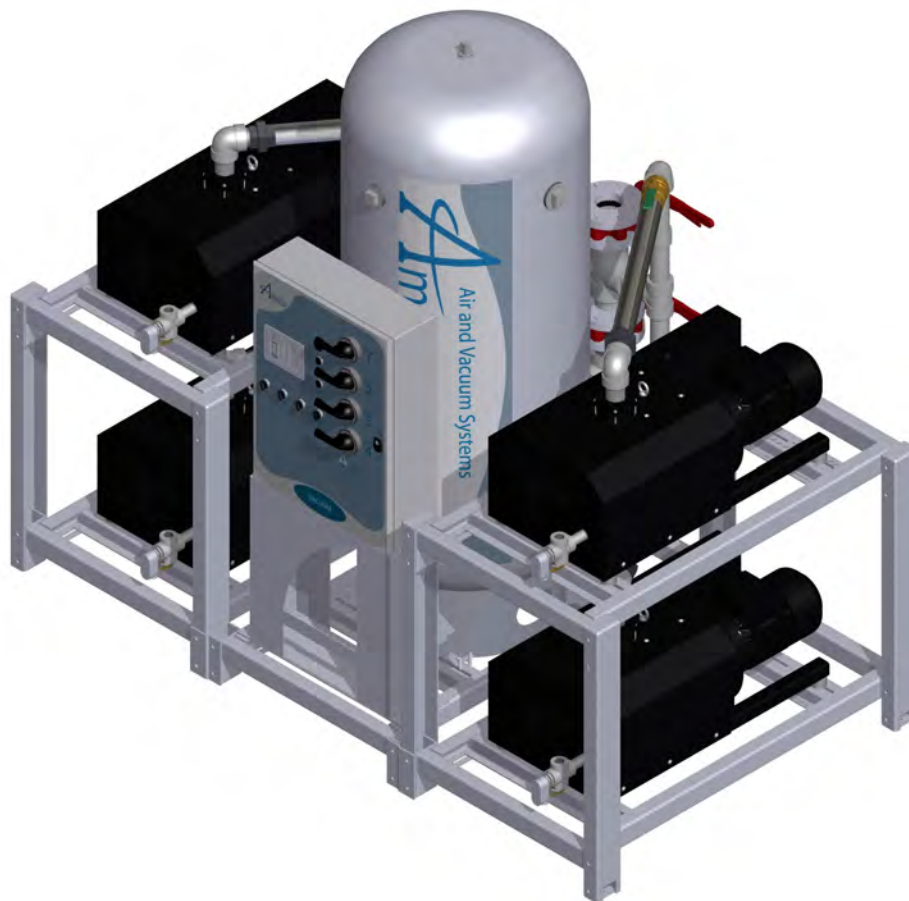


Contact-Less Claw Vacuum System



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 G-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.

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AS-SP-CNTCT-LS-CLW-VAC 08.26.2014

Vacuum Technology Comparison Chart



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	<ul style="list-style-type: none"> • Low operating cost • Excellent choice for dedicated anaesthesia evacuation system • Low maintenance 	<ul style="list-style-type: none"> • Pump life, ambient temperature indifferent • Excellent choice for a dedicated anaesthesia system 	<ul style="list-style-type: none"> • High vacuum • Long vane life • No water and sewage costs • Low noise level • Air cooled design • No rust and scale problems • Low operating cost 	<ul style="list-style-type: none"> • Low maintenance • Low run temperature 	<ul style="list-style-type: none"> • Good for high hp application • Enclosed unit
Disadvantages	<ul style="list-style-type: none"> • High initial cost • Higher noise level compared to other systems • Higher heat load or higher running temperature 	<ul style="list-style-type: none"> • Dependence on a reliable supply of water • Good water quality is crucial to avoid premature failures due to scale build-up 	<ul style="list-style-type: none"> • High maintenance • Unsuitable for a dedicated anaesthesia evacuation system • Cannot take a slug of water 	<ul style="list-style-type: none"> • Much shorter vane life than lubricated pumps • Lower capacity per horsepower than other designs 	<ul style="list-style-type: none"> • 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.

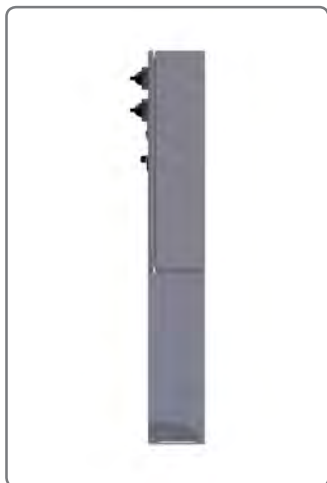
(4) In the O₂ assured version.

ECO+ 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 thermal overload protection.
- 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.
- Lighting on the H-O-A switches indicates which pump is running.
- Audible and visual local alarms are included for all alarm conditions.
- Manual reset for thermal malfunction shutdown.
- All control and alarm functions shall remain energized while any compressor or vacuum in the system remains electrically online.
- The lag compressor shall be able to start automatically if the lead compressor fails to operate.
- Digital dew point and CO readout integrated on screen, with alarm contacts.
- Digital display of the dew point (either in °F or °C) and CO in ppm on the monitor.
- Alarm contacts are provided for remote annunciation for all alarm conditions.
- Language selection: English, French or Spanish.
- Available for Duplex and Triplex systems.



Side View



Angled View

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.

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AS-SP-ECO+-CNTRL-PNL 11.21.2014

Premium 3.5 Control Panel

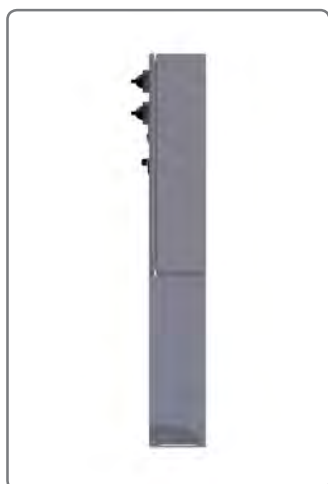


Specifications

- 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 thermal overload protection.
- 3.5" (8.9 cm) multicolor 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 alarm conditions.
- Manual reset for thermal malfunction shutdown.
- All control and alarm functions shall remain energized while any compressor or vacuum in the system remains electrically online.
- The lag compressor shall be able to start automatically if the lead compressor fails to operate.
- Digital dew point and CO readout integrated on screen, with alarm contacts.
- Digital display of the dew point (either in °F or °C) and CO in ppm on the monitor.
- Alarm contacts are provided for remote annunciation for all alarm conditions.
- Ethernet connection for remote access to panel interface through the use of a web browser.
- Language selection: English, French or Spanish.
- Available for Duplex systems and above.

Options

- Alarm logging
- Alarm emailing
- BACNET connection
- Extra alarm points monitoring
- Internet remote panel control via 3G cellular network (Monthly connection fee applies)
- Variable Speed Drive (VFD)



