83	92 (2.34)	80 (2.03)	90 (2.29)
V-RVL-D-200P-SS-N-200*	20 (14.9)	3.0	3.0	200 (757)	114.2 (3233)	137.0 (3879)	114.2 (3233)	137.0 (3879)	4367 (1981)	51.1 (4.75)	108	104	56	52	50,909	84	92 (2.34)	80 (2.03)	90 (2.29)
V-RVL-D-200P-SS-N-250*	25 (18.6)	3.0	3.0	200 (757)	140.0 (3964)	168.0 (4757)	140.0 (3964)	168.0 (4757)	4785 (2170)	51.1 (4.75)	140	124	74	62	63,611	85	92 (2.34)	80 (2.03)	90 (2.29)
V-RVL-D-200P-SS-N-300*	30 (22.4)	4.0	3.0	200 (757)	165.0 (4668)	198.0 (5601)	165.0 (4668)	198.0 (5601)	5116 (2321)	80.0 (7.43)	-	148	90	80	76,333	81	144 (3.66)	80 (2.03)	90 (2.29)
V-RVL-D-200P-SS-N-400*	40 (29.8)	4.0	3.0	200 (757)	201.0 (5701)	242.0 (6841)	201.0 (5701)	242.0 (6841)	6642 (3013)	91.7 (8.53)	-	198	102	-	101,777	83	150 (3.81)	88 (2.24)	90 (2.29)
V-RVL-D-200P-SS-N-500*	50 (37.3)	4.0	3.0	200 (757)	246.0 (6968)	295.0 (8362)	246.0 (6968)	295.0 (8362)	6672 (3026)	91.7 (8.53)	-	244	128	122	127,222	84	150 (3.81)	88 (2.24)	90 (2.29)

*SYSTEM CONFIGURATION DIFFERS FROM MODEL SHOWN

ADDITIONAL MODELS AVAILABLE UPON REQUEST

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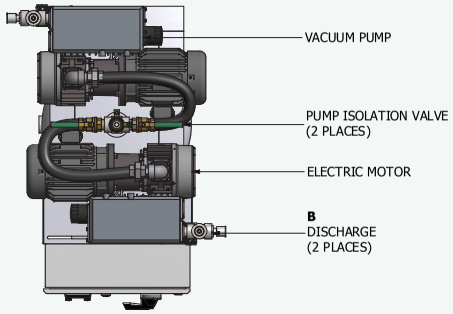
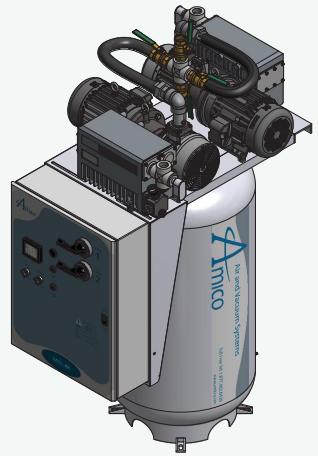
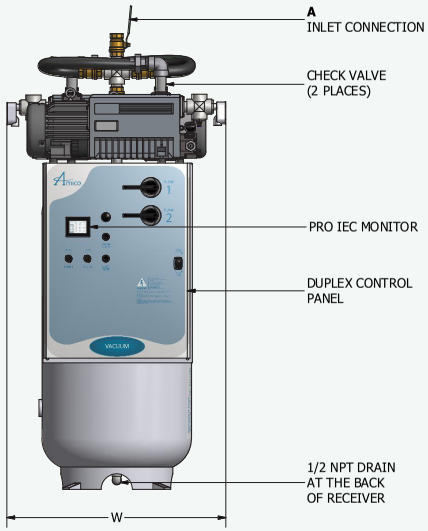
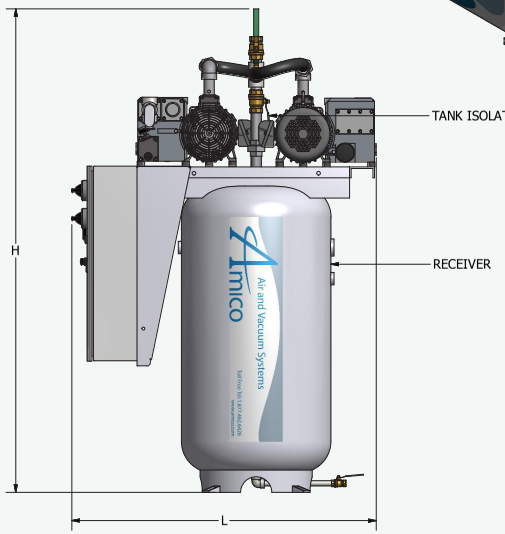
Fax: 1.866.440.4986

ROTARY VANE - LUBRICATED DUPLEX "SPACE SAVER" VACUUM SYSTEM
(1.0 HP - 10.0 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)				SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V					
V-RVL-D-080P-TS-N-010	1 (0.75)	0.75	0.75	80 (303)	4.6 (130)	5.5 (156)	4.6 (130)	5.5 (156)	833 (378)	8.8 (0.81)	7	7	4	4	2,545	72	28 (0.71)	45 (1.14)	75 (1.91)
V-RVL-D-080P-TS-N-015	1.5 (1.12)	1.25	1.25	80 (303)	5.8 (165)	7.0 (198)	5.8 (165)	7.0 (198)	1058 (480)	11.4 (1.06)	10	8	5	4	3,818	70	35 (0.89)	47 (1.19)	82 (2.08)
V-RVL-D-080P-TS-N-020	2 (1.49)	1.25	1.25	80 (303)	9.2 (260)	11.0 (311)	9.2 (260)	11.0 (311)	1035 (469)	11.4 (1.06)	12	11	6	5	5,091	70	35 (0.89)	47 (1.19)	82 (2.08)
V-RVL-D-080P-TS-N-030	3 (2.24)	1.25	1.25	80 (303)	14.2 (401)	17.0 (481)	14.2 (401)	17.0 (481)	1207 (547)	13.9 (1.29)	18	16	9	8	7,636	70	40 (1.02)	50 (1.27)	82 (2.08)
V-RVL-D-120P-TS-N-050	5 (3.73)	2.0	2.0	120 (454)	30.8 (873)	37.0 (1048)	30.8 (873)	37.0 (1048)	1828 (829)	15.3 (1.42)	29	26	15	13	12,727	79	40 (1.02)	55 (1.40)	85 (2.16)
V-RVL-D-120P-TS-N-075	7.5 (5.59)	2.0	2.0	120 (454)	43.3 (1227)	52.0 (1472)	43.3 (1227)	52.0 (1472)	1974 (895)	24.6 (2.28)	42	41	24	20	19,091	79	58 (1.47)	61 (1.55)	85 (2.16)
V-RVL-D-120P-TS-N-100	10 (7.46)	2.0	2.0	120 (454)	64.2 (1817)	77.0 (2180)	64.2 (1817)	77.0 (2180)	2237 (1015)	27.5 (2.55)	53	51	30	26	25,455	81	60 (1.52)	66 (1.68)	85 (2.16)

ADDITIONAL MODELS AVAILABLE UPON REQUEST

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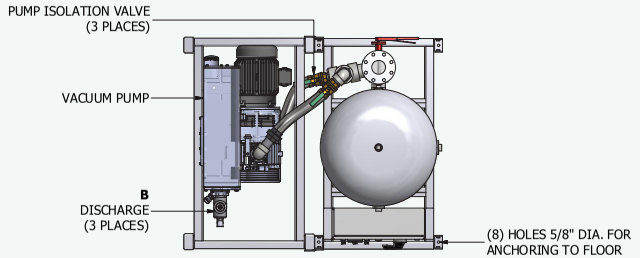
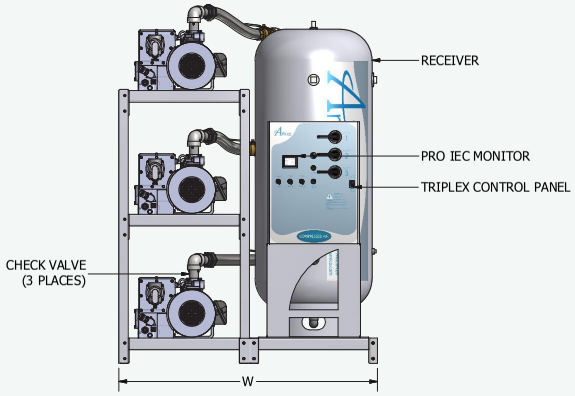
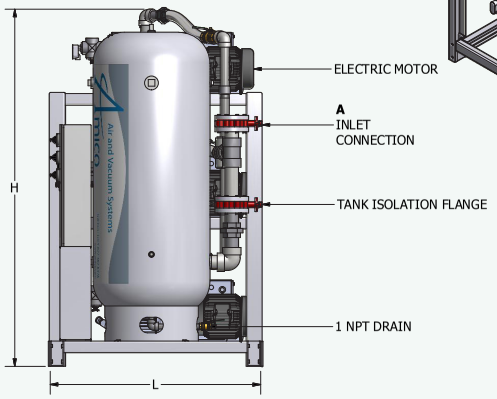
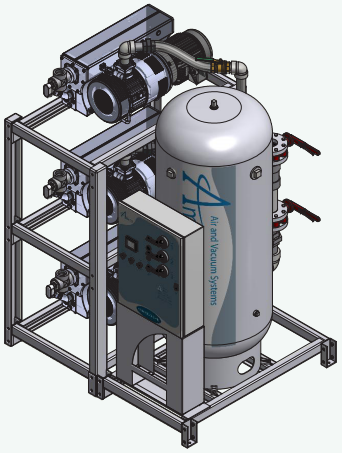
ROTARY VANE - LUBRICATED TRIPLEX STACK MOUNTED VACUUM SYSTEM
(1.0 HP - 50.0 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)				SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V					
V-RVL-T-200P-SS-N-010*	1 (0.75)	1.0	0.75	200 (757)	4.6 (130)	5.5 (156)	9.2 (260)	11.0 (311)	1692 (767)	26.1 (2.42)	11	10	6	6	5,090	75	67 (1.70)	56 (1.42)	91 (2.31)
V-RVL-T-200P-SS-N-015*	1.5 (1.12)	1.5	1.25	200 (757)	5.8 (165)	7.0 (198)	11.7 (330)	14.0 (396)	1928 (875)	26.1 (2.42)	15	13	8	6	7,636	73	67 (1.70)	56 (1.42)	91 (2.31)
V-RVL-T-200P-SS-N-020*	2 (1.49)	1.5	1.25	200 (757)	9.2 (260)	11.0 (311)	18.3 (519)	22.0 (623)	1970 (894)	26.1 (2.42)	19	16	9	8	10,182	73	67 (1.70)	56 (1.42)	91 (2.31)
V-RVL-T-200P-SS-N-030*	3 (2.24)	1.5	1.25	200 (757)	14.2 (401)	17.0 (481)	28.3 (802)	34.0 (963)	2126 (964)	26.1 (2.42)	27	23	14	12	15,272	73	67 (1.70)	56 (1.42)	91 (2.31)
V-RVL-T-200P-SS-N-050	5 (3.73)	3.0	2.0	200 (757)	30.8 (873)	37.0 (1048)	61.7 (1746)	74.0 (2095)	2951 (1339)	26.1 (2.42)	44	39	22	20	25,454	81	67 (1.70)	56 (1.42)	97 (2.46)
V-RVL-T-200P-SS-N-075	7.5 (5.59)	3.0	2.0	200 (757)	43.3 (1227)	52.0 (1472)	86.7 (2454)	104.0 (2945)	3170 (1438)	26.1 (2.42)	63	61	36	31	38,182	84	67 (1.70)	56 (1.42)	97 (2.46)
V-RVL-T-200P-SS-N-100	10 (7.46)	3.0	2.0	200 (757)	64.2 (1817)	77.0 (2180)	128.3 (3634)	154.0 (4361)	3590 (1628)	26.1 (2.42)	79	77	45	38	50,910	84	67 (1.70)	56 (1.42)	97 (2.46)
V-RVL-T-200P-SS-N-150*	15 (11.2)	4.0	3.0	200 (757)	92.5 (2619)	111.0 (3143)	185.0 (5239)	222.0 (6286)	5491 (2491)	80.0 (7.43)	121	112	67	56	76,364	86	144 (3.66)	80 (2.03)	90 (2.29)
V-RVL-T-200P-SS-N-200*	20 (14.9)	4.0	3.0	200 (757)	114.2 (3233)	137.0 (3879)	228.3 (6466)	274.0 (7759)	5983 (2714)	80.0 (7.43)	162	156	84	78	101,818	87	144 (3.66)	80 (2.03)	90 (2.29)
V-RVL-T-200P-SS-N-250*	25 (18.6)	4.0	3.0	200 (757)	140.0 (3964)	168.0 (4757)	280.0 (7929)	336.0 (9514)	6610 (2998)	80.0 (7.43)	210	186	111	93	127,222	88	144 (3.66)	80 (2.03)	90 (2.29)
V-RVL-T-200P-SS-N-300*	30 (22.4)	5.0	3.0	200 (757)	165.0 (4668)	198.0 (5601)	330.0 (9335)	396.0 (11202)	7144 (3240)	108.9 (10.12)	-	222	135	120	152,666	84	196 (4.98)	80 (2.03)	90 (2.29)
V-RVL-T-200P-SS-N-400*	40 (29.8)	5.0	3.0	200 (757)	201.0 (5701)	242.0 (6841)	403.0 (11402)	484.0 (13705)	9428 (4277)	119.8 (11.13)	-	297	153	-	203,554	86	196 (4.98)	88 (2.24)	90 (2.29)
V-RVL-T-200P-SS-N-500*	50 (37.3)	5.0	3.0	200 (757)	246.0 (6968)	295.0 (8362)	492.0 (13937)	591.0 (16724)	9473 (4297)	119.8 (11.13)	-	366	192	183	254,444	87	196 (4.98)	88 (2.24)	90 (2.29)

