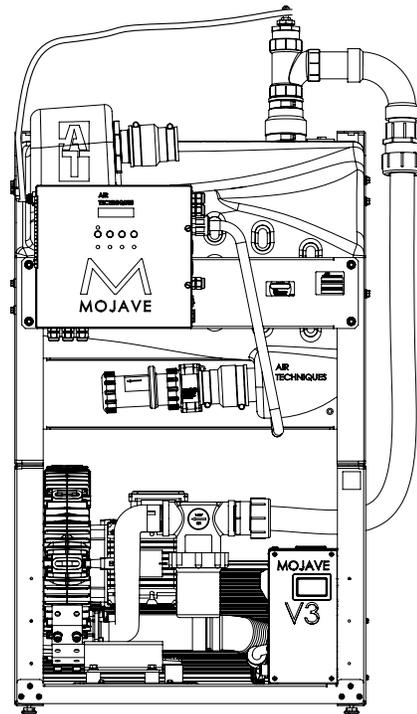


MOJAVE

DRY VACUUM SYSTEM

PART NUMBERS V3, V5, V7, 2V3, 2V3CT, 2V5, 2V5CT, 2V7, 3V5 AND 4V5

USER'S AND INSTALLATION MANUAL



**We Recommend
Daily use of
Monarch
CleanStream**

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CONGRATULATIONS

Congratulations on the purchase of your new **MOJAVE** Dry Vacuum System that provides state of the art regenerative side channel vacuum technology. This vacuum system is designed for reliable operation in the modern dental facility. The system uses a 100% oil-less Vacuum Pump to produce the high-volume air flow required for multiple simultaneous users, while the Separator Tank ensures that no liquids enter the pump.

In addition, **MOJAVE** incorporates an efficient energy management system. This is accomplished using a Variable Frequency Drive (VFD) for each Vacuum Pump, which is controlled by a Master Controller. This controller automatically adjusts the frequency of the pumps to maintain the required vacuum level depending on the needs of your dental facility. With this balanced system, each user always has the flow rate necessary to do the job while conserving electricity and prolonging the life of your pumps.

SAFETY SUMMARY

Use of **MOJAVE** not in conformance with the instructions specified in this manual may result in permanent failure of the unit.

WARNING: To prevent fire or electrical shock, do not expose this appliance to rain or moisture.
All user serviceable items are described in the maintenance section.

ATTENTION USERS:

Markings. The following terms or symbols are used on the equipment or in this manual to denote information of special importance:



Alerts users to important Operating and Maintenance instructions. Read carefully to avoid any problems.



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



Warns users that uninsulated voltage within the unit may be of sufficient magnitude to cause electric shock.



Identifies the name of the manufacturer.



Indicates date of manufacture



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



Indicates protective Earth Ground for the Equipment power switch.



Indicates that the equipment complies with the Medical Device Directive 93/42/EEC.



MEDICAL ELECTRICAL EQUIPMENT

WITH RESPECT TO ELECTRICAL SHOCK, FIRE, MECHANICAL AND OTHER SPECIFIED HAZARDS ONLY
IN ACCORDANCE WITH UL 60601-1, CAN/CSA C22.2 No. 601.1
66CA



Air Techniques, Inc.
1295 Walt Whitman Road
Melville, New York, USA 11747- 3062

PURPOSE OF THIS MANUAL

This manual provides installation, operation and maintenance instructions for the support of the eight available **MOJAVE** Dry Vacuum System configurations listed below. Although not listed, each system also includes a Master Controller. Review and follow the guidelines included in this User Manual to ensure that the system provides the highest level of service.

System	Description	Simultaneous Users
V3	One V3 Dry Vacuum Pump and an MT10 Tank	3 to 5
V5	One V5 Dry Vacuum Pump and an MT10 Tank	5 to 7
V7	One V7 Dry Vacuum Pump and an MT10 Tank	7 to 10
2V3	Two V3 Dry Vacuum Pumps and an MT10 Tank	6 to 10
2V3CT	Two V3 Dry Vacuum Pumps and a CT20 Tank	6 to 10
2V5	Two V5 Dry Vacuum Pumps and an MT10 Tank	10 to 14
2V5CT	Two V5 Dry Vacuum Pumps and a CT20 Tank	10 to 14
2V7	Two V7 Dry Vacuum Pumps and an CT20 Tank	14 to 20
3V5	Three V5 Dry Vacuum Pumps and a CT20 Tank	15 to 20
4V5	Four V5 Dry Vacuum Pumps and a CT20 Tank	20 to 25

SIZING GUIDE

Choosing the right configuration of **MOJAVE** for your practice depends on the number of vacuum users and the anticipated demand. To ensure optimum operation, the demands should not exceed the number of vacuum users shown below. The chart lists the number of simultaneous High Volume Evacuators (HVEs) and Saliva Ejectors (SEs) that can be used in specific **MOJAVE** system configurations.

Recommended Number of Simultaneous HVE/SE Users

V3		V5		V7		2V3 or 2V3CT		2V5 or 2V5CT		2V7		3V5		4V5	
HVE	SE	HVE	SE	HVE	SE	HVE	SE	HVE	SE	HVE	SE	HVE	SE	HVE	SE
5	+ 0	7	+ 0	10	+ 0	10	+ 0	14	+ 0	20	+ 0	20	+ 0	25	+ 0
4	+ 2	6	+ 2	9	+ 2	9	+ 2	13	+ 2	18	+ 4	18	+ 4	20	+ 10
2	+ 6	5	+ 4	7	+ 6	7	+ 6	12	+ 4	13	+ 14	13	+ 14	18	+ 14
0	+ 10	4	+ 6	5	+ 10	5	+ 10	9	+ 10	10	+ 20	10	+ 20	13	+ 24
		0	+ 14	3	+ 14	3	+ 14	6	+ 16	8	+ 24	8	+ 24	10	+ 30
Note: 1 HVE = 2 SE's 1 HVE = 2 Nitrous Scavengers				1	+ 18	1	18	2	+ 24	5	+ 30	5	+ 30	8	+ 34
				0	+ 20	0	20	0	+ 28	0	+ 40	0	+ 40	0	+ 50

SPECIFICATIONS

Master Controller Electrical Specifications		
Voltage (Volts AC Single Phase \pm 10%)	120 (See Note)	220 (See Note)
Full Load Current (Amps AC)	5	5
Input Frequency (Hz)	60	50/60

Notes:
 120V MMC used with MT10 & CT20
 220V MMC used with MT12 & CT22

Pump Electrical Specifications	V3	V5	V7	2V3 & 2V3CT	2V5 & 2V5CT	2V7	3V5	4V5
Voltage (Volts AC \pm 10%)	220	220	220	220	220	220	220	220
Full Load Current (Amps AC)	12	15	18	24	30	36	45	60
Input Frequency (Hz)	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Preset Vacuum Level (InHg)	8	8	8	8	8	8	8	8
Horsepower	1.6	1.9	2.1	3.2	3.8	4.2	5.7	7.6

Tank Specifications	V3, V5, V7, 2V3 & 2V5	2V3CT, 2V5CT, 2V7, 3V5 & 4V5
Working Liquid Capacity	MT10 Tank 10 gallon maximum capacity	CT20 Continuum Tank infinite volume capacity
Tank Material (All systems)	Rotomolded Plastic	Rotomolded Plastic

Water usage in Gallons Per Minute (GPM) at different facility water pressures.		
Water Pressure (PSI)	Total gallons used in 2 minute washout cycle	
	MT10	CT20
20	7.4	14.8
30	9.0	18.0
40	10.4	20.8
50	11.6	23.2
60	12.7	25.4
80	14.7	29.4
100	16.4	32.8

System Environmental Conditions (All Systems)

Operating Temperature	40 to 104°F or 10 to 40°C
Storage and Transport Temperature	32 to 158°F or 0 to 70°C
Operating Relative Humidity	80%, no condensation
Storage and Transport Relative Humidity	90%, no condensation

UL60601-1 CLASSIFICATION

Protection against electrical shock (5.1, 5.2) Class I, Transportable, Continuous Operation. No applied parts. Protection against ingress of liquids-Ordinary Equipment not suitable for use in the presence of flammable anaesthetic mixture with air or with oxygen or nitrous oxide.

All MOJAVE vacuum pumps comply with NFPA 99C level 3 requirements.

As shown by Figure 1, the **MOJAVE** Dry Vacuum System consists of the major components listed below.

Vacuum Pump Assemblies V3, V5 or V7.

- A single-stage pump, where all of the wetted metal parts are nickel plated or stainless steel.
- A metal electrical enclosure that houses a VFD, circuit breaker, Cooling Fan and an interface PCB.
- An aluminum heat exchanger to cool the exhaust air from the pump before it travels through the exhaust vent. (Heat exchanger not included with -NHE models).
- A metal chassis for mounting components.

10 Gallon Separation Tank Assembly MT10.

- A molded plastic tank that is capable of holding 10 gallons of liquid.
- An internal float switch that signals the Master Controller to turn the vacuum pump OFF if the liquid level exceeds the preset level.
- A washout port with internal nozzle that is used to rinse the interior of the tank during the automatic Washout Cycle.
- A metal chassis for mounting components.

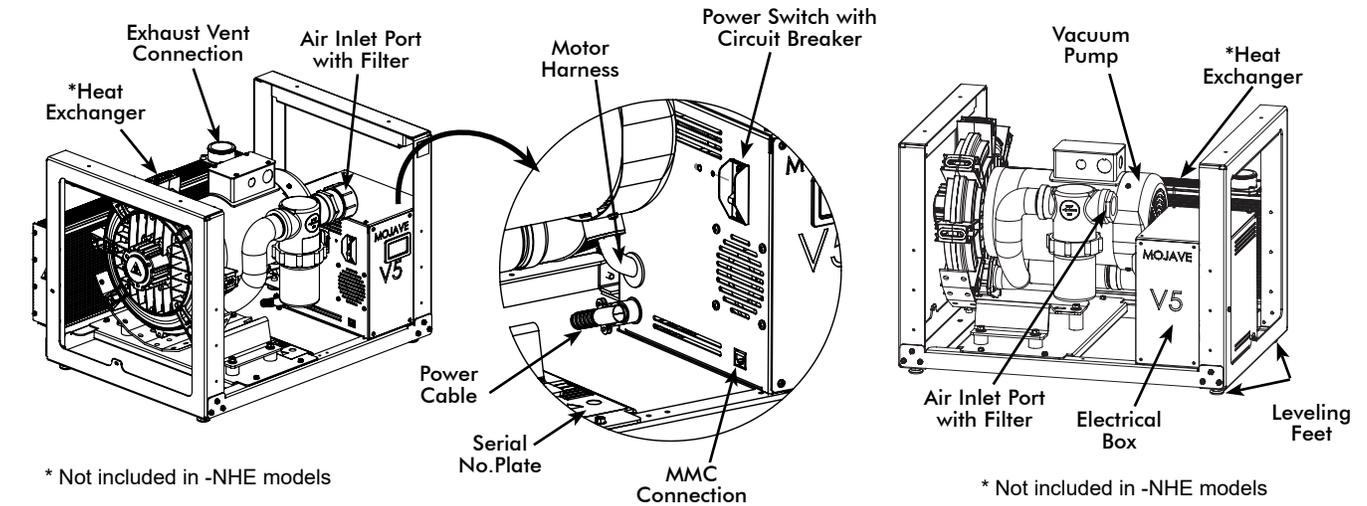
Continuum Separation Tank Assembly CT20.

- The continuum tank combines two molded plastic tanks connected via a check valve and two solenoid valves. This tank is capable of handling an infinite volume of liquid because one tank section drains as the other tank section fills, while maintaining a preset vacuum level.
- Each tank has an internal float switch that signals the Master Controller to toggle the state of the tank and air solenoid.
- Solenoids keep the liquid moving through the tanks by controlling the venting and pressurization of each tank.
- Each tank has a washout port with internal nozzle that is used to rinse the interior of the tank during the automatic Washout Cycle.
- A metal chassis for mounting components.

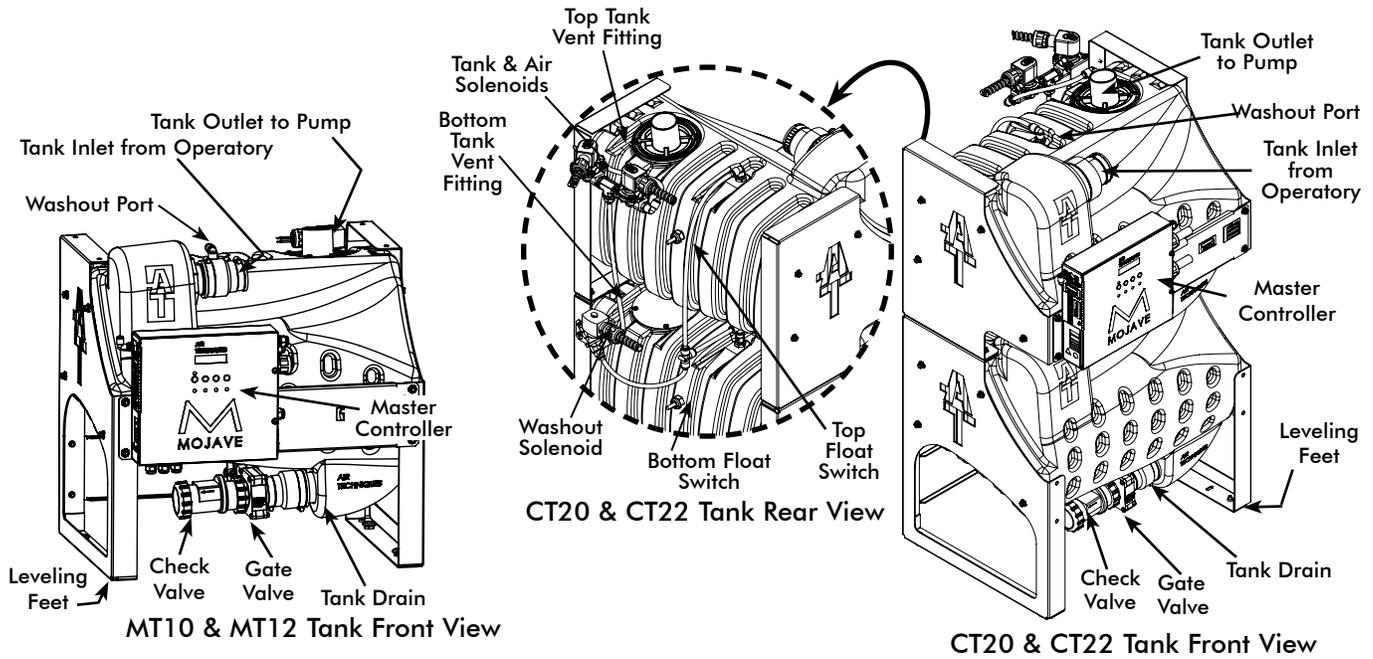
Master Controller. This self-contained metal enclosure is mounted on the front of the MT10 or CT20 tank chassis. The unit includes a Main PCB, Front Panel PCB and an LCD Display PCB and provides the following system functions:

- Provides the operational user interface for the **MOJAVE** system.
- Monitors and displays the frequency, vacuum level and temperature.
- Records the run time, in hours, of up to 4 connected pumps.
- Balances the vacuum load equally across all running pumps.
- Displays any error/fault codes.
- Controls the Washout function.