Side View



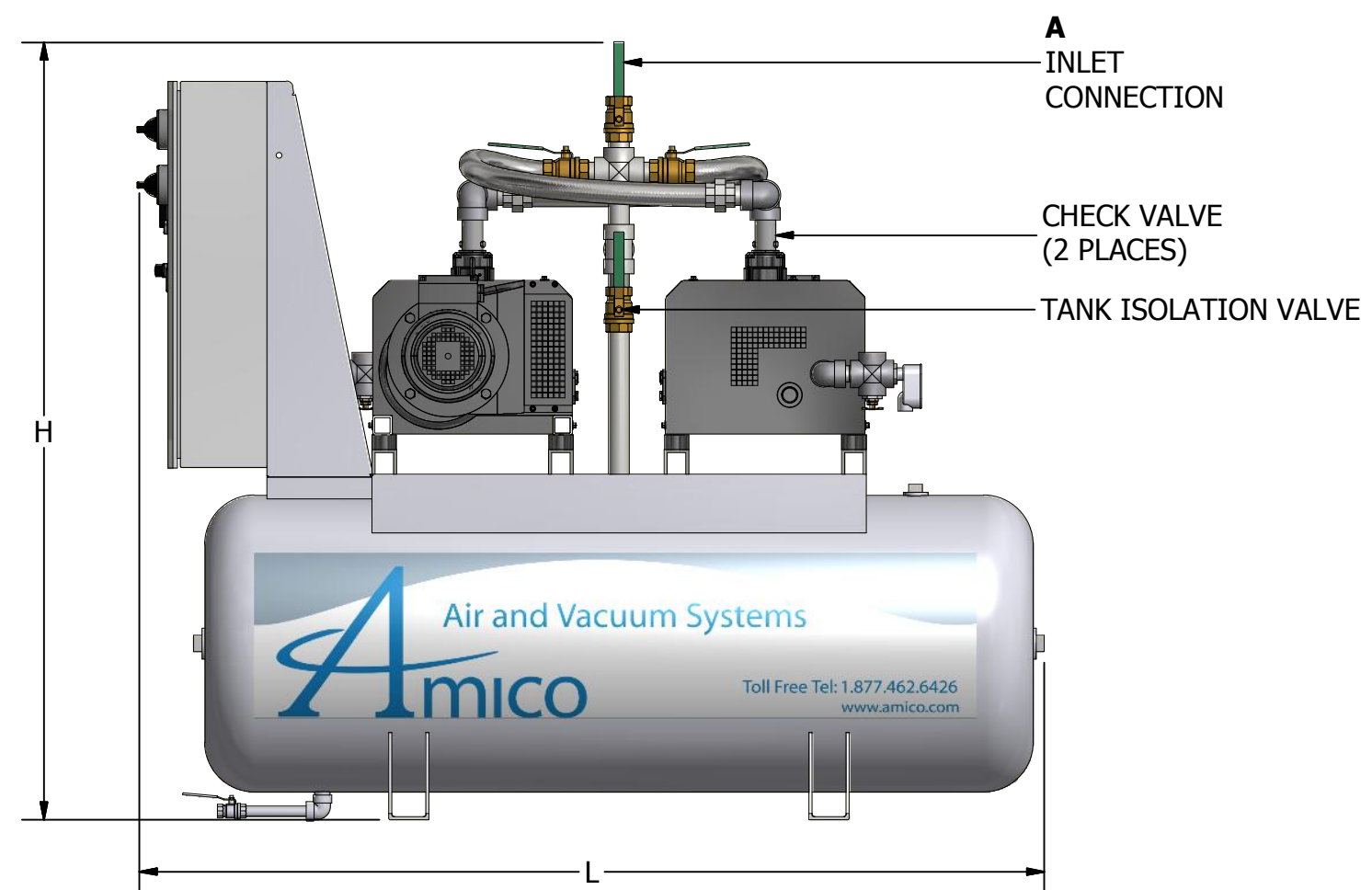
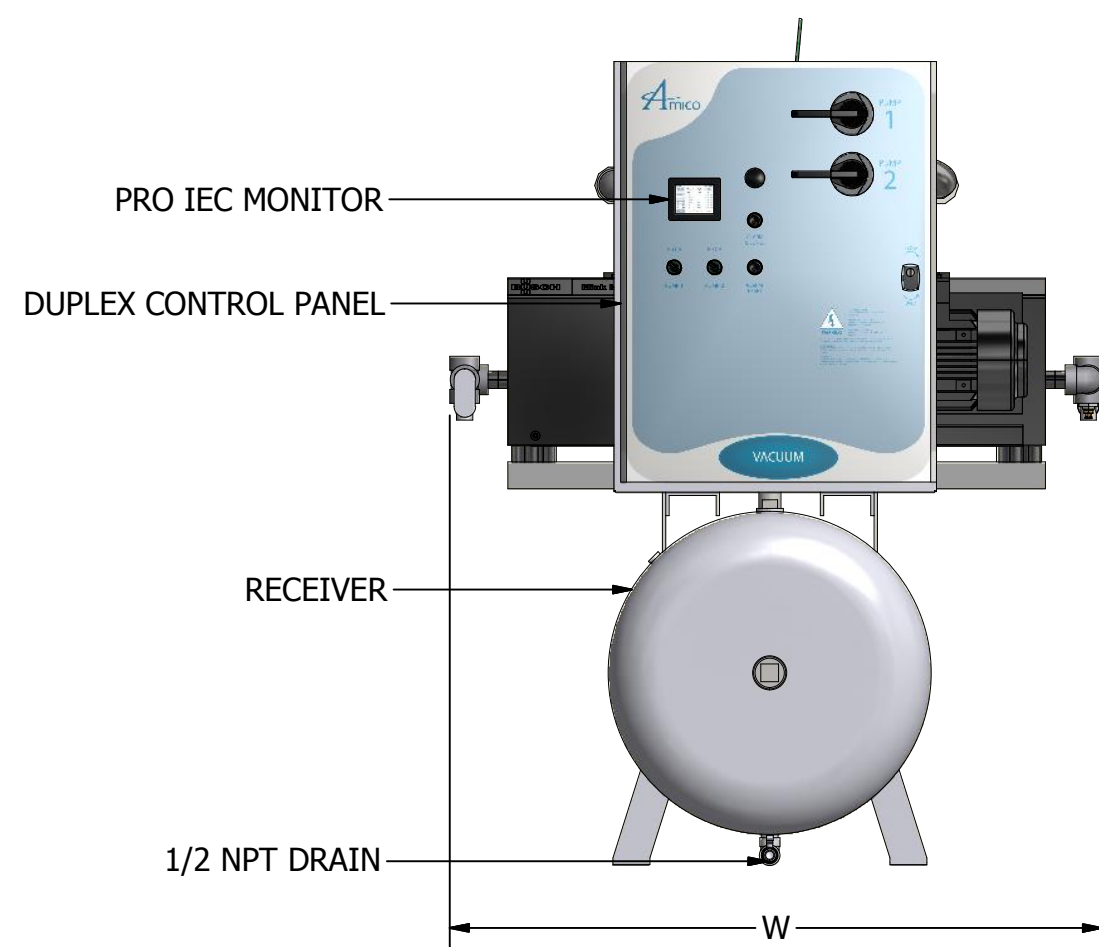
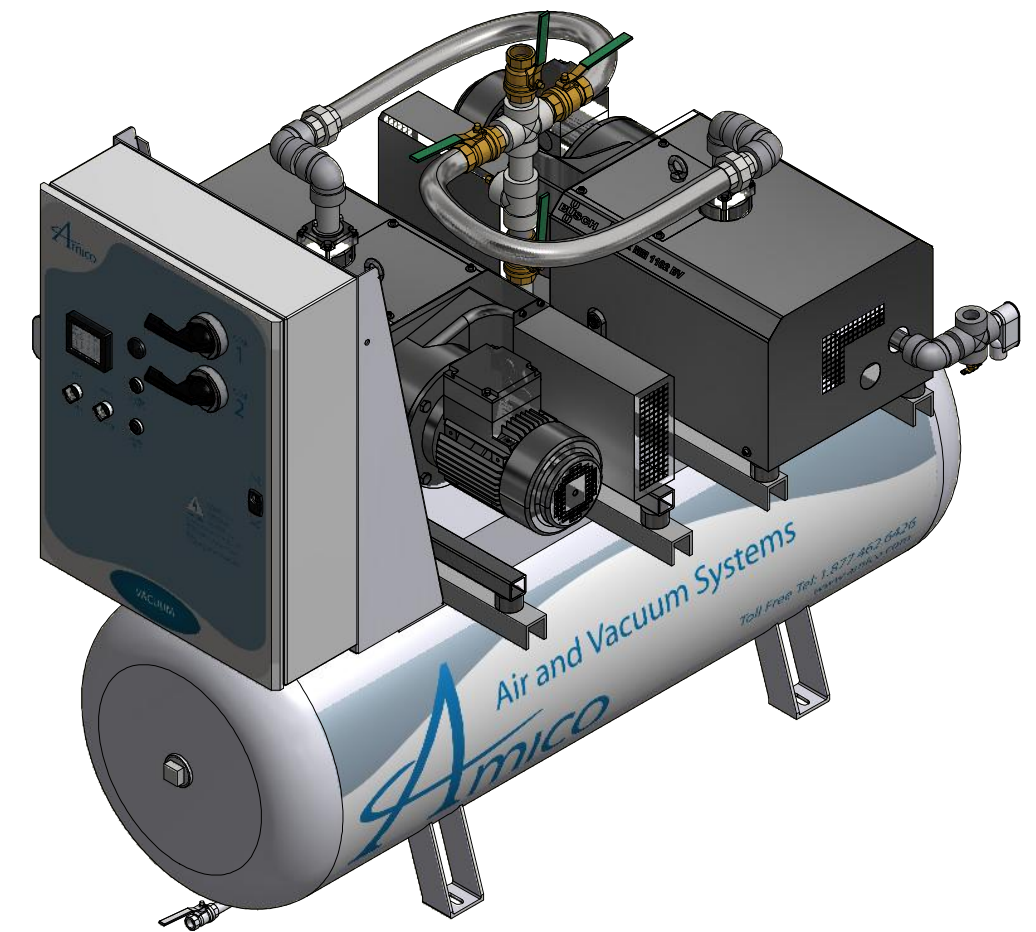
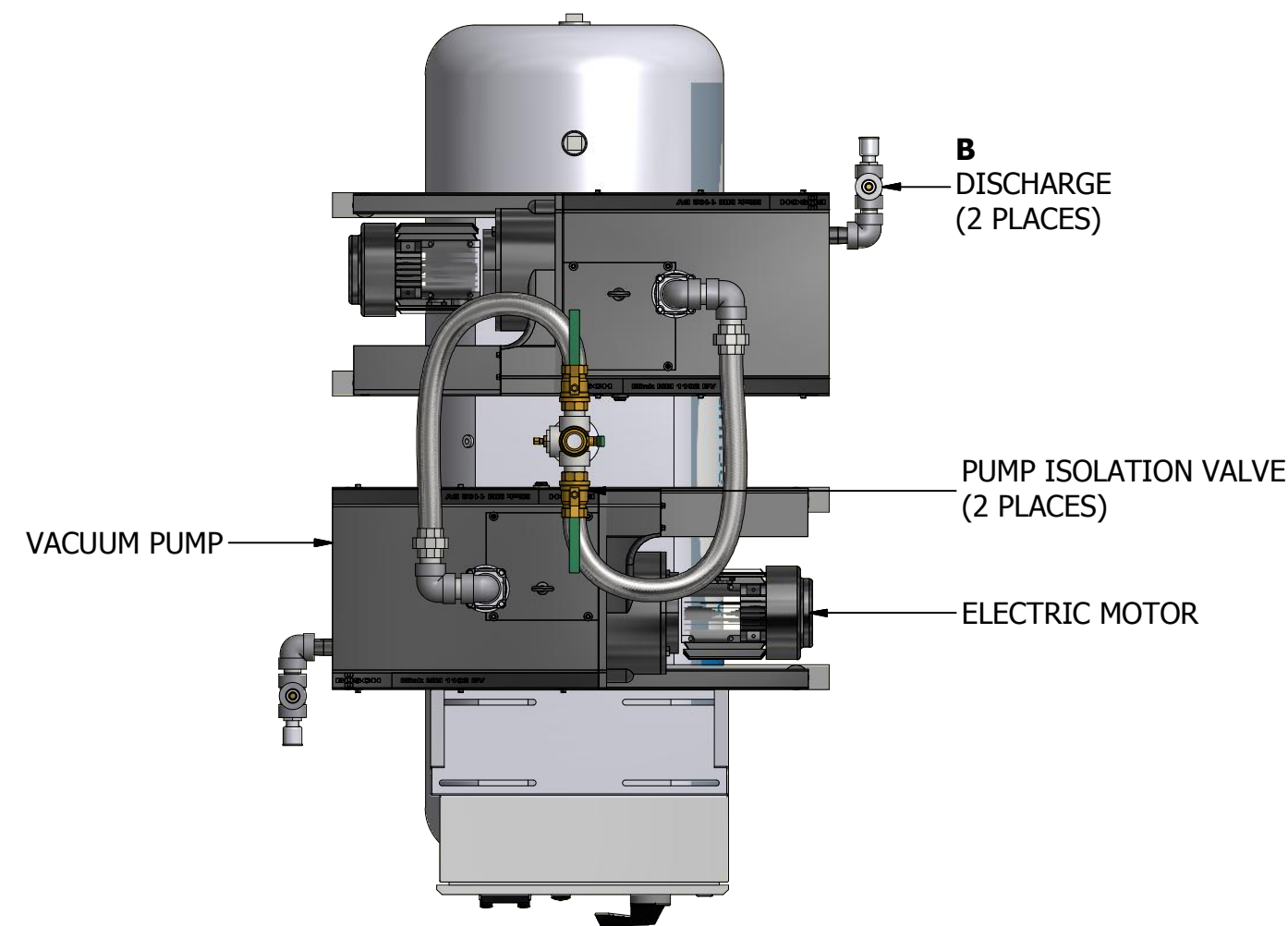
Angled View