*SYSTEM CONFIGURATION DIFFERS FROM MODEL SHOWN

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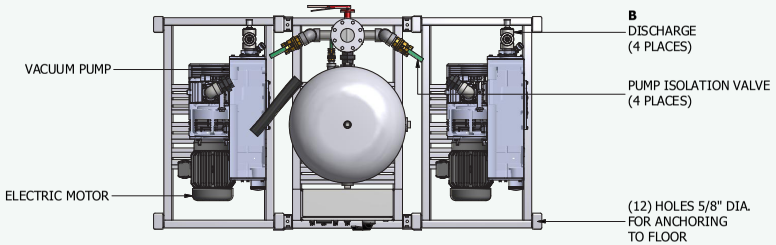
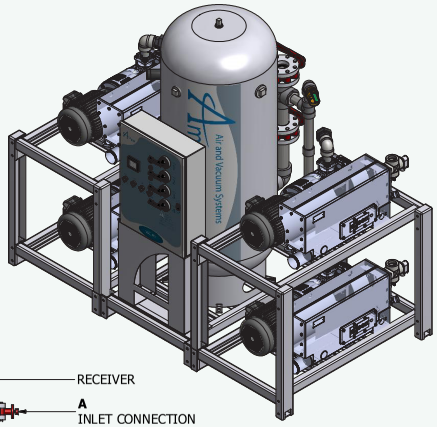
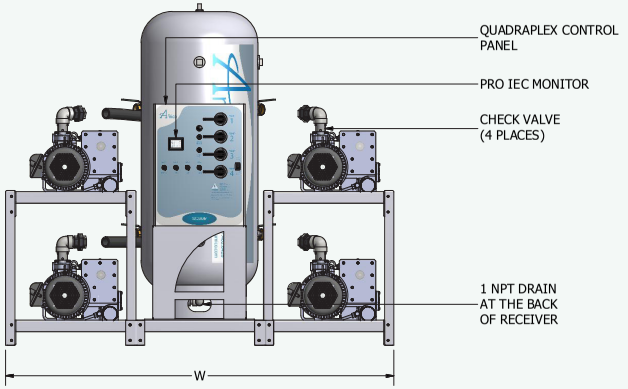
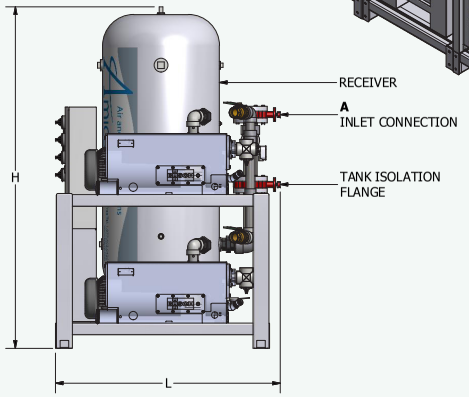
ROTARY VANE - LUBRICATED QUADRAPLEX STACK MOUNTED VACUUM SYSTEM (1.0 HP - 50.0 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)				SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V					
V-RVL-Q-200P-SS-N-010*	1 (0.75)	1.25	0.75	200 (757)	4.6 (130)	5.5 (156)	13.8 (389)	16.5 (467)	1833 (831)	26.1 (2.42)	14	14	8	8	7,635	77	67 (1.70)	56 (1.42)	91 (2.31)
V-RVL-Q-200P-SS-N-015*	1.5 (1.12)	2.0	1.25	200 (757)	5.8 (165)	7.0 (198)	17.5 (496)	21.0 (595)	2131 (967)	26.1 (2.42)	20	17	10	8	11,454	75	67 (1.70)	56 (1.42)	91 (2.31)
V-RVL-Q-200P-SS-N-020*	2 (1.49)	2.0	1.25	200 (757)	9.2 (260)	11.0 (311)	27.5 (779)	33.0 (934)	2187 (992)	26.1 (2.42)	25	22	12	11	15,273	75	67 (1.70)	56 (1.42)	91 (2.31)
V-RVL-Q-200P-SS-N-030*	3 (2.24)	2.0	1.25	200 (757)	14.2 (401)	17.0 (481)	42.5 (1203)	51.0 (1444)	2395 (1086)	26.1 (2.42)	36	31	18	16	22,908	75	67 (1.70)	56 (1.42)	91 (2.31)
V-RVL-Q-200P-SS-N-050	5 (3.73)	4.0	2.0	200 (757)	30.8 (873)	37.0 (1048)	92.5 (2619)	111.0 (3143)	3517 (1595)	51.9 (4.82)	58	52	29	26	38,181	84	115 (2.92)	65 (1.65)	91 (2.31)
V-RVL-Q-200P-SS-N-075	7.5 (5.59)	4.0	2.0	200 (757)	43.3 (1227)	52.0 (1472)	130.0 (3681)	156.0 (4417)	3809 (1728)	51.9 (4.82)	84	82	48	41	57,273	84	115 (2.92)	65 (1.65)	91 (2.31)
V-RVL-Q-200P-SS-N-100	10 (7.46)	4.0	2.0	200 (757)	64.2 (1817)	77.0 (2180)	192.5 (5451)	231.0 (6541)	4369 (1982)	51.9 (4.82)	106	102	60	51	76,365	86	115 (2.92)	65 (1.65)	91 (2.31)
V-RVL-Q-200P-SS-N-150*	15 (11.2)	5.0	3.0	200 (757)	92.5 (2619)	111.0 (3143)	277.5 (7858)	333.0 (9429)	6988 (3170)	80.0 (7.43)	162	150	89	75	114,546	88	144 (3.66)	80 (2.03)	90 (2.29)
V-RVL-Q-200P-SS-N-200*	20 (14.9)	5.0	3.0	200 (757)	114.2 (3233)	137.0 (3879)	342.5 (9699)	411.0 (11638)	7644 (3467)	80.0 (7.43)	216	208	112	104	152,727	89	144 (3.66)	80 (2.03)	90 (2.29)
V-RVL-Q-200P-SS-N-250*	25 (18.6)	5.0	3.0	200 (757)	140.0 (3964)	168.0 (4757)	420.0 (11893)	504.0 (14272)	8480 (3847)	80.0 (7.43)	280	248	148	124	190,833	90	144 (3.66)	80 (2.03)	90 (2.29)
V-RVL-Q-200P-SS-N-300*	30 (22.4)	6.0	3.0	200 (757)	165.0 (4668)	198.0 (5601)	495.0 (14003)	593.0 (16803)	9087 (4122)	137.8 (12.80)	-	296	180	160	228,999	86	248 (6.30)	80 (2.03)	90 (2.29)
V-RVL-Q-200P-SS-N-400*	40 (29.8)	6.0	3.0	200 (757)	201.0 (5701)	242.0 (6841)	604.0 (17103)	725.0 (20524)	12134 (5504)	151.6 (14.11)	-	396	204	-	305,331	88	248 (6.30)	88 (2.24)	90 (2.29)
V-RVL-Q-200P-SS-N-500*	50 (37.3)	6.0	3.0	200 (757)	246.0 (6968)	295.0 (8362)	738.0 (20905)	886.0 (25086)	12194 (5531)	151.6 (14.11)	-	488	256	244	381,666	89	248 (6.30)	88 (2.24)	90 (2.29)

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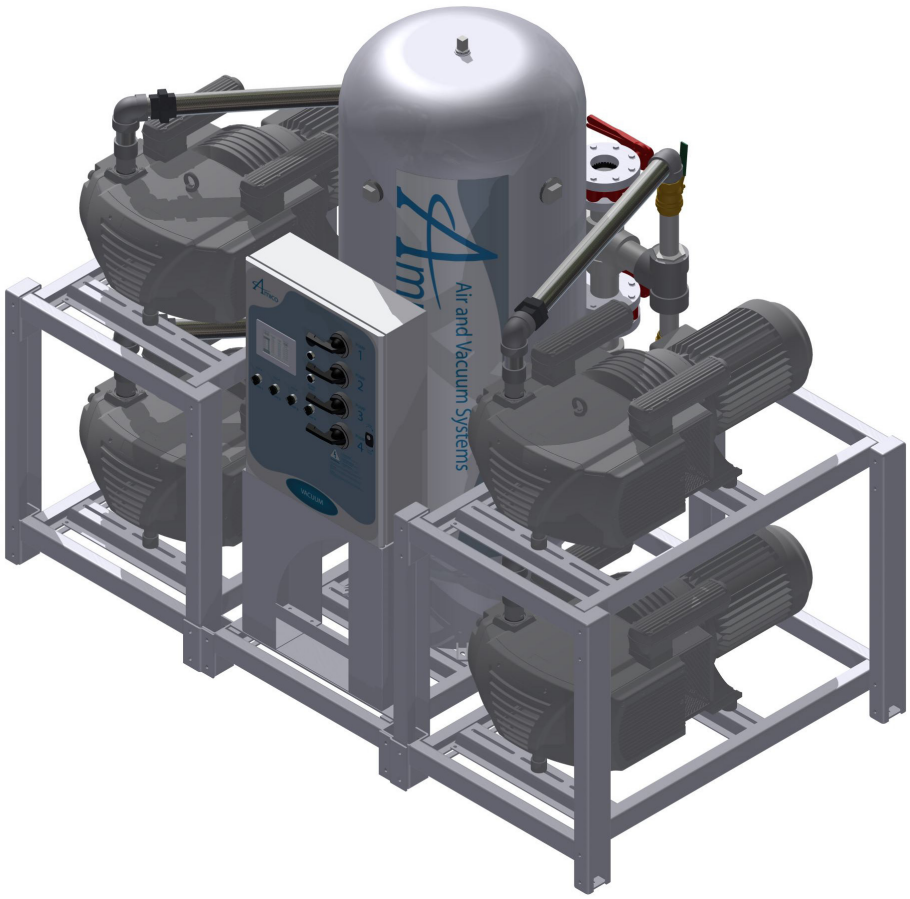
Oil Less