PRODUCT DESCRIPTION



V3, V5 and V7 Vacuum Pumps



Notes:

MT10 & CT20 used with 120V MMC

MT12 & CT22 used with 220V MMC

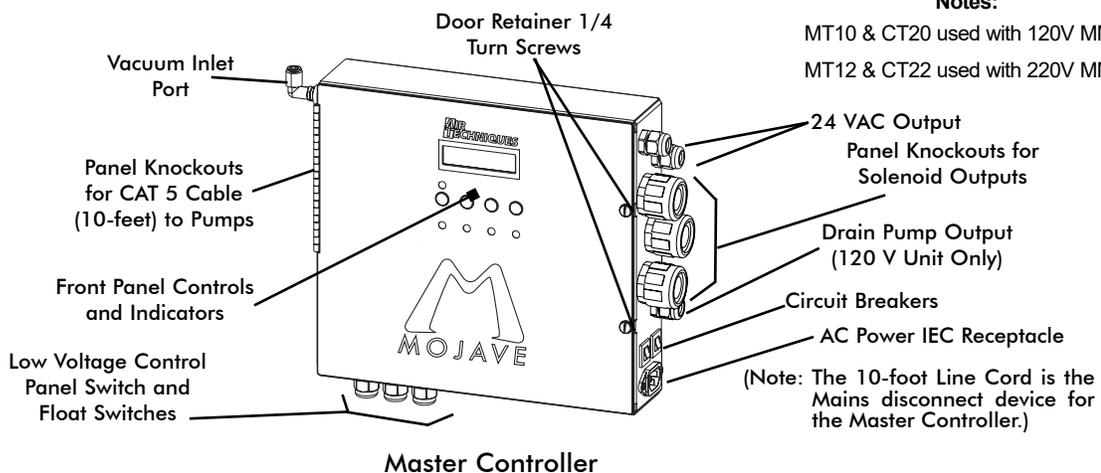


Figure 1. Main System Components



Any time the power to the MOJAVE is turned OFF the tanks will automatically drain.

Vacuum System Operation.

Air, water, and solids from the operatory are pulled into the separator tank. Air is expelled out through the pump exhaust while liquids and solids fall to the bottom of the tank. The vacuum in the tank keeps the check valve to the drain closed and the tank gradually fills.

In single tank (MT10) configurations, if the rising fluid level actuates the float switch, the Master Controller stops the operation of all connected pumps and an optional drain pump (sold separately) is turned on for one minute. With pump operation idle, the vacuum is no longer being maintained and the check valve of the tank drain opens allowing liquids and solids to drain from the separator tank. Once the tank drains, the Master Controller automatically restarts the primary pump.

Systems using the continuum tank (CT20), which is capable of handling infinite liquid volume capacities, operate differently. Each tank has an internal float switch. The tanks also use two 2-way solenoids. The float switches control the state of the two solenoids to allow the filling and draining of each tank, keeping the liquid moving through the tanks. When the top tank is filling, the bottom tank is draining and when a bottom tank is filling, the top tank is draining. The preset vacuum level is maintained in either state. If the top float switch is active, the Master Controller stops the operation of all connected pumps. Additionally, whenever the bottom tank float switch is activated, an optional drain pump (sold separately) is turned on for one minute. Once the tank drains, the Master Controller automatically restarts the primary pump.

When an instrument (suction tip) has been opened, the Master Controller senses an increase in vacuum demand and will instruct the VFD to speed up the motor.

Conversely, when an instrument (suction tip) has been closed, the Master Controller will instruct the VFD to slow motor operation down due to decreased vacuum demand. The Master Controller can also turn on and off up to 4 connected pumps to regulate the vacuum level.

Additionally, the Master Controller initiates a 2-minute tank washout cycle when the system has been in Standby for 5 minutes.

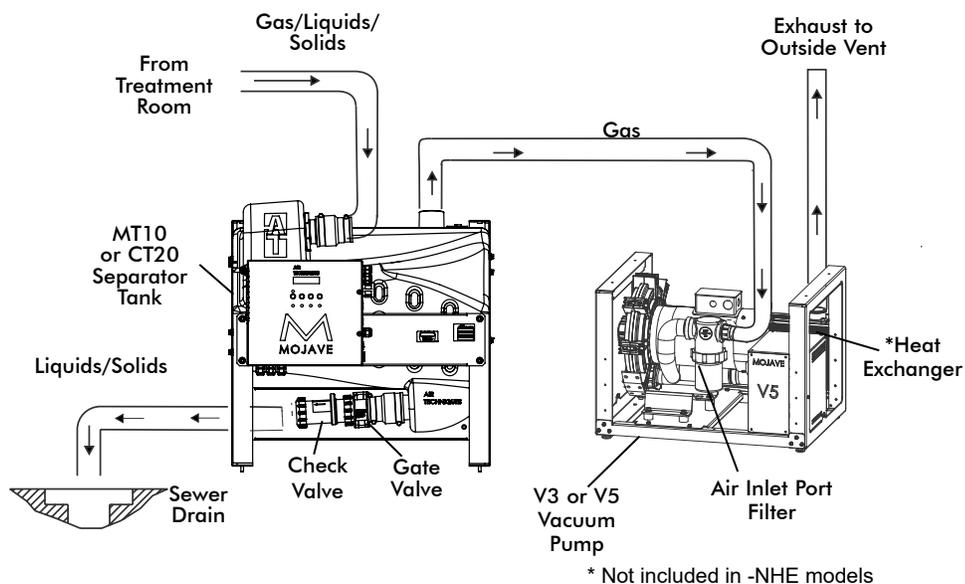


Figure 2. Typical MOJAVE Functional Flow Diagram

INSTALLATION INFORMATION



Grounding reliability can only be achieved when the Master Controller is connected to a HOSPITAL GRADE receptacle.

General. For new installations it is recommended to follow the following guidelines:

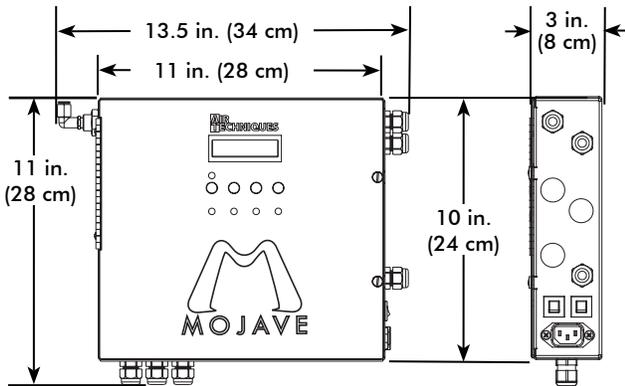
- Make sure to install the system in accordance with all local electrical and plumbing codes.
- Sizes of each suction line from the operatories differ between **MOJAVE** systems. See Site Requirements provided on page 12.
- The suction line should not have any sharp right angle bends and must be sloped a minimum of 1/4 inch for every 10 feet toward the separation tank.
- The drain on the base of the separation tank must be connected to a vented or an open floor drain capable of handling 10 gallons in 30 seconds. Drain pipe size 1 1/2 inch schedule 40.
- The drain line should be a short run with a minimum slope of 1/4 inch for every 10 feet toward the drain (avoid any sharp right angle bends).
- Vent line requirements differ among **MOJAVE** systems. See Site Requirements.
- Make sure to install the supplied exhaust vent assembly to the bottom end of the facility vent line.
- The vent should be sloped 1/4 inch per 10 feet towards the pump. Vent lines must be capable of handling vapors and liquids.
- The outside vent must be protected from rain and animals.
- A flexible air exhaust hose is provided to connect to the 2 inch diameter vent pipe and heat exchanger. Hose clamps are provided to secure hose to heat exchanger and pipe.
- Wash-out water supplied via 1/2 inch copper tubing terminated with a 1/2 inch FNPT shut-off valve providing water pressure between 20 and 100 psi.
- Wash-out port on the tank top is a 3/8 inch push to connect elbow that connects to the water supply via supplied 10 foot 3/8 inch Poly tubing and 1/2 MNPT x 3/8 inch push to connect adapter.
- As shown by Figure 1, the Master Controller is delivered mounted on the front chassis of the fully assembled MT10 or CT20 tank associated with the system. In addition to the water connection at the washout solenoid, electrical and vacuum connections must also be made.
- Accessory packs and system installation kits shipped with associated **MOJAVE** systems are listed below. Refer to the Installation Section for a listing of components supplied with each kit and the instructions necessary to install specific **MOJAVE** systems.

MOJAVE Accessory Packs and System Installation Kits

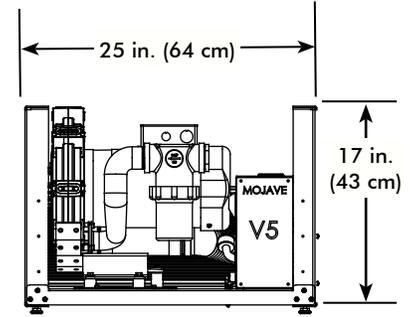
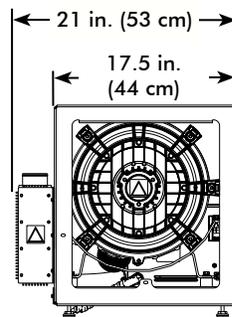
Part No.	Description	Included With
H5210	MT10 120V Tank Accessory Pack	Ships with every 120V MT10 tank
H5479	MT12 220V Tank Accessory Pack	Ships with every 220V MT12 tank
H5170	MOJAVE V3, V5 and V7 Pump Accessory Pack	Ships with every V3 Pump, V5 Pump and V7 Pump
H5307	MOJAVE V3, V5, V7 without Heat Exchanger Pump Accessory Pack*	Ships with every V3N Pump, V5N Pump and V7N Pump
MIK2	MOJAVE Dual System Installation Kit	Ships with every 2V3, 2V5, 2V7 2V3CT and 2V5CT System
MIK4	MOJAVE Triple and Quad System Installation Kit	Ships with every 3V5 and 4V5 System
H5243	CT20 120V Tank Accessory Pack	Ships with every 120V CT20 tank
H5289	CT22 220V Tank Accessory Pack	Ships with every 220V CT22 tank

Physical Characteristics

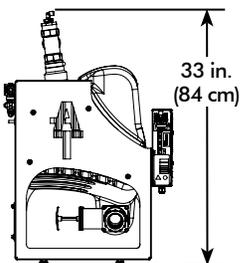
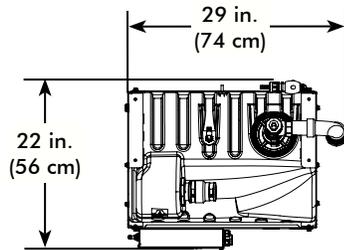
	Master Controller	Tank		One V3, V5 or V7 Pump	Two V3, V5 or V7 Pumps Stacked	Three V5 Pumps Stacked
		MT10 10 Gallon	CT20 Continuum			
Width	13.5 in. (34 cm)	29 in. (74 cm)	25 in. (64 cm)	25 in. (64 cm)	25 in. (64 cm)	25 in. (64 cm)
Depth	3 in. (8 cm)	22 in. (56 cm)	23 in. (58 cm)	21 in. (53 cm)	21 in. (53 cm)	21 in. (53 cm)
Height	11 in. (28 cm)	33 in. (84 cm)	50 in. (127 cm)	17 in. (43 cm)	34 in. (86 cm)	51 in. (130 cm)
Weight	13 Lbs. (6 kg)	75 Lbs. (34 kg)	150 Lbs. (68 kg)	145 Lbs (66 kg)	290 Lbs (132 kg)	435 Lbs (197 kg)



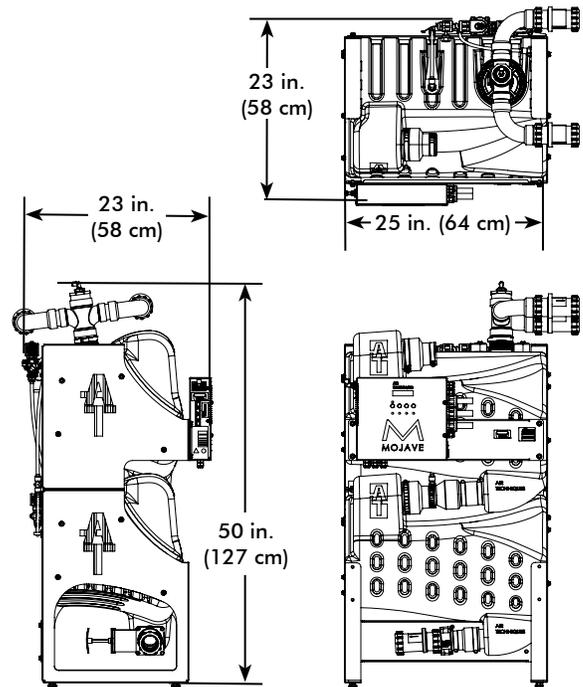
Master Controller Dimensions



V3, V5 and V7 Vacuum Pump Dimensions



MT10 10 Gallon Tank Dimensions



CT20 Continuum Tank Dimensions

Figure 3. MOJAVE System Component Dimensions

INSTALLATION INFORMATION

Site Requirements

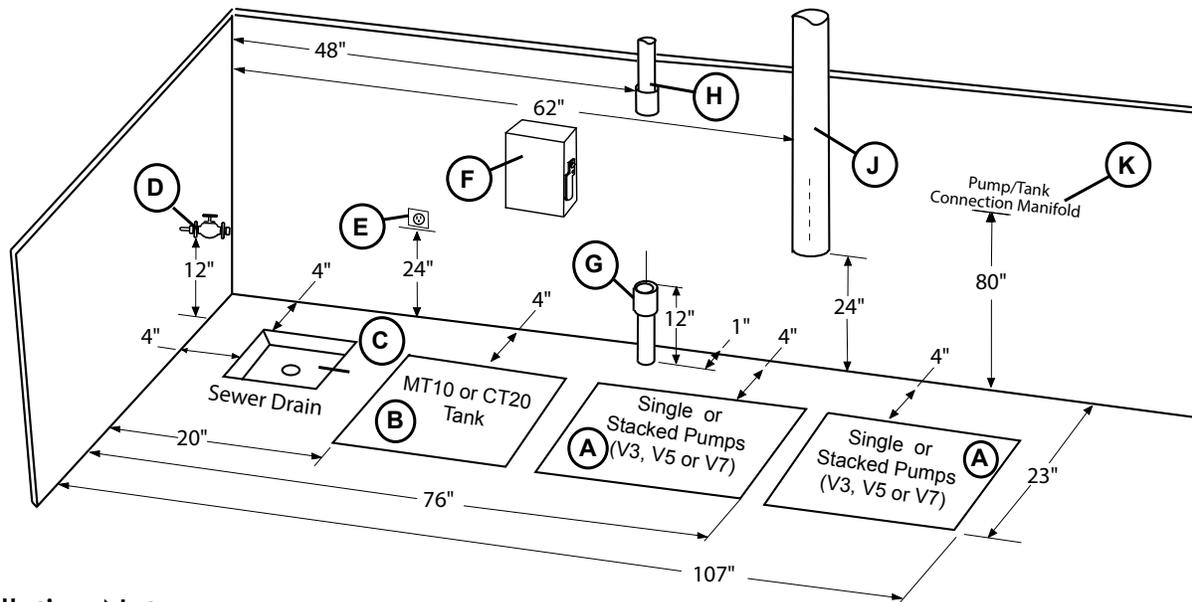
Electrical	V3 & V5	V7	2V3 & 2V3CT	2V5 & 2V5CT	2V7	3V5	4V5	Master Controller
Voltage Rating Volts AC	All pumps 220 Volts Single Phase AC, 60 Hz							120 or 220
Voltage Minimum/Maximum	198/242 Volts AC All pumps							108/132 Volts AC or 198/242 Volts AC
Wire Size AWG Minimum Gauge	#12 AWG (Qty 1)	#10 AWG (Qty 1)	#12 AWG (Qty 2)	#12 AWG (Qty 2)	#10 AWG (Qty 2)	#12 AWG (Qty 3)	#12 AWG (Qty 4)	#14 AWG
Minimum Panel Breaker Rating	20A	30A	20A (Qty 2)	20A (Qty 2)	30A (Qty 2)	20A (Qty 3)	20A (Qty 4)	15A
Incoming Power	Hard wire Connection (Each pump is supplied a 6 foot BX cable)							NEMA 5-15R for 120V NEMA 6-15R for 220V (Supplied 10-ft. line cord)
Remote (Low Voltage Wiring)	#18 AWG (Qty 4) Wire Connection between the MMC and the Remote Switch Panel . (See Figure 14, page 26.)							
Optional Buck Boost Transformer	67002	67000-1	2X 67002 or 1X 67000-1	2X 67000-1	3X 67002	4X 67002	67002 or 67005	

Plumbing	V3	V5	V7	2V3 & 2V3CT	2V5 & 2V5CT	2V7	3V5	4V5
Exhaust Vent Pipe Using Heat Exchanger	2" PVC Sch. 40	2" PVC Sch. 40	2" PVC Sch. 40	One 3" or two 2" PVC Sch. 40	One 3" or two 2" PVC Sch. 40	One 3" or two 2" PVC Sch. 40	One 4" or three 2" PVC Sch. 40	Two 3" or four 2" PVC Sch. 40
Exhaust Vent Pipe Not Using Heat Exchanger (See note 1)	2" Metal Pipe	2" Metal Pipe	2" Metal Pipe	One 3" or two 2" Metal Pipe	One 3" or two 2" Metal Pipe	One 3" or two 2" Metal Pipe	One 4" or three 2" Metal Pipe	Two 3" or four 2" Metal Pipe
Minimum Suction Line Pipe	1" PVC Sch. 40	1 1/2" PVC Sch. 40	2" PVC Sch. 40	1 1/2" PVC Sch. 40	2" PVC Sch. 40	3" PVC Sch. 40	3" PVC Sch. 40	3" PVC Sch. 40
Maximum Suction Line Pipe (See note 2)	1 1/2" PVC Sch. 40	2" PVC Sch. 40	2 1/2" PVC Sch. 40	2" PVC Sch. 40	2 1/2" PVC Sch. 40	4" PVC Sch. 40	4" PVC Sch. 40	4" PVC Sch. 40
Riser Pipe	1/2" PVC Sch. 40	1/2" PVC Sch. 40	1/2" PVC Sch. 40	1/2" PVC Sch. 40	1/2" PVC Sch. 40	1/2" PVC Sch. 40	1/2" PVC Sch. 40	1/2" PVC Sch. 40
Vacuum Line Termination	1 1/2" FNPT	1 1/2" FNPT	2" FNPT	2" FNPT	2" FNPT	2" FNPT	2" FNPT	2" FNPT
Branch Line Pipe	Size requirement of Branch piping differs by the number of operatories being serviced. Up to three operatories use 1" PVC Schedule 40. Three to six operatories use 1 1/2" PVC Schedule 40. More that six operatories use 2" PVC Schedule 40							
Drain Line Pipe	1 1/2" PVC Schedule 40							
Wash-Out Water Line	1/2" FNPT Shut-off Valve							

NOTES

1. Recommended pipe used with models without a heat exchanger includes wrought iron pipe (black & galvanized) or copper pipe type M. Insulate metal pipe in utility room to avoid adding heat to the room. Insulation must be rated for a minimum of 300°F continuously.
2. Use maximum internal diameter for the main line when preparing any new installation.