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



DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

ADDITIONAL MODELS AVAILABLE UPON REQUEST

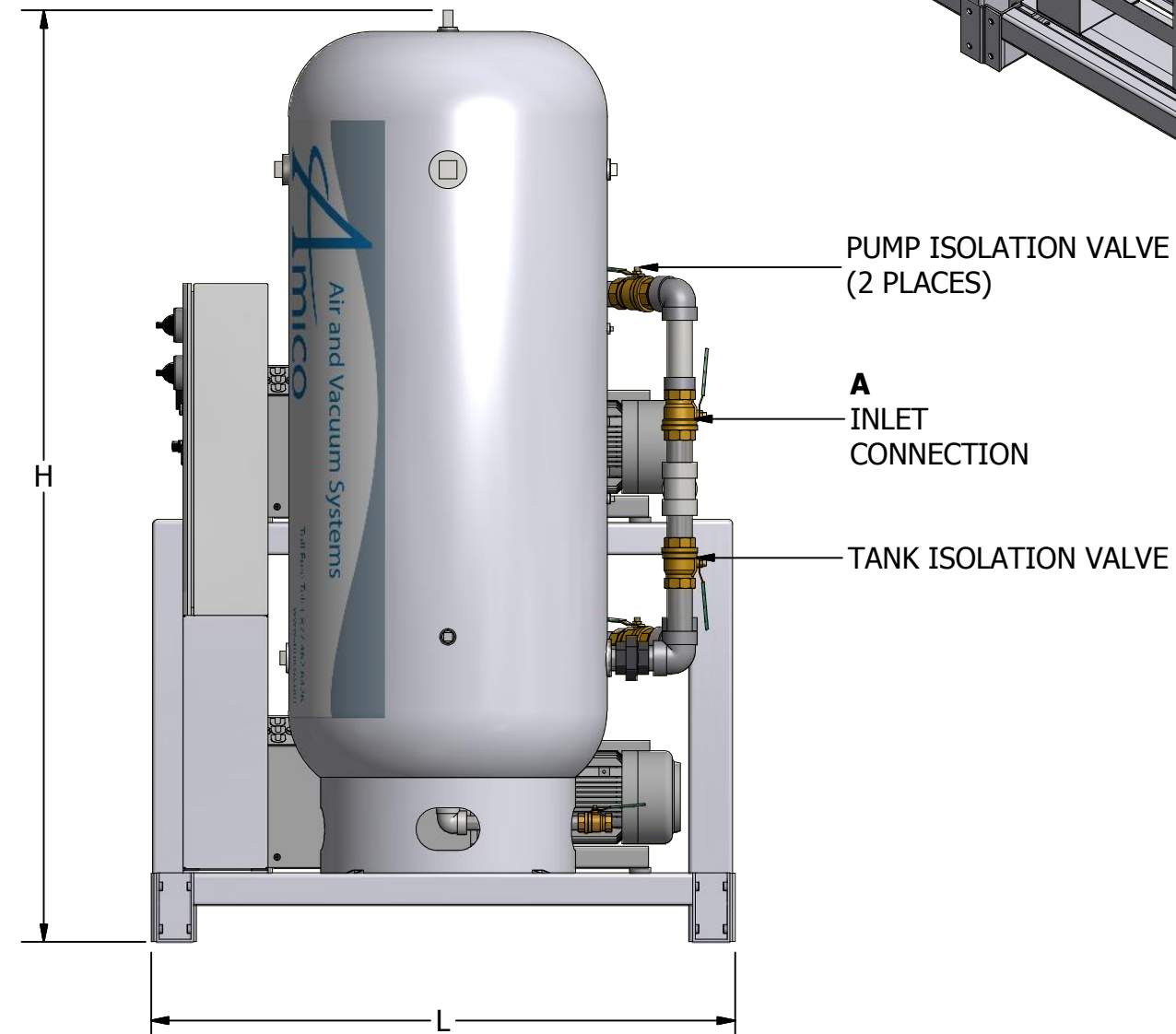
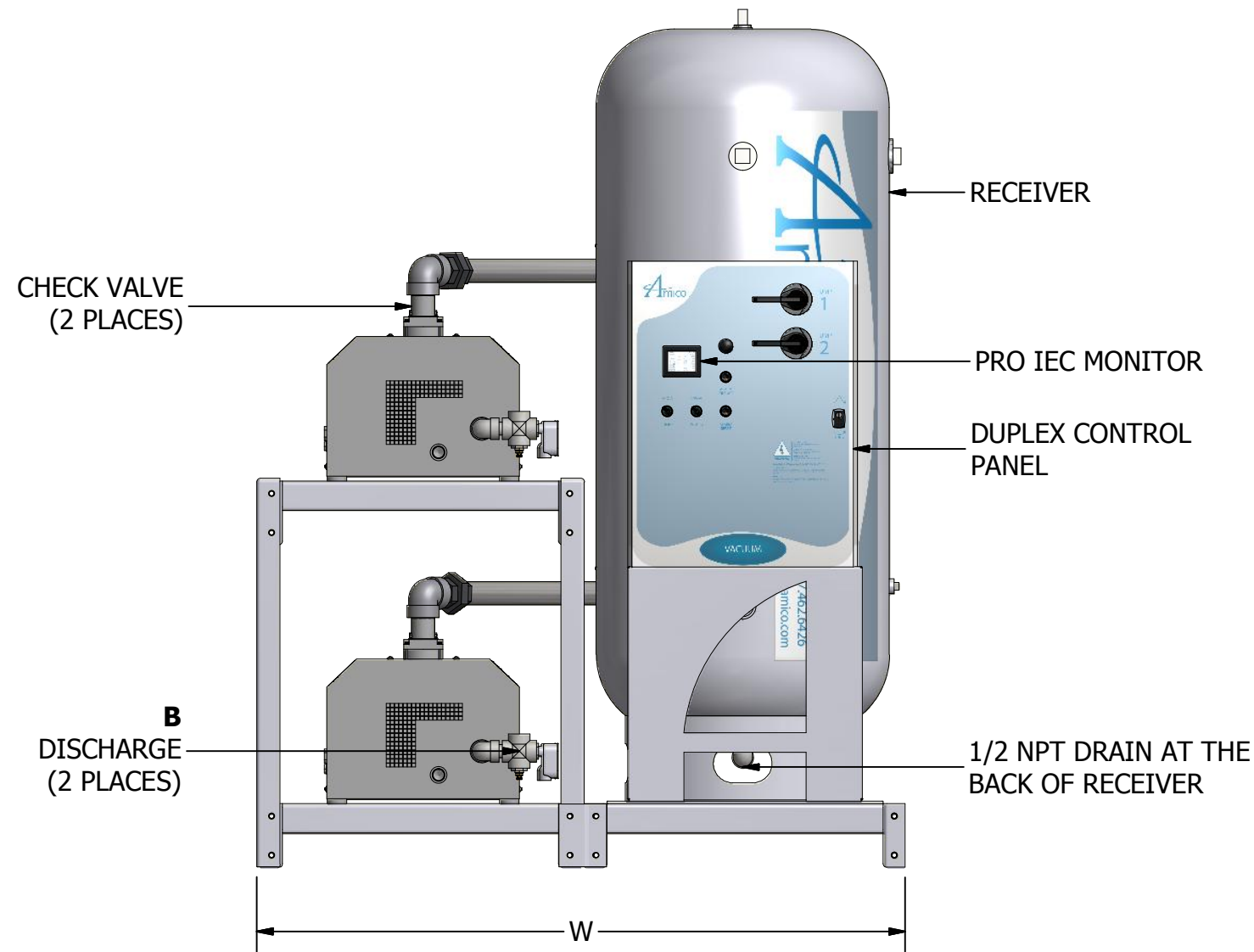
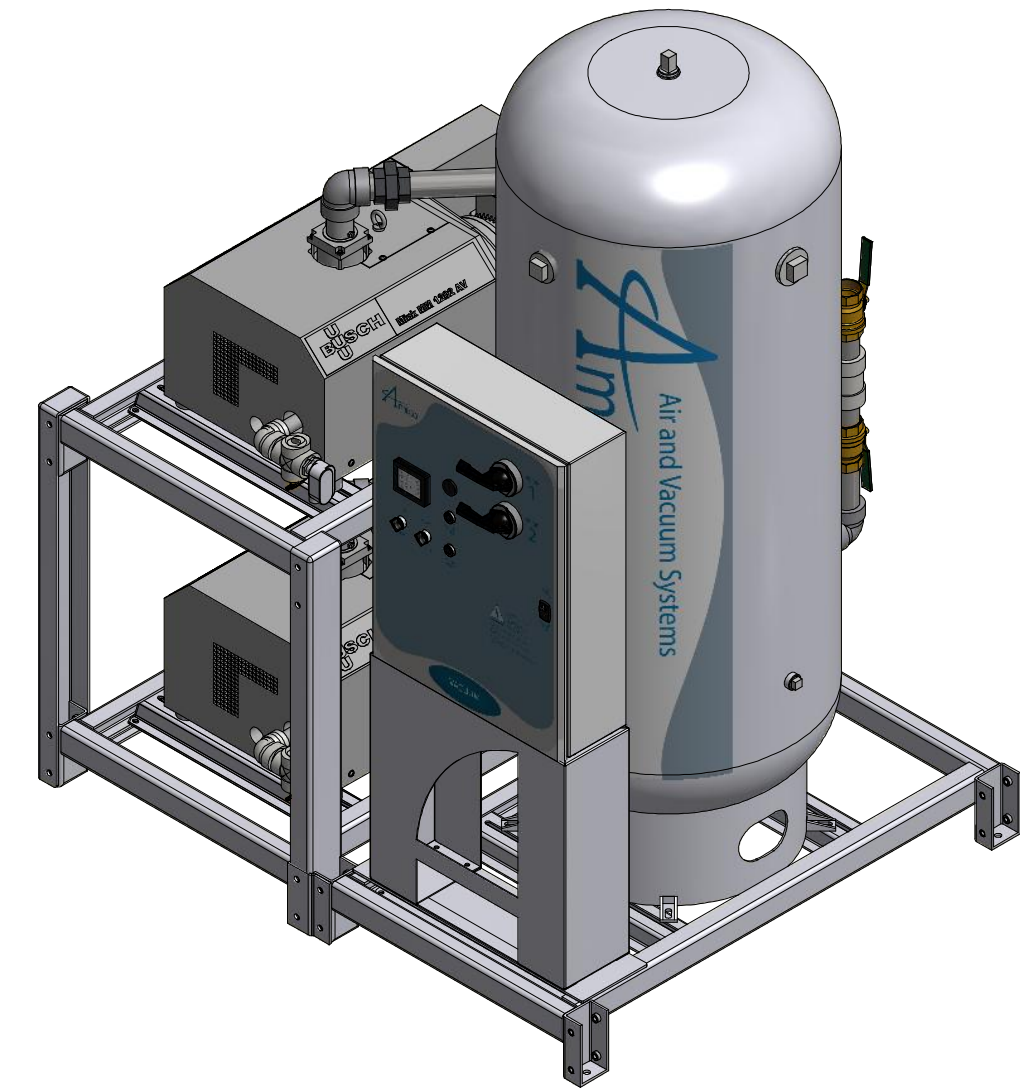
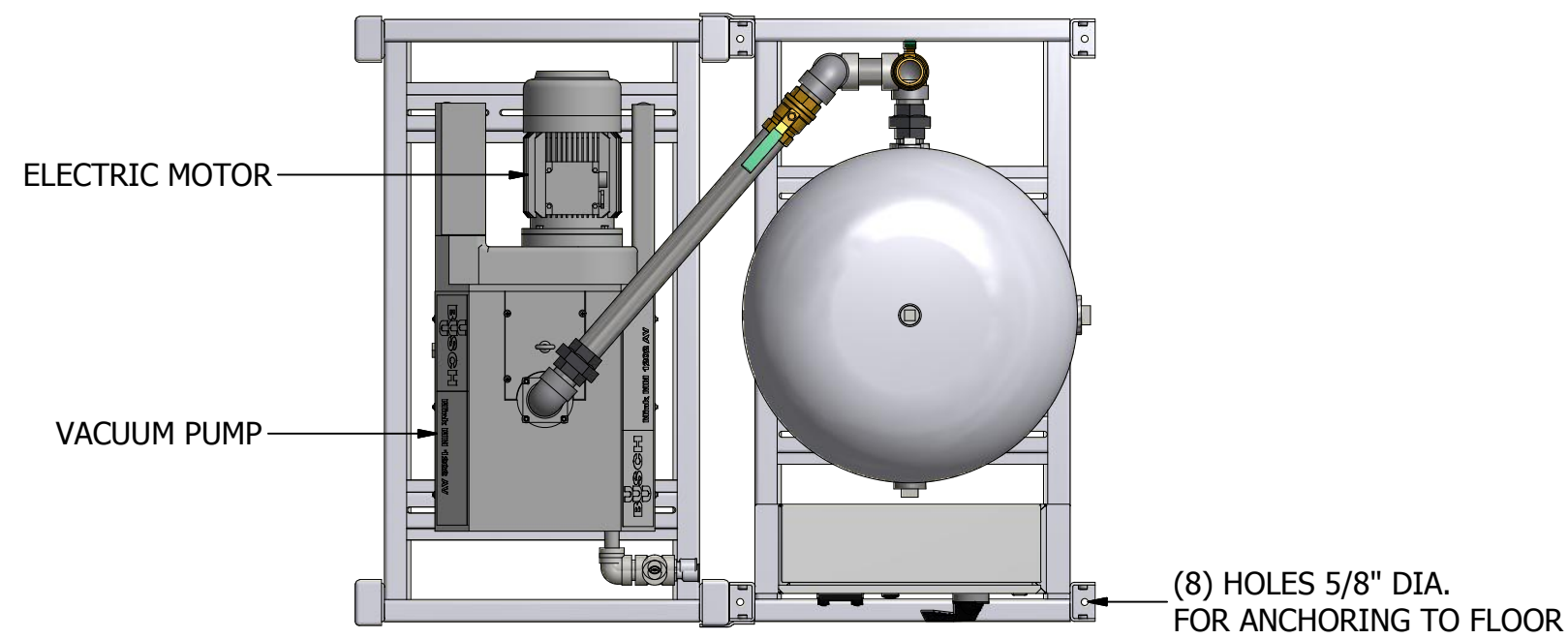
MODEL	HP (KW)	A INLET NPT	B OUTLET NPT	TANK SIZE GALLON (LITRE)	PUMP SCFM @ 19" HG (LPM)		NFPA SYSTEM CAPACITIES WITH ONE COMPRESSOR ON STANDBY @ 19" HG (LPM)		WEIGHT IN LBS (KG)	SQ. FT. REQUIRED (M ²)	SYSTEM FLA (WITH ALL COMPRESSORS RUNNING)				SYSTEM BTU/HR	SOUND LEVEL dB (A)	W (M)	L (M)	H (M)
					50 Hz Motor	60 Hz Motor	50 Hz Motor	60 Hz Motor			208V	230V	380V	460V					
					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)					
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)



