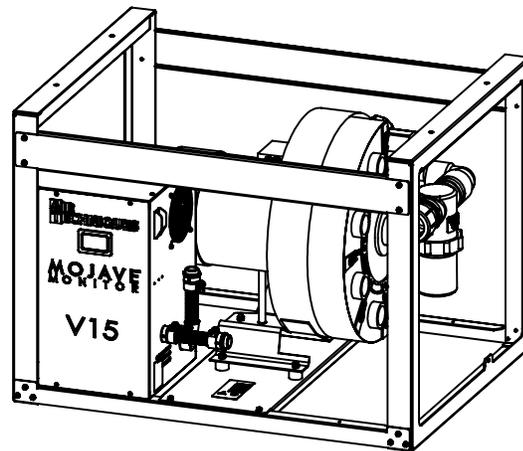
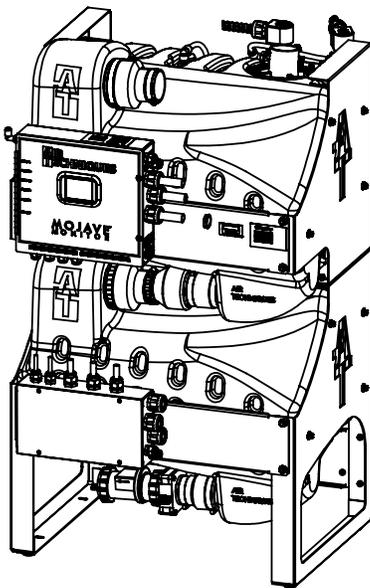


# MOJAVE<sup>®</sup> MONITOR DRY VACUUM SYSTEM

PART NUMBERS: V15M, 2V15M, 3V15M AND 4V15M

## USER'S AND INSTALLATION MANUAL



**AIR**  
**TECHNIQUES** equipped for life<sup>®</sup>



**Monarch CleanStream** is the **ONLY** vacuum line cleaner Air Techniques recommends for daily use to ensure the highest performance and longevity of your Mojave Monitor.

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## ***CONGRATULATIONS***

Congratulations on the purchase of your new **MOJAVE** Dry Vacuum System that provides the state of the art in 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 by adding a Variable Frequency Drive (VFD) to the Vacuum Pump, which is controlled by a Master Controller. This controller automatically adjusts the frequency of the pump 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.

## ***INTENDED USE***

The **MOJAVE** creates vacuum that will be used in a dental facility.

## ***PURPOSE OF THIS MANUAL***

This manual provides installation, operation and maintenance instructions for the support of the four 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.

<b>System</b>	<b>Description</b>	<b>Maximum Users</b>
V15M	One V15M Dry Vacuum Pump and one CT12-M Tank	15
2V15M	Two V15M Dry Vacuum Pumps and one CT12-M Tank	30
3V15M	Three V15M Dry Vacuum Pumps with CT12-M and CT34-Tanks	45
4V15M	Four V15M Dry Vacuum Pumps with CT12 and CT34-M Tanks	60

# 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

**I ON**  
**O OFF**

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



Indicates protective Earth Ground for the Equipment power switch.



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

<b>Master Controller Electrical Specifications</b>	
Voltage (Volts AC Single Phase $\pm$ 10%)	220
Full Load Current (Amps AC)	5
Input Frequency (Hz)	50/60

<b>Pump Electrical Specifications</b>	<b>V15M</b>	<b>2V15M</b>	<b>3V15M</b>	<b>4V15M</b>
Voltage (Volts AC, 3 Phase, $\pm$ 10%)	220	220	220	220
Full Load Current (Amps AC)	25	50	75	100
Input Frequency (Hz)	50/60	50/60	50/60	50/60
Preset Vacuum Level (InHg)	10	10	10	10
Horsepower (each V15M pump)	4.6 kW or 6.2 HP			

<b>Tank Specifications</b>	<b>V15M &amp; 2V15M</b>	<b>3V15M &amp; 4V15M</b>
Working Liquid Capacity	CT12-M Continuum Tank infinite volume capacity	CT12-M and CT34-M Continuum Tanks infinite volume capacity
Tank Material	Rotomolded Plastic	Rotomolded Plastic

**Water usage in Gallons Per Minute (GPM) at different facility water pressures.**

Water Pressure (PSI)	Gallons Per Minute (GPM) for CT12-M	Gallons Per Minute (GPM) for CT12-M and CT34-M
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	32.4

**System Environmental Conditions (All Systems)**

Operating Temperature	40 to 104°F or 5 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.**

## PRODUCT DESCRIPTION

---

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

### Vacuum Pump Assembly V15M.

- A dual-stage pump, where all of the wetted metal parts are aluminum or stainless steel.
- A metal electrical enclosure that houses a Variable Frequency Drive (VFD), circuit breaker, axial fan and an interface Printed Circuit Board (PCB).
- A metal chassis for mounting components.

### Continuum Separation Tank Assemblies CT12-M and CT34-M.

- Each continuum tank combines two molded plastic tanks connected via a check valve and two solenoid valves. A third solenoid is used for the washout cycle. 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 CT12-M tank chassis. The unit includes a Main PCB and a color LCD touchscreen to provide the following system functions:

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

# PRODUCT DESCRIPTION

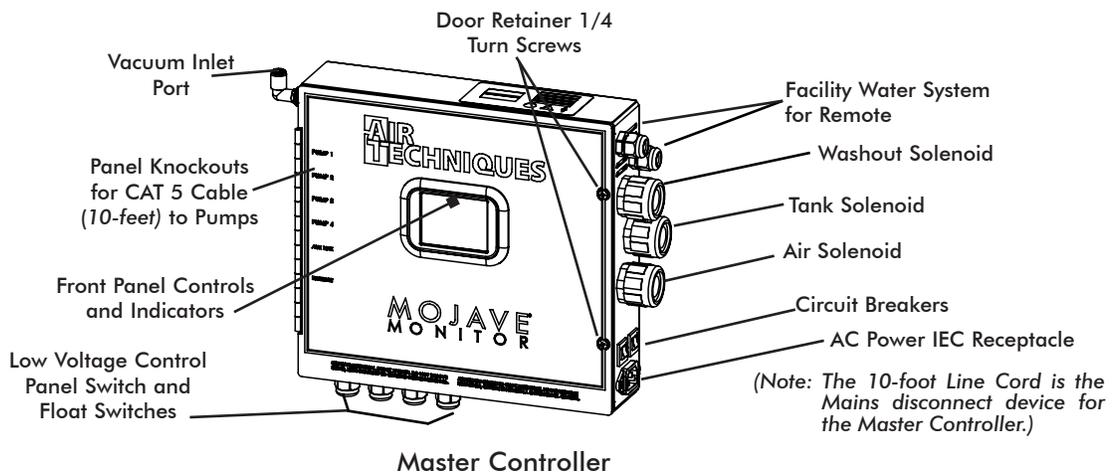
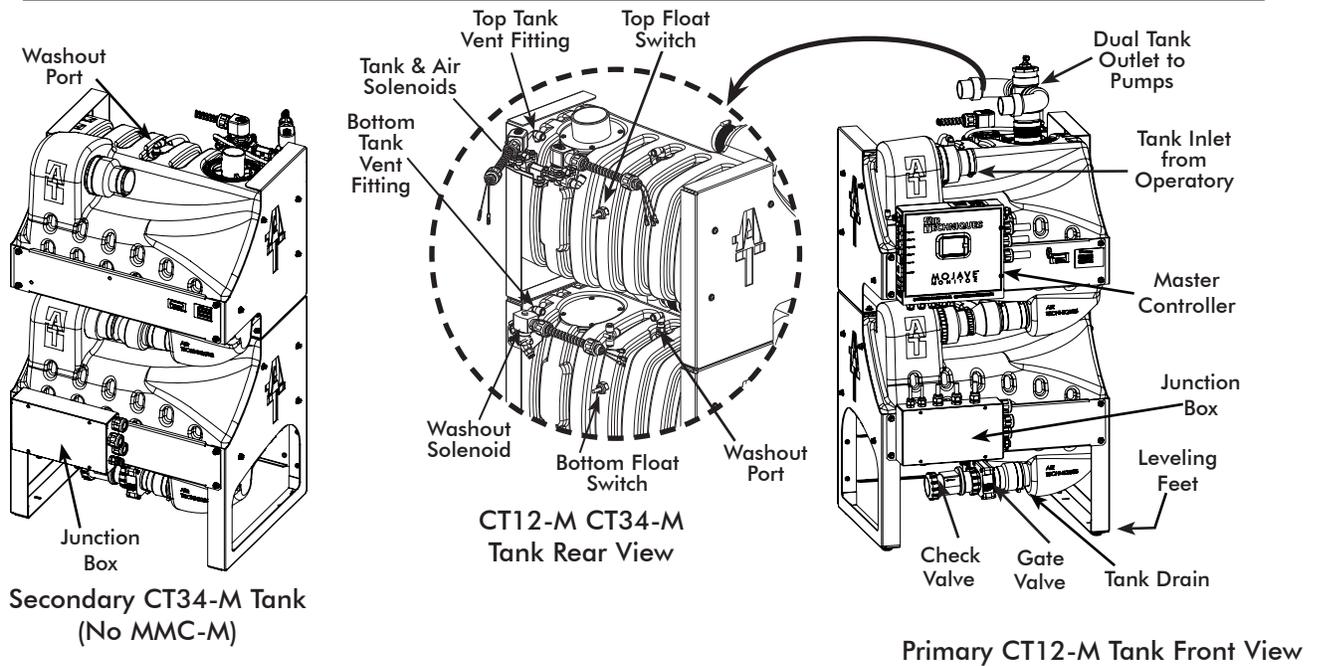
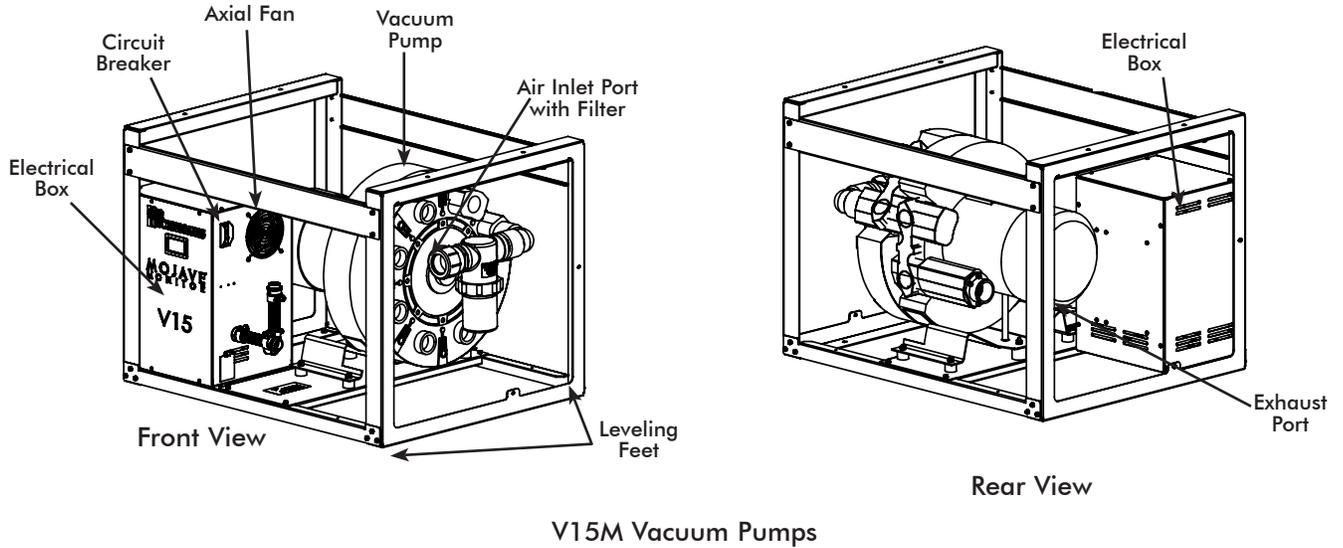