Installation Layout Space. Figure 4 shows the requirements for the installation of the various **MOJAVE** model configurations. Please note that all units are shipped with leveling feet set to lowest position. Heights can be increased by 1 inch by adjusting the leveling feet. Refer to Figure 5 for the recommended configuration arrangements.



Installation Notes.

- A. PUMP INSTALLATION SPACE** - Area for stacked V3, V5 or V7 pumps in typical side by side installations. Only stack up to 2 pumps in one area.
- B. TANK INSTALLATION SPACE** - Area for MT10 or CT20 tank in typical side by side installations. Never install the CT20 tank on top of a pump.
- C. SEWER DRAIN** - Provide a drain for the removal of waste liquids from the **MOJAVE** tank. Use an open drain pipe (1 1/2 inch P-Trap with 1 inch air gap or floor sink) or a closed vented drain. See Figure 8, sheet 2.
- D. TANK WASHOUT** - Provide a water source terminated with a 1/2 inch FNPT shut-off valve providing water pressure between 20 and 100 psi for daily tank washout. Valve location must be no more than 10 feet from the tank installation to allow connection of supplied 10-foot 3/8-inch Poly tubing to the tank washout port. Provisions for backflow prevention may be required. Check local code requirements.
- E. MASTER CONTROLLER ELECTRIC OUTLET** - Master Controller requires a dedicated standalone 120 or 220V, hospital grade grounded receptacle. The supplied 10-foot line cord is the Mains disconnect device for the unit.
- F. PUMP ELECTRIC SERVICE** - Each **MOJAVE** pump is wired directly with a dedicated 220V, 20 AMP, (or 30 AMP for the V7) single phase 50/60 Hz circuit. If Main Circuit panel is not located in equipment room, a disconnect box with approved ground is needed for each pump. Disconnect boxes should be mounted no more than 3 feet of each other and 3 feet of installation center line.
- G. SUB FLOOR INSTALLATION VACUUM LINE** - See Plumbing Requirements for connection to tank inlet via supplied hose.
- H. OVERHEAD INSTALLATION VACUUM LINE** - See Plumbing Requirements for connection to tank inlet via supplied hose.
- J. HEAT EXHAUST** - See Plumbing Requirements for the exhaust vent line required for specific **MOJAVE** configurations. Use metal pipe on systems whenever the Heat Exchanger is removed. Schedule 40 pipe can normally be used on typical **MOJAVE** configuration installations with a Heat Exchanger. When installing two pumps, a reducing Y adapter (See Figure 10.) is needed to connect both vent tubes to a common 3-inch exhaust vent line.
- K. PUMP/TANK MANIFOLD** - User fabricated to connect 3 or 4 pumps to a tank. Used with 3V5 and 4V5 systems. See Figures 11, 12 and 13.

Figure 4. V3, V5, V7, 2V3, 2V3CT, 2V5, 2V5CT, 2V7, 3V5 and 4V5 System Floor Plan

MOJAVE SYSTEM CONFIGURATIONS

Important: Side by side installation of pump and tank is preferred.
 Stack a MT10 tank on top of one V3, V5 or V7 pump only if space is a problem.
 V3, V5 or V7 pumps should only be stacked two high in all other system configurations as shown.
 All units are shipped with leveling feet set to lowest position.

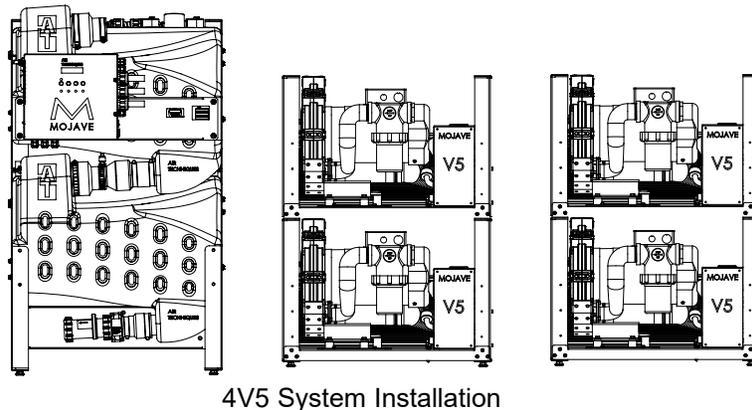
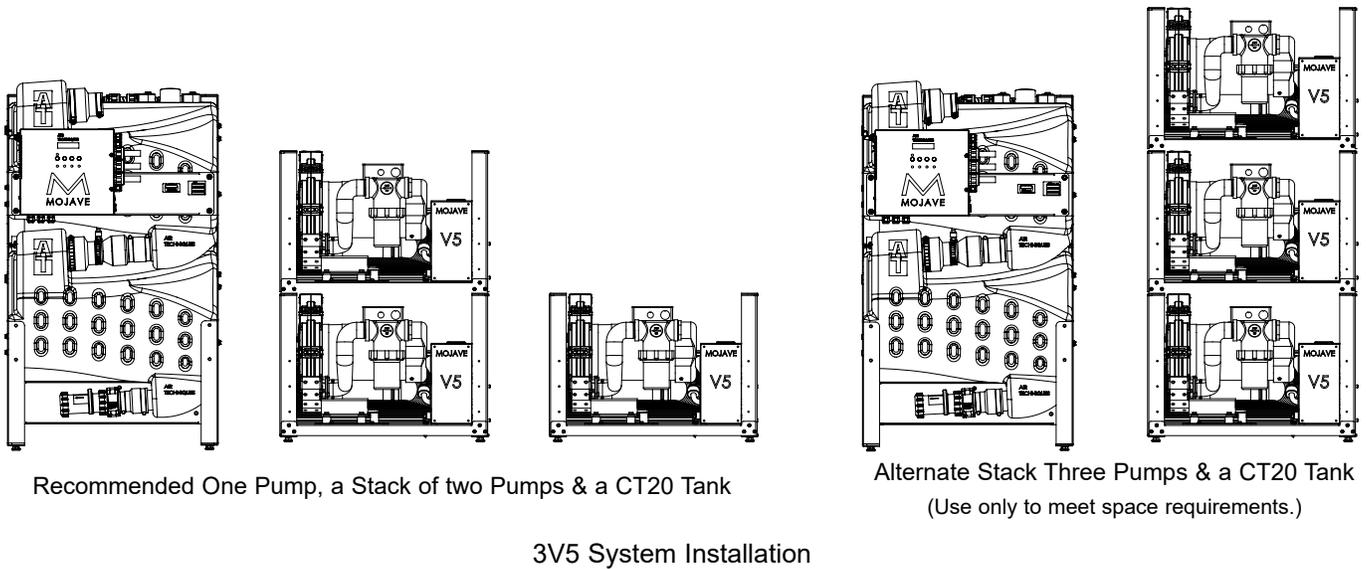
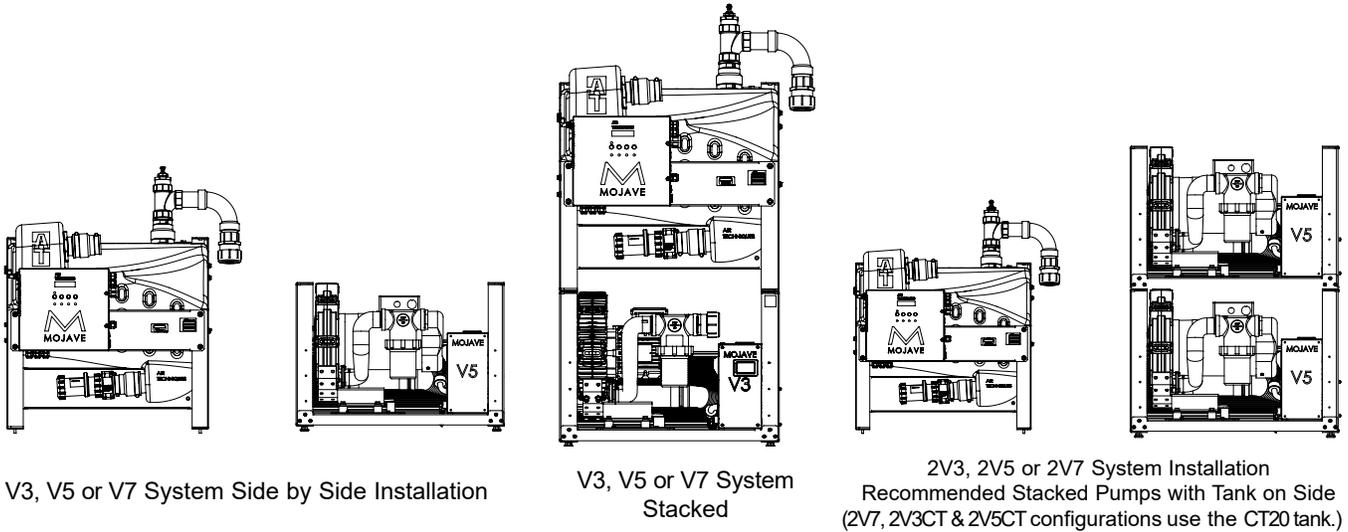


Figure 5. MOJAVE System Configuration Layouts

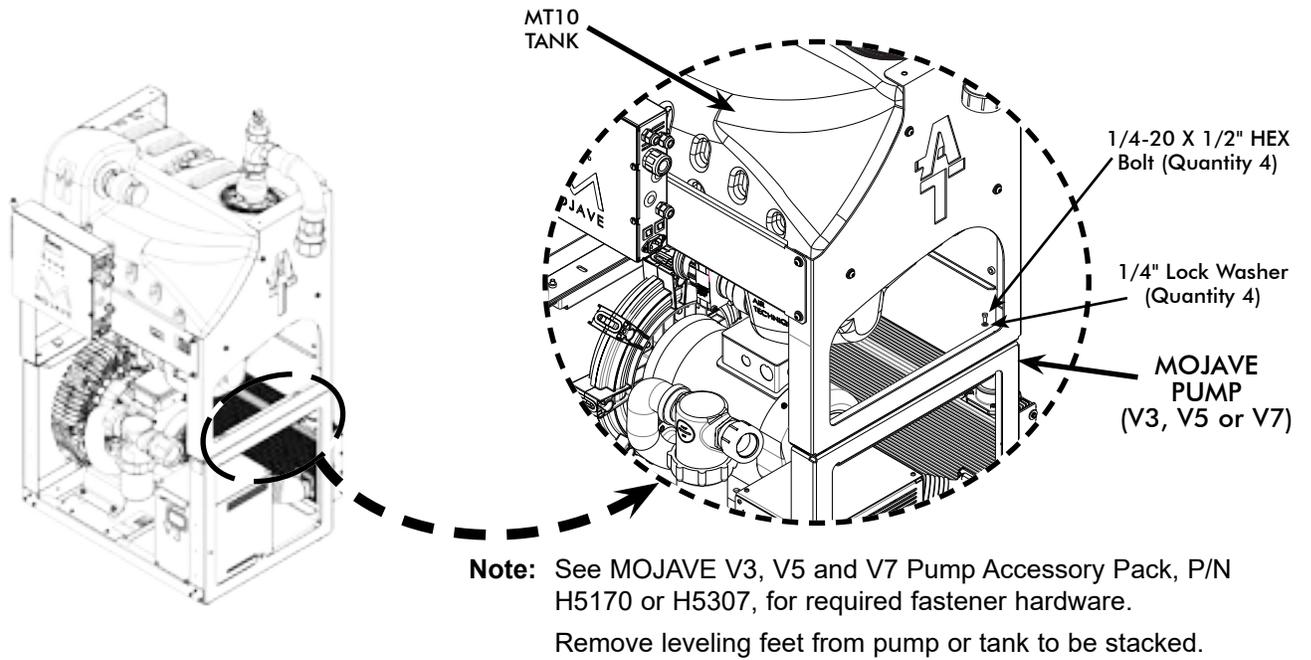


Figure 6. Stacking the MT10 Tank on Top of a MOJAVE Pump Hardware Detail

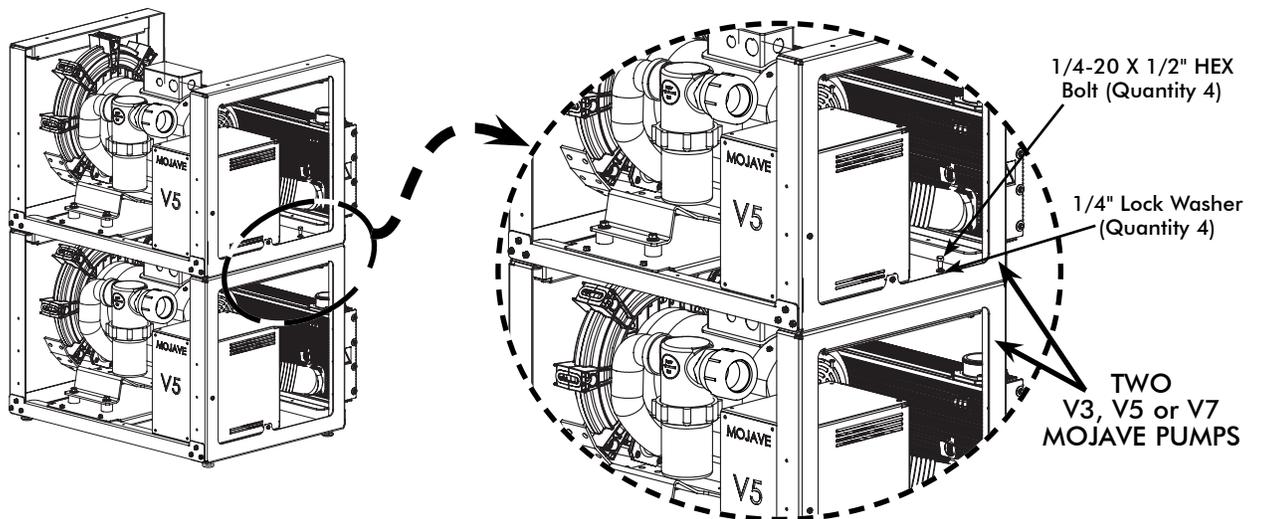


Figure 7. Stacking Two MOJAVE Pumps Hardware Detail

INSTALLATION

V3, V5 and V7 System Installation.