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



DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE

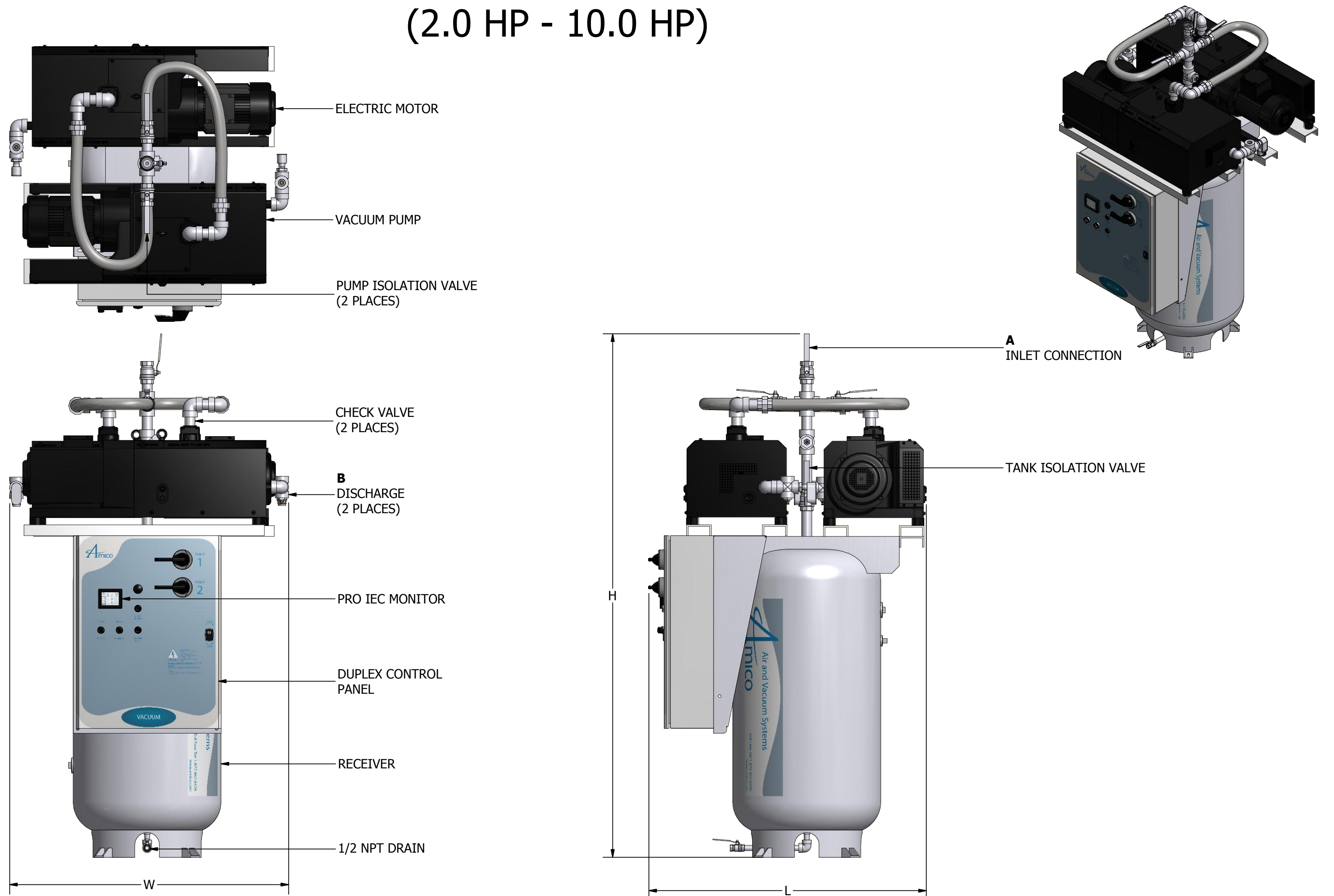
*SYSTEM CONFIGURATION DIFFERS FROM MODEL SHOWN
ADDITIONAL MODELS AVAILABLE UPON REQUEST

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					
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)