Figure 1. Main System Components

## PRODUCT DESCRIPTION



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. See Figure 2. 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 while the tank gradually fills.

Each continuum tank (CT12-M and CT34-M) has two internal float switches and 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 each tank. 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. 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.

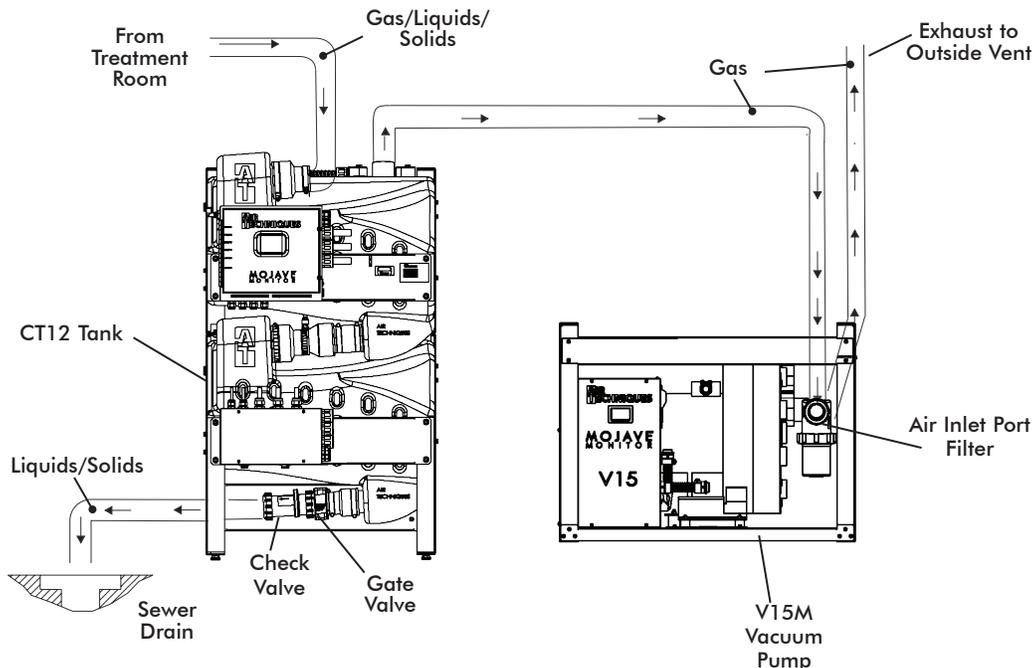


Figure 2. Typical MOJAVE Functional Flow Diagram



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 11.
- 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 provided on page 11.
- Make sure to install the supplied drip leg 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 exhaust port of the pump. Hose clamps are provided to secure hose to each exhaust port 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 CT12-M 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.
- Run a network cable into the room where you will set up your Mojave to allow connection to Vision Monitor.

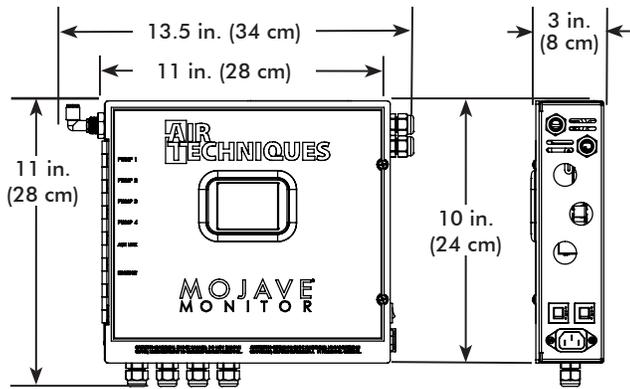
**Table 1. MOJAVE Accessory Packs and System Installation Kits**

Part No.	Description	Included With Every
H5403	MOJAVE V15M Pump Accessory Pack	V15M Pump
H5501	V15M Tank Outlet Kit	V15M and 3V15M System
H5502	2V15M Tank Outlet Kit	2V15M, 3V15M and 4V15M System
H5489	CT12-M Tank Accessory Pack	CT12-M Tank
H5288	CT34-M Tank Accessory Pack	CT34-M Tank

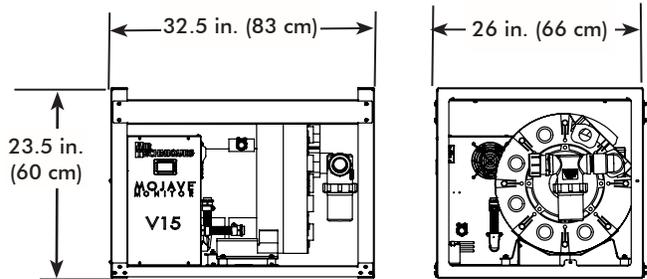
# INSTALLATION INFORMATION

## Physical Characteristics

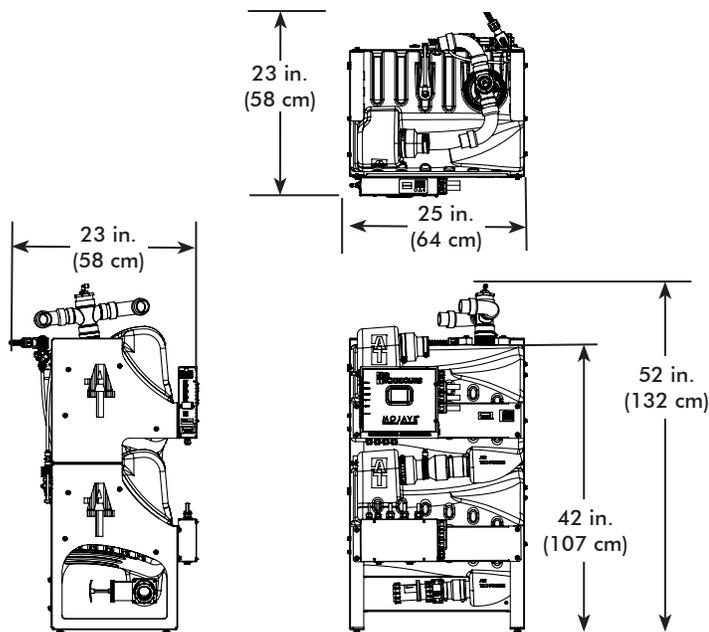
	Master Controller	CT12-M & CT34-M Continuum Tank	One V15M Pump	Two V15M Pumps Stacked
Width	11 in. (28 cm)	25 in. (64 cm)	32.5 in. (83 cm)	32.5 in. (83 cm)
Depth	3 in. (8 cm)	23 in. (58 cm)	26 in. (66 cm)	26 in. (66 cm)
Height	10 in. (24 cm)	42 in. (107 cm)	23.5 in. (60 cm)	47 in. (119 cm)
Weight	13 Lbs. (6 kg)	175 Lbs. (65 kg)	250 Lbs (93 kg)	500 Lbs (187 kg)



Master Controller Dimensions



V15M Vacuum Pump Dimensions



CT12-M and CT34 -M Continuum Tank Dimensions

Figure 3. MOJAVE System Component Dimensions

## Site Requirements

Electrical	V15M	2V15M	3V15M	4V15M	Master Controller
Voltage Rating Volts AC	All pumps 220 Volts 3 Phase AC, 60 Hz, ± 10%				220 (Single Phase ± 10%)
Voltage Minimum/Maximum	198/242 Volts AC All pumps				198/242
Wire Size AWG Minimum Gauge	#8 AWG	#8 AWG	#8 AWG	#8 AWG	#14 AWG
Minimum Circuit Breaker Rating	40A	40A (Qty 2)	40A (Qty 3)	40A (Qty 4)	15A
Incoming Power	Hard wire Connection (Each pump is supplied a 6 foot BX cable)				NEMA 6-15R (Supplied 10-ft. line cord)
Remote 24V (Low Voltage Wiring)	#18 AWG (Qty up to 4) Wire Connection between the MMC-M and the Remote Switch Panel . (See Figure 16, page 26.)				