Note: Each kit provides the required hoses, clamps and adapters.
No schedule 40 PVC pipe is included.

Installation Accessory Packs. Figure 9, sheets 1 and 2, shows the hose connections required for all V3, V5 and V7 **MOJAVE** System configuration installations using accessory packs that provide the required hoses, clamps and adapters as follows:

- ❑ **MOJAVE V3, V5 and V7 Pump Accessory Pack, P/N H5170 or H5307** - supplied with each pump and is used as follows.
 - Secure the MT10 Tank on top of the associated **MOJAVE** pump as shown by Figure 6.
 - Connect the pump exhaust to the facility vent line, connection item (4) on Figure 9, sheet 2.
- ❑ **MT10 Tank Accessory Pack, P/N H5210 or H5479** - used to make the following connections:
 - Between the suction line and tank inlet. Item (1) on Figure 9, sheet 1.
 - Between the tank air outlet and pump inlet. Item (2) on Figure 9, sheet 1.
 - Install exhaust vent assembly to the facility vent line, connection item (3) on Figure 9, sheet 2.
 - The tank outlet drain to the facility sewer drain. Item (5) on Figure 9, sheet 2.
 - Washout port to the washout solenoid or water shutoff valve. Item (6) on Figure 9, sheet 2.

Accessory Pack Supplied Components. The supplied components of accessory packs (P/Ns H5170 or H5307 and H5210 or H5479) are listed below. Verify that all listed items were received. If any item is missing, notify your dealer.

V3, V5 and V7 Pump Accessory Pack, P/N H5170

Part No.	Description	Qty
56057	Vent Hose, 2-1/4" ID X 17" Long 1" W Cuff	1
89324	Hose Clamp 1-9/16"- 2-1/2" Maximum	2
419342	10 Foot CAT5e Network Cable	1

Part No.	Description	Qty
30914	Bolt 1/4-20 X 1/2, HEX Head,18-8	4
30958	1/4" Flat Washer	4
30920	1/4" Split Lock Washer	4

V3-NHE, V5-NHE and V7-NHE Pump Accessory Pack, P/N H5307

Part No.	Description	Qty
54184	Vent Hose, 2-1/4" ID X 36" Long 1" W Cuff	1
89324	Hose Clamp 1-9/16"- 2-1/2" Maximum	2
419342	10 Foot CAT5e Network Cable	1

Part No.	Description	Qty
30914	Bolt 1/4-20 X 1/2, HEX Head,18-8	4
30958	1/4" Flat Washer	4
30920	1/4" Split Lock Washer	4

MT10 120 V Tank Accessory Pack, P/N H5210 or MT12 220 V Tank Accessory Pack, P/N H5479

Part No.	Description	Qty
54521	1 1/2" ID, Clear Hose with Blue Helix 15 Feet	1
H5206	Tank Outlet Assembly; Single Pump	1
51453	Urethane Tubing, 1/4 OD 15 Feet	1
19271	Poly Tubing, 3/8" OD 10 Feet	1
57238	1 1/2" Flexible Coupling Connector	1
77243 (See Note)	Mojave Master Controller Line Cord 10 Feet, 18 GA., IEC X North America, Hospital Grade, 120V	1
117527 (See Note)	Mojave Master Controller Line Cord 10 Feet, 14 GA., IEC X North America, Hospital Grade, 220V	1

Part No.	Description	Qty
30936	Plastic Screw Anchor, #10-12 X 1"	4
30295	#10 X 3/4, Type A, Plated Slot Pan Head Screw	4
56194	Connector Adapter, 1/2 MNPT X 3/8 PUSH	1
H5302	Exhaust Vent Assembly	1
54509	PVC Tubing; 10mm x 6.5mm, 10 feet	1
53202-1	Switch Assembly; Push Button, Panel Mount, GRN/YEL, 6V LED	1
H5153	Users Manual for V3, V5, V7, 2V3, 2V3CT, 2V5, 2V5CT, 2V7, 3V5 and 4V5	1

Note:

The MT10 120V tank requires a 120-Volt line cord, PN 77243, provided by accessory pack, PN H5210.

The MT12 220V tank requires a 220-Volt line cord, PN 117527 provided by accessory pack, PN H5479.

Installation Setup. Installation of a V3, V5 and V7 **MOJAVE** system configuration consists of placing the equipment in the proper installation space and making connections between a MT10 tank and a V3, V5 or V7 pump. Use standard industry guidelines for working with electrical circuits, plumbing and on electronic equipment as necessary.

1. Refer to Figures 4 and 5 and determine the installation footprint dimensions and connection requirements. Place the tank and pump in position as shown by Figure 4.
2. If installing side-by-side configuration, proceed to step 4. If stacking, perform step 3.
3. When stacking the MT10 tank on top of a pump, refer to Figure 6 and secure the tank to pump using hardware supplied by the Pump Accessory Pack, P/N H5170 or H5307.

Note: If more of the 1 ½" ID, Clear Hose hose is needed, order P/N 54521 by the foot.

4. Measure and record distance between each connection point. Cut the supplied hose to the length required for each connection.

Master Controller and Washout Solenoid Installation Options. The Master Controller is delivered installed on the front of the tank (MT10 or CT20) chassis associated with the **MOJAVE** system being installed. The water connections for the washout solenoid must be made. The Washout Solenoid is delivered wired to the Master Controller with 3/8 inch poly tubing cut to length for mounting on the rear of either the MT10 tank or the bottom CT20 tank using two Washer Head Screws, P/N 30711 (already installed on the tank).

Although not recommended, both the controller and solenoid can be installed on the equipment room wall. The solenoid should be located between the facility water supply and the Master Controller. Securing hardware consisting of Plastic Screw Anchors, P/N 30936 and Plated Slot Pan Head Screws, P/N 30295 are provided by the accessory pack for the associated tank configuration listed below.

Part No.	Description	Part No.	Description
H5210	MT10 120V Tank Accessory Pack	H5243	CT20 120V Tank Accessory Pack
H5479	MT12 220V Tank Accessory Pack	H5289	CT22 220V Tank Accessory Pack

Note: Recommended installation is to mount the solenoid on the rear of the associated MT10 or CT20 tank and keep the master controller mounted on the front of the tank.

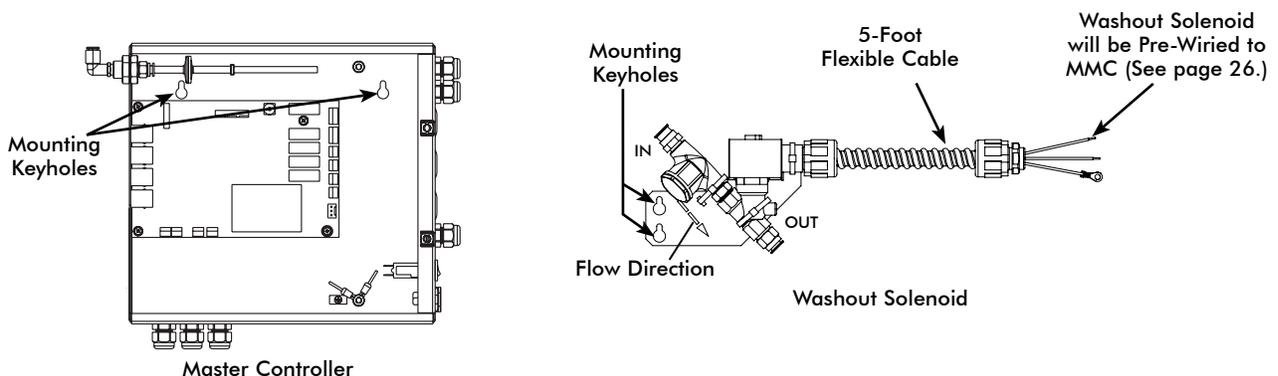


Figure 8. MOJAVE Master Controller and Washout Solenoid Optional Mounting

INSTALLATION

V3, V5 and V7 Connection Procedure. Using industry standard techniques, make the connections between the tank and pump with supplied components of accessory packs (P/Ns H5170 & H5210 or H5479). Refer to Figure 9, sheets 1 and 2 for the connection diagram and perform the following procedure.

1. **Suction Line to Tank Inlet Connection.** Refer to Figure 9, item (1) .
 - a. Install one 1½" flexible coupling connector (P/N 57238) to the pipe from the operator.
 - b. Install the 1½" ID, clear hose (P/N 54521) cut for installation between the operator suction line and tank inlet and secure with two hose clamps on each flexible coupling.

Note: If more of the 1/4 inch OD Urethane Tubing is needed, order P/N 51453 by the foot.
2. **Tank Air Outlet to Pump Inlet Connection.** Refer to Figure 9, item (2) .
 - a. Install the Single Pump Tank Outlet Assembly (P/N H5206) onto the tank outlet port and secure with the hose clamp on the base of the single pump tank outlet assembly. The outlet assembly is provided with MT10 or MT12 Tank Accessory Pack (P/N H5210 or H5479).
 - b. Connect 1½" ID, clear hose (P/N 54521) cut for installation between the compression connector of the Single Pump Tank Outlet Assembly and pump air inlet filter. Secure by tightening compression nut.
 - c. Install a length of 1/4 inch OD Urethane Tubing (P/N 51453) between the vacuum sample port and the vacuum inlet port of the Master Controller. See Figure 9, item (2a.)

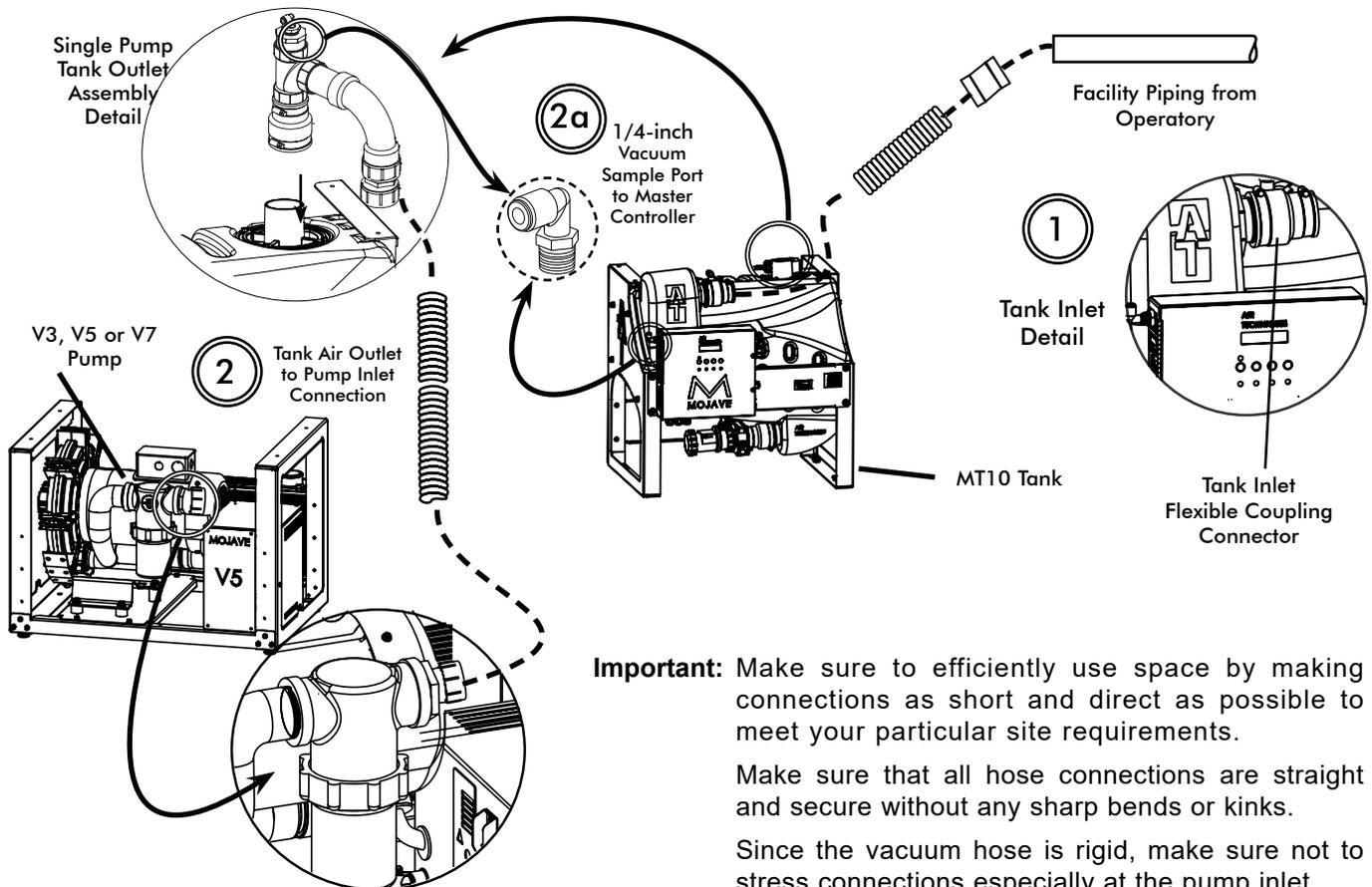


Figure 9. MOJAVE V3/V5/V7 Pump and MT10 Tank Connection Diagram, Sheet 1

3. **Exhaust Vent Assembly Installation.** Install the Exhaust Vent Assembly (P/N H5302) to the bottom end of the facility vent line. Install a length of 1/4 inch OD Urethane Tubing (P/N 51453) between the vent condensation drain port and facility sewer drain. See Figure 9, item (3).
4. **Heat Exhaust Vent Connection.** Refer to Figure 9, item (4) and connect the vent hose (P/N 56057) between the pump heat exchanger and the facility vent line. Secure with two hose clamps (P/N 89324). On systems without heat exchangers (-NHE models), the vent hose is connected directly to the pump exhaust.
5. **Tank Drain to Facility Sewer Connection.** Connect the last section of 1 1/2" ID, clear hose cut for installation to the tank outlet drain. Secure by tightening each check valve compression nut. Connect unconnected hose end to the facility sewer drain as necessary. See Figure 9, item (5).
6. **Tank Washout Port to Facility Water Connection.** Refer to Figure 9, item (6) and install a length of 3/8 inch tubing (P/N 19271) between the washout port and the water solenoid then to water shutoff valve. The tubing is provided with MT10 or MT12 Tank Accessory Pack, P/N H5210 or H5479.
7. **System Electrical Connections.** Refer to the Electrical Connections section and connect the pump and Master Controller to facility power.

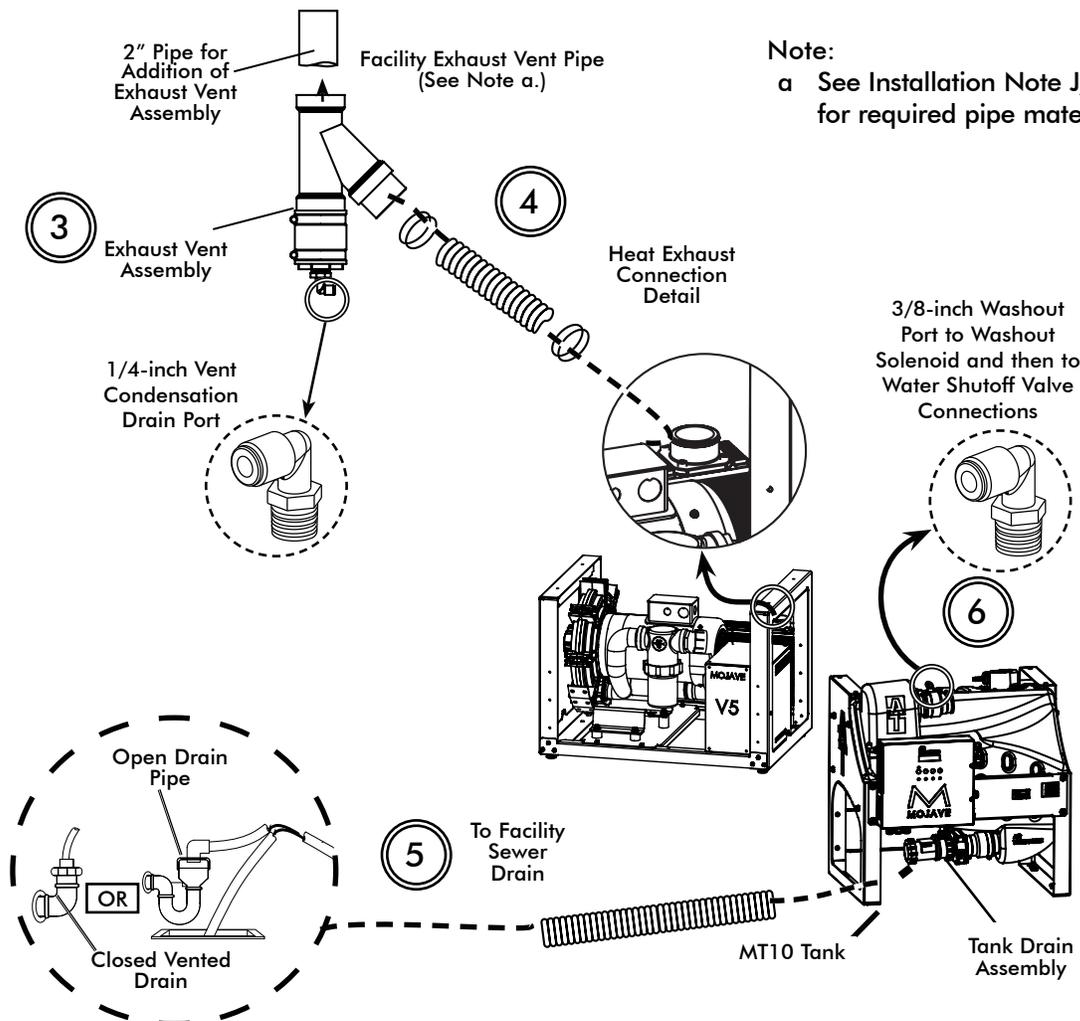


Figure 9. MOJAVE V3/V5/V7 Pump and MT10 Tank Connection Diagram, Sheet 2

INSTALLATION

2V3, 2V3CT, 2V5, 2V5CT and 2V7 System Installations.