Dry Rotary Vane Vacuum System



Control Panel Specifications

- UL listed control panel has a NEMA 12 enclosure.
- Externally operable circuit breakers with door interlocks, control circuit transformers with fused primary and secondary circuits, H-O-A switches and magnetic starters with three leg overload protection.
- Touch screen monitor displays the hours of operation of each pump, setting of the system and indicates any faults.
- Lighting on the H-O-A switches indicates which pump is running.
- Audible and visual local alarms are included for compressor temperature malfunction and reserve compressor in use.
- All control and alarm functions shall remain energized while any compressor in the system remains electrically online.
- The lag compressor shall be able to start automatically if the lead compressor fails to operate.
- Alarm contacts are provided for remote annunciation for all alarm points.
- Alarm logging within the control panel PLC (premium only)
- Ethernet connection for remote panel control (premium only)

Dry Rotary Vane Vacuum System

Vacuum System Specifications

- Meets or exceeds the requirements of NFPA 99.
- Package contains: lubricated rotary vane vacuum pumps, associated equipment, one ASME air receiver and one control panel
- System intake, exhaust and power connection at the control panel are the only field connections required.
- Air inlet and electrical shall be completely pre-piped and pre-wired to a single point service connection.
- All interconnecting piping and wiring shall be completed and operationally tested prior to shipment.
- Liquid tight conduit, fittings and junction boxes for all control and power wiring are provided.

Vacuum Pump

- Dry rotary vane, air-cooled design with integral, fully re-circulating oil supply with sight glass to indicate oil level.
- Bearing shall be permanently lubricated and sealed.

Vacuum Pump Drive

The vacuum pump shall be direct driven. Torque is transmitted from the motor to the pump through a shaft coupling.

Vibration Isolation System

The pumps and motor are fully isolated from the package base by means of rubber mounts.

Vacuum System Accessories

Inlet and discharge flexible connectors, inlet check valves, inlet isolation valves, exhaust tee with drip-leg and drain cock valve as well as poly tubing with DISS fitting for vacuum switches and gauge are provided.

Intake Piping

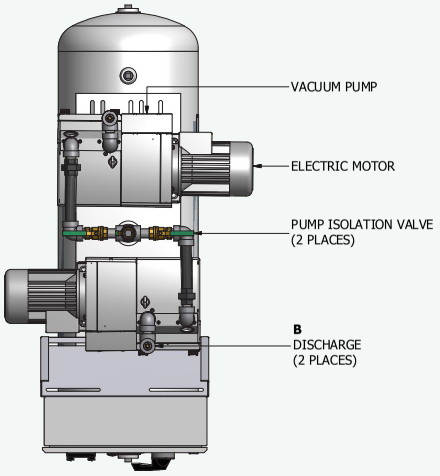
- Each vacuum pump shall have a factory piped intake with integral flex connector, isolation valve and check valve.
- Interconnecting piping shall consist of iron/galvanized pipe and fittings.

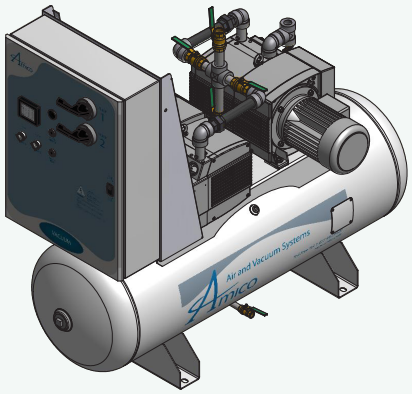
Vacuum Receiver

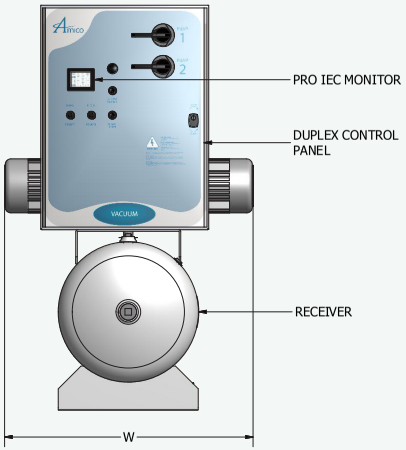
- ASME construction
- The receiver shall be rated for full vacuum service and shall be equipped with a manual valve drain.
- Rated for a minimum 200 psig design pressure.

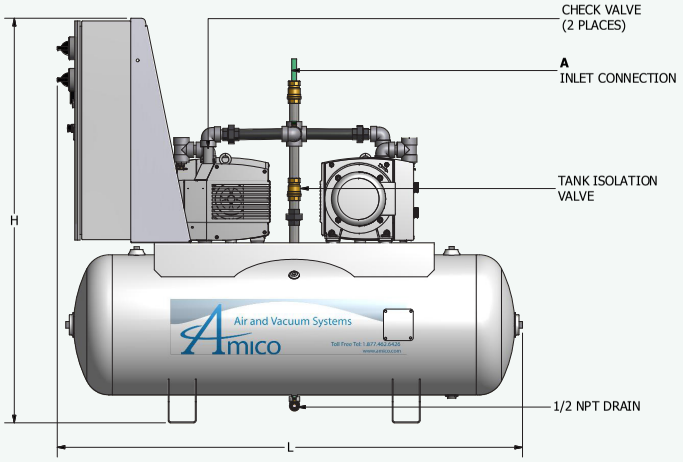
The service of a factory trained representative shall be made available at job site to check installation and start up as well as train operating personnel in proper operation and maintenance procedures.

ROTARY VANE - DRY DUPLEX TANK MOUNTED VACUUM SYSTEM
(1.2 HP - 8.9 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)					SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V	575V					
V-RVD-D-080P-TH-N-012	1.2 (0.89)	0.75	1.0	80 (303)	4.4 (126)	5.3 (151)	4.4 (126)	5.3 (151)	865 (393)	16.1 (1.49)	8	8	4	4	4	3,056	67	34 (0.86)	68 (1.73)	60 (1.52)
V-RVD-D-080P-TH-N-020	2 (1.49)	0.75	1.0	80 (303)	6.9 (195)	8.3 (234)	6.9 (195)	8.3 (234)	920 (417)	17.0 (1.58)	13	13	8	7	5	5,091	72	36 (0.91)	68 (1.73)	60 (1.52)
V-RVD-D-080P-TH-N-030	3 (2.24)	1.0	1.0	80 (303)	10.4 (295)	12.5 (354)	10.4 (295)	12.5 (354)	1145 (519)	19.4 (1.81)	18	16	13	8	6	7,636	73	40 (1.02)	70 (1.78)	60 (1.52)
V-RVD-D-080P-TH-N-048	4.8 (3.58)	1.5	1.5	120 (454)	18.4 (522)	22.1 (626)	18.4 (522)	22.1 (626)	1455 (660)	23.9 (2.22)	29	27	15	13	10	12,213	77	43 (1.09)	80 (2.03)	64 (1.63)
V-RVD-D-120P-TH-N-064	6.4 (4.77)	2.0	2.0	120 (454)	34.2 (967)	41.0 (1161)	34.2 (967)	41.0 (1161)	2154 (977)	28.9 (2.68)	48	45	26	22	17	16,284	78	52 (1.32)	80 (2.03)	64 (1.63)
V-RVD-D-120P-TH-N-089	8.9 (6.64)	2.0	2.0	120 (454)	42.7 (1209)	51.3 (1451)	42.7 (1209)	51.3 (1451)	2050 (972)	28.9 (2.68)	55	51	30	25	19	22,645	79	52 (1.32)	80 (2.03)	64 (1.63)