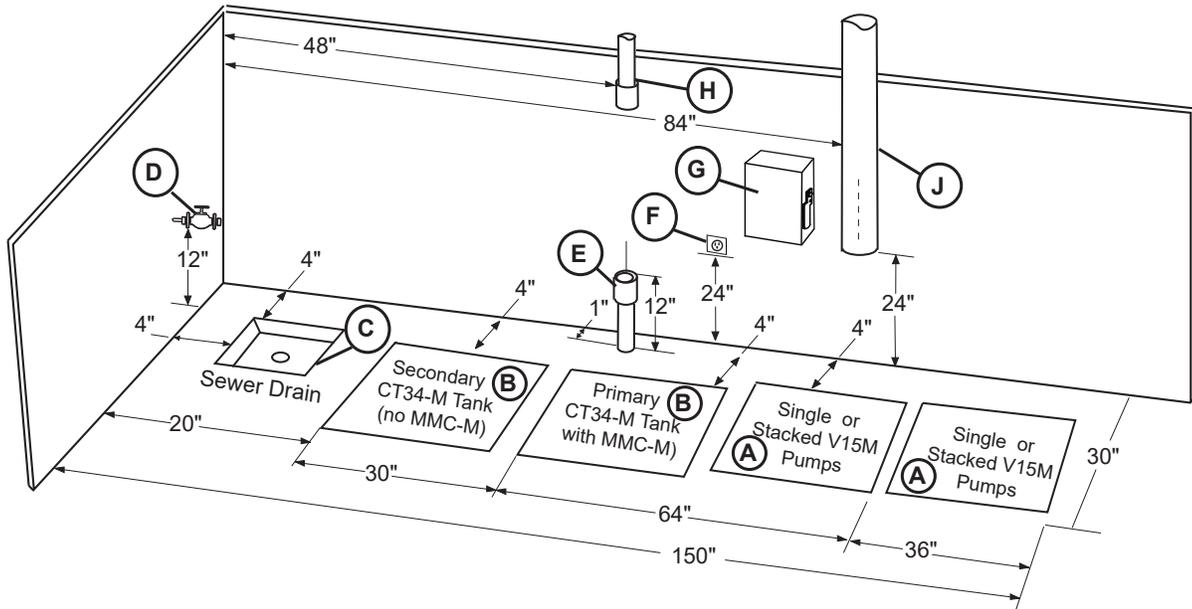
Plumbing	V15M	2V15M	3V15M	4V15M
Exhaust Vent Pipe (See note 1)	2" Metal Pipe	One 3" or two 2" Metal Pipe	One 4" or three 2" Metal Pipe	Two 3" or four 2" Metal Pipe
Minimum Suction Line Pipe	2" PVC Sch. 40	3" PVC Sch. 40	3" PVC Sch. 40	4" PVC Sch. 40
Maximum Suction Line Pipe (See note 2)	3" PVC Sch. 40	4" PVC Sch. 40	4" PVC Sch. 40	6" PVC Sch. 40
Riser Pipe	½" PVC Sch. 40	½" PVC Sch. 40	½" PVC Sch. 40	½" PVC Sch. 40
Vacuum Line Termination	3"	3"	3"	3"
Branch Line Pipe	Size requirement of branch piping differs by the number of operatories being serviced. Up to two operatories use 1" PVC Schedule 40. Three to six operatories use 1 ½" PVC Schedule 40. More that six operatories use 2" PVC Schedule 40			
Drain Line Pipe	1 ½" PVC Schedule 40			
Wash-Out Water Line	½" FNPT Shut-off Valve			

### NOTES

1. Recommend use wrought iron pipe (black or galvanized) or copper pipe type M.
2. Use maximum internal diameter for the main line when preparing any new installation.

# INSTALLATION INFORMATION

**Installation Layout Space.** Figure 4 shows the requirements for the installation of the various **MOJAVE** model configurations. Please note that all tanks are shipped with leveling feet set to lowest position. Heights can be increased by 1 inch by adjusting the leveling feet. The pump assembly is shipped without the leveling feet installed. They are supplied in the V15M Pump Accessory Kit, H5403. Refer to Figure 5 for the recommended configuration arrangements.



## Installation Notes.

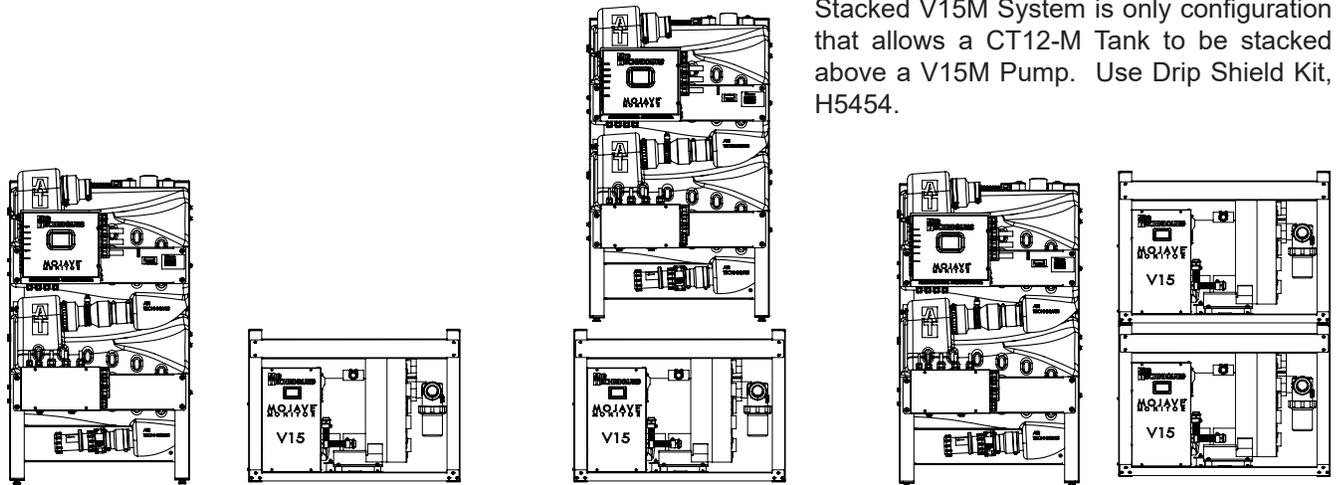
- A. PUMP INSTALLATION SPACE** - Area for single or stacked V15M pumps in typical side by side installations. Only stack up to 2 pumps in one area.
- B. TANK INSTALLATION SPACE** - Area for CT12-M or CT34-M tank in typical side by side installations.
- C. SEWER DRAIN** - Provide a drain for the removal 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.
- 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. SUB FLOOR INSTALLATION VACUUM LINE** - See Plumbing Requirements for connection to tank inlet via supplied hose.
- F. MASTER CONTROLLER ELECTRIC OUTLET** - Master Controller requires a dedicated standalone 220V, hospital grade grounded receptacle. The supplied 10-foot line cord is the Mains disconnect device for the unit.
- G. PUMP ELECTRIC SERVICE** - Each **MOJAVE** pump is wired directly with a dedicated 220V, 40 AMP, three phase 50/60 Hz circuit. If the 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.
- 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. Schedule 40 pipe can normally be used on typical **MOJAVE** configuration installations. 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.

Figure 4. V15M, 2V15M, 3V15M and 4V15M System Floor Plan

# MOJAVE SYSTEM CONFIGURATIONS

**Important:** Side by side installation of pump and tank is preferred.  
 V15M pumps should only be stacked two high in all other system configurations as shown.  
 All tanks are shipped with leveling feet set to lowest position.  
 V15M pumps are shipped without leveling feet. They are supplied in pump accessory kit.

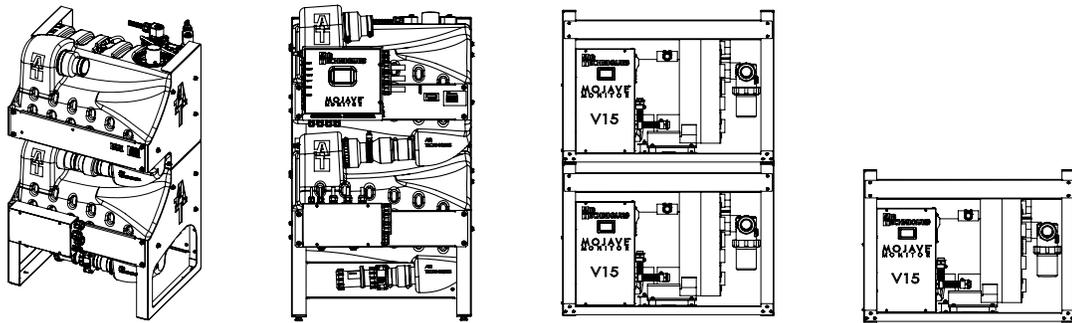
**Note:**  
 Stacked V15M System is only configuration that allows a CT12-M Tank to be stacked above a V15M Pump. Use Drip Shield Kit, H5454.



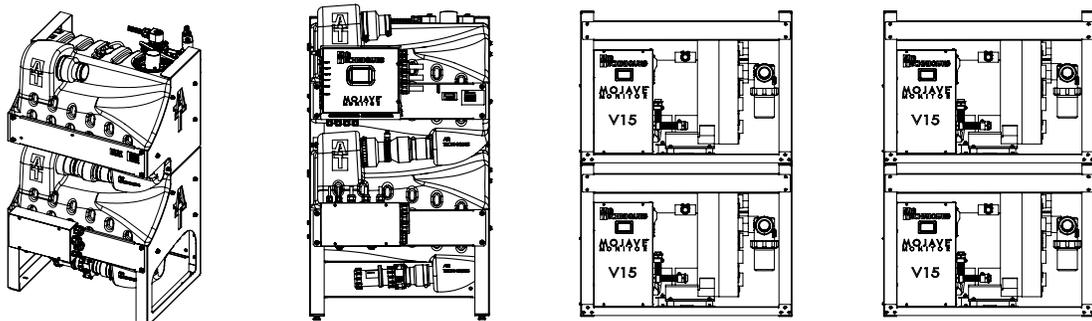
V15M System Installation: One V15M Pump and One CT12-M Tank Installed Side by Side

Stacked V15M System Installation: One CT12-M Tank above One V15M Pump (See note.)