Note: Each kit provides the required hoses, clamps and adapters. No schedule 40 PVC pipe is included.

Installation Accessory Packs. Figure 10 shows the hose connections required for all dual **MOJAVE** system configuration installations using accessory packs that provide the required hoses, clamps and adapters as follows:

- ❑ **MOJAVE V3, V5 and V7 Pump Accessory Pack, P/N H5170 or H5307** - supplied with each pump and is used as follows.
 - Stack the associated **MOJAVE** pumps as shown by Figure 7.
 - Connect each pump to the facility vent line, connection item (4) on Figure 10, sheet 2.
- ❑ **MT10 Tank Accessory Pack, P/N H5210 or H5479** - used to make the following connections:
 - Between the suction line and tank inlet. Item (1) on Figure 10, sheet 1.
 - Install the Exhaust Vent Assembly to the facility vent line, connection item (3) on Figure 10, sheet 2.
 - The tank outlet drain to the facility sewer drain. Item (5) on Figure 10, sheet 2.
 - The washout port to the washout solenoid or water shutoff valve. Item (6) on Figure 10, sheet 2.
- ❑ **MOJAVE Dual System Installation Kit, MIK2** - used to make the following connections:
Between the tank air outlet and each pump inlet. Item (2) on Figure 10, sheet 1.

Supplied Components. The supplied components of the Dual System Installation Kit (P/N MIK2) are listed below. The supplied components of accessory packs(P/Ns H5170 or H5307 & H5210 or H5479) are provided on page 16. Verify that all listed items were received. If any item is missing, notify your dealer.

MOJAVE Dual System Installation Kit, MIK2

Part No.	Description	Qty
H5176	Tank Outlet Assembly; Dual Pump Installation	1
54521	1 ½" ID, Clear Hose with Blue Helix 6 FT	1
54512	2" ID, Clear Hose with Blue Helix 4 FT	1
54138	Check Valve Modified	2
H5234	2" Flexible Coupling Connector	2
54224	1 ½" Conduit Clamp	2

Installation Setup. Installation of a dual pump **MOJAVE** system configurations consist of placing the equipment in the proper installation space and making connections between a tank and pump. Use standard industry guidelines for working with electrical circuits, plumbing and on electronic equipment as necessary.

1. Refer to Figures 4 and 5 and determine the installation footprint dimensions and connection requirements. Place the tank and pumps in position as shown by Figure 4.
2. If installing side-by-side configuration, proceed to step 4. If stacking, perform step 3.
3. When stacking pumps, refer to Figure 6 and secure the pumps using hardware supplied by the Pump Accessory Pack, P/N H5170 or H5307.

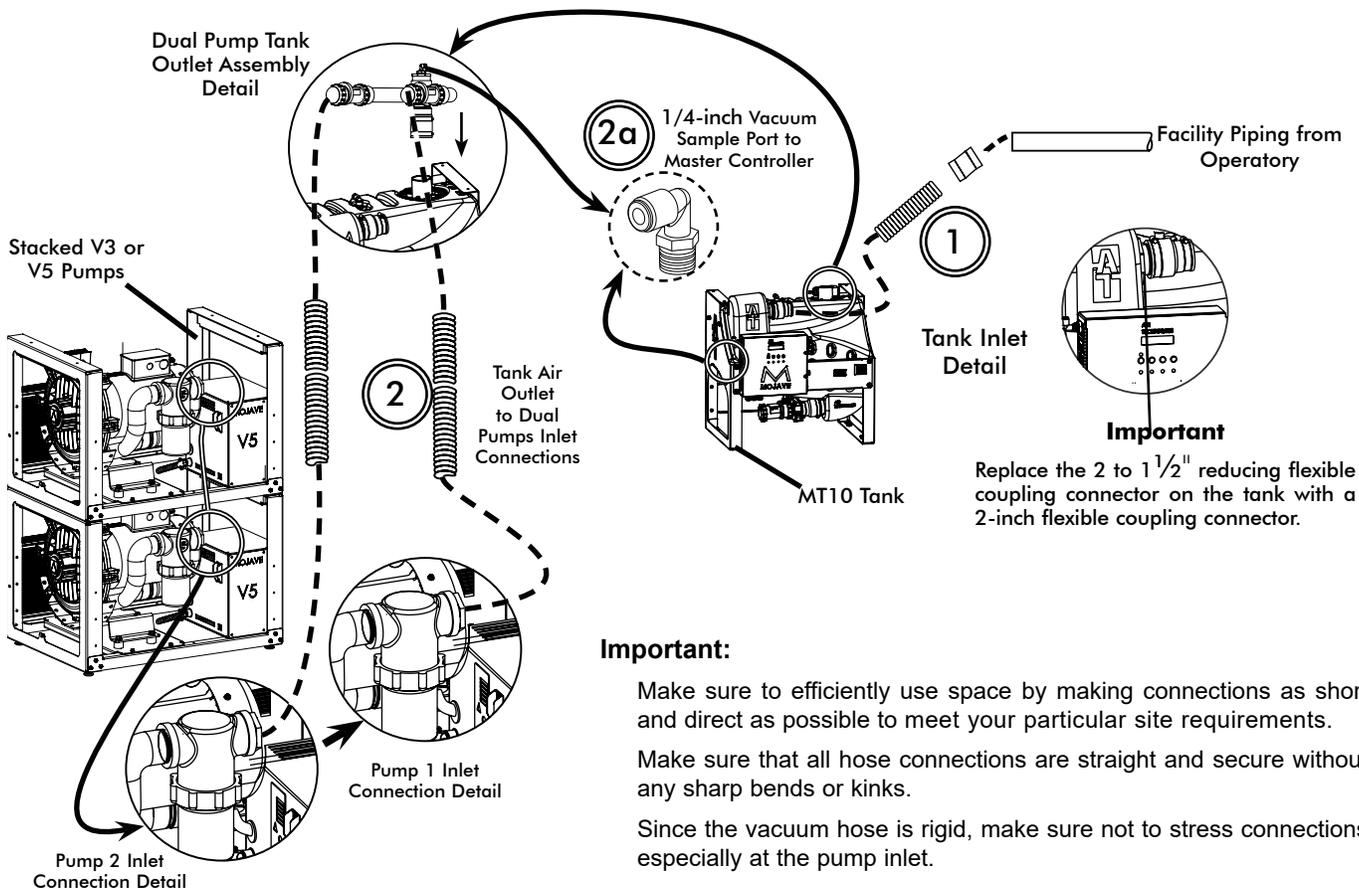
Note: If more of the 1 ½" ID, Clear Hose hose is needed, order P/N 54521 by the foot.

4. Measure and record distance between each connection point. Cut the supplied hose to the length required for each connection.

2V3, 2V3CT, 2V5, 2V5CT and 2V7 Connection Procedure. Using industry standard techniques, make the connections between the tank and pumps with supplied components of accessory packs (P/Ns H5170 or H5307 & H5210) and Dual System Installation Kit (P/N MIK2). Refer to Figure 10, sheets 1 and 2, for the connection diagram and perform the following procedure.

1. **Suction Line to Tank Inlet Connection.** Refer to Figure 10, item (1) .
 - a. Install 2" flexible coupling connector (P/N H5234), provided with Dual System Installation Kit (P/N MIK2), to the pipe from the operator.
 - b. Replace the reducing flexible coupling connector on the tank with 2" flexible coupling connector (P/N H5234) provided in the Dual System Installation Kit.
 - c. Install the 2" ID, clear hose (P/N 54512) between the operator suction line and tank inlet and secure by tightening band clamp on the 2" flexible couplings.
2. **Tank Air Outlet to Pump Inlets Connection.** Refer to Figure 10, item (2) .
 - a. Install the Dual Pump Tank Outlet Assembly (P/N H5176) onto the tank outlet port and secure with hose clamp at the base of the assembly. The outlet assembly is provided with Dual System Installation Kit (P/N MIK2).
 - b. Connect 1½" ID, clear hose (P/N 54521) cut for installation between the check valves of the Dual Pump Tank Outlet Assembly and the air inlet filter of each pump. Secure by tightening the compression nut.
 - c. Install a length of 1/4 inch OD Urethane Tubing (P/N 51453) between the vacuum sample port and the vacuum inlet port of the Master Controller. See Figure 10, item (2a.)

Note: If more than 15 feet of the 1/4 inch OD Urethane Tubing is needed, order P/N 51453 for additional 15 foot lengths.



INSTALLATION

3. **Exhaust Vent Assembly Installation.** Install the Exhaust Vent Assembly (P/N H5302) to the bottom end of the facility vent line. Install a length of 1/4 inch OD Urethane Tubing (P/N 51453) between the vent condensation drain port and facility sewer drain. See Figure 10, sheet 2, item (3).
4. **Heat Exhaust Vent Connection.** Refer to Figure 10, sheet 2, item (4) and connect the vent hose (P/N 56057) between the pump heat exchanger and the facility vent line. Secure with two hose clamps (P/N 89324). On systems without heat exchangers (-NHE models), the vent hose is connected directly to the pump exhaust.
5. **Tank Drain to Facility Sewer Connection.** Connect the last section of 1 1/2" ID, clear hose cut for installation to the adapter. Secure by tightening the check valve compression nut. Connect unconnected hose end to the facility sewer drain as necessary. See Figure 9, item (5).
6. **Tank Washout Port to Facility Water Connection.** Refer to Figure 9, item (6) and install a length of 3/8 inch tubing (P/N 19271) between the washout port and the washout solenoid, then to water shutoff valve. The tubing is provided with MT10 or MT12 Tank Accessory Pack, P/N H5210 or H5479.
7. **System Electrical Connections.** Refer to the Electrical Connections section and connect each pump and Master Controller to facility power.

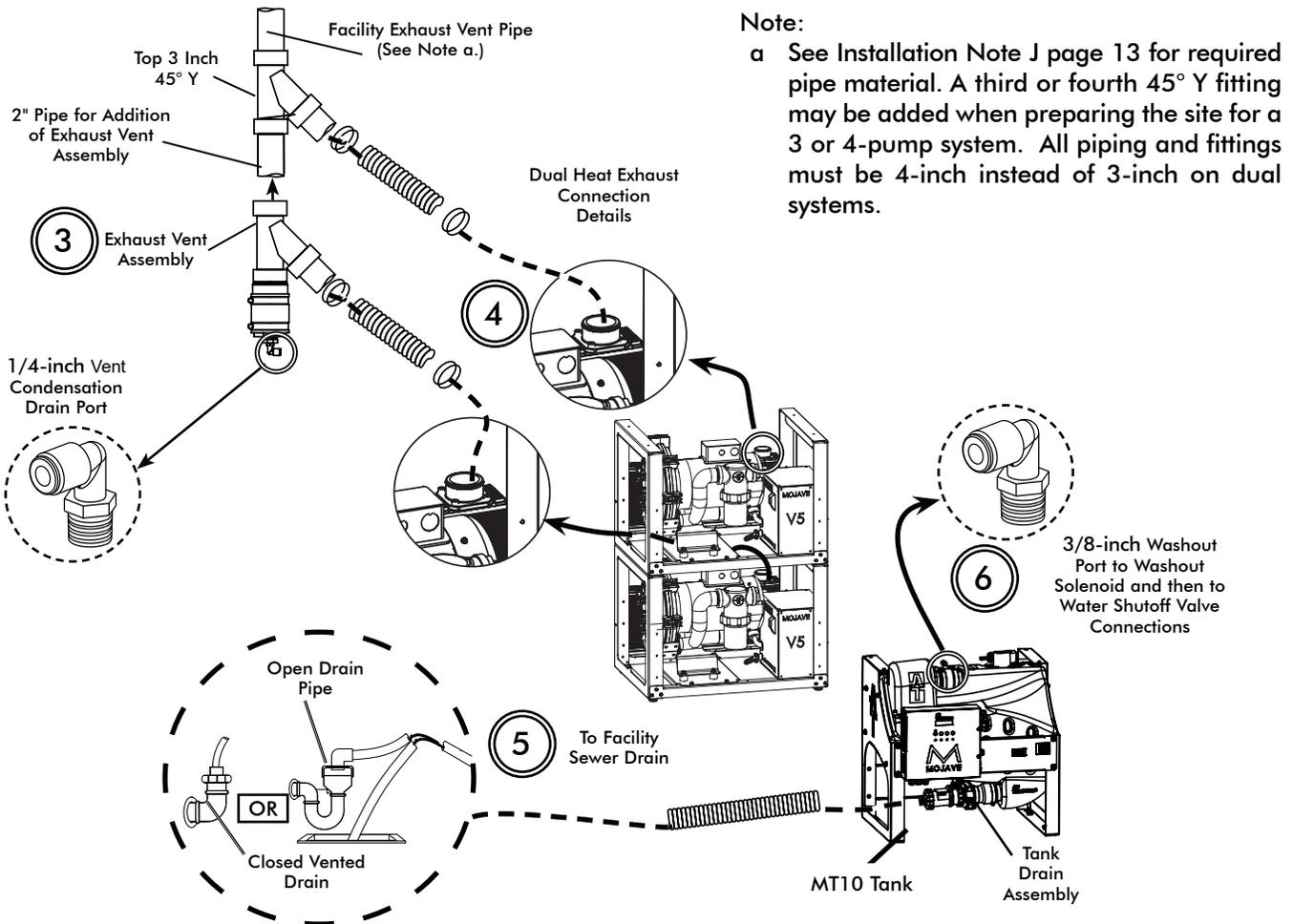


Figure 10. MOJAVE Dual Pump and Tank Connection Diagram, Sheet 2

3V5 and 4V5 System Installations.

Note: Each kit provides the required hoses, clamps and adapters. No schedule 40 PVC pipe is included.

Installation Accessory Packs. Figure 11 shows the hose connections required for 3V5 and 4V5 **MOJAVE** system configuration installations using accessory packs that provide the required hoses, clamps and adapters as follows:

- ❑ **MOJAVE V3 and V5 Pump Accessory Pack, P/N H5170 or H5307** - use as follows.
 - Stack the associated **MOJAVE** pumps as shown by Figure 7.
 - Connect each pump to the facility vent line, connection item (4) on Figure 10, sheet 2.
- ❑ **CT20 Tank Accessory Pack, P/N H5243 or H5289** - used to make the following connections:
 - Between the suction line and tank inlet. Item (1) on Figure 10, sheet 1.
 - Install the Exhaust Vent Assembly to the facility vent line, connection item (3) on Figure 10, sheet 2.
 - The tank outlet drain to the facility sewer drain. Item (5) on Figure 10, sheet 2.
 - The washout port to the washout solenoid or water shutoff valve. Item (6) on Figure 10, sheet 2.
- ❑ **MOJAVE Triple & Quad System Installation Kit, P/N MIK4** - used to fabricate a manifold to make the connections between a CT20 or CT22 tank and three or four V5 pumps.
- ❑ **CT20 or CT22 Dual Tank Accessory Pack, P/N H5243 or H5289** - used to install a CT20 or CT22 tank and make connections to the Master Controller assembly.