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



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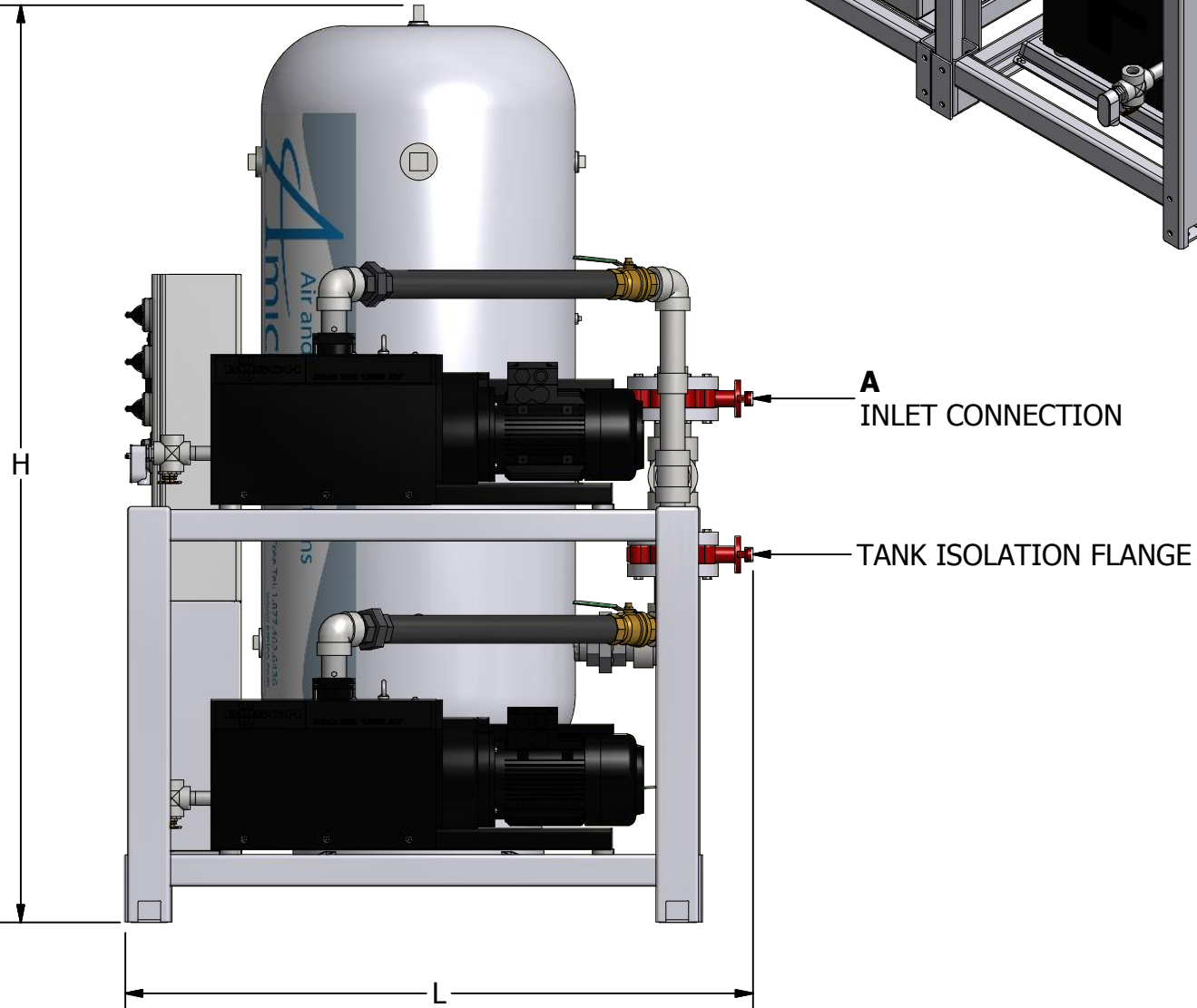
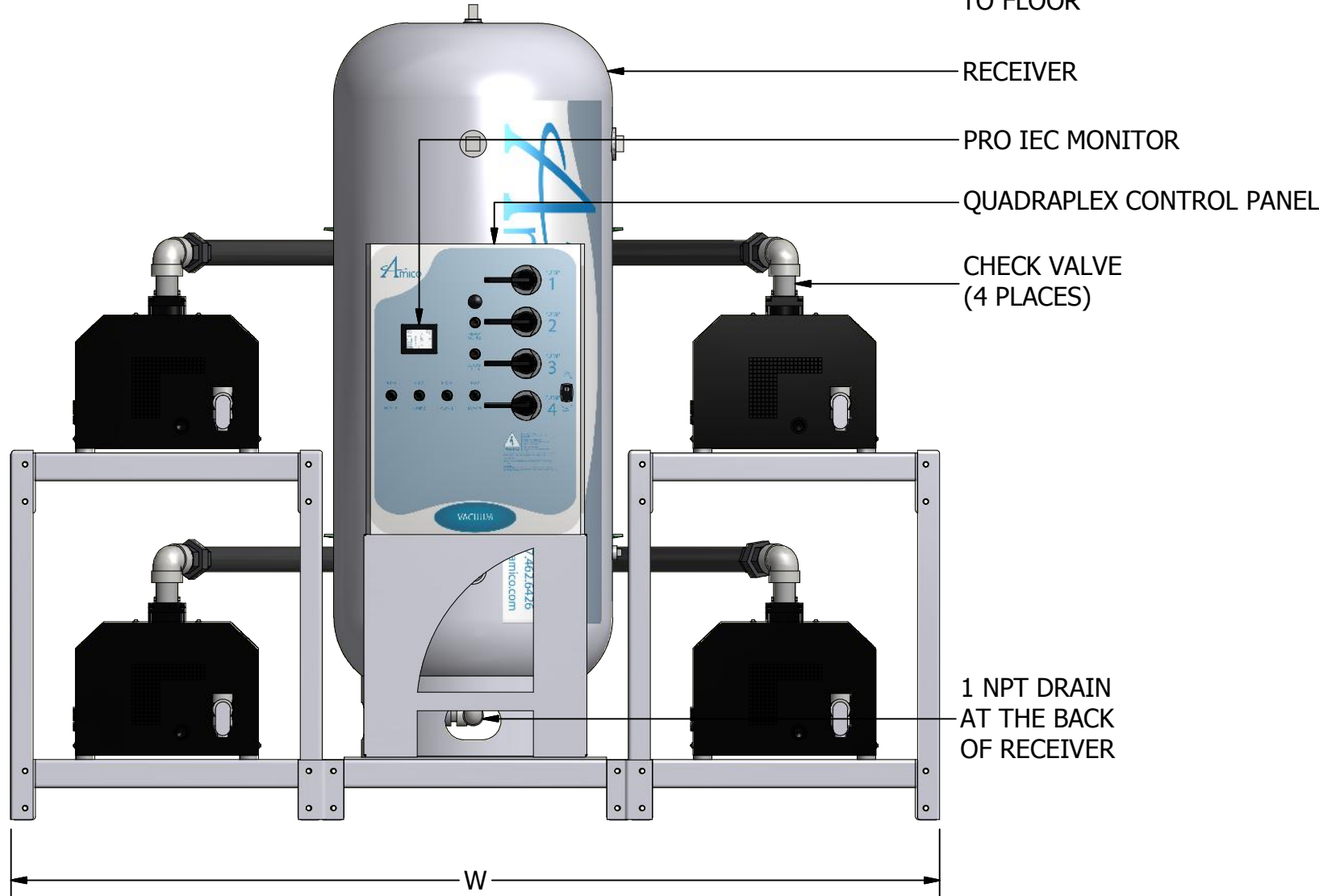
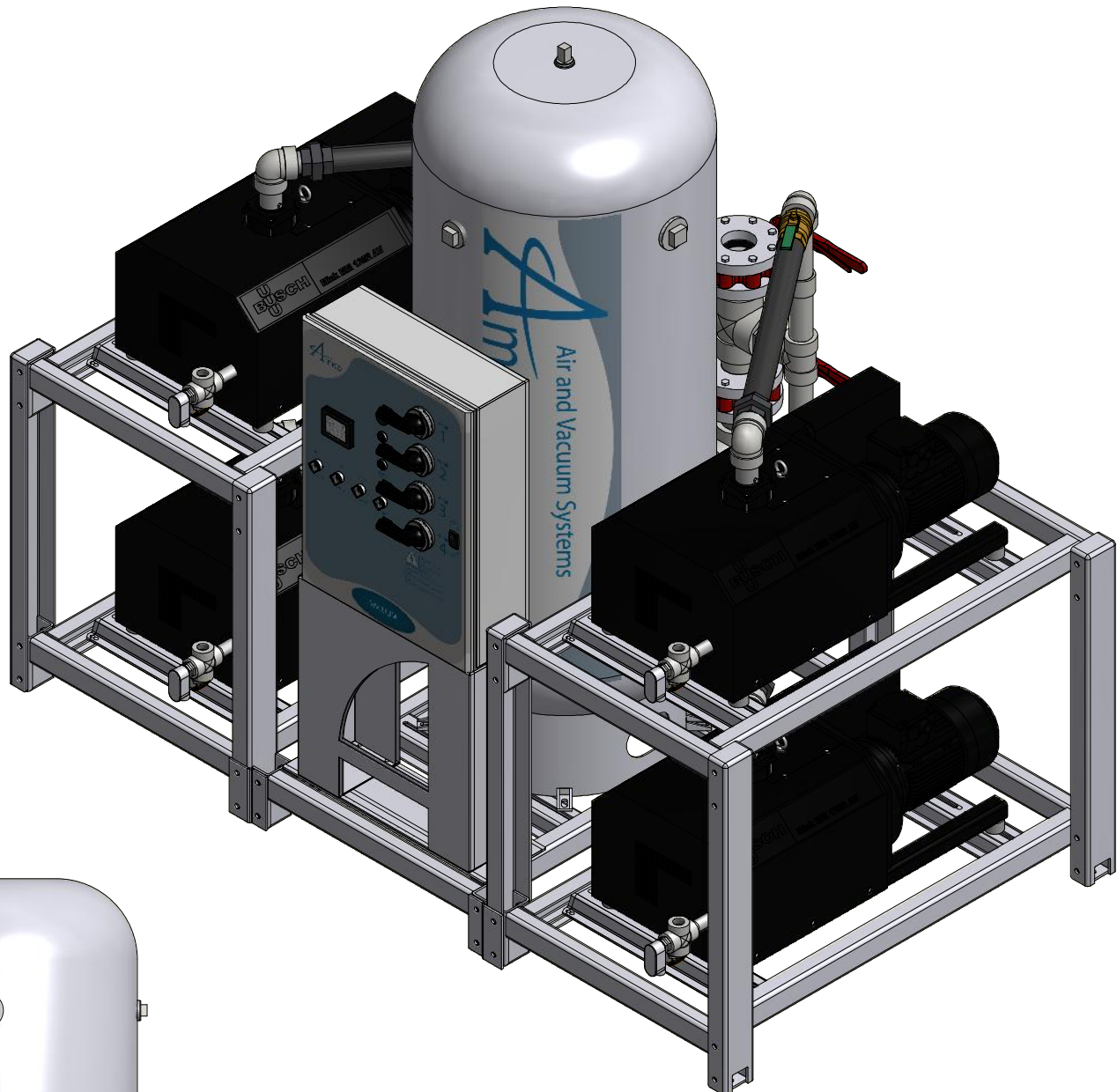
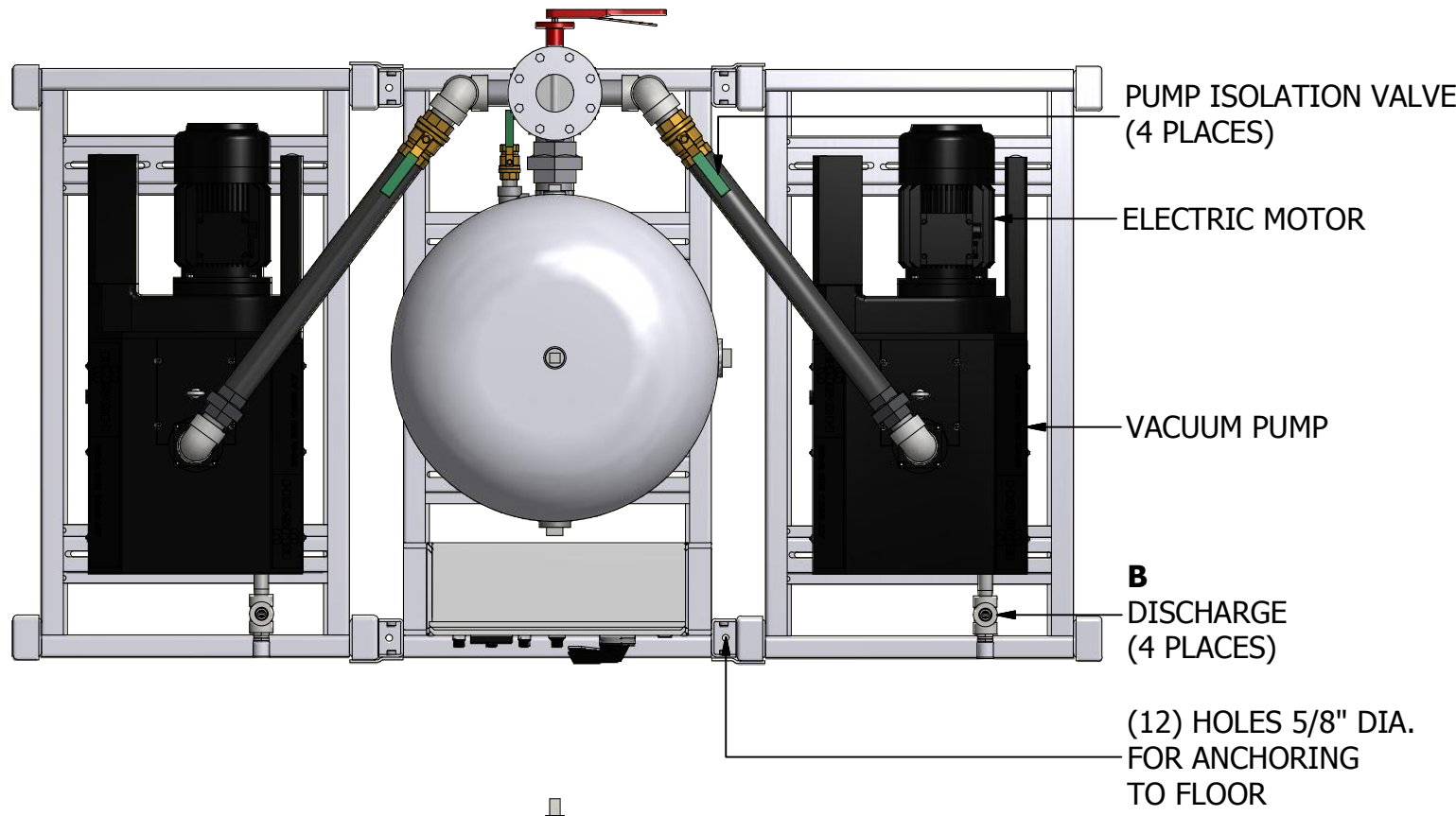
ADDITIONAL MODELS AVAILABLE UPON REQUEST