ADDITIONAL MODELS AVAILABLE UPON REQUEST

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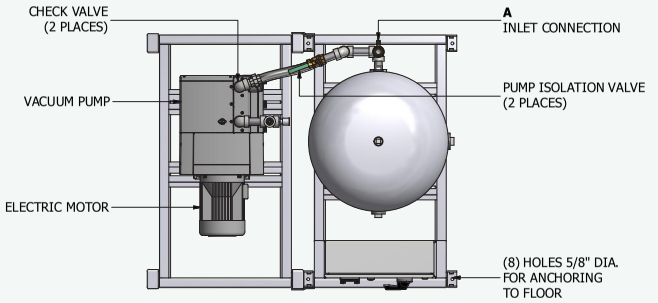
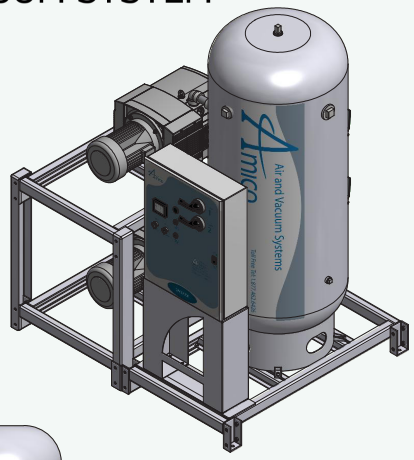
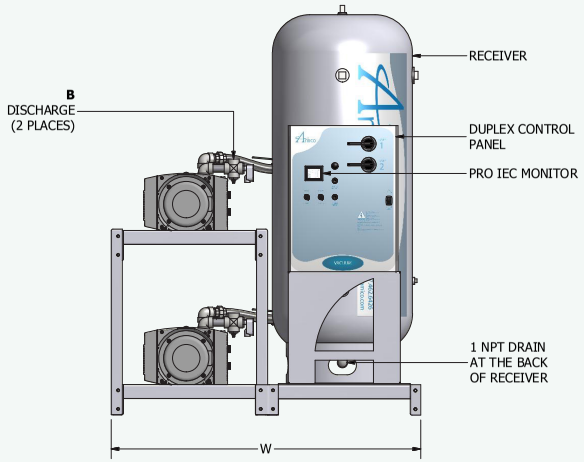
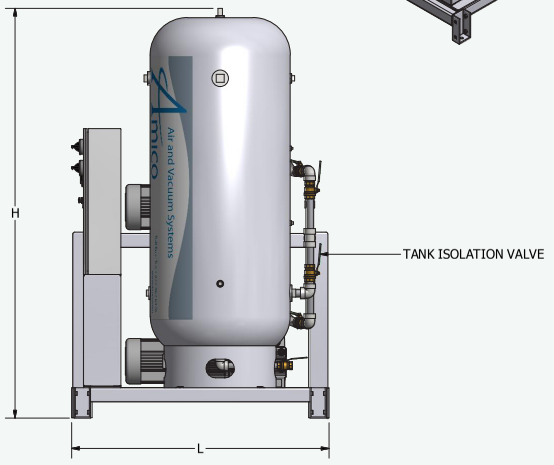
ROTARY VANE - DRY DUPLEX STACK MOUNTED VACUUM SYSTEM
(1.2 HP - 17.7 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M^2)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)					SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V	575V					
V-RVD-D-200P-SS-N-012*	1.2 (0.89)	0.75	1.0	200 (757)	4.4 (126)	5.3 (151)	4.4 (126)	5.3 (151)	1375 (624)	25.7 (2.38)	8	8	4	4	4	3,056	67	66 (1.68)	56 (1.42)	91 (2.31)
V-RVD-D-200P-SS-N-020*	2 (1.49)	0.75	1.0	200 (757)	6.9 (195)	8.3 (234)	6.9 (195)	8.3 (234)	1430 (649)	25.7 (2.38)	13	13	8	7	5	5,091	72	66 (1.68)	56 (1.42)	91 (2.31)
V-RVD-D-200P-SS-N-030*	3 (2.24)	1.0	1.0	200 (757)	10.4 (295)	12.5 (354)	10.4 (295)	12.5 (354)	1655 (751)	25.7 (2.38)	18	16	13	8	6	7,636	73	66 (1.68)	56 (1.42)	91 (2.31)
V-RVD-D-200P-SS-N-048	4.8 (3.58)	1.5	1.5	200 (757)	18.4 (522)	22.1 (626)	18.4 (522)	22.1 (626)	1989 (902)	26.1 (2.42)	29	27	15	13	10	12,213	77	67 (1.70)	56 (1.42)	91 (2.31)
V-RVD-D-200P-SS-N-064	6.4 (4.77)	2.0	2.0	200 (757)	34.2 (968)	41.0 (1161)	34.2 (968)	41.0 (1161)	2738 (1242)	30.2 (2.81)	48	45	26	22	17	16,284	78	67 (1.70)	65 (1.65)	91 (2.31)
V-RVD-D-200P-SS-N-089	8.9 (6.64)	2.0	2.0	200 (757)	42.7 (1209)	51.3 (1451)	42.7 (1209)	51.3 (1451)	2617 (1187)	30.2 (2.81)	55	51	30	25	19	22,645	79	67 (1.70)	65 (1.65)	91 (2.31)
V-RVD-D-200P-SS-N-121	12.1 (9.02)	4.0	4.0	200 (757)	64.8 (1836)	77.8 (2203)	64.8 (1836)	77.8 (2203)	3311 (1502)	30.2 (2.81)	76	71	42	36	31	30,788	79	67 (1.70)	65 (1.65)	91 (2.31)
V-RVD-D-200P-SS-N-177*	17.7 (13.2)	4.0	4.0	200 (757)	86.2 (2440)	103.4 (2928)	86.2 (2440)	103.4 (2928)	3453 (1566)	51.1 (4.75)	105	96	54	48	46	45,036	80	92 (2.34)	83 (2.11)	90 (2.29)

*SYSTEM CONFIGURATION DIFFERS FROM MODEL SHOWN

ADDITIONAL MODELS AVAILABLE UPON REQUEST

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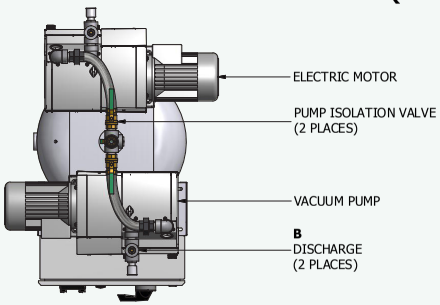
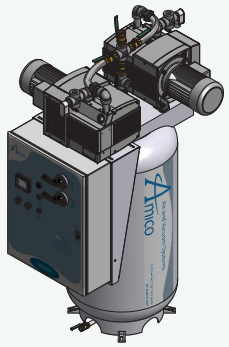
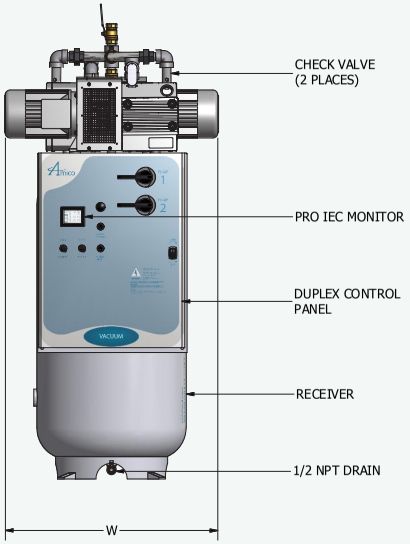
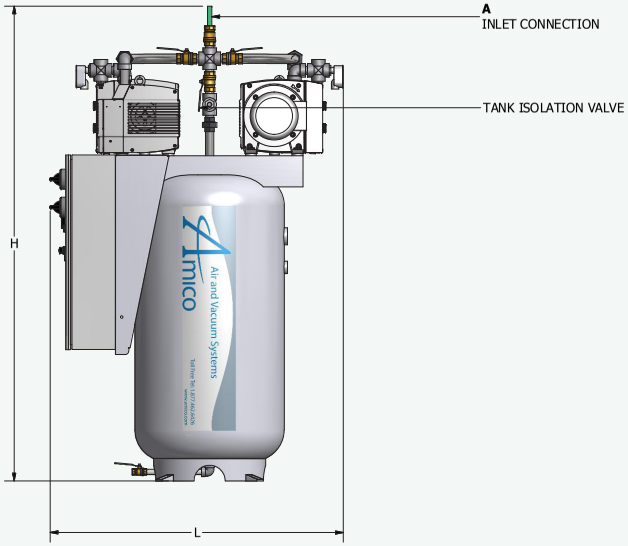
ROTARY VANE - DRY DUPLEX "SPACE SAVER" VACUUM SYSTEM
(1.2 HP - 8.9 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)					SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V	575V					
V-RVD-D-080P-TS-N-012	1.2 (0.89)	0.75	1.0	80 (303)	4.4 (126)	5.3 (151)	4.4 (126)	5.3 (151)	859 (390)	10.9 (1.02)	8	8	4	4	4	3,056	67	35 (0.89)	45 (1.14)	77 (1.96)
V-RVD-D-080P-TS-N-020	2 (1.49)	0.75	1.0	80 (303)	6.9 (195)	8.3 (234)	6.9 (195)	8.3 (234)	914 (415)	10.9 (1.02)	13	13	8	7	5	5,091	72	35 (0.89)	45 (1.14)	77 (1.96)
V-RVD-D-080P-TS-N-030	3 (2.24)	1.0	1.0	80 (303)	10.4 (295)	12.5 (354)	10.4 (295)	12.5 (354)	1089 (494)	12.8 (1.19)	18	16	13	8	6	7,636	73	37 (0.94)	50 (1.27)	80 (2.03)
V-RVD-D-080P-TS-N-048	4.8 (3.58)	1.5	1.5	120 (454)	18.4 (522)	22.1 (626)	18.4 (522)	22.1 (626)	1438 (652)	17.3 (1.61)	29	27	15	13	10	12,213	77	47 (1.19)	53 (1.35)	86 (2.18)
V-RVD-D-120P-TS-N-064	6.4 (4.77)	1.5	1.5	120 (454)	25.4 (718)	30.4 (862)	25.4 (718)	30.4 (862)	1537 (697)	17.3 (1.61)	36	34	19	17	15	16,284	79	47 (1.19)	53 (1.35)	86 (2.18)
V-RVD-D-120P-TS-N-089	8.9 (6.64)	2.0	2.0	120 (454)	42.7 (1209)	51.3 (1451)	42.7 (1209)	51.3 (1451)	2033 (922)	27.5 (2.55)	55	51	30	25	19	22,645	79	60 (1.52)	66 (1.68)	86 (2.18)

ADDITIONAL MODELS AVAILABLE UPON REQUEST

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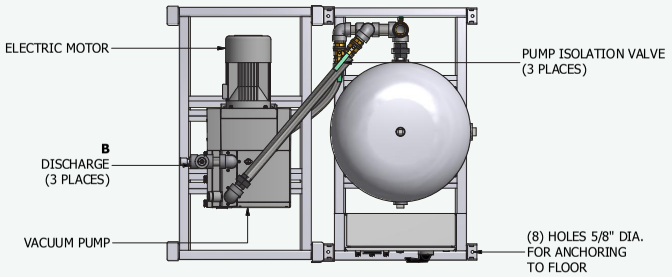
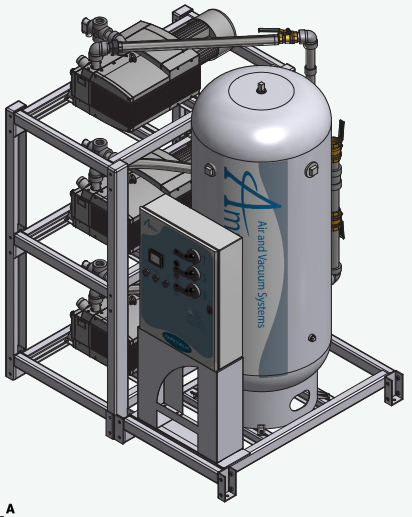
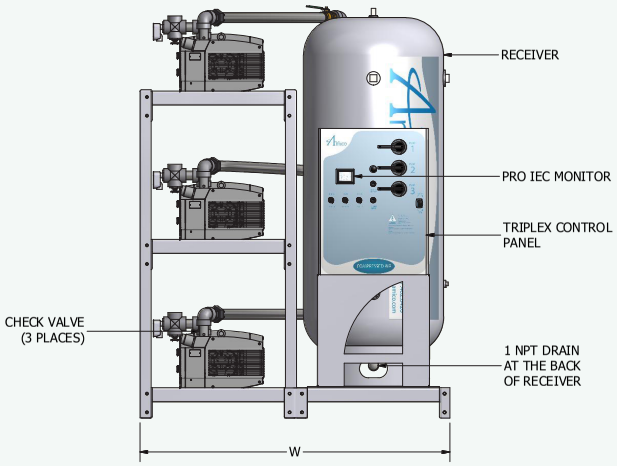
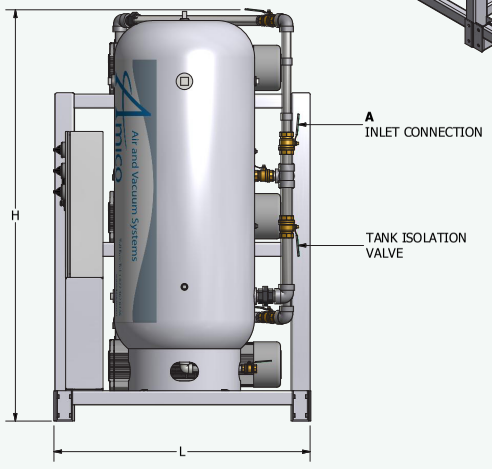
ROTARY VANE - DRY TRIPLEX STACK MOUNTED VACUUM SYSTEM
(1.2 HP - 17.7 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)					SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V	575V					
V-RVD-T-200P-SS-N-012*	1.2 (0.89)	1.0	1.0	200 (757)	4.4 (126)	5.3 (151)	8.9 (251)	10.6 (301)	1682 (763)	26.1 (2.42)	12	12	7	6	6	6,112	70	67 (1.70)	56 (1.42)	91 (2.31)
V-RVD-T-200P-SS-N-020*	2 (1.49)	1.0	1.0	200 (757)	6.9 (195)	8.3 (234)	13.8 (390)	16.5 (468)	1764 (800)	26.1 (2.42)	20	19	11	11	7	10,182	75	67 (1.70)	56 (1.42)	91 (2.31)
V-RVD-T-200P-SS-N-030*	3 (2.24)	1.25	1.0	200 (757)	10.4 (295)	12.5 (354)	20.8 (589)	25.0 (708)	2076 (942)	26.1 (2.42)	26	24	19	12	9	15,272	76	67 (1.70)	56 (1.42)	91 (2.31)
V-RVD-T-200P-SS-N-048	4.8 (3.58)	2.0	1.5	200 (757)	18.4 (522)	22.1 (626)	36.8 (1043)	44.2 (1252)	2442 (1107)	26.1 (2.42)	43	40	23	20	15	24,426	80	67 (1.70)	56 (1.42)	91 (2.31)
V-RVD-T-200P-SS-N-064	6.4 (4.77)	3.0	2.0	200 (757)	34.2 (968)	41.0 (1161)	68.4 (1937)	82.0 (2322)	3515 (1594)	30.2 (2.81)	72	67	39	34	25	32,568	81	67 (1.70)	65 (1.65)	91 (2.31)
V-RVD-T-200P-SS-N-089	8.9 (6.64)	3.0	2.0	200 (757)	42.7 (1209)	51.3 (1451)	85.4 (2419)	102.5 (2902)	3334 (1512)	30.2 (2.81)	82	76	44	38	29	45,290	82	67 (1.70)	65 (1.65)	97 (2.46)
V-RVD-T-200P-SS-N-121	12.1 (9.02)	5.0	4.0	200 (757)	64.8 (1836)	77.8 (2203)	129.7 (3672)	155.6 (4406)	4279 (1941)	48.6 (4.52)	114	107	62	53	47	61,576	82	100 (2.54)	70 (1.78)	91 (2.31)
V-RVD-T-200P-SS-N-177*	17.7 (13.2)	5.0	4.0	200 (757)	86.2 (2440)	103.4 (2928)	172.3 (4880)	206.8 (5856)	4461 (2024)	80.0 (7.43)	157	144	81	72	69	90,072	83	144 (3.66)	80 (2.03)	90 (2.29)