Supplied Components. The supplied components of kits P/N MIK4, and H5243 or H5289 are listed below. The supplied components of accessory pack (P/N H5170 or H5307) is provided on page 16. Verify that all listed items were received. If any item is missing, notify your dealer.

MOJAVE Triple & Quad System Installation Kit, (P/N MIK4), Contents

Part No.	Description	Qty
54138	Check Valve Modified	4
54512	2" ID, Clear Hose with Blue Helix 4 FT	1
H5234	2" Flexible Coupling Connector	2
54521	1½" ID, Clear Hose with Blue Helix 30 FT	1

Note:

The CT20 120V tank requires a 120-Volt line cord, PN 77243, provided by accessory pack, PN H5243.

The CT22 220V tank requires a 220-Volt line cord, PN 117527 provided by accessory pack, PN H5289.

CT20 120V Tank Accessory Pack, P/N H5243 and CT22 220V Tank Accessory Pack, P/N H5289

Part No.	Description	Qty
51453	Urethane Tubing, 1/4 OD, 5 Feet	1
H5302	Exhaust Vent Assembly	1
77243 (See Note)	Mojave Master Controller Line Cord 10 Feet, 18 GA., IEC X North America, Hospital Grade, 120V	1
117527 (See Note)	Mojave Master Controller Line Cord 10 Feet, 14 GA., IEC X North America, Hospital Grade, 220V	1
19271	Poly Tubing, 3/8" OD 10 Feet	1
30936	Plastic Screw Anchor, #10-12 X 1"	4
30295	#10 X 3/4, Type A, Plated Slot Pan Head Screw	4
56194	Connector Adapter, 1/2 MNPT X 3/8 PUSH	1
54509	PVC Tubing; 10mm x 6.5mm, 10 feet	
53202-1	Switch Assembly; Push Button, Panel Mount, GRN/YEL, 6V LED	1
H5153	Users Manual for V3, V5, V7, 2V3, 2V3CT, 2V5, 2V5CT, 2V7, 3V5 & 4V5	1

INSTALLATION

Installation Setup. Installation of triple and quad **MOJAVE** system configurations consist of placing the equipment in the proper installation space, fabricating a Pump/Tank Connection Manifold and an inlet tee connector.

1. Refer to Figures 4 and 5 and determine the installation footprint dimensions and connection requirements. Place the CT20 or CT22 tank and V3, V5 pumps in position.
2. If installing side-by-side configuration, proceed to step 4. If stacking, perform step 3.
3. When stacking pumps, refer to Figure 7 and secure the pumps using hardware supplied by the Pump Accessory Pack, P/N H5170 or H5307. When stacking any system component higher than two, make sure to secure installation with wall mount bracket kit available from your dealer.
4. Using check valves supplied in the **MOJAVE** Triple & Quad System Installation Kit, MIK4, fabricate a Pump/Tank Connection Manifold per the instructions supplied in the kit.
5. Using customer-supplied 3/4 inch and 2 inch pipe, fabricate an inlet tee connector as shown by Figure 12. Install an 1/4-inch elbow connector to the 3/4 inch riser of the tee connector using an 3/4 inch bushing. Both the elbow connector and bushing are provided in accessory pack H5243 or H5289.
6. Fabricate additional reducing Y or tee adapters to connect each pump vent tube to the common 4-inch exhaust vent line. See Figure 10, sheet 2.
7. Using at least 3 pipe supports, hang the Pump/Tank Connection Manifold. See Figure 11.

Note: If more of the 1 1/2" ID, Clear Hose hose is needed, order P/N 54521 by the foot.

8. Measure and record distance between each connection point as shown in the corresponding connection detail diagram, Figure 12.
9. Cut the supplied hose to the length required for each connection.

3V5 and 4V5 Connection Procedure. Using industry standard techniques, make the connections between the tank and pumps with supplied components of accessory packs (P/Ns H5170 or H5307 & H5243 or H5289) and Triple & Quad System Installation Kit, (P/N MIK4). Refer to Figures 4 through 12 as necessary and perform the following procedure.

Note: If more of the 1/4 inch OD Urethane Tubing is needed, order P/N 51453 by the foot.

1. **Suction Line to Tank Inlet Connection.** Refer to Figure 12, item (1).
 - a. Using the 3 x 2-inch flexible coupling connector (P/N H8037), installed in the inlet of the CT20 tank, install the fabricated tee connector into the inlet of the CT20 tank.
 - b. Install 2" flexible coupling connector (P/N H5234) supplied in the MIK4 kit to the pipe from the operator.
 - c. Install the 2" ID, clear hose (P/N 54512) between the operator suction line and tank inlet and secure with 2" flexible coupling connector (P/N H5234)
 - d. Install a length of 1/4 inch OD Urethane Tubing (P/N 51453) supplied in the MIK4 kit between the vacuum sample port and the vacuum inlet port of the Master Controller. See Figure 12, item (1a).

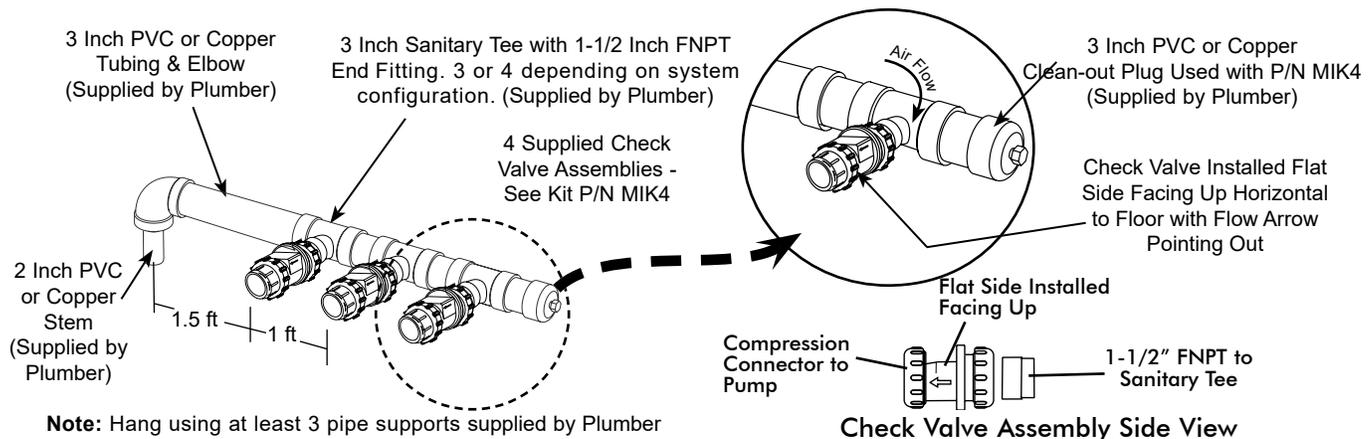


Figure 11. Pump/Tank Connection Manifold Fabrication

2. **Tank Air Outlet to Pump Inlets Connection.** Refer to Figure 12, item (2).
 - a. Connect 1 1/2" ID, clear hose (P/N 54521) cut for installation between the compression connectors of the Pump/Tank Connection Manifold check valves and the air inlet filter of each pump. Secure by tightening the compression nuts.
 - b. Connect 1 1/2" ID, clear hose (P/N 54521) cut for installation between the tank outlet port and the Pump/Tank Connection Manifold. Secure by tightening the hose clamps of the 2" flexible couplings. See Figure 12, item (2b).
3. **Exhaust Vent Assembly Installation.** Install the Exhaust Vent Assembly (P/N H5302) to the bottom end of the facility vent line. Install a length of 1/4 inch OD Urethane Tubing (P/N 51453) between the vent condensation drain port and facility sewer drain. See Figure 10, sheet 2, item (3).
4. **Heat Exhaust Vent Connection.** Refer to Figure 10, item (4) and connect the vent hose (P/N 56057) between the pump heat exchanger and the facility vent line via fabricated reducing Y or tee adapters. Secure with hose clamps (P/N 89324). On systems without heat exchangers (-NHE models), the vent hose is connected directly to the pump exhaust.
5. **Tank Drain to Facility Sewer Connection.** Connect the last section of 1 1/2" ID, clear hose cut for installation to the adapter. Secure by tightening the check valve compression nut. Connect unconnected hose end to the facility sewer drain as necessary. See Figure 10, sheet 2, item (5).
6. **Tank Washout Port to Facility Water Connection.** Refer to See Figure 10, sheet 2, item (6) and install a length of 3/8 inch tubing (P/N 19271) between the washout port and the washout solenoid and then to water shutoff valve. The tubing is provided with CT20 or CT22 Tank Accessory Pack, P/N H5243 or H5289.
7. **System Electrical Connections.** Refer to the Electrical Connections section and connect each pump and Master Controller to facility power.

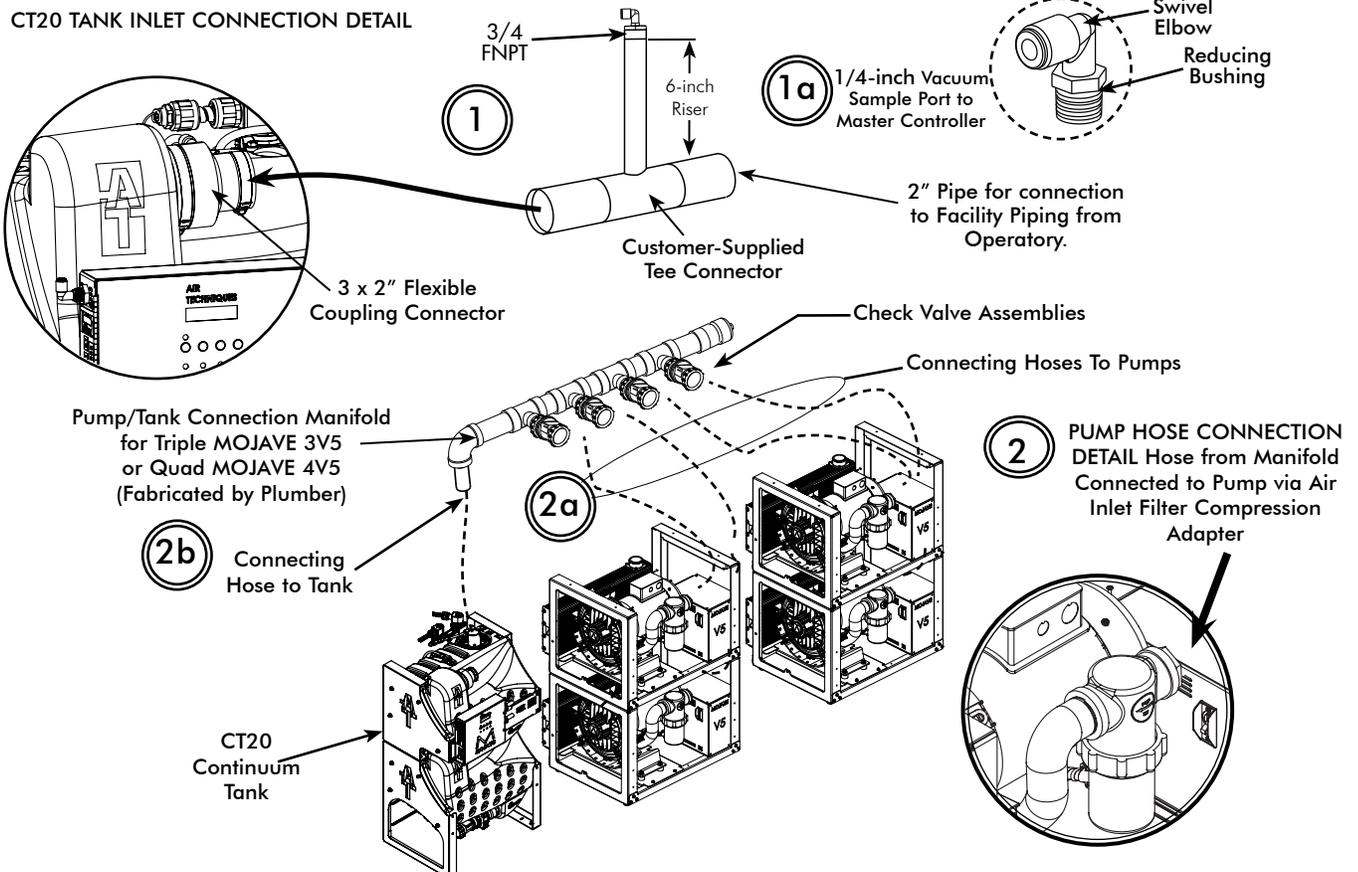


Figure 12. 3V5 or 4V5 System Connection Detail Using Accessory Kit

ELECTRICAL CONNECTIONS



Remove all power to the system prior to working within the electrical box. Contacting high voltage can cause serious injury or even death.



All systems must be wired directly from an electrical box that complies with local electrical codes.

MOJAVE Pump Direct Power Connection.

Each pump is wired directly to an dedicated 220V, 20 AMP (30 AMP for V7) single phase 50/60 Hz circuit via a disconnect box with approved ground. Disconnect boxes should be mounted no more than 3 feet of each other and 3 feet of installation centerline.

Figure 13 shows the wiring of the electrical BX cable used to connect each pump directly to facility input power.

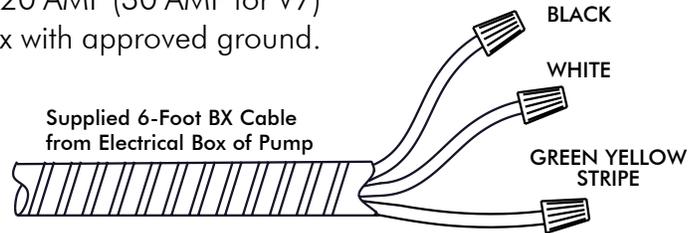
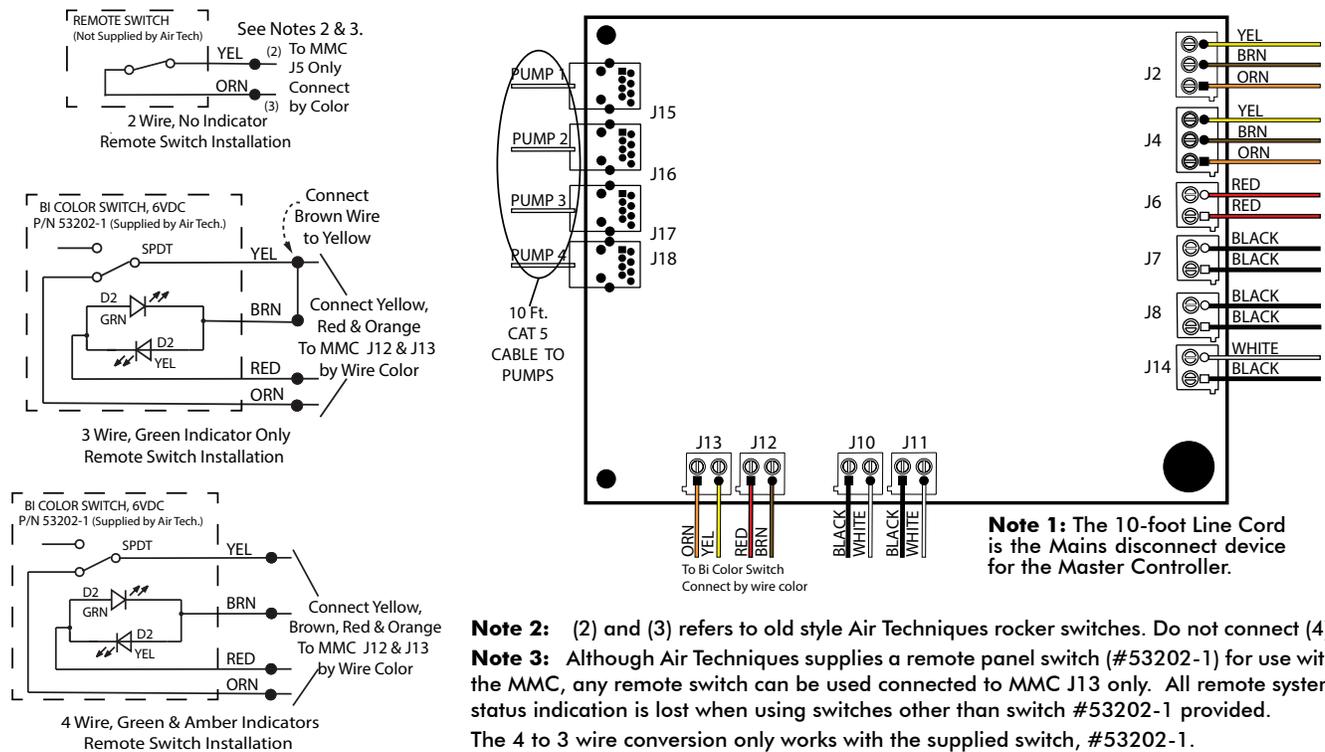


Figure 13. MOJAVE Pump Power Connection

Master Controller Connections. The Master Controller is connected to a dedicated 120V or 220V, hospital grade grounded receptacle using a supplied Hospital Grade line cord. Refer to Figure 14 with associated connection list and make the necessary connections required for your specific **MOJAVE** system.