2V15M System Installation: Two V15 Pumps Stacked with One CT12-M Tank on the Side



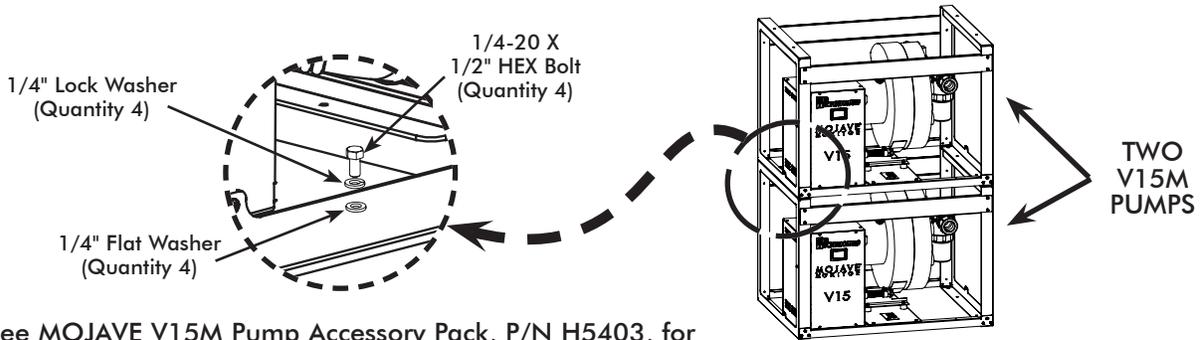
3V15M System Installation  
 Three V15M Pumps (2 stacked) with CT12-M and CT34-M Tanks on the Side



4V15M System Installation  
 Two Side by Side Stacks of Two V15M Pumps with CT12-M and CT34-M Tanks on the Side

Figure 5. MOJAVE System Configuration Layouts

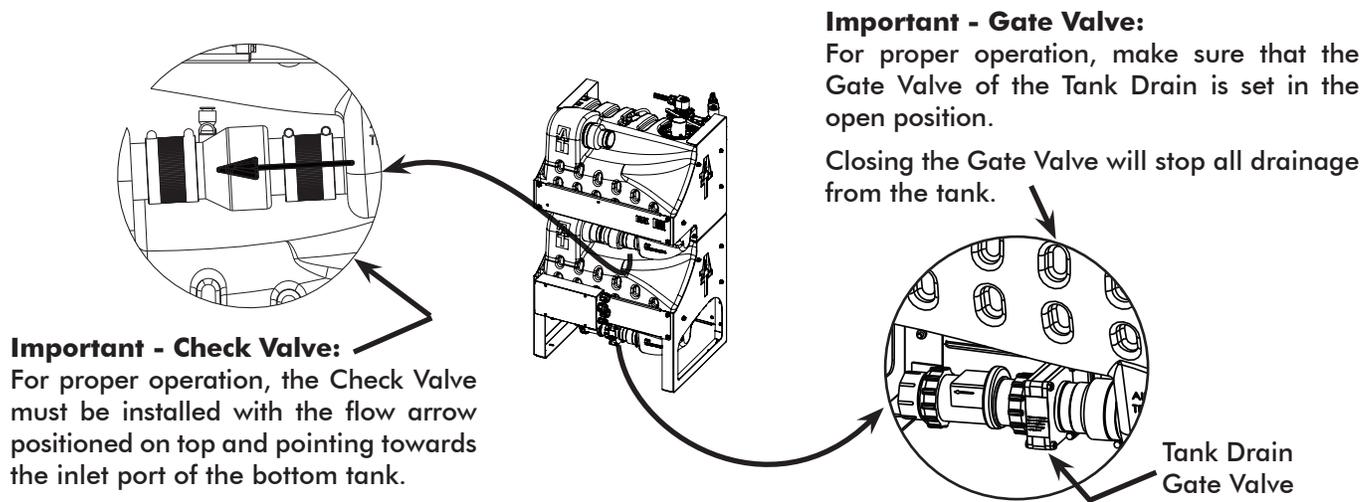
# INSTALLATION



**Note:** See MOJAVE V15M Pump Accessory Pack, P/N H5403, for required fastener hardware.

Do Not install leveling feet on top pump to be stacked.

**Figure 6. Stacking Two MOJAVE Pumps Hardware Detail**



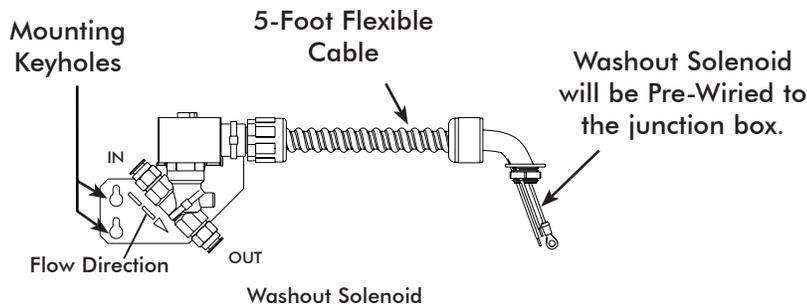
**Important - Check Valve:**  
For proper operation, the Check Valve must be installed with the flow arrow positioned on top and pointing towards the inlet port of the bottom tank.

**Important - Gate Valve:**  
For proper operation, make sure that the Gate Valve of the Tank Drain is set in the open position.  
Closing the Gate Valve will stop all drainage from the tank.

**Figure 7. CT12-M and CT34-M Check Valve and Gate Valve Operating Position**

**Washout Solenoid Installation Options.** The Washout Solenoid is delivered installed on the rear of CT12-M and CT34-M tanks.

Although not recommended, the Washout 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 CT12-M Tank Accessory Pack, P/N H5489.



**Figure 8. Washout Solenoid Optional Mounting**

**V15M System Installation.**

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

**Installation Accessory Packs.** Figures 9 and 10 show the hose connections required for the V15M **MOJAVE** System configuration installations using accessory packs that provide the required hoses, coupling clamps and adapters as follows:

- ❑ **V15M Pump Accessory Pack, P/N H5403** - supplied with each pump and is used to connect the pump exhaust to the facility vent line, connection item (3) on Figure 10.
- ❑ **CT12-M Tank Accessory Pack, P/N H5489** - used to make the following connections:
  - Between the suction line and tank inlet. Item (1) on Figure 9.
  - Install an exhaust vent assembly to the facility vent line, connection item (4) on Figure 10.
  - The tank outlet drain to the facility sewer drain. Item (5) on Figure 10.
  - Washout port to the washout solenoid or water shutoff valve. Item (6) on Figure 10.
- ❑ **V15M Tank Outlet Kit, H5501** - used to make the connections between the tank air outlet and pump inlet. See item (2) on Figure 9.

**Accessory Pack Supplied Components.** The supplied components of accessory packs (P/Ns H5403 and H5489) and the V15M Tank Outlet Kit (P/N H5501) are listed below. Verify that all listed items were received. If any item is missing, notify your dealer.

Table 2. V15M Pump Accessory Pack, P/N H5403

Part No.	Description	Qty	Part No.	Description	Qty
56057	Vent Hose, 2-1/4" ID X 17" Long 1" W Cuff	1	30914	Bolt 1/4-20 X 1/2, HEX Head, 18-8	4
89324	Hose Clamp 1-9/16"- 2-1/2" Maximum	2	30958	1/4" Flat Washer	4
419342	10 Foot CAT5e Network Cable	1	30920	1/4" Split Lock Washer	4
			57259	Leveling Feet	4

Table 3. CT12-M Tank Accessory Pack, P/N H5489

Part No.	Description	Qty	Part No.	Description	Qty
51453	Urethane Tubing, 1/4 OD 15 Feet	1	H5498M	Instruction Sheet CT12M Installation	1
19271	Poly Tubing, 3/8" OD 10 Feet	1	30936	Plastic Screw Anchor, #10-12 X 1"	4
H5542	Users Manual, V15M, 2V15M, 3V15M & 4V15M	1	30295	#10 X 3/4, Type A, Plated Slot Pan Head Screw	4
H5302	Exhaust Vent Assembly	1	56194	Connector Adapter, 1/2 MNPT X 3/8 PUSH	1
117527	Mojave Master Controller Line Cord 10 Feet, 14 GA., IEC X North America, Hospital Grade, 220V	1	H5159	2" Flexible Coupling Connector	1
			53202-1	Switch Assembly; Push Button, Panel Mount, GRN/YEL, 6V LED	1
			H5329	3" Flexible Coupling Connector	1

Table 4. V15M Tank Outlet Kit, H5501

Part No.	Description	Qty	Part No.	Description	Qty
H5459	Tank Outlet Assembly; Single Pump Installation	1	54521-10	1 1/2" ID, Clear Hose with Blue Helix , 10 Ft.	1
54512-4	2" ID, Clear Hose with Blue Helix, 4 Ft.	1	H5234	2" Flexible Coupling Connector	2