*SYSTEM CONFIGURATION DIFFERS FROM MODEL SHOWN

ADDITIONAL MODELS AVAILABLE UPON REQUEST

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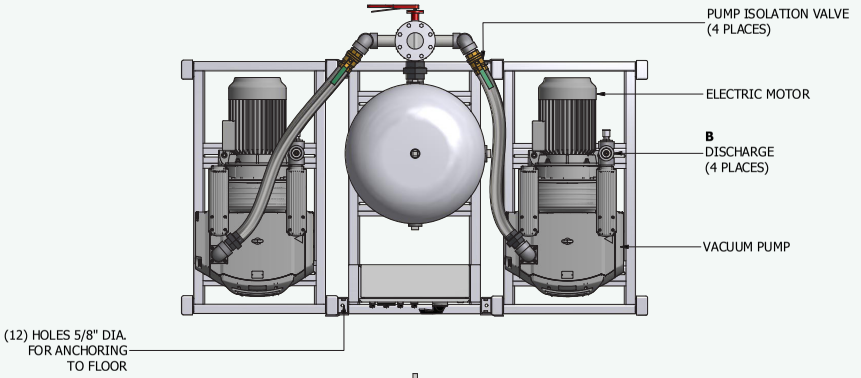
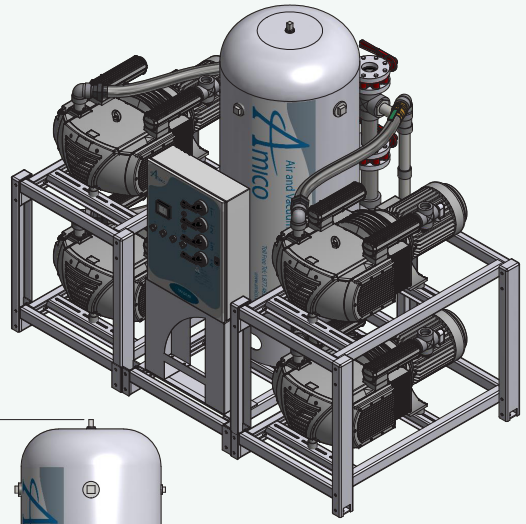
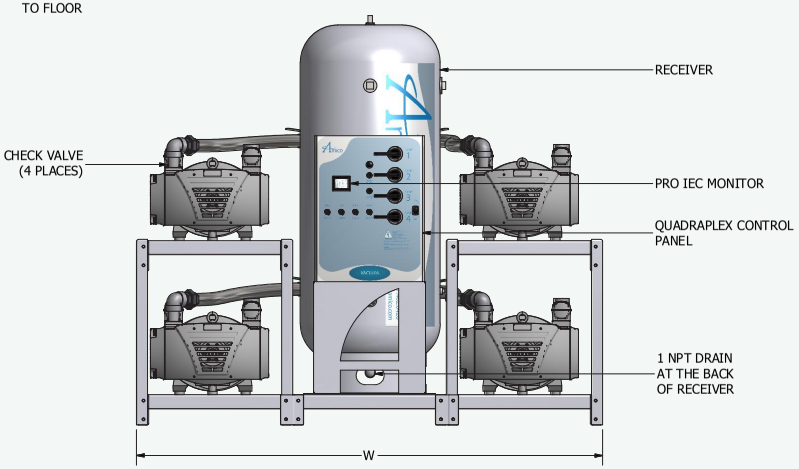
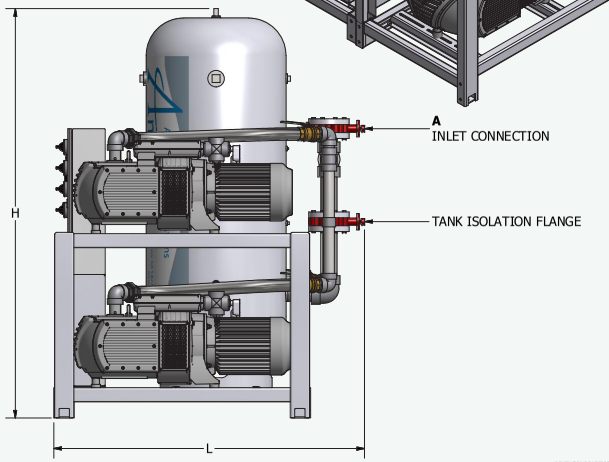
ROTARY VANE - DRY QUADRAPLEX STACK MOUNTED VACUUM SYSTEM
(1.2 HP - 17.7 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)					SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V	575V					
V-RVD-Q-200P-SS-N-012*	1.2 (0.89)	1.25	1.0	200 (757)	4.4 (126)	5.3 (151)	13.3 (377)	16.0 (452)	1836 (833)	26.1 (2.42)	16	15	9	9	8	9,168	72	67 (1.70)	56 (1.42)	91 (2.31)
V-RVD-Q-200P-SS-N-020*	2 (1.49)	1.25	1.0	200 (757)	6.9 (195)	8.3 (234)	20.7 (585)	24.8 (703)	1946 (883)	26.1 (2.42)	27	26	15	14	9	15,273	77	67 (1.70)	56 (1.42)	91 (2.31)
V-RVD-Q-200P-SS-N-030*	3 (2.24)	1.5	1.0	200 (757)	10.4 (295)	12.5 (354)	31.3 (885)	37.5 (1062)	2345 (1064)	26.1 (2.42)	35	32	26	16	12	22,908	78	67 (1.70)	56 (1.42)	91 (2.31)
V-RVD-Q-200P-SS-N-048	4.8 (3.58)	3.0	1.5	200 (757)	18.4 (522)	22.1 (626)	55.3 (1565)	66.3 (1877)	2871 (1302)	45.6 (4.24)	57	54	31	27	20	36,639	82	101 (2.57)	65 (1.65)	91 (2.31)
V-RVD-Q-200P-SS-N-064	6.4 (4.77)	4.0	2.0	200 (757)	34.2 (968)	41.0 (1161)	102.5 (2904)	123 (3483)	4269 (1936)	45.6 (4.24)	96	90	52	45	33	48,852	83	101 (2.57)	65 (1.65)	91 (2.31)
V-RVD-Q-200P-SS-N-089	8.9 (6.64)	4.0	2.0	200 (757)	42.7 (1209)	51.3 (1451)	128.3 (3632)	153.9 (4358)	4027 (1827)	45.6 (4.24)	109	102	59	51	39	67,935	84	101 (2.57)	65 (1.65)	91 (2.31)
V-RVD-Q-200P-SS-N-121	12.1 (9.02)	6.0	4.0	200 (757)	64.8 (1836)	77.8 (2203)	194.5 (5508)	233.4 (6609)	5365 (2433)	49.1 (4.57)	152	142	83	71	63	92,364	84	101 (2.57)	70 (1.78)	91 (2.31)
V-RVD-Q-200P-SS-N-177*	17.7 (13.2)	6.0	4.0	200 (757)	86.2 (2440)	103.4 (2928)	258.5 (7320)	310.2 (8784)	5615 (2547)	80.0 (7.43)	209	192	108	96	92	135,108	85	144 (3.66)	80 (2.03)	90 (2.29)

*SYSTEM CONFIGURATION DIFFERS FROM MODEL SHOWN

ADDITIONAL MODELS AVAILABLE UPON REQUEST

Amico
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85 Fulton Way, Richmond Hill
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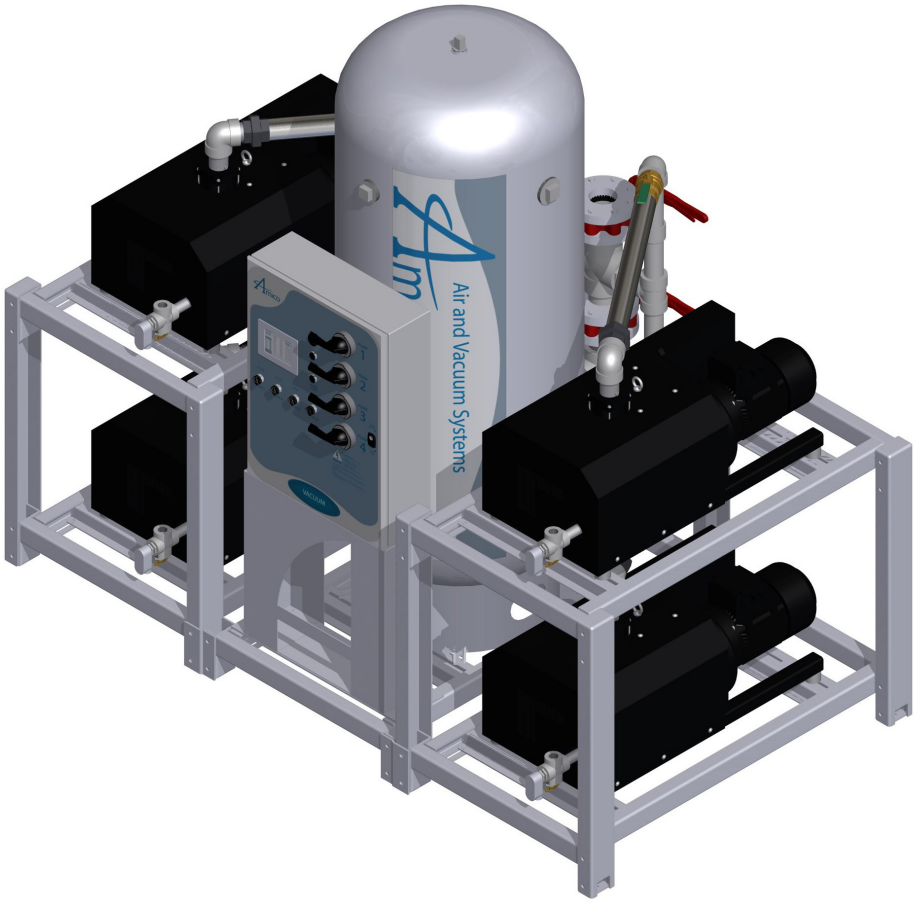
Oil Less