Connector	Function	Connector	Function
J2	Main Water Panel Switch (optional)	J10	Float Switch Bottom (CT20 only - pre-wired)
J4	Main Water Solenoid (optional)	J11	Float Switch Top MT10 Tank & CT20 Tank (pre-wired)
J6	Washout Solenoid (pre-wired)	J12	Remote Panel Switch #53202-1 provided by Air Techniques. See note 2 when using a switch not provided by Air Techniques.
J7	Tank Solenoid (CT20 only - pre-wired)	J13	
J8	Air Solenoid (CT20 only - pre-wired)	J15 Thru J18	10-foot CAT 5 Cable to each Pump
J14	Drain Pump (optional)		

Figure 14. Master Controller Wiring Diagram

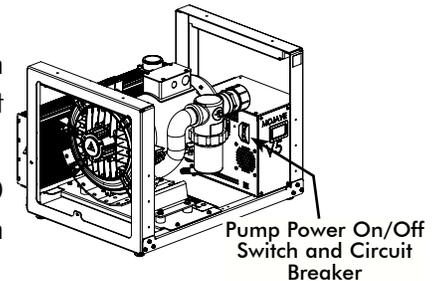
General.

- ❑ The vacuum level is factory preset at 8 inHg. This vacuum set point is adjustable from 8.0 to 10.0 inHg in increments of 0.5 inHg via the Master Controller.
- ❑ System operation is automatically controlled via the Master Controller and the Variable Frequency Drive (VFD) of each pump.
- ❑ The system is capable of running continuously and may be turned OFF when not in use.
- ❑ Designation of the Primary Pump is cycled through all pumps in the system to evenly distribute run time across all pumps in the system.
- ❑ The system may be turned ON or OFF from a single, convenient location within the dental office using an optional Remote Control Panel switch.
- ❑ The default setting for the number of tanks is set at the factory.
- ❑ Each tank has been designed to collect the fluids evacuated during a normal operating day.
- ❑ An internal float switch interrupts the pump operation and automatically drains the tank when an excessive amount of fluids are collected in the tank.
- ❑ All liquids drain from the separation tank when the power is turned OFF.

Pump Power On/Off Switch with Circuit Breaker.

As the Mains power disconnect of the associated pump, this combination switch and circuit breaker controls application of the connected input power and protects the pump from overloads and short circuits.

When set to the up (1) position, it applies input power to the internal VFD electronics and the associated pump and must be set in the up (1) position to allow the pump to operate via the Master Controller.



Activation. Whenever the Master Controller starts running, a system pump will start operation. The Master Controller state (Standby or Running) is controlled by either the local Pump ON/OFF switch located on the front panel or the Master Controller Remote Panel switch located on the optional remote panel. This first operating pump is designated the Primary Pump for the system. The selection of the Primary Pump changes among the available pumps each time the Master Controller is activated (Running). This cycling of the primary pump designation is designed to distribute the wear across all pumps of the system. The pump's VFD control the frequency of the active (primary) pump to maintain the vacuum set point. If the system vacuum level falls below 1 inHg of the Set Point for 15 seconds the next pump in the series is automatically activated. Additional pumps are automatically turned on as necessary to maintain the vacuum level required for the dental office. Using this balanced system approach, each user has the vacuum level necessary to do the job while conserving electricity and prolonging the life of the pumps.

De-Activation. When the frequency of the Primary Pump is below approximately 60 Hz for 15 seconds, the last pump turned ON shuts down. If this condition remains, then each additional pump in the system also is automatically turned OFF in the reverse order of their activation until only the Primary Pump is left operating.

Washout Cycle. A Washout Cycle is initiated 5 minutes after the system transitions into Standby. The Facility Main Water and the Washout Solenoid are then activated. The Washout Cycle will run for 2 minutes as long as the system remains in Standby. The Washout and Water Solenoids will be turned OFF, and not allowed to be turned ON again until after the system comes out of the Standby condition.

OPERATING INFORMATION

Master Controller Controls and Indicators. Figure 15 shows the front panel view of the Master Controller while the table on the next page lists the nomenclature and function of each front panel control, indicator and connector of the Master Controller.

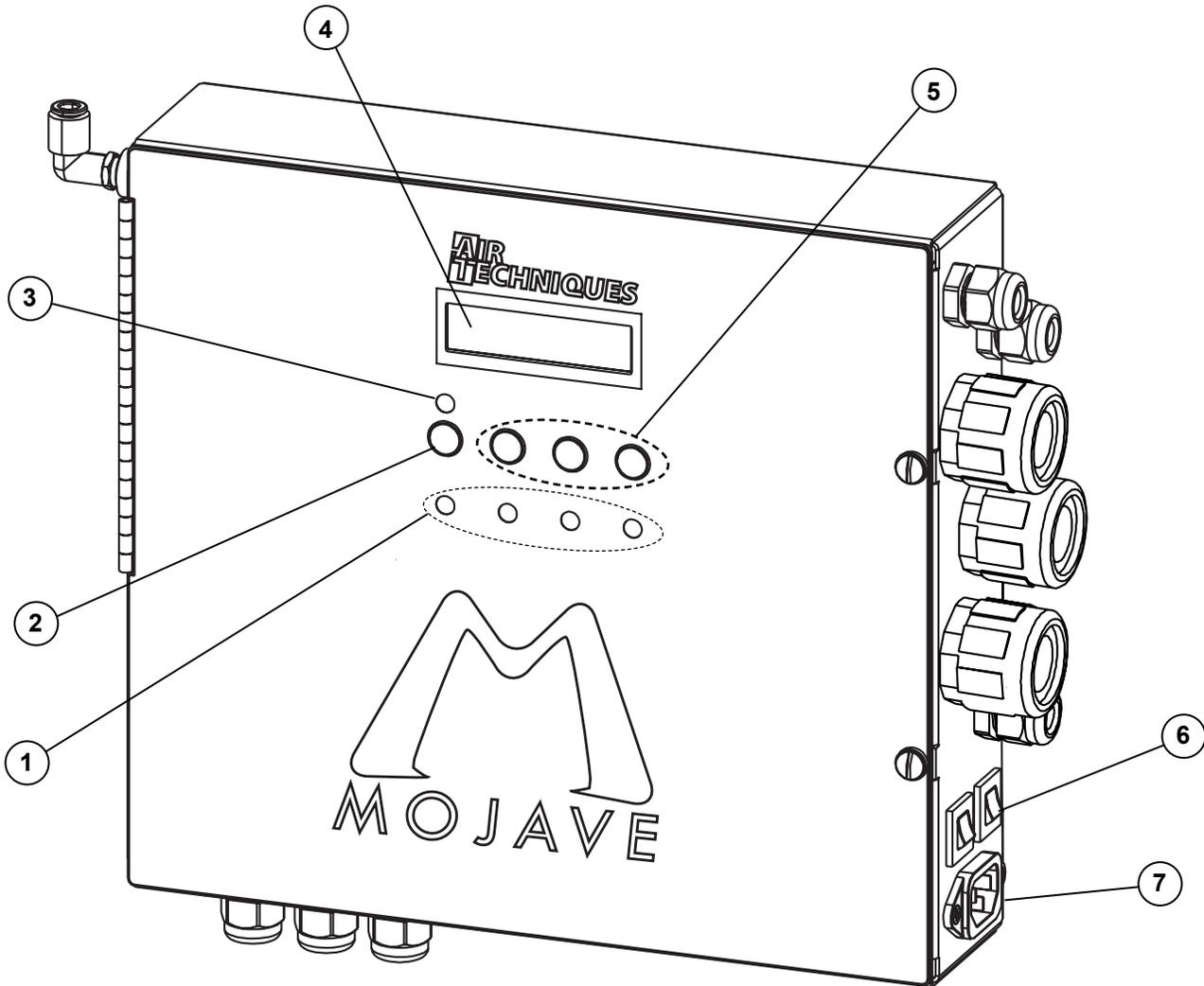


Figure 15. Master Controller Assembly Controls and Indicators

Master Controller Controls and Indicators

Item	Control/Indicator	Function
1	Pump Status Indicators (1 for each pump) <i>None</i> <i>Quick Flashing Green</i> <i>Solid Green</i> <i>Flashing Yellow</i>	Four bi-color Green/Yellow LED indicators that display the current status of each connected vacuum pump as follows: Pump cable is not connected Pump cable is connected on both ends Corresponding pump is operating (spinning) and no Error is Present Corresponding pump is not operating (not spinning) and an Error is Present
2	PUMP ON/OFF Button	A momentary tactile switch that toggles the Master Controller between Standby and Running. When the Master Controller is Running at least the primary pump is operating. (See Master Controller Status Indicator.)
3	Master Controller Status Indicator <i>None</i> <i>Quick Flashing Green</i> <i>Solid Green</i> <i>Solid Yellow</i> <i>Flashing Yellow</i> <i>Alternating Green/Yellow</i>	Bi-color Green/Yellow LED indicator that displays the current status of the Master Controller as follows: Module Has No Power Master Controller is in Standby (idle) Master Controller is Running (at least one Pump is operating) A Washout Cycle is Running A Washout Cycle is Running and an Error is Present Master Controller is Running and an Error is Present
4	LCD Display Panel <i>Normal Display Mode</i> <i>Menu Display Mode</i>	A 2 line by 16 Character LCD display with a white LED backlight that displays system operating and programming information as follows: Top left section shows temperature. Top right section displays vacuum pressure (InHg). The bottom line displays the currently selected sub-menu item Top LCD line displays the top level menu item and the bottom LCD line will display the sub-menu item. (See MENU, SCROLL and SELECT buttons.)
5	Menu Navigation Buttons <i>MENU Button</i> <i>SCROLL Button</i> <i>SELECT Button</i>	When pressed, the MENU , SCROLL and SELECT membrane buttons allow the navigation of the system menu displayed via the LCD Display. No activity for 5 seconds will put the display back into its Normal Display mode. Places system in Menu Display mode as described above. Also, when pressed further, advances to the next top level menu item with associated sub-menu items. Refer to the Menu Display Mode description provided on the next page. Scrolls thru the sub-menu items of the currently selected top level menu item. Selects the sub-menu item and then reverts back to the Normal Display mode.
6	Circuit Breakers	Two 5 Amp circuit breakers that protect the Master Controller from overloads and short circuits.
7	AC Power IEC Receptacle	Accepts supplied AC Line Cord connector to apply either 120 or 220 VAC input power for operation of the Master Controller. The Line Cord is the Mains disconnect device for the Master Controller.

OPERATING INFORMATION

Normal Display Mode. The Normal Display Mode is the default view of the LCD Display Panel where the top line shows the PCB temperature on the left and system vacuum level on the right side. The the bottom line displays the currently selected sub-menu item.

Menu Display Mode. In Menu Display Mode, the top line shows the top level menu item while the bottom line displays the sub-menu item. See the table below for top and sub menu items. Navigation of the menu is accomplished as follows:

1. Pressing the MENU button advances to the next top level menu item and associated sub-menu items.
2. Pressing the SCROLL button scrolls thru the sub-menu items associated with the selected top level menu item.
3. Pressing the SELECT button Selects the sub-menu item and then reverts back to the Normal Display mode.

Menu Display Mode

Top-Menu Item	Sub-Menu Item	Description
Pump Frequency	Cycle	Cycles through all connected pump frequencies every 2 seconds.
	Pump #1	Shows the frequency of Pump #1
	Pump #2	Shows the frequency of Pump #2
	Pump #3	Shows the frequency of Pump #3
	Pump #4	Shows the frequency of Pump #4
Pump Run Time	Cycle	Cycles through all connected pump run times every 2 seconds.
	Pump #1	Shows the total Run Time of Pump #1
	Pump #2	Shows the total Run Time of Pump #2
	Pump #3	Shows the total Run Time of Pump #3
	Pump #4	Shows the total Run Time of Pump #4
Tank Config	Single Tank Dual Tank	MT10 Tank configuration CT20 Tank configuration
Vacuum Set Point	Set Point 8.0	Sets System Vacuum level to 8.0 inHg (Set as default.)
	Set Point 8.5	Sets System Vacuum level to 8.5 inHg
	Set Point 9.0	Sets System Vacuum level to 9.0 inHg
	Set Point 9.5	Sets System Vacuum level to 9.5 inHg
	Set Point 10.0	Sets System Vacuum level to 10.0 inHg
Reset All Errors	Hold Down Select	Hold Select button for 10 seconds to Reset all errors.

Initial System Startup. Start the **MOJAVE** system for the first time by referring to the Operating Information section and performing the following procedure.

Important: Make sure that each facility electrical disconnect box controlling the 220V, 20 AMP single phase 50/60 Hz circuit to the corresponding pump is set to the ON position.

1. Apply facility operating power to each pump by placing the Pump Power Switch with Circuit Breaker in the up (1) position.
2. Connect CAT5 cable between all pumps and the Master Controller.
3. Connect the supplied line cord between the Mains (120 or 220 VAC) outlet and the AC Power IEC Receptacle of the Master Controller. The Master Controller is now in the Standby mode. Observe the following:
 - a. Master Controller Status Indicator **Quick Flashes Green** designating that the Master Controller is in Standby (idle).
 - b. LCD Display Panel is illuminated showing the default Normal Display Mode view.
 - c. Pump Status Indicator corresponding to the connected pump or pumps **Quick Flash Green** designating that the pumps are connected but not operating. Pump Status Indicators associated with no connected pump will be extinguished.
4. Start system operation by pressing the PUMP ON/OFF button located on the Master Controller. This places the Master Controller in the Running mode where at least one Pump is operating. Observe the following.
 - a. Master Controller Status Indicator illuminates **Solid Green** designating that the Master Controller is Running (at least one pump is operating in multi pump systems).
 - b. Pump Status Indicator associated with the operating pump illuminates **Solid Green** designating that a pump is operating (spinning) and no error is present.
5. Press the PUMP ON/OFF button to stop the pump operation and return the Master Controller to the Standby mode (idle). If operating a system with only one pump, proceed to step 6. When operating a multi pump system, repeat steps 3 and 4 for each pump and observe that the next pump in the system starts operation each time the PUMP ON/OFF button is pressed.
6. Proceed to step 6 if the system has a MT10 tank. When using systems with a CT20 tank change the **Tank Config** as follows:
 - a. Navigate to the **Tank Config** top menu item by pressing the MENU button 3 times.
 - b. Press the SCROLL button to navigate to the **Dual Tanks** sub menu item.
 - c. Press the SELECT button to change the **Tank Config** to **Dual Tanks**.

Note: The optional Remote Control Panel switch may be used instead of the PUMP ON/OFF button.

Normal Operation. The **MOJAVE** system is normally operated by simply pressing the PUMP ON/OFF button located on the front panel of the Master Controller. This places the Master Controller in the Running mode to control system operation via the Variable Frequency Drive (VFD) electronics of each pump. During operation the controller automatically starts pump operation, adjusts the frequency of the pumps to maintain the required vacuum level as needed. Additionally the Master Controller constantly monitors the system operation status, performs self diagnostics and reports errors.