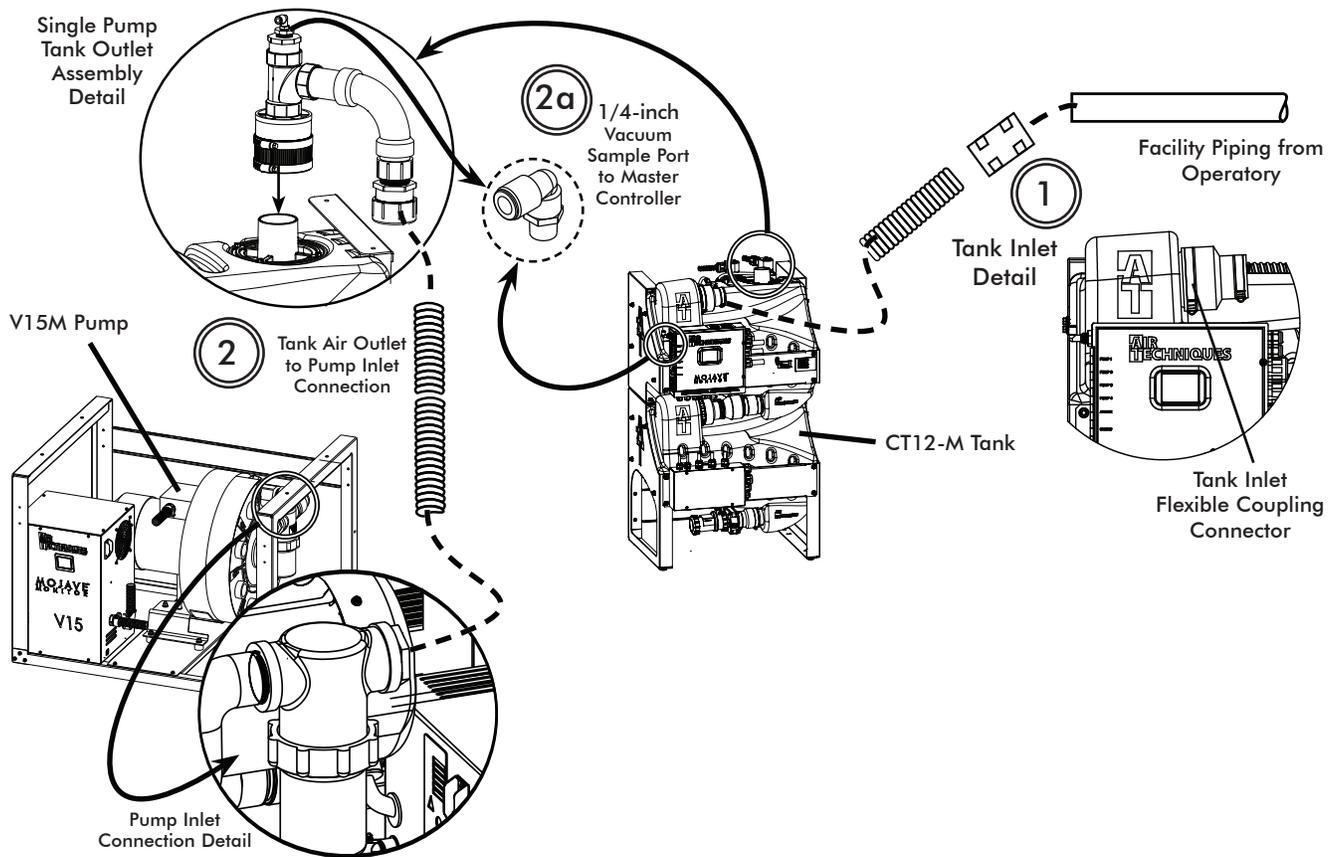
# INSTALLATION

**Installation Setup.** Installation of a V15M **MOJAVE** system configuration consists of placing the equipment in the proper installation space and making connections between a CT12-M tank and a V15M 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. Install the tank and pump side-by-side or stacked with a drip shield as shown by Figure 5.

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

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



### Important:

Make sure to efficiently use space by making connections as short and direct as possible to meet your particular site requirements.

Make sure that all hose connections are straight and secure without any sharp bends or kinks.

Since the vacuum hose is rigid, make sure not to stress connections especially at the pump inlet.

Figure 9. MOJAVE V15M Pump and CT12-M Tank Connection Diagram

**V15M Connection Procedure.** Using industry standard techniques, make the connections between the tank and pump with supplied components of accessory packs (P/Ns H5403 & H5501). Refer to Figures 9 and 10 for the connection diagram and perform the following procedure.

1. **Suction Line to Tank Inlet Connection.** Refer to Figure 9, item (1).
  - a. Install 2" flexible coupling (P/N H5159) to the pipe from the operator.
  - b. Install the 2" ID, clear hose (P/N 54512) cut for installation between the operator suction line and tank inlet and tighten the flexible coupling clamps.
2. **Tank Air Outlet to Pump Inlet Connection.** Refer to Figure 9, item (2).
  - a. Install the Single Pump Tank Outlet Assembly (P/N H5459) onto the tank outlet port and secure with the hose clamp at the base of the outlet assembly. The outlet assembly is provided with the V15M Tank Outlet Kit (P/N H5501).
  - b. Connect 1 ½" ID, clear hose (P/N 54521) cut for installation between the compression adapters of the Single Pump Tank Outlet Assembly and pump air inlet filter. Secure by tightening the compression nut of both adapters.
  - 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.)
3. **Pump Exhaust Vent Connection.** Refer to Figure 10, item (3) and connect the vent hose (P/N 56057) between the pump and the facility vent line. Secure with two hose clamps (P/N 89324).
4. **Drip Leg Assembly Installation.** Install the Drip Leg Assembly (P/N H5207) 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 and facility sewer drain. See Figure 10, item (4).

**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.
5. **Tank Drain to Facility Sewer Connection.** Connect the last section of 1 ½" ID, clear hose cut for installation to the tank outlet drain. Secure by tightening the check valve compression nut. Connect unconnected hose end to the facility sewer drain as necessary. See Figure 10, item (5).
6. **Tank Washout Port to Facility Water Connection.** Refer to Figure 10, item (6) and install a length of 3/8 inch tubing (P/N 19271) between the washout port and the water solenoid then from the solenoid to water shutoff valve. The tubing is provided with CT12 Tank Accessory Pack, P/N H5489.
7. **System Electrical Connections.** Refer to the Electrical Connections section and connect the pump and Master Controller to facility power.

# INSTALLATION

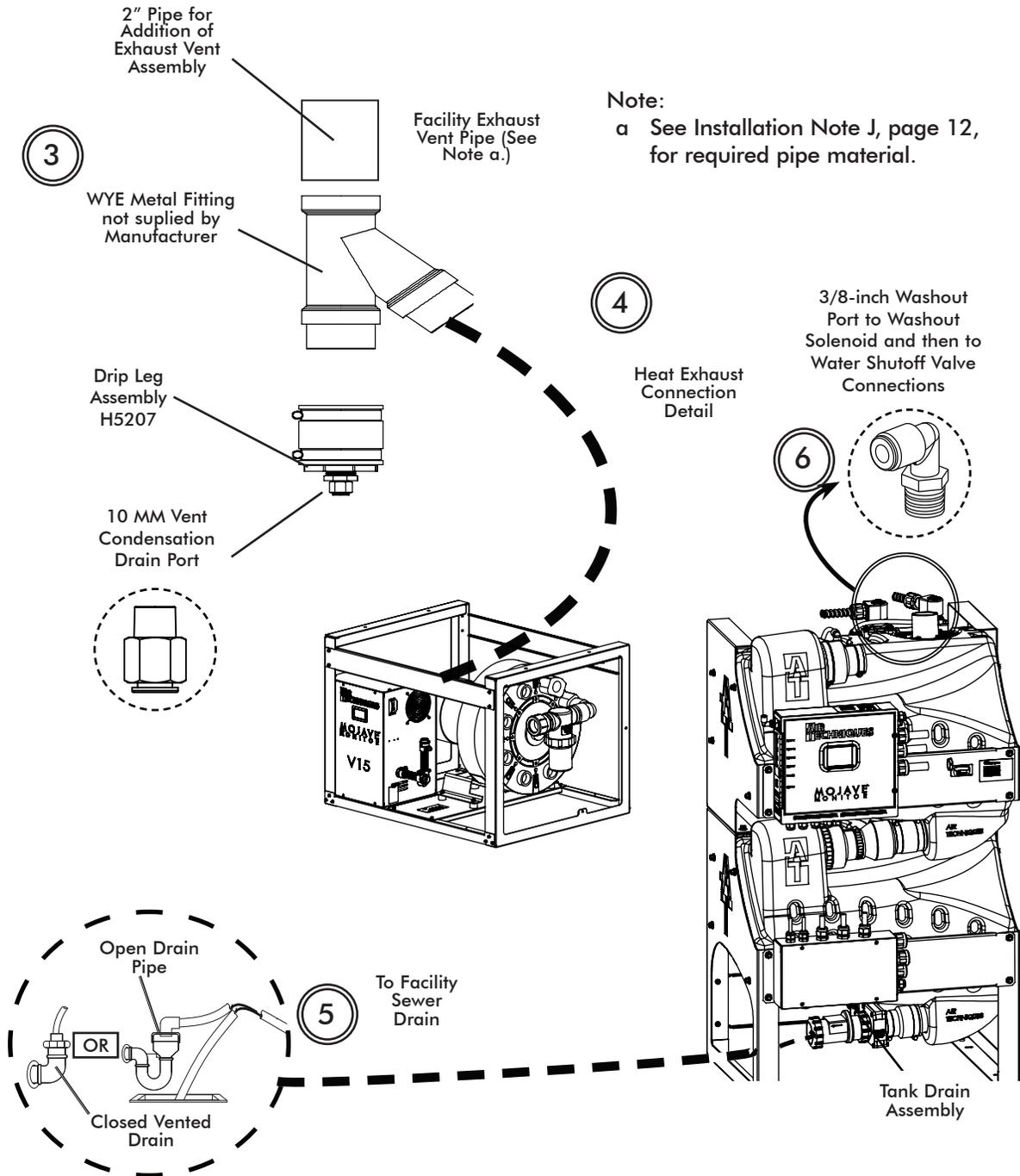


Figure 10. MOJAVE V15M Pump Vent and CT12-M Tank Drain Connection Diagram

**2V15M System Installations.**

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

**Installation Accessory Packs.** Figures 11 and 12 show the hose connections required for all dual **MOJAVE** system configuration installations using accessory packs that provide the required hoses, clamps and adapters as follows:

- ❑ **V15M Pump Accessory Pack, P/N H5403** - supplied with each pump and is used as follows.
  - Stack the associated **MOJAVE** pumps as shown by Figure 6.
  - Connect each pump to the facility vent line, connection item (3) on Figure 12.
- ❑ **CT12-M Tank Accessory Pack, P/N H5489** - used to make the following connections:
  - Between the suction line and tank inlet. Item (1) on Figure 11.
  - Install Drip Leg Assembly to the facility vent line, connection item (4) on Figure 12.
  - The tank outlet drain to the facility sewer drain. Item (5) on Figure 12.
  - The washout port to the washout solenoid or water shutoff valve. Item (6) on Figure 12.
- ❑ **2V15M Tank Outlet Kit, H5502** - used to make the connections between the tank air outlet and each pump inlet. Item (2) on Figure 12.