Contact-Less Claw Vacuum System



Control Panel Specifications

- UL listed control panel has a NEMA 12 enclosure.
- Externally operable circuit breakers with door interlocks, control circuit transformers with fused primary and secondary circuits, H-O-A switches and magnetic starters with three leg overload protection.
- Touch screen monitor displays the hours of operation of each pump, setting of the system and indicates any faults.
- Lighting on the H-O-A switches indicates which pump is running.
- Audible and visual local alarms are included for compressor temperature malfunction and reserve compressor in use.
- Manual reset for thermal malfunction shutdown is available.
- All control and alarm functions shall remain energized while any compressor in the system remains electrically online.
- The lag compressor shall be able to start automatically if the lead compressor fails to operate.
- Alarm contacts are provided for remote annunciation for all alarm points.
- Alarm logging within the control panel PLC (premium only)
- Ethernet connection for remote panel control (premium only)

Contact-Less Claw Vacuum System

Vacuum System Specifications

- Meets or exceeds the requirements of NFPA 99.
- Package contains: contact-less claw vacuum pumps, associated equipment, one ASME air receiver and one control panel.
- System intake, exhaust and power connection at the control panel are the only field connections required.
- All components shall be completely pre-piped and pre-wired to a single point service connection.
- All interconnecting piping and wiring shall be completed and operationally tested prior to shipment.
- Liquid tight conduit, fittings and junction boxes for all control and power wiring are provided.

Vacuum Pump

- Continuous duty, high efficiency, oil less and frictionless contact-less claw type.
- Air cooled with no water requirements, pumping chamber is oil free.
- Maintenance shall be limited to changing the gear box oil as needed.

Vacuum Pump Drive

The vacuum pump shall be direct driven. Torque is transmitted from the motor to the pump through a shaft coupling.

Vacuum Pump Motor

- TEFC NEMA C-face
- 3600 RPM, continuous duty
- 208 V or 230-460 V, 60 Hz, 3 phase electrical service

Vibration Isolation System

The pumps and motor are fully isolated from the package base by means of rubber mounts.

Vacuum System Accessories

System is equipped with vacuum relief valves, check valves, inlet and discharge flexible connectors, isolation valves, high discharge temperature switches, vacuum switches, vacuum gauge and oil sight glass.

Intake Piping

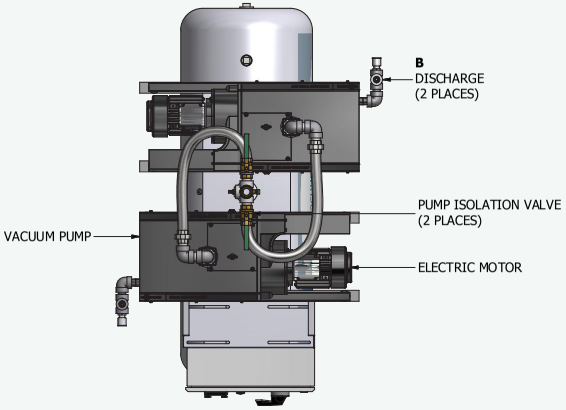
- Factory piped intake with integral flex connector, isolation valve and check valve.
- Interconnecting piping shall consist of iron pipe and fittings painted white.

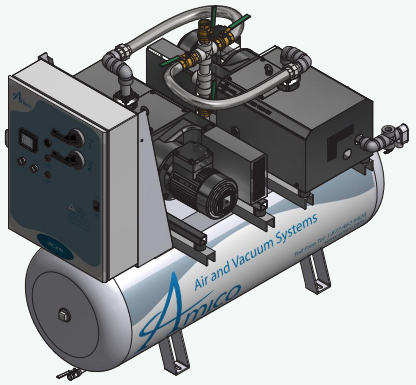
Vacuum Receiver

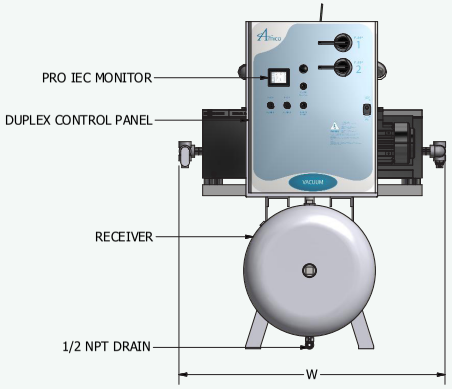
- ASME construction, epoxy lined
- Rated for a minimum 200 psig design pressure
- Rated for full vacuum service
- Manual valve drain included

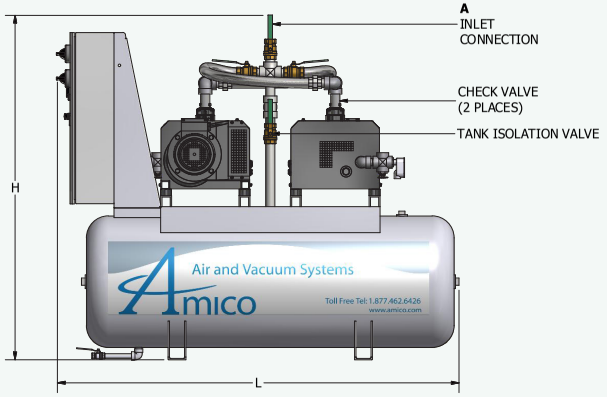
The service of a factory trained representative shall be made available at job site to check installation and start up as well as train operating personnel in proper operation and maintenance procedures.

CONTACTLESS CLAW - DRY DUPLEX TANK MOUNTED VACUUM SYSTEM (2.0 HP - 10.0 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)				SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V					
V-CCD-D-080P-TH-N-020	2 (1.49)	1.25	1.0	80 (303)	13.3 (378)	16.0 (453)	13.3 (378)	16.0 (453)	1635 (741)	28.6 (2.66)	14	14	7	7	5,091	70	55 (1.40)	75 (1.91)	65 (1.65)
V-CCD-D-080P-TH-N-030	3 (2.24)	1.25	1.0	80 (303)	17.5 (496)	21.0 (595)	17.5 (496)	21.0 (595)	1657 (751)	28.6 (2.66)	20	19	10	9	7,636	70	55 (1.40)	75 (1.91)	65 (1.65)
V-CCD-D-080P-TH-N-040	4 (2.98)	1.25	1.0	80 (303)	24.2 (684)	29.0 (821)	24.2 (684)	29.0 (821)	1635 (741)	28.6 (2.66)	25	23	12	11	10,178	79	55 (1.40)	75 (1.91)	65 (1.65)
V-CCD-D-080P-TH-N-054	5.4 (4.03)	1.25	1.0	80 (303)	31.7 (897)	38.0 (1076)	31.7 (897)	38.0 (1076)	1657 (751)	28.6 (2.66)	34	30	17	15	13,740	79	55 (1.40)	75 (1.91)	65 (1.65)
V-CCD-D-120P-TH-N-064	6.4 (4.77)	2.0	1.0	120 (454)	43.3 (1227)	52.0 (1472)	43.3 (1227)	52.0 (1472)	2024 (918)	36.7 (3.41)	37	35	19	17	16,284	79	60 (1.52)	88 (2.24)	70 (1.78)
V-CCD-D-120P-TH-N-075	7.5 (5.59)	2.0	1.0	120 (454)	54.2 (1534)	65.0 (1841)	54.2 (1534)	65.0 (1841)	2046 (928)	36.7 (3.41)	48	45	24	23	19,091	79	60 (1.52)	88 (2.24)	70 (1.78)
V-CCD-D-120P-TH-N-100	10 (7.46)	2.0	1.25	120 (454)	60.8 (1722)	73.0 (2067)	60.8 (1722)	73.0 (2067)	2250 (1020)	36.7 (3.41)	54	50	28	25	25,455	82	60 (1.52)	88 (2.24)	70 (1.78)

ADDITIONAL MODELS AVAILABLE UPON REQUEST

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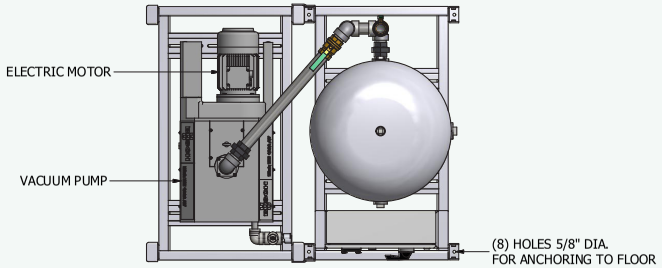
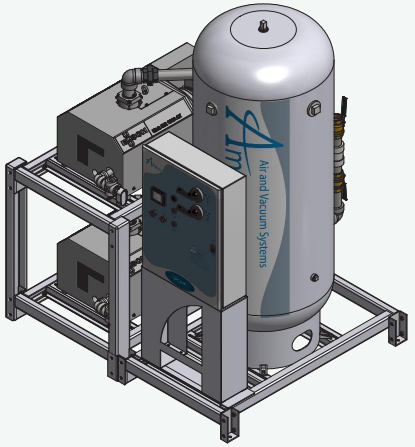
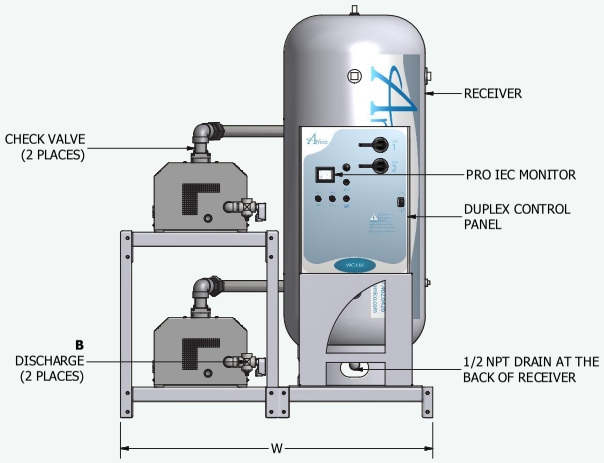
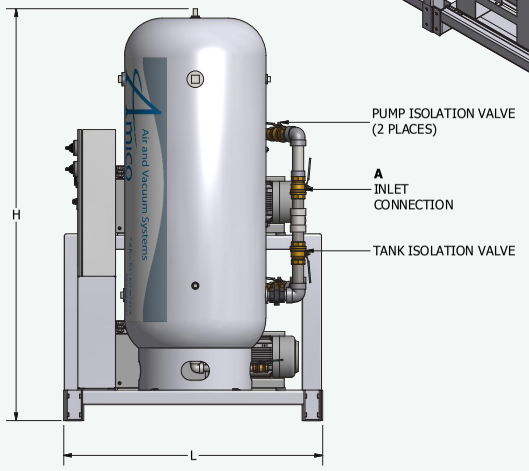
Fax: 1.866.440.4986