TROUBLESHOOTING

Automated Self Diagnostic Feature. Every 4 hours each pump in the system that is not ON will be turned ON for 6 seconds and then turned OFF, one at a time. By constantly checking the status of all pumps in the system this feature makes sure that each is ready for operation and may be helpful in preventing locked rotors.

Error Reporting. The Master Controller constantly monitors the system operation and immediately records and reports any errors found. Some errors clear automatically as soon as the operating issues are resolved; other errors have to be manually reset. The table below lists the types of errors reported along with their causes, affects on the system, and details on how the error can be reset.

Reported Error	Type	Cause	Observable Result	Reset Methods
Feedback Error	Pump	Feedback from a running Pump indicates a Frequency of <5 Hz 5 Seconds after being turned ON.	<ul style="list-style-type: none"> • This pump is shutdown • Error status is displayed 	<ul style="list-style-type: none"> • Automated Self Diagnostic Function • Disconnect Pump • Menu: Reset All Errors • Cycle MMC Power
Pump VFD Error	Pump	A Pump VFD has reported an error through its relay contact.	<ul style="list-style-type: none"> • This pump is shutdown • Error status is displayed 	<ul style="list-style-type: none"> • Automated, once the fault is diagnosed and resolved.
Control Error	Pump	A Pump is running that the Master Controller did not instruct to run.	<ul style="list-style-type: none"> • Error status is displayed 	<ul style="list-style-type: none"> • Automated, once the fault is diagnosed and resolved. • Disconnect Pump • Check Bypass Switch is in OFF position
Tank Error	System	A Float Switch has been tripped to prevent water from entering the Pumps.	<ul style="list-style-type: none"> • All running pumps are shutdown • Error status is displayed 	<ul style="list-style-type: none"> • Automated, after a 1 Minute "Active Drain" delay.
Vacuum Error	System	The Vacuum level has been either below 0.5 inHg or 1 inHg above the Set Point for 1 minute.	<ul style="list-style-type: none"> • All running pumps are shutdown • Error status is displayed 	<ul style="list-style-type: none"> • Cycle System "Running" Status • Menu: Reset All Errors • Cycle MMC Power
Connection Error	System	No pumps are connected to the Master Controller.	<ul style="list-style-type: none"> • Error status is displayed 	<ul style="list-style-type: none"> • Automated, once a pump is connected
Drain Error	System	Tripped Floats that caused an Active Drain condition are still tripped after the 1 Minute Active Drain delay.	<ul style="list-style-type: none"> • Error status is displayed 	<ul style="list-style-type: none"> • Menu: Reset All Errors • Cycle MMC Power
Critical Temp	System	The PCB Temperature is above 150 °F.	<ul style="list-style-type: none"> • All running pumps are shutdown • Error status is displayed 	<ul style="list-style-type: none"> • Menu: Reset All Errors • Cycle MMC Power

Problem	Possible Cause	Possible Solutions
1. Tanks does not drain.	<ul style="list-style-type: none"> a. Gate Valve in closed position. b. Drain check valve clogged. c. Clogged drain. d. Separator tank is full and will not drain. 	<ul style="list-style-type: none"> a. Open Gate Valve fully. b. Call your authorized dealer for repair service. c. Call your local plumber. d. Tank must be hooked up to an open drain. If hooked to an open drain and tank won't drain call your authorized dealer for repair service.
2. No suction.	<ul style="list-style-type: none"> a. Master Controller not turned on. b. Pump not turned on. c. Pump not running. d. Kinked or collapsed suction hose. 	<ul style="list-style-type: none"> a. Turn Master Controller on. b. Turn pump main power switch to ON. c. See problem 5 below. d. Make sure all hoses are properly connected. Check the suction line from the unit to the separation tank and the separation tank to the operatory line. If clogged, collapsed or kinked call your authorized dealer for repair service.
3. Poor or low suction	<ul style="list-style-type: none"> a. Restricted air exhaust. b. Restricted air suction. 	<ul style="list-style-type: none"> a. Check air exhaust pipe to make sure it conforms to specifications. Check and clear possible restrictions in exhaust line. b. Check the suction line from the unit to the separation tank and the separation tank to the operatory line. If clogged , collapsed or kinked call your authorized dealer for repair service.
4. Excessive suction	<ul style="list-style-type: none"> a. Clogged or restricted vacuum inlet line to Master Controller. b. Malfunctioning Master Controller. 	<ul style="list-style-type: none"> a. Check and clear any clogs or restrictions, and/or fluid from vacuum inlet line. b. Call your authorized dealer for repair service.
5. Pump does not run.	<ul style="list-style-type: none"> a. Site circuit breaker is "OFF". b. Pump circuit breaker is "OFF". c. Master Controller circuit breaker is tripped. d. Low voltage Remote Control Panel Switch turned "OFF", or not connected properly. e. Electrical problem. 	<ul style="list-style-type: none"> a. Turn "ON" the site circuit breaker. b. Turn "ON" the pump circuit breaker. c. If the white section of the circuit breaker is visible, it is tripped. Flip this section back in to reset breaker. d. Make sure remote switch is turned "ON" and wired properly. e. Call your authorized dealer for repair service.

MAINTENANCE

Warning: Cleaning agents that contain bleach or foam should not to be used in this system. These cleaners will leech mercury from amalgam and pollute our environment. Please use non-foaming, non leaching, and biodegradable Clean Stream (PN 57850) for proper cleaning.

Initial Maintenance.

After installation, clean the vacuum lines with Clean Stream Cleaner. This is especially necessary when a new system is being installed into existing dental system piping. Using Clean Stream Cleaner helps the **MOJAVE** system to remove any built up deposits in the piping system. Perform the initial cleaning by performing the daily maintenance procedure provided below.

Maintenance-Free MOJAVE Pumps.

All **MOJAVE** pumps are designed for maintenance-free operation. The pump features a powerful 3-phase motor. The motor is completely water and oil-free and provides a dependable operation requiring no scheduled maintenance.

Preventive Maintenance.

Whenever a service technician fulfills a repair call at the customer site routine checks should also be performed to detect general overall wear, and replacement of parts should be made if necessary before a failure causes a prolonged shut-down. This preventive maintenance program will aid in dependable equipment operation and help reduce breakdown.

Scheduled Maintenance.

Since a well-organized maintenance program aids dependable equipment operation and reduces breakdown to a minimum, it is essential that the maintenance instructions be followed completely. The routine cleaning will remove any built up deposits in the piping system and the tank inspection will verify proper drainage before a failure causes a prolonged shut-down.

- Daily**
1. Clean drain lines from the operatory to the separator tanks with Clean Stream Cleaner by performing the procedure provided on the next page.
 2. A Washout Cycle is automatically initiated when the system has been in Standby for 5 minutes. During this cycle the Facility Main Water and the Washout Solenoids are activated and the tank is rinsed with water for 2 minutes via the wash-out fitting on the top of the tank. The Washout Cycle runs for 2 minutes as long as the system remains in Standby and will not be started again until after the system comes out of the Standby.

- Weekly**
1. Check for noise and leaks.
 2. Clean exterior surfaces
 3. Make sure that no flammable, corrosive, or combustible materials are stored in the equipment room (especially in the area around the equipment).

- Monthly**
1. Check tubing for kinks or cracks.
 2. Check drip leg for liquids on exhaust line.

Important: Evidence of buildup at the base drain or liquids reaching the float assembly most likely means that a stricter adherence to the daily maintenance procedure is required.

If problems are found during tank inspection, perform the daily maintenance Tank Washout procedure as necessary to remove buildup at the base drain. Reinspect to verify proper tank drainage. If the tank is leaking and needs to be replaced, order the appropriate Tank Replacement Kit (part numbers: H5510, H5512, H5515, H5520 or H5522). Follow instructions with kit and **DO NOT** send used contaminated tank back to ATI.

- Semi-Annually**
1. Check the inlet filter on each pump assembly for buildup. The filter should be dry and clean. The presence of any liquid or debris means that the installation or the tank is incorrect.
 2. Check for buildup at the base of the tank entering the drain to verify proper drainage.
 3. On CT20 Continuum tanks, check for buildup at the check valve connecting the two tank sections to verify proper liquid flow.
 4. Check the washout solenoid inlet strainer for buildup. Unscrew the cover nut and remove the mesh strainer. Inspect strainer and clean if necessary. Insert mesh strainer back in strainer body and tighten cover nut while ensuring orientation has the strainer facing down.

Warning: The following steps must be performed while wearing skin and eye protection designed for handling typical Haz-Mat material. Use care at all times to prevent spillage.

Caution: Use only Clean Stream Cleaner to maintain the system vacuum lines. Do not use chlorine bleach or solutions of sodium hypochlorite to disinfect the MOJAVE system. These materials may result in damage or destruction of equipment or loss of system performance.

Daily Maintenance - Clean Vacuum Lines

Clean all vacuum lines in the vacuum system with Clean Stream Cleaner daily as part of the overall preventive maintenance program. This helps to maintain the cleanliness of the tank as well as the vacuum lines and tubing throughout the system. Using the 2.5 liter bottle of Clean Stream Cleaner, PN 57850 and the Clean Stream dispenser system, PN 57665.

Required - Not Supplied

Part No.	Description
57850	2.5 Liter Bottle Clean Stream Cleaner (125 applications)
57665	Clean Stream Dispenser System 1 Bottle with o-rings and caps 1 Saliver Ejector Adapter 1 High-Volume Actuator Adapter 1 Small Suction Hose Adapter 1 Large Suction Hose Adapter



Part No. 57850



CleanStream Dispenser System,
Part No. 57665

Procedure. Prepare the cleaning solution and clean the system daily by performing the following steps.

Note: The Clean Stream Dispenser can hold a maximum of 2 liters of solution for cleaning up to 2 operatories. Mix solution quantity as necessary.

1. Fill the Clean Stream dispenser with tap water as applicable;
 - a. to the line marked 1 L for 1 operator
 - b. to the line marked 2 L for 2 operatories
2. Using the 20ml measuring line in the Clean Stream Cleaner bottle cap, add the Clean Stream Cleaner concentrate to the dispenser as applicable;
 - a. for 1 operator, add 20ml of Clean Stream concentrate to the 1 liter of water
 - b. for 2 operatories, add 40ml of Clean Stream concentrate to the 2 liters of water
3. As shown by Figure 16, the interior of the Clean Stream dispenser bottle cap is configured with three holes for the insertion of HVEs and SEs via provided adapters as follows.
 - a. attach saliva ejector to smallest atomizing adapter
 - b. attach 1 or 2 high volume ejectors to respective adapter(s)
4. Refer to Figure 16 and place dispenser in the 2-liter vertical position or the 1-liter horizontal position as necessary.
5. With the vacuum pump on and handpiece valves open, aspirate the Clean Stream solution from dispenser.
6. After each cleansing procedure, disconnect the hand pieces and rinse the dispenser.

MAINTENANCE

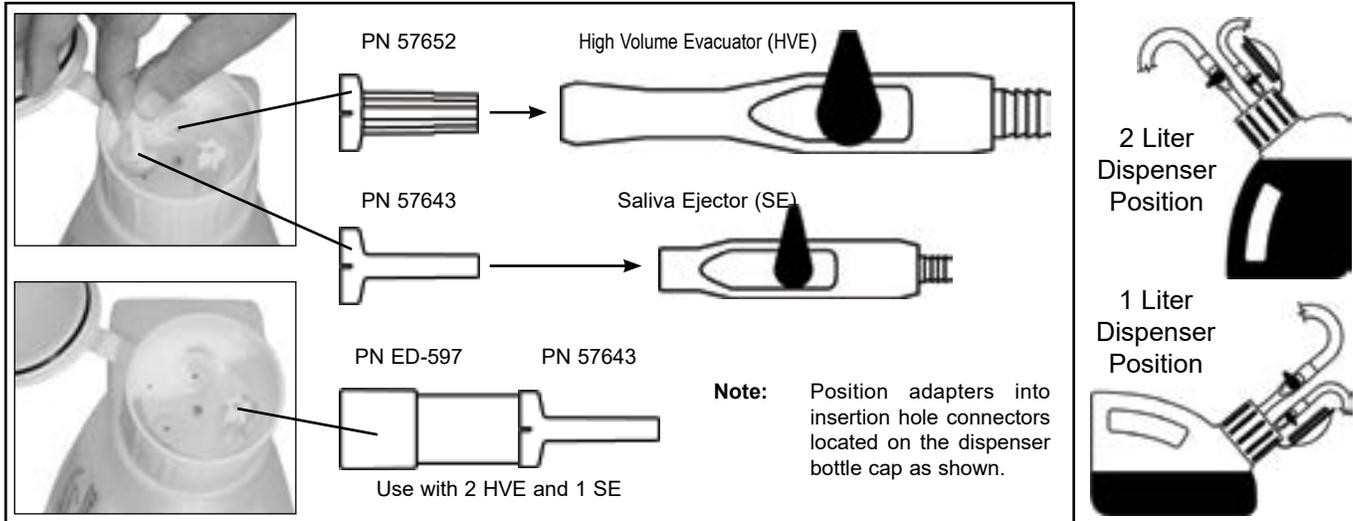


Figure 16. Clean Stream Dispenser Cap Adaptor Locations



Important Information **Tank Disposal**

- DO NOT send used contaminated tank back to ATI.
- Every contaminated tank must be disposed of in accordance with local codes, regulations and guidelines for biohazard material handling and disposal.

Tank Replacement. If the tank is leaking and needs to be replaced, order the appropriate Tank Replacement Kit (part numbers: H5510, H5512, H5515, H5520 or H5522). Follow instructions provided with kit and **DO NOT** send used contaminated tank back to ATI.

ACCESSORIES/OPTIONS

Accessories/Equipment Options. The following lists the ordering number and description for accessory components available to maintain the **MOJAVE** product family. Contact an authorized Air Techniques' dealer for information.

Part No.	Description
H5231	Drain Pump Assembly (120 - Volt Tanks Only)
53020T, 53021T, 53170T & 53173T	Remote Water Control Valve Systems
H5217	V3 / V5 / V7 Replacement Bowl, Screen and Gasket for Inlet Filter
56650	XL Utility Stack Rack

The **MOJAVE** is warranted to be free from defects in material and workmanship from the date of installation for a period as follows

Standard Warranty: 5 years (60 months) for the complete unit.

Any item returned to our factory through an authorized distributor, will be repaired or replaced at our option at no charge provided that our inspection shall indicate it to have been defective. Dealer labor, shipping and handling charges are not covered by this warranty.

This warranty does not apply to damage due to shipping, misuse, careless handling or repairs by other than authorized service personnel. Warranty is void if equipment is installed or serviced by other than dealer service personnel authorized by Air Techniques. Air Techniques, Inc. is not liable for indirect or consequential damages or loss of any nature in connection with this equipment.

This warranty is in lieu of all other warranties expressed or implied. No representative or person is authorized to assume for us any liability in connection with the sale of our equipment.

ONLINE WARRANTY REGISTRATION

Quickly and easily register your new **MOJAVE** online. Just have your product model and serial numbers available. Then go to the Air Techniques web site, www.airtechniques.com/dental, click the **warranty registration** link and complete the registration form. This on-line registration ensures a record for the warranty period and helps Air Techniques keep you informed of product updates and other valuable information.

For over 60 years, Air Techniques has been a leading innovator and manufacturer of dental products. Our priority is ensuring complete satisfaction by manufacturing reliable products and providing excellent customer and technical support. Whether the need is digital imaging, utility room equipment or merchandise, Air Techniques can provide the solution via our network of authorized professional dealers. Proudly designed, tested and manufactured in the U.S., our products are helping dental professionals take their practices to the next level.

Air Techniques' family of quality products for the dental professional include:

- ❑ **Digital Imaging**
 - Digital Radiography
 - Intraoral Camera
 - Caries Detection Aid
 - Intraoral X-ray

- ❑ **Utility Room**
 - Dry Vacuums
 - Wet Vacuums
 - Air Compressors
 - Nitrous Oxide/ Oxygen Systems
 - Amalgam Separator
 - Utility Accessories
 - Utility Packages

- ❑ **Merchandise**
 - Surface Disinfectant
 - Enzymatic Cleaner
 - Hand Sanitizer
 - Waterline Cleaner
 - Evacuation System Cleaner
 - Nitrous Oxide Nasal Hoods
 - Imaging Accessories
 - Film Processor Chemistry and Cleaners

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