**Supplied Components.** The supplied components of the 2V15M Tank Outlet Kit, H5502 are listed below. The supplied components of accessory packs( P/Ns H5403 & H5489) are provided on page 15. Verify that all listed items were received. If any item is missing, notify your dealer.

Table 5. 2V15M Tank Outlet Kit, H5502

Part No.	Description	Qty
H5441	Tank Outlet Assembly; Dual Pump Installation	1
54521	1 ½" ID, Clear Hose with Blue Helix 20 FT	1
54512	2" ID, Clear Hose with Blue Helix 4 FT	1
54138	Check Valve Modified	2
H5234	2" Flexible Coupling Connector	2

**Installation Setup.** Installation of a dual pump **MOJAVE** system (2V15M) configuration consists of placing the equipment in the proper installation space while 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 pumps, 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 H5403.

**Note:** If additional 1 ½" ID, Clear Hose hose is needed, order P/N 54521 (order by the foot)

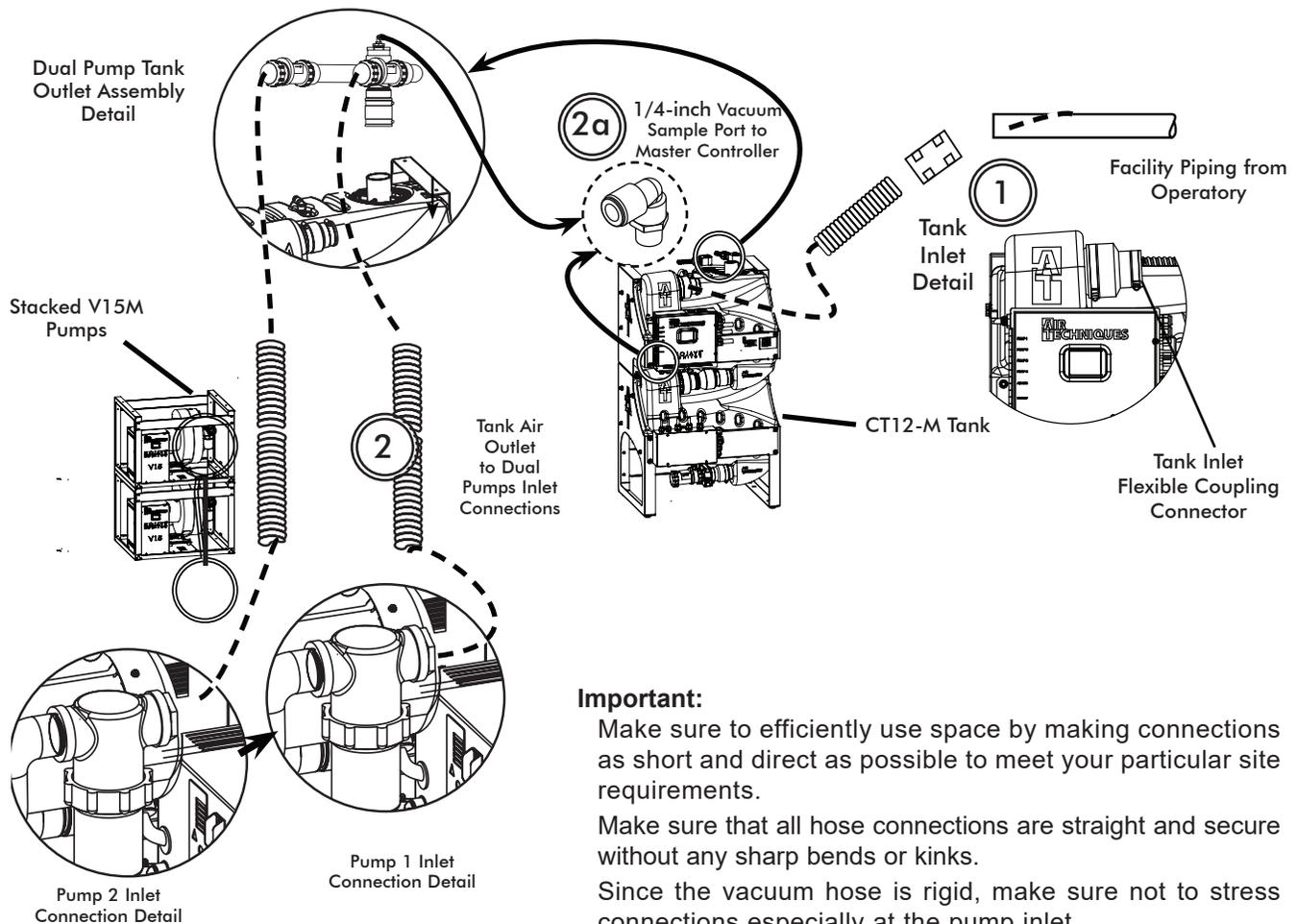
4. Measure and record distance between each connection point. Cut the supplied hose to the length required for each connection.

# INSTALLATION

**2V15M Connection Procedure.** Using industry standard techniques, make the connections between the tank and pumps with supplied components of accessory pack (P/N H5489) and 2V15M Tank Outlet Kit (P/N H5502). Refer to Figures 11 and 12 for the connection diagram and perform the following procedure.

1. **Suction Line to Tank Inlet Connection.** Refer to Figure 11, item (1) .
  - a. Install 2" flexible coupling connector (P/N H5159) to the pipe from the operator.
  - b. Install the 2" ID, clear hose (P/N 54512) between the operatory suction line and tank inlet and secure with 2" flexible coupling connector.
2. **Tank Air Outlet to Pump Inlets Connection.** Refer to Figure 11, item (2) .
  - a. Install the Dual Pump Tank Outlet Assembly (P/N H5441) onto the tank outlet port and secure with the hose clamp at the base of the tank outlet assembly. The outlet assembly is provided with 2V15M Tank Outlet Kit (P/N H5502).
  - b. Connect 1 1/2" 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 each 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 11, 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.



**Important:**

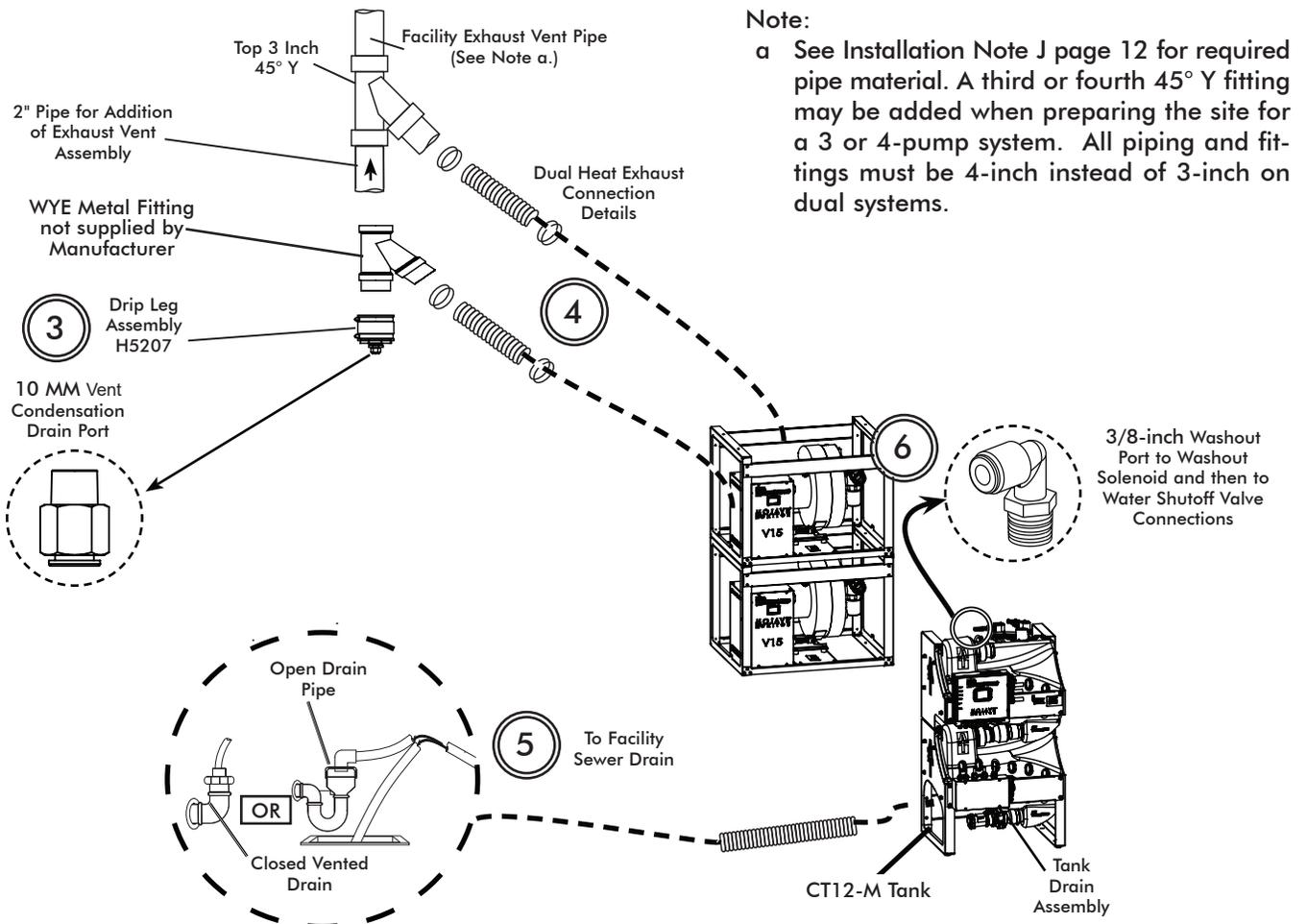
Make sure to efficiently use space by making connections as short and direct as possible to meet your particular site requirements.