CONTACTLESS CLAW - DRY DUPLEX STACK MOUNTED VACUUM SYSTEM
(2.0 HP - 30.0 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)				SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V					
V-CCD-D-200P-SS-N-020	2 (1.49)	1.25	1.0	200 (757)	13.3 (378)	16.0 (453)	13.3 (378)	16.0 (453)	2304 (1045)	26.1 (2.41)	14	14	7	7	5,091	70	67 (1.70)	56 (1.42)	91 (2.31)
V-CCD-D-200P-SS-N-030	3 (2.24)	1.25	1.0	200 (757)	17.5 (496)	21.0 (595)	17.5 (496)	21.0 (595)	2326 (1055)	26.1 (2.41)	20	19	10	9	7,636	70	67 (1.70)	56 (1.42)	91 (2.31)
V-CCD-D-200P-SS-N-040	4 (2.98)	1.25	1.0	200 (757)	24.2 (684)	29.0 (821)	24.2 (684)	29.0 (821)	2304 (1045)	26.1 (2.41)	25	23	12	11	10,178	79	67 (1.70)	56 (1.42)	91 (2.31)
V-CCD-D-200P-SS-N-054	5.4 (4.03)	1.25	1.0	200 (757)	31.7 (897)	38.0 (1076)	31.7 (897)	38.0 (1076)	2326 (1055)	26.1 (2.41)	34	30	17	15	13,740	79	67 (1.70)	56 (1.42)	91 (2.31)
V-CCD-D-200P-SS-N-064	6.4 (4.77)	2.0	1.0	200 (757)	43.3 (1227)	52.0 (1472)	43.3 (1227)	52.0 (1472)	2574 (1168)	26.1 (2.41)	37	35	19	17	16,284	79	67 (1.70)	56 (1.42)	91 (2.31)
V-CCD-D-200P-SS-N-075	7.5 (5.59)	2.0	1.0	200 (757)	54.2 (1534)	65.0 (1841)	54.2 (1534)	65.0 (1841)	2596 (1178)	26.1 (2.41)	48	45	24	23	19,091	79	67 (1.70)	56 (1.42)	91 (2.31)
V-CCD-D-200P-SS-N-100	10 (7.46)	3.0	2.0	200 (757)	91.7 (2597)	110.0 (3115)	91.7 (2597)	110.0 (3115)	3000 (1361)	30.2 (2.81)	54	48	-	24	25,455	83	67 (1.70)	65 (1.65)	91 (2.31)
V-CCD-D-200P-SS-N-150	15 (11.2)	3.0	2.0	200 (757)	107.5 (3044)	129.0 (3653)	107.5 (3044)	129.0 (3653)	3022 (1371)	34.9 (3.24)	79	70	-	35	38,182	82	67 (1.70)	75 (1.91)	91 (2.31)
V-CCD-D-200P-SS-N-300*	30 (22.4)	4.0	4.0	200 (757)	179.4 (5081)	215.3 (6097)	179.4 (5081)	215.3 (6097)	5153 (2337)	66.7 (6.19)	160	144	92	72	76,333	83	120 (3.05)	80 (2.03)	92 (2.34)

*SYSTEM CONFIGURATION DIFFERS FROM MODEL SHOWN

ADDITIONAL MODELS AVAILABLE UPON REQUEST

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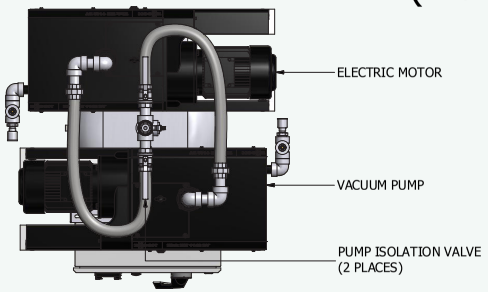
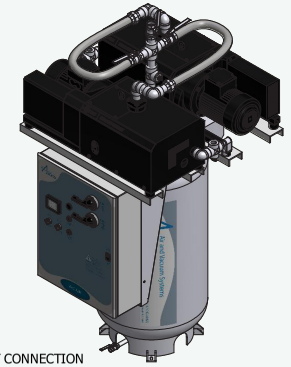
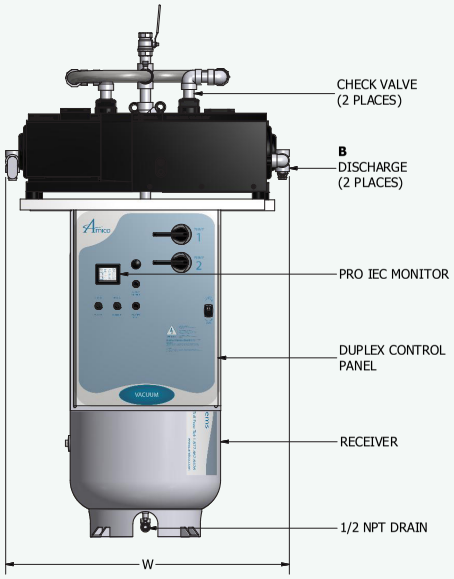
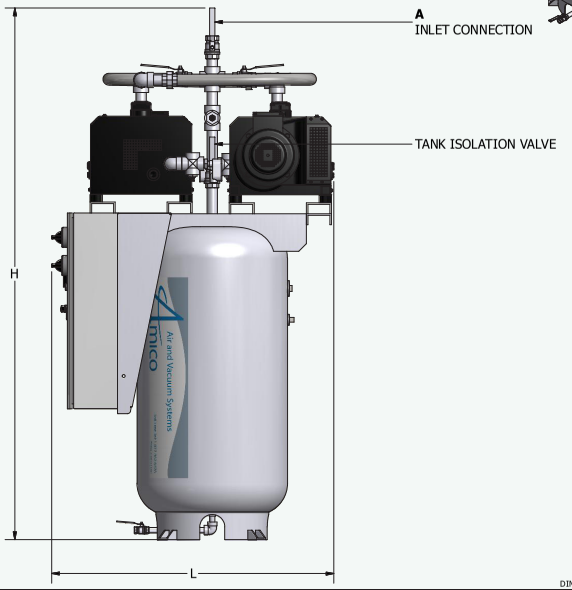
CONTACTLESS CLAW - DRY DUPLEX "SPACE SAVER" VACUUM SYSTEM
(2.0 HP - 10.0 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)				SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V					
V-CCD-D-080P-TS-N-020	2 (1.49)	1.25	1.0	80 (303)	13.3 (378)	16.0 (453)	13.3 (378)	16.0 (453)	1579 (716)	19.9 (1.85)	14	14	7	7	5,091	70	55 (1.40)	52 (1.32)	92 (2.34)
V-CCD-D-080P-TS-N-030	3 (2.24)	1.25	1.0	80 (303)	17.5 (496)	21.0 (595)	17.5 (496)	21.0 (595)	1601 (726)	19.9 (1.85)	20	19	10	9	7,636	70	55 (1.40)	52 (1.32)	92 (2.34)
V-CCD-D-080P-TS-N-040	4 (2.98)	1.25	1.0	80 (303)	24.2 (684)	29.0 (821)	24.2 (684)	29.0 (821)	1579 (716)	19.9 (1.85)	25	23	12	11	10,178	79	55 (1.40)	52 (1.32)	92 (2.34)
V-CCD-D-080P-TS-N-054	5.4 (4.03)	1.25	1.0	80 (303)	31.7 (897)	38.0 (1076)	31.7 (897)	38.0 (1076)	1601 (726)	19.9 (1.85)	34	30	17	15	13,740	79	55 (1.40)	52 (1.32)	92 (2.34)
V-CCD-D-120P-TS-N-064	6.4 (4.77)	2.0	1.0	120 (454)	43.3 (1227)	52.0 (1472)	43.3 (1227)	52.0 (1472)	2007 (910)	23.0 (2.13)	37	35	19	17	16,284	79	57 (1.45)	58 (1.47)	95 (2.41)
V-CCD-D-120P-TS-N-075	7.5 (5.59)	2.0	1.0	120 (454)	54.2 (1534)	65.0 (1841)	54.2 (1534)	65.0 (1841)	2029 (920)	23.0 (2.13)	48	45	24	23	19,091	79	57 (1.45)	58 (1.47)	95 (2.41)
V-CCD-D-120P-TS-N-100	10 (7.46)	2.0	1.25	120 (454)	60.8 (1723)	73.0 (2067)	60.8 (1723)	73.0 (2067)	2233 (1013)	23.0 (2.13)	54	50	28	25	25,455	82	57 (1.45)	58 (1.47)	95 (2.41)