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					
					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)					
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)



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



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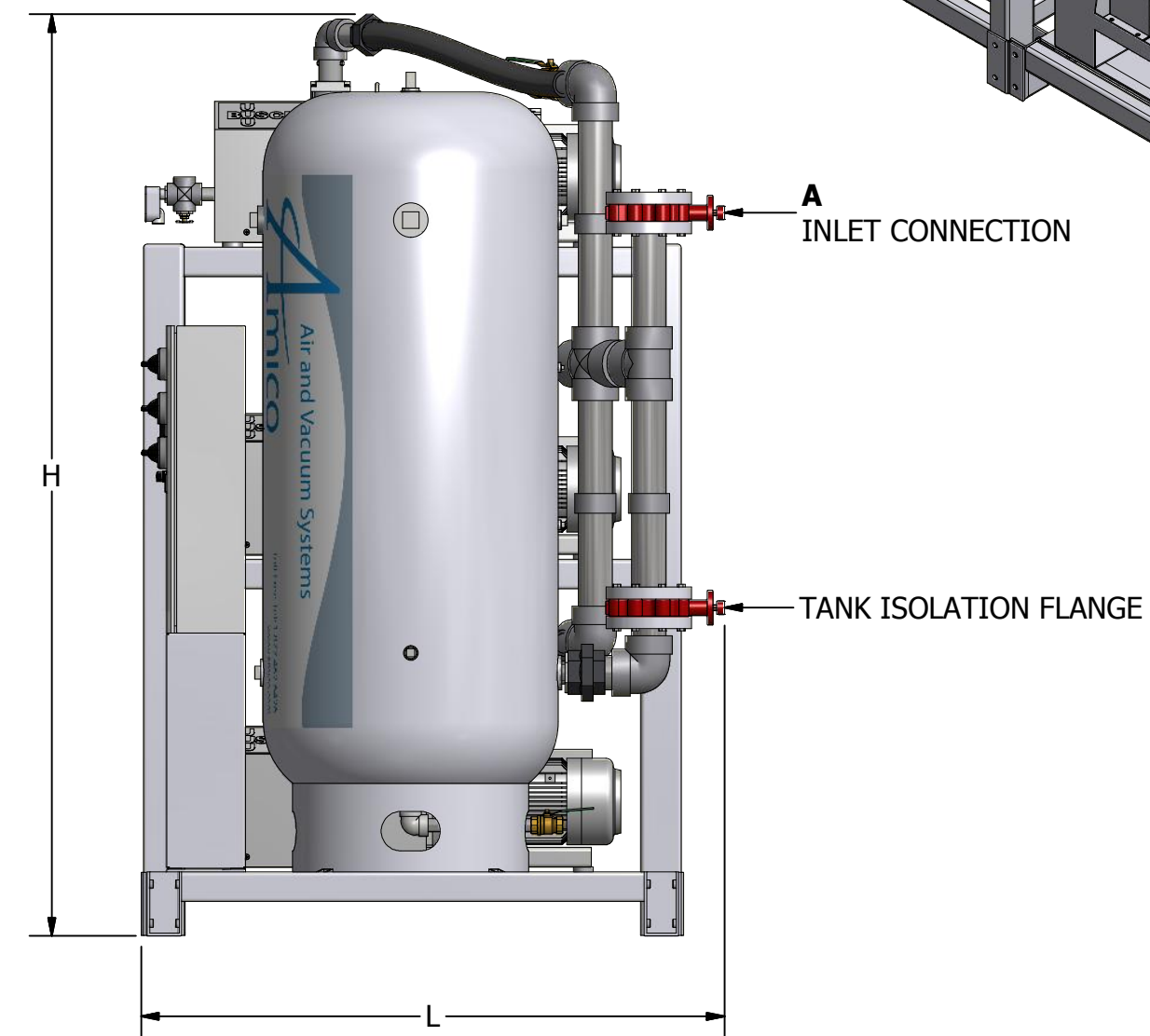
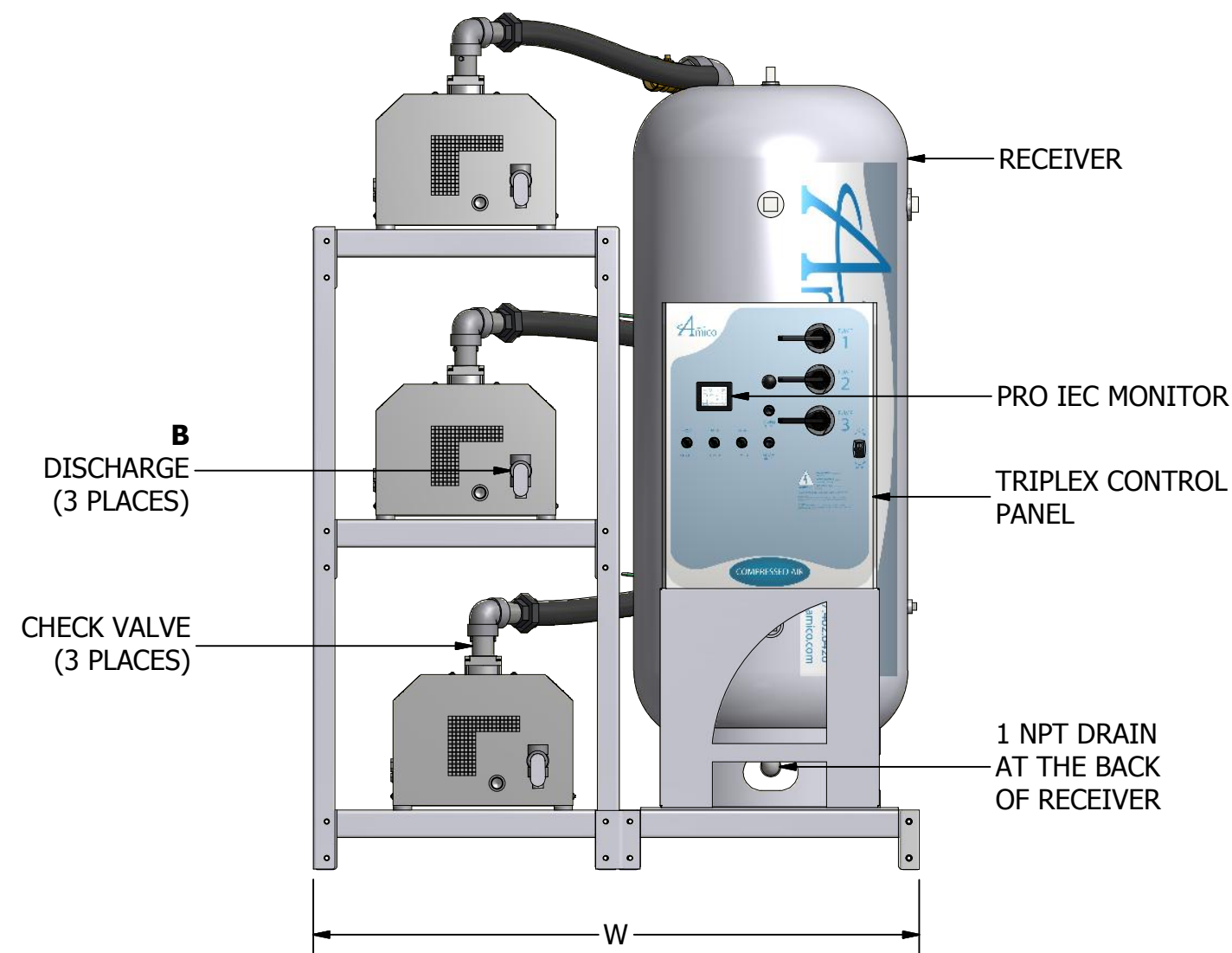
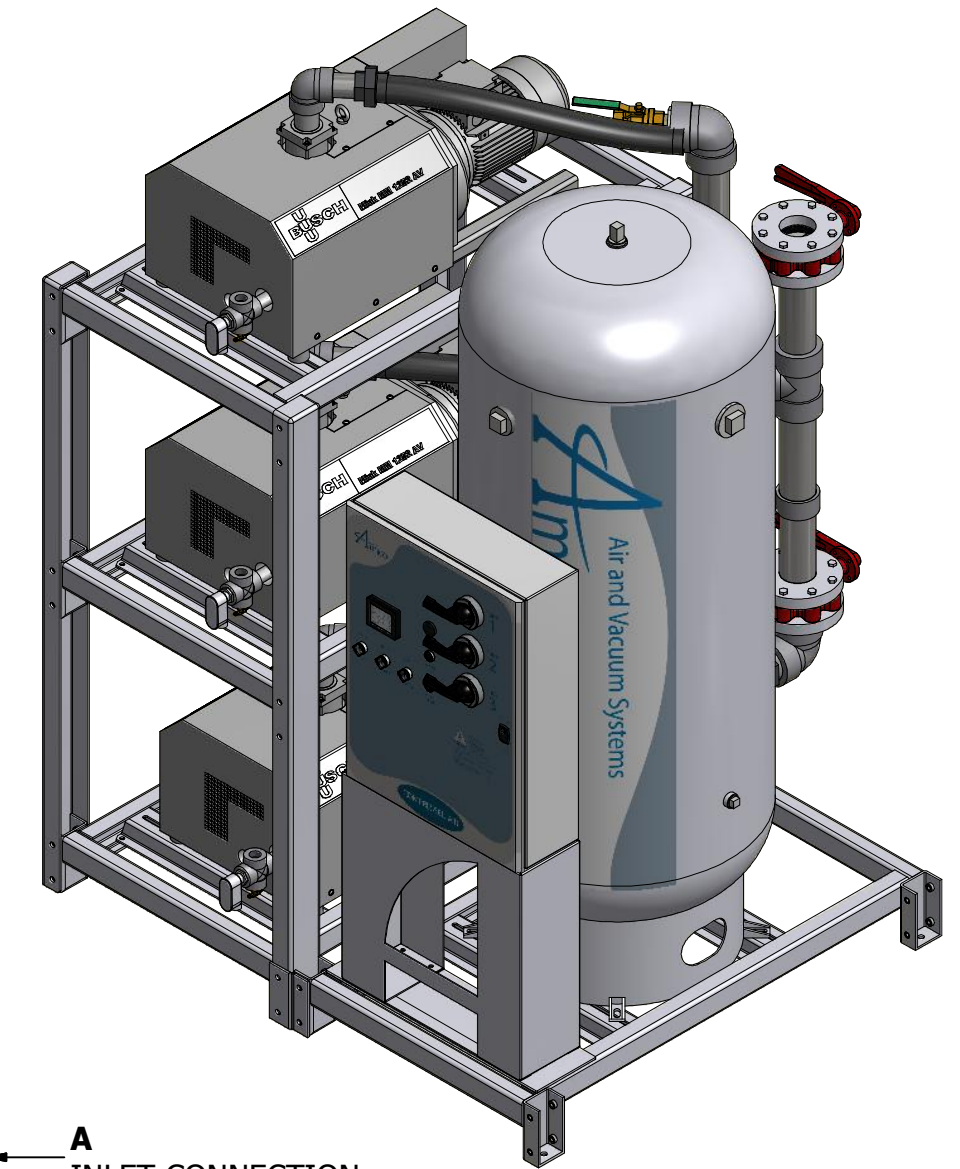
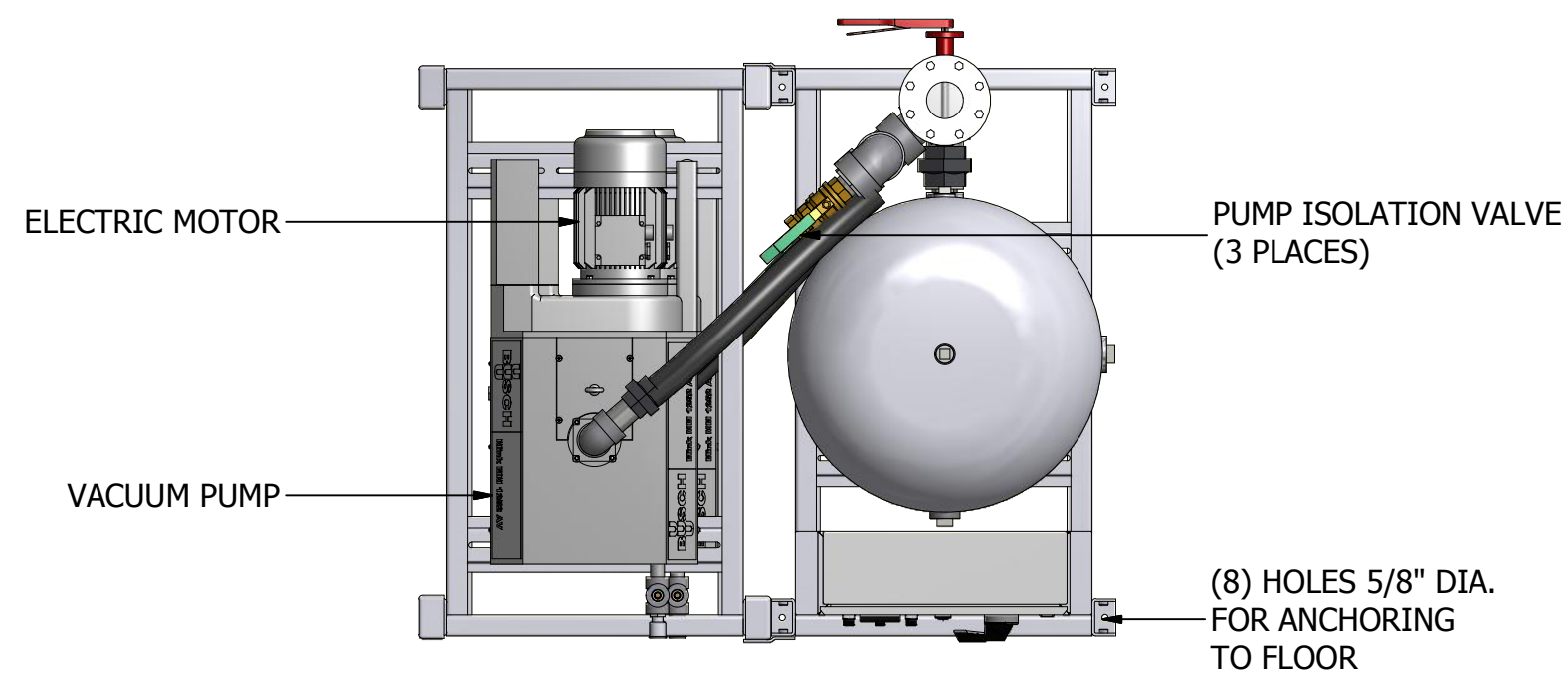
*SYSTEM CONFIGURATION DIFFERS FROM MODEL SHOWN
ADDITIONAL MODELS AVAILABLE UPON REQUEST