Make sure that all hose connections are straight and secure without any sharp bends or kinks.

Since the vacuum hose is rigid, make sure not to stress connections especially at the pump inlet.

Figure 11 MOJAVE Dual Pump and Tank Connection Diagram

3. **Heat Exhaust Vent Connection.** Refer to Figure 12, item (3) and connect the vent hose (P/N 56057) between each pump and the facility vent line. Secure with two hose clamps (P/N 89324).
4. **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 and facility sewer drain. See Figure 12, item (4).
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 the check valve compression nut. Connect unconnected hose end to the facility sewer drain as necessary. See Figure 12, item (5).
6. **Tank Washout Port to Facility Water Connection.** Refer to Figure 12, item (6) and install a length of 3/8 inch tubing (P/N 19271) between the washout port and the washout solenoid, then to the solenoid water shutoff valve. The tubing is provided with CT12 Tank Accessory Pack, P/N H5489.
7. **System Electrical Connections.** Refer to the Electrical Connections section and connect each pump and Master Controller to facility power.



**Figure 12. MOJAVE Dual Pump Vent and Tank Drain Connection Diagram**

# INSTALLATION

## 3V15M and 4V15M System Installations.

**Installation Accessory Packs and Kits.** Refer to Table 6 to find the correct accessory packs and kits that are used for the installation of 3V15M and 4V15M MOJAVE systems. Figures 13 and 14 show the hose connections required for 3V15M and 4V15M MOJAVE system configuration installations using accessory packs and kits that provide the required hoses, clamps and adapters as follows:

Table 6. Quantity of Accessory Packs and Kits Used on 3V15M and 4V15M

Part No.	Description	Mojave System	
		3V15M	4V15M
H5501	V15M Tank Outlet Kit	✓ 1	N/A
H5502	2V15M Tank Outlet Kit	✓ 1	✓ 2
H5403	V15M Pump Accessory Pack	✓ 3	✓ 4
H5489	CT12-M Tank Accessory Pack	✓ 1	✓ 1
H5288	CT34-M Tank Accessory Pack	✓ 1	✓ 1

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

- ❑ **V15M Pump Accessory Pack, P/N H5403** - use as follows.
  - Stack the associated **MOJAVE** pumps as shown by Figure 6.
  - Connect each pump to the facility vent line, connection item (3) on Figure 13.
- ❑ **CT12-M Tank Accessory Pack, P/N H5489** - used to make the following connections:
  - Between the suction line and tank inlet. Item (1) on Figure 14.
  - Install the exhaust vent assembly to the facility vent line, connection item (4) on Figure 13.
  - The tank outlet drain to the facility sewer drain. Item (5) on Figure 13.
  - Washout port to the washout solenoid or water shutoff valve. Item (9) on Figure 14.
- ❑ **CT34-M Tank Accessory Pack, P/N H5288** - used to install a CT34 tank and make connections to the CT12-M tank.
- ❑ **V15M Tank Outlet Kit, P/N H5501** - used to make the connections between the tank air outlet and pump inlet. See item (2) on Figure 13.
- ❑ **2V15M Tank Outlet Kit, H5502** - used to make the connections between the tank air outlet and each pump inlet. See item (2) on Figure 13.

**Supplied Components.** The supplied components of CT34-M Tank Accessory Pack, P/N H5288 are listed by Table 7. The supplied components of accessory packs( P/Ns H5403 & H5489) and the V15M Tank Outlet Kit (H5501) are provided by Tables 2,3 and 4. The supplied components of 2V15M Tank Outlet Kits H5502 are provided by Table 5. Verify that all listed items were received. If any item is missing, notify your dealer.

Table 7. CT34-M Tank Accessory Pack, P/N H5288

Part No.	Description	Qty	Part No.	Description	Qty
H5478M	Instruction Sheet CT34-M Installation	1	19271	POLY TUBING; 3/8"OD	10ft
H5542	Users Manual, V15M	1	51453	Tubing 1/4"OD	10ft
56194	Push Adapter 1/2MNPT X 3/8	1	H5329	3" Flexible Coupling	1
56339	Push Pconn; Union TEE, 1/4	1	H5159	2" Flexible Coupling	1
56333	Pconn; Union TEE, 3/8PUSH	1	H5207	Drip Leg Assembly	1
54509	Poly Tubing,10MM OD, 6.5MM ID	10ft			

**Installation Setup.** Installation of triple and quad **MOJAVE** system (3V15M or 4V15M) 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. Refer to Figures 4 and 5 to determine the installation footprint dimensions and connection requirements.

1. Refer to Figure 6 and stack pumps, securing them using hardware supplied by the V15M Pump Accessory Pack, P/N H5403. Never stack more than two pumps high.
2. Place the CT12-M and CT34-M tanks and V15M pumps in side by side configuration as shown by Figure 13. Space between tanks should be no more than 3 feet.
3. Assemble a Dual Pump Tank Outlet assembly supplied in the 2V15M Tank Outlet Kit, H5502, per the instructions supplied in the kit.
4. Using customer-supplied 2-inch pipe, fabricate reducing Y or tee adapters to connect each pump vent tube to the common exhaust vent line. See Figure 13 and the Installation Information section.
5. As shown by Figure 13, use customer-supplied 4 and 2 inch pipe and fabricate an inlet tee connector as shown by Figure 14.
6. Measure and record distance between each connection point as shown in the corresponding connection detail diagrams, Figures 13 and 14.
7. Cut the supplied hose to the length required for each connection.

**3V15M and 4V15M Connection Procedure.** Using industry standard techniques, make the connections between the tanks and pumps with supplied components of accessory packs (P/N H5489 and H5488) and V15M and 2V15M Tank Outlet Kits (P/Ns H5501 and H5502). Refer to Figures 13 and 14 for the connection diagram and perform the following procedure.

**Note:** Order P/N 51453 for additional 15 foot lengths of 1/4 inch OD Urethane Tubing if needed.

1. **Suction Line to Tank Inlet Connection.** Refer to Figure 12, item (1).
  - a. Using the supplied 2-inch flexible coupling connector (P/N H5159), install the fabricated tee connector into the inlet of the CT12-M and CT34-M tanks.
  - b. Connect the 4-inch part of fabricated tee to the pipe from the operator.
  - 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 14.
2. **Tank Air Outlet to Pump Inlets Connection.** Connect 1 1/2" ID, clear hose (P/N 54521) cut for installation between the check valves of the dual pump inlet and the compression adapter of the single pump inlet. Secure by tightening each compression nut. See Figure 13, item (2).
3. **Heat Exhaust Vent Connection.** Refer to Figure 13, item (3) and connect the vent hose (P/N 56057) between the pump exhaust and the facility vent line via fabricated reducing Y or tee adapters. Secure with hose clamps (P/N 89324).
4. **Exhaust Vent Assembly Installation.** Install the vent (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 and facility sewer drain. See Figure 13, item (4).
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 the check valve compression nut. Connect unconnected hose end to the facility sewer drain as necessary. See Figure 13, item (5).
6. **Tank Washout Port to Facility Water Connection.** Refer to Figure 14, item (9) and install a length of 3/8 inch tubing (P/N 19271) between the washout port and washout solenoid, then the solenoid to the water shutoff valve. The tubing is provided with CT12-M Tank Accessory Pack, P/N H5243. Use the union tee provided with P/N H5288, CT34-M Tank assembly kit to connect the washout from CT12-M.
7. **System Electrical Connections.** Refer to the Electrical Connections section and connect each pump and Master Controller to facility power.