ADDITIONAL MODELS AVAILABLE UPON REQUEST

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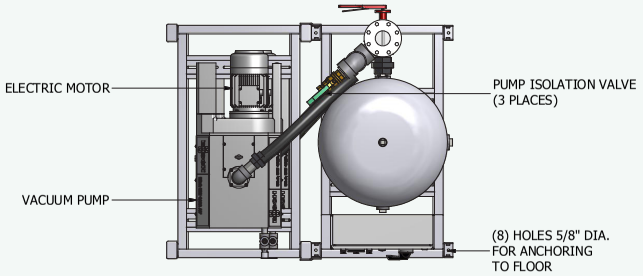
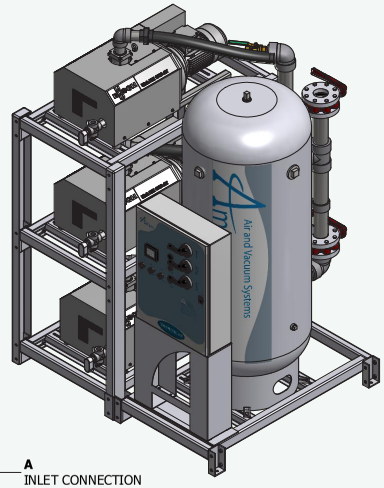
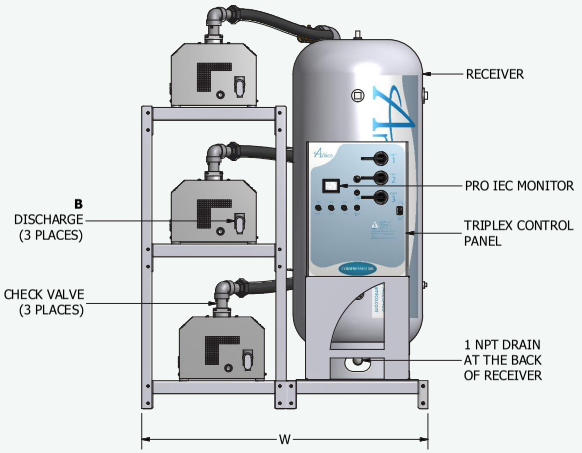
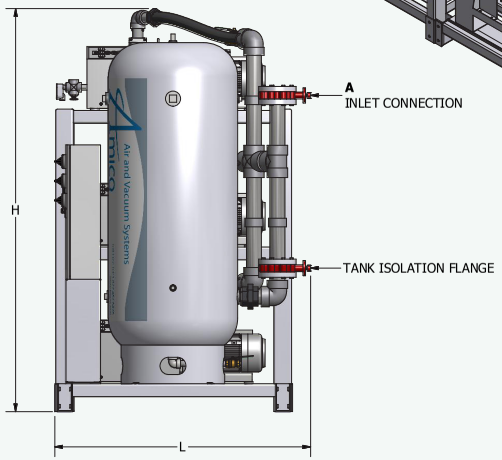
CONTACTLESS CLAW - DRY TRIPLEX STACK MOUNTED VACUUM SYSTEM
(2.0 HP - 30.0 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)				SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V					
V-CCD-T-200P-SS-N-020	2 (1.49)	1.5	1.0	200 (757)	13.3 (378)	16.0 (453)	26.7 (755)	32.0 (906)	2939 (1333)	26.1 (2.41)	22	20	11	10	10,182	73	67 (1.70)	56 (1.42)	95 (2.41)
V-CCD-T-200P-SS-N-030	3 (2.24)	1.5	1.0	200 (757)	17.5 (496)	21.0 (595)	35 (991)	42.0 (1189)	2972 (1348)	26.1 (2.41)	29	28	15	14	15,272	73	67 (1.70)	56 (1.42)	95 (2.41)
V-CCD-T-200P-SS-N-040	4 (2.98)	1.5	1.0	200 (757)	24.2 (684)	29.0 (821)	48.3 (1369)	58.0 (1642)	2939 (1333)	26.1 (2.41)	37	34	19	17	20,356	82	67 (1.70)	56 (1.42)	95 (2.41)
V-CCD-T-200P-SS-N-054	5.4 (4.03)	1.5	1.0	200 (757)	31.7 (897)	38.0 (1076)	63.3 (1793)	76.0 (2152)	2972 (1348)	26.1 (2.41)	51	45	26	23	27,480	82	67 (1.70)	56 (1.42)	97 (2.46)
V-CCD-T-200P-SS-N-064	6.4 (4.77)	3.0	1.0	200 (757)	43.3 (1227)	52.0 (1472)	86.7 (2454)	104.0 (2945)	3319 (1505)	30.2 (2.81)	56	52	28	26	32,568	82	67 (1.70)	65 (1.65)	97 (2.46)
V-CCD-T-200P-SS-N-075	7.5 (5.59)	3.0	1.0	200 (757)	54.2 (1534)	65.0 (1841)	108.3 (3068)	130.0 (3681)	3352 (1320)	30.2 (2.81)	71	68	36	34	38,182	82	67 (1.70)	65 (1.65)	97 (2.46)
V-CCD-T-200P-SS-N-100	10 (7.46)	4.0	2.0	200 (757)	91.7 (2597)	110.0 (3115)	183.4 (5193)	220.0 (6230)	3933 (1784)	48.6 (4.52)	80	71	-	36	50,910	86	100 (2.54)	70 (1.78)	91 (2.31)
V-CCD-T-200P-SS-N-150	15 (11.2)	4.0	2.0	200 (757)	107.5 (3044)	129.0 (3653)	215 (6088)	258.0 (7306)	3966 (1799)	52.1 (4.84)	119	105	-	53	76,364	85	100 (2.54)	75 (1.91)	91 (2.31)
V-CCD-T-200P-SS-N-300*	30 (22.4)	5.0	4.0	200 (757)	179.4 (5081)	215.3 (6097)	358.8 (10161)	430.6 (12193)	7092 (3217)	88.9 (8.24)	240	216	137	108	152,666	86	160 (4.06)	80 (2.03)	92 (2.34)

*SYSTEM CONFIGURATION DIFFERS FROM MODEL SHOWN

ADDITIONAL MODELS AVAILABLE UPON REQUEST

Amico
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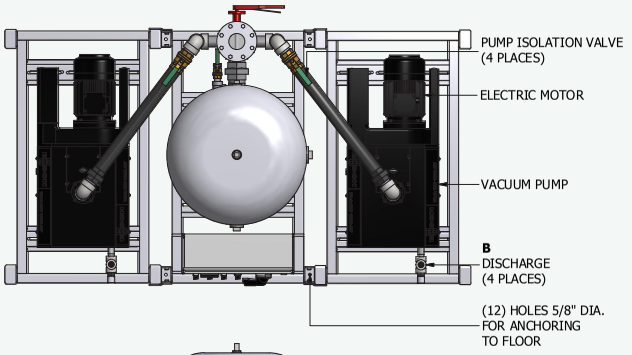
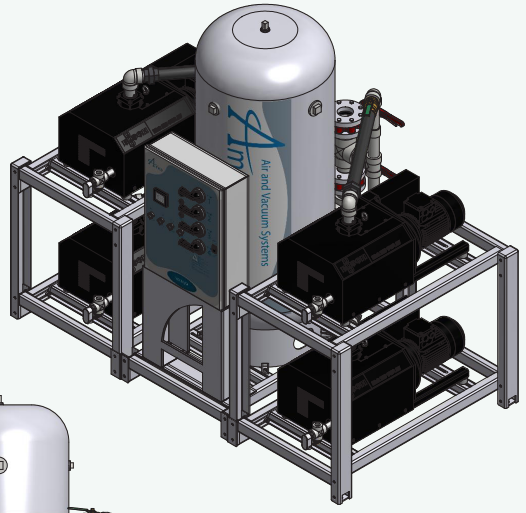
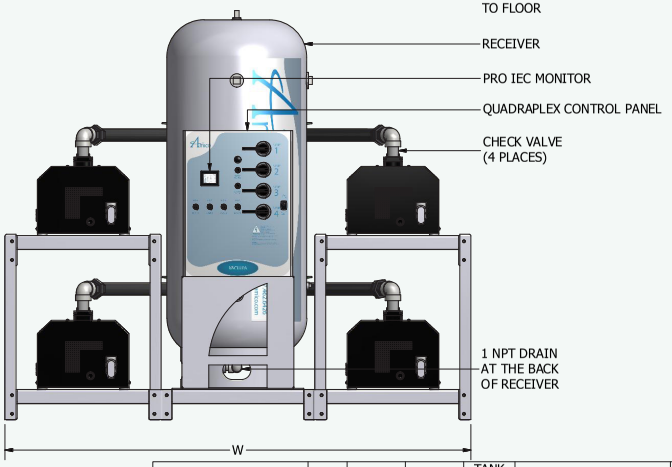
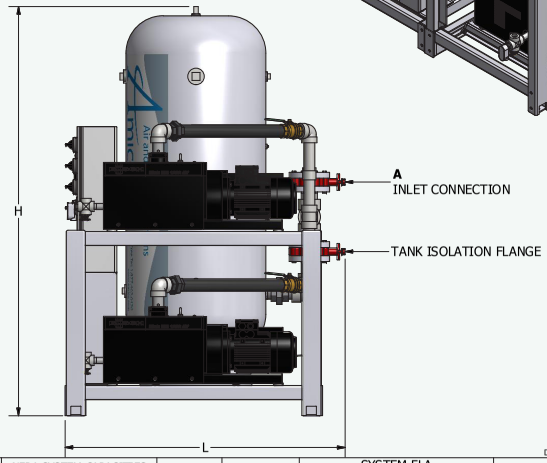
85 Fulton Way, Richmond Hill
Ontario, L4B 2N4 Canada
71 East Industry Court
Deer Park, NY 11729
Direct Tel: 905.764.0800
Tel: 1.877.462.6426
Fax: 1.866.440.4986

CONTACTLESS CLAW - DRY QUADRAPLEX STACK MOUNTED VACUUM SYSTEM (2.0 HP - 30.0 HP)









DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

MODEL	HP (kW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)				SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V					
V-CCD-Q-200P-SS-N-020	2 (1.49)	2.0	1.0	200 (757)	13.3 (378)	16.0 (453)	40.0 (1133)	48.0 (1359)	3551 (1611)	39.3 (3.65)	29	27	14	14	15,273	75	101 (2.57)	56 (1.42)	95 (2.41)
V-CCD-Q-200P-SS-N-030	3 (2.24)	2.0	1.0	200 (757)	17.5 (496)	21.0 (595)	52.5 (1487)	63.0 (1784)	3595 (1631)	39.3 (3.65)	39	38	20	19	22,908	75	101 (2.57)	56 (1.42)	95 (2.41)
V-CCD-Q-200P-SS-N-040	4 (2.98)	2.0	1.0	200 (757)	24.2 (684)	29.0 (821)	72.5 (2053)	87.0 (2464)	3551 (1611)	39.3 (3.65)	50	46	25	23	30,534	84	101 (2.57)	56 (1.42)	95 (2.41)
V-CCD-Q-200P-SS-N-054	5.4 (4.03)	2.0	1.0	200 (757)	31.7 (897)	38.0 (1076)	95.0 (2690)	114.0 (3228)	3595 (1631)	39.3 (3.65)	68	60	34	30	41,220	84	101 (2.57)	56 (1.42)	97 (2.46)
V-CCD-Q-200P-SS-N-064	6.4 (4.77)	4.0	1.0	200 (757)	43.3 (1227)	52.0 (1472)	130.0 (3681)	156.0 (4417)	4041 (1833)	45.6 (4.24)	74	70	37	35	48,852	84	101 (2.57)	65 (1.65)	97 (2.46)
V-CCD-Q-200P-SS-N-075	7.5 (5.59)	4.0	1.0	200 (757)	54.2 (1534)	65.0 (1841)	162.5 (4601)	195.0 (5522)	4085 (1853)	45.6 (4.24)	95	90	48	45	57,273	84	101 (2.57)	65 (1.65)	97 (2.46)
V-CCD-Q-200P-SS-N-100	10 (7.46)	5.0	2.0	200 (757)	91.7 (2597)	110.0 (3115)	275.0 (7787)	330.0 (9345)	4887 (2217)	49.1 (4.57)	107	95	-	48	76,365	88	101 (2.57)	70 (1.78)	91 (2.31)
V-CCD-Q-200P-SS-N-150	15 (11.2)	5.0	2.0	200 (757)	107.5 (3044)	129.0 (3653)	322.5 (9132)	387.0 (10959)	5819 (2639)	52.6 (4.91)	158	140	-	70	114,546	87	101 (2.57)	75 (1.91)	91 (2.31)
V-CCD-Q-200P-SS-N-300*	30 (22.4)	6.0	4.0	200 (757)	179.4 (5081)	215.3 (6097)	538.3 (15242)	645.9 (18290)	9061 (4110)	111.1 (10.3)	320	288	183	144	228,999	88	200 (5.08)	80 (2.03)	92 (2.34)

*SYSTEM CONFIGURATION DIFFERS FROM MODEL SHOWN

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AS-DG-NFPA-VACUUM 05.29.2015