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					
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)



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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 (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					
					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)					
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



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Mink MM 1104 - 1142 BV

Mink MM 1324 - 1402 AV



MM 1142 BV

Description

The Busch MM series positive displacement vacuum pumps feature a compact rotary claw design that is air-cooled, dry-running and non-contacting.

These features, along with quality construction, result in a pump that offers extremely high reliability and a long service life.

Features

- Non-contacting design, eliminates internal wear and parts to replace
- Air-cooled, requiring no water
- Dry-running, no sealing or lubricating oil is needed in the pumping chamber
- Minimal maintenance
- Economical, reduced power requirements
- High volumetric efficiency

Standard Equipment

- Acoustic enclosure
- Base frame
- Vibration isolators
- TEFC motor
- Oil sight glass
- Inlet screen
- Anti-suck-back valve on inlet
- Vacuum relief valve
(models MM 1202 AV, MM 1252 AV, MM 1322 AV, MM 1402 AV only)
- Discharge silencer
- Threaded NPT inlet/outlet connections

Energy Savings with Busch Mink Vacuum Pumps

Energy Savings Overview

Busch rotary claw vacuum pumps can reduce energy consumption by 25% or more,* lowering electrical costs while also qualifying for custom energy rebates offered by many utility companies. With their unique, non-contacting, friction-free design, energy is not wasted from internal friction or drag like other pump designs. Additionally, when matched with PLC-based variable speed controls, energy efficiency is further enhanced, providing true on-demand operation.



Operating Principle

Inside the pumping chamber, two “S” profile rotors driven by gears spin in opposite directions. As the rotors pass the inlet, a void is created and the trapped air is pushed to the exhaust side where it is first internally compressed and then discharged.

A small, fixed, gauged clearance is maintained between all moving parts. Due to this, there is no friction or wear and oil is not required in the compression chamber for lubrication, sealing or cooling.

Vacuum Pumps

Mink series vacuum pumps are available in a variety of sizes and configurations to best suit your requirements. All pumps feature 100% oil-less compression, are air cooled, have TEFC motors and are suitable for variable speed operation.

- Pumping speed to 325 CFM
- Vacuum to 15 Torr (29.3” Hgv)



Vacuum Systems

Busch Mink series vacuum systems are available in standard or custom configurations for industrial and laboratory applications.

Also available are a wide range of optional accessories and controls, including PLC-based variable speed controls that further enhance energy and maintenance savings.



Vacuum Pump Comparison

Technical Data	Rotary claw dry-running	Rotary vane oil-lube	Rotary vane oil-less	Rotary screw oil-lube	Liquid-ring oil-sealed
ACFM	Very high	High	Medium-low	Medium	Medium
BHP	Low	Low	High	Medium	High
Efficiency	Very high	High	Medium-low	Medium	Medium
VFD* capability	Very high	Low	Low	Low	Low
Cost of ownership	Very low	Low	Very high	Medium-high	Medium-high

*Variable frequency drive

Energy Cost Comparison*

Operating parameters	Rotary claw dry-running	Rotary vane oil-lube	Rotary vane oil-less	Rotary screw oil-lube	Liquid-ring oil-sealed
Motor HP	7.5	10	15	15	15
Run hours/year	8000	8000	8000	8000	8000
Motor efficiency	90%	90%	90%	90%	90%
\$/kWh	\$ 0.08	\$ 0.08	\$ 0.08	\$ 0.08	\$ 0.08
Total yearly cost**	\$ 3,977	\$ 5,303	\$ 7,954	\$ 7,954	\$ 7,954

*Comparison of pump technologies to deliver 150 ACFM @ 150 Torr (24" HgV)

** Yearly cost = (HP x .7457 x kWh cost)/Motor efficiency

Variable Frequency Drive Energy Cost Savings

For applications with varying demand conditions, the use of a VFD (variable frequency drive) on a Mink rotary claw vacuum pump will result in additional energy cost savings (compared to a non-VFD equipped pump). This example represents a Busch MM 1252 AV model pump sized for an application with a maximum load condition of 150 ACFM @ 150 Torr (24" HgV), but with varying daily demand.