# INSTALLATION

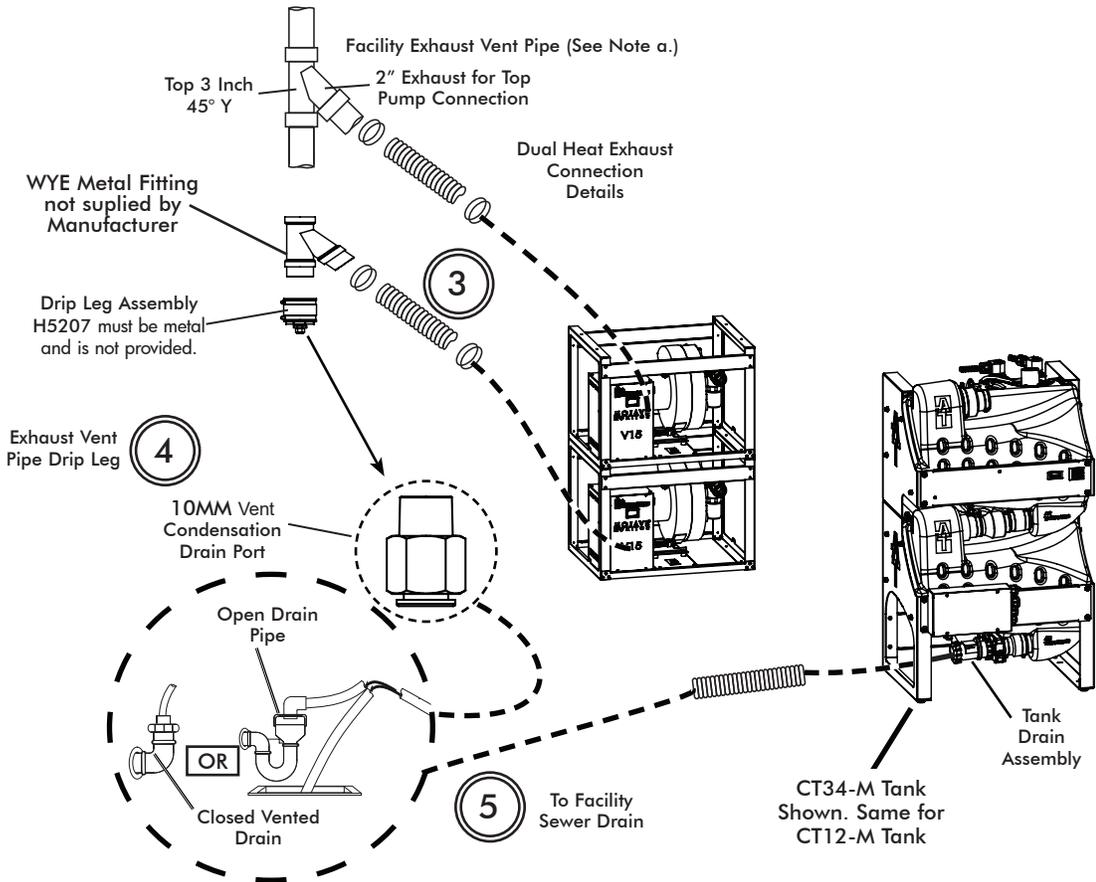
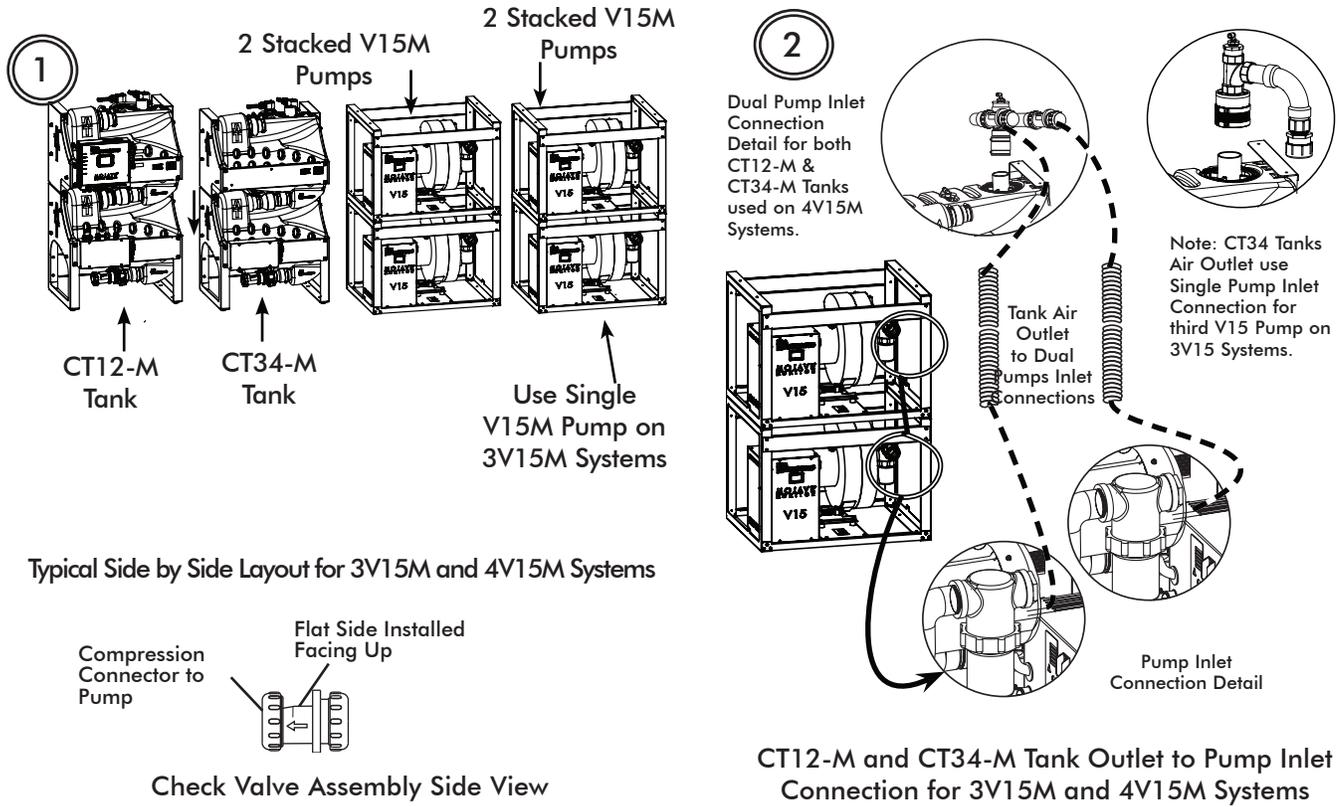


Figure 13. CT12-M and CT34-M Tank Output, Drain and Pump Vent Connection Diagram

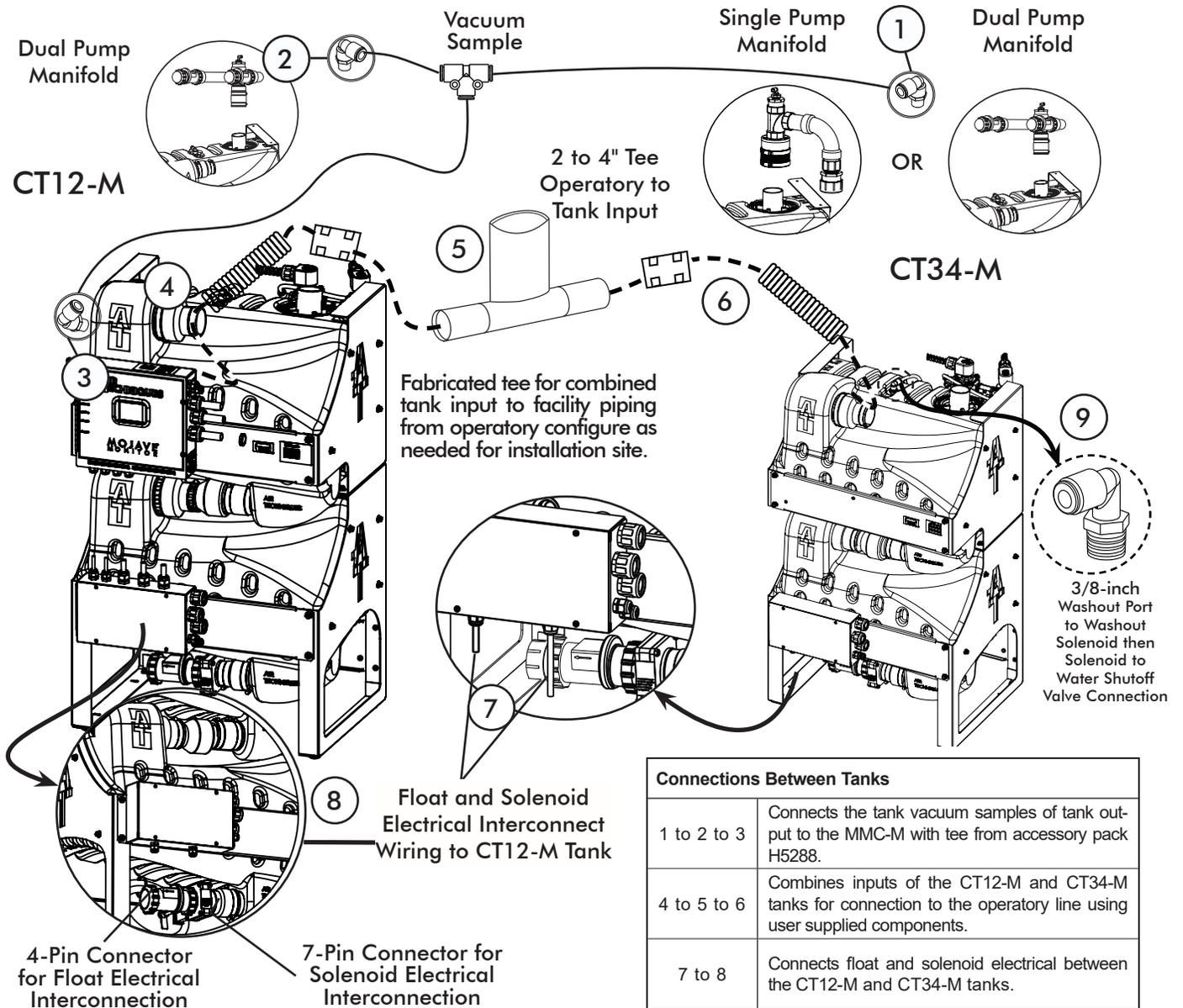


Figure 14. CT12-M Tank to CT34-M Tank and Washout Port Connections Diagram

# 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 dedicated 3-phase 220VAC, 40 AMP 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.

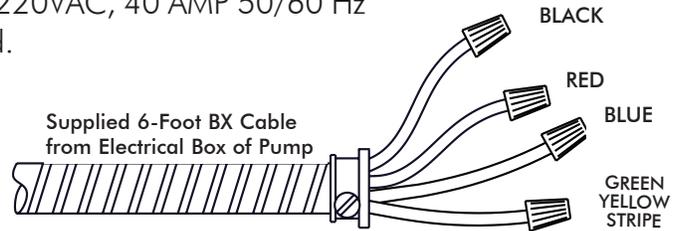