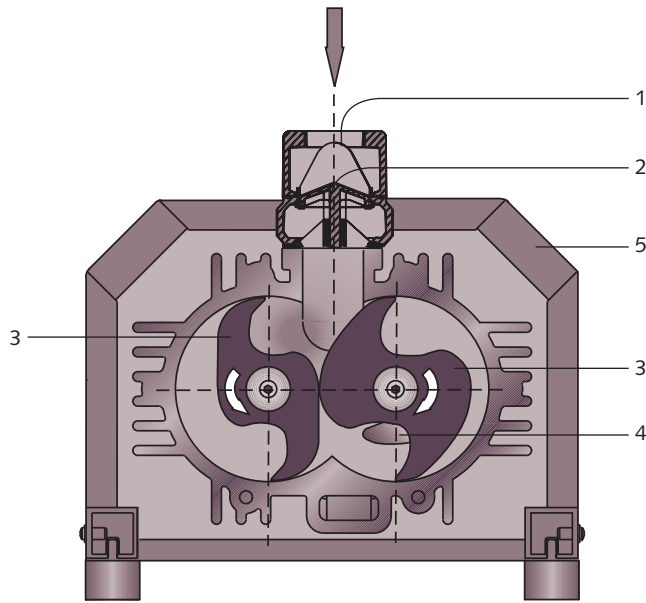
System demand	ACFM @ 150 Torr	Motor frequency	Brake horsepower	Operating hours	Yearly cost*
100%	150	58 Hz	6.8	800	\$ 361
75%	112.5	47 Hz	5.4	3200	\$ 1,145
50%	75	36 Hz	4.0	2400	\$ 636
25%	37.5	23 Hz	2.8	1600	\$ 297
Totals				8000	\$ 2,439

*Based on \$0.08 kWh and 90% motor efficiency



Dry rotary claw vacuum pumps

Operating Principle



- 1 Gas inlet
- 2 Non-return valve
- 3 Claws
- 4 Gas outlet
- 5 Acoustic enclosure

Operating Principle

Inside the pump housing, two claw-shaped rotors take in air as they rotate in opposite directions. The air is compressed by the rotors, then discharged through a silencer to atmosphere.

The non-return valve incorporated into the inlet flange prevents air from back flowing into the vacuum chamber when the pump is turned off.

Mink MM rotary claw vacuum pumps are directly driven by a flanged motor, and the two rotors are synchronized by gears.

A wide range of accessories allows optimum adaptation to many applications.

Accessories

- Inlet filters
- Liquid separators
- Knock-out pots
- High-volume bag filters
- Control valves
- Gauges
- Switches and transmitters
- Motor starters
- Variable speed drives
- Vacuum receivers

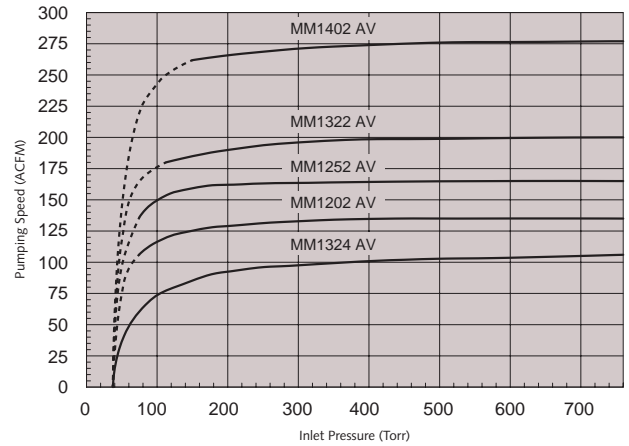
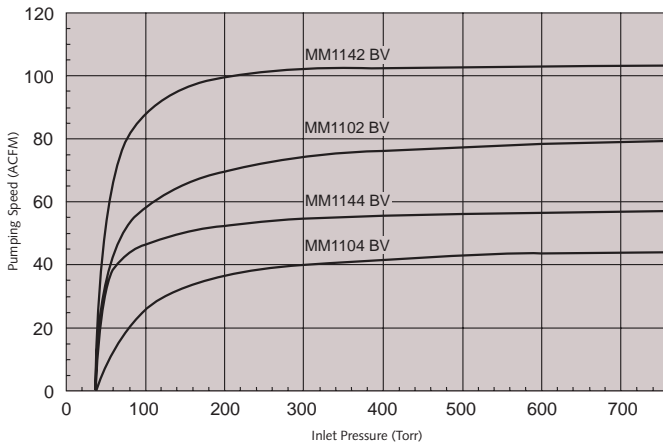
Applications

- Food packaging
- Food processing
- Medical
- Laboratory
- Plastics
- Automation
- Packaging
- Electronics
- Pneumatic conveying
- Printing
- Environmental
- Woodworking
- Renewables
- Paper
- Central systems



Technical Data

Pumping Speed vs. Inlet Pressure



Operation duty in dashed area not allowed. Vacuum relief valve to maintain maximum continuous operating pressure included as a standard feature.

Technical Data		1104 BV	1144 BV	1102 BV	1142 BV	1324 AV	1202 AV	1252 AV	1322 AV	1402 AV
Nominal pumping speed	ACFM	44	57	79	103	106	135	165	200	277
Ultimate pressure continuous duty	Torr	37.5	37.5	37.5	37.5	37.5	75	75	112.5	150
	"HgV	28.4	28.4	28.4	28.4	28.4	27	27	25.5	24
Motor size	kW	1.7	2.4	3.4	4.8	4.2	5.2	6.8	7.6	9.5
	HP	2.3	3.2	4.6	6.4	5.6	7.0	9.1	10.2	12.7
Nominal motor speed	RPM	1800	1800	3600	3600	1800	3600	3600	3600	3600
Sound level rating*	dB(A)	70	70	79	79	74	79	79	82	83
Approximate weight	Lbs.	408	419	408	419	595	518	529	606	717

All performance data is based on ambient conditions of 14.7 PSIA and 70° F, and has a tolerance of +/- 10%.

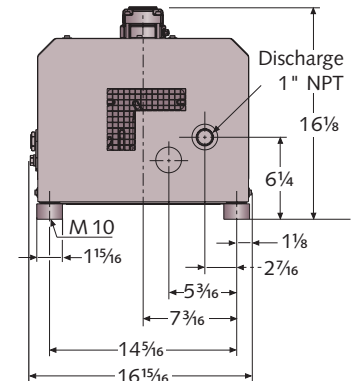
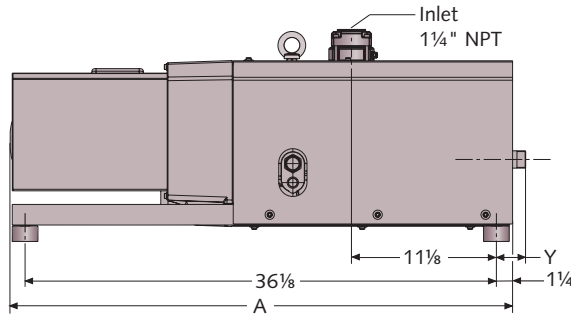
*DIN EN ISO 2151, at 300 Torr inlet pressure

Dry rotary claw vacuum pumps



Dimensions

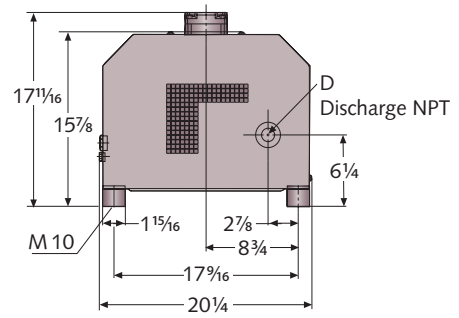
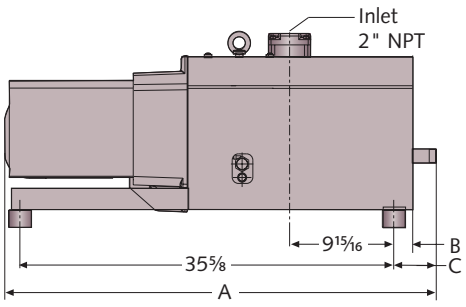
MM 1104-1142 BV



Dimensions	A	Y
MM 1104 BV	39	17 ¹ / ₁₆
MM 1144 BV	39	2

Dimensions	A	Y
MM 1102 BV	40 ¹¹ / ₁₆	2 ¹¹ / ₁₆
MM 1142 BV	39 ¹ / ₂	3 ⁵ / ₁₆

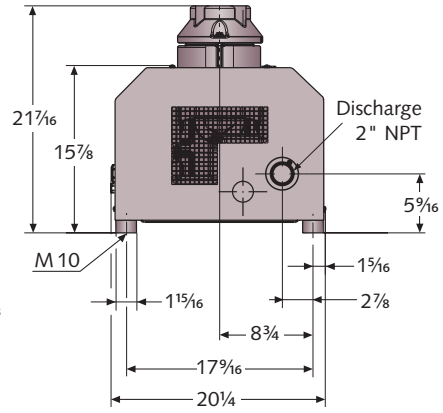
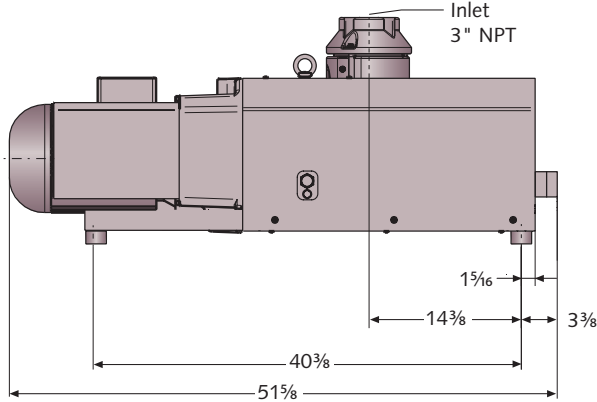
MM 1324-1322 AV



Dimensions	A	B	C	D
MM 1324 AV	43 ⁵ / ₁₆	1 ¹³ / ₁₆	3 ¹ / ₂	1
MM 1202 AV	41 ¹ / ₈	1 ¹³ / ₁₆	3 ¹ / ₈	1

Dimensions	A	B	C	D
MM 1252 AV	41 ⁵ / ₁₆	1 ¹³ / ₁₆	3 ¹ / ₂	1
MM 1322 AV	44 ³ / ₁₆	3 ¹ / ₈	4 ¹³ / ₁₆	1 ¹ / ₄

MM 1402 AV



All dimensions in inches unless otherwise noted.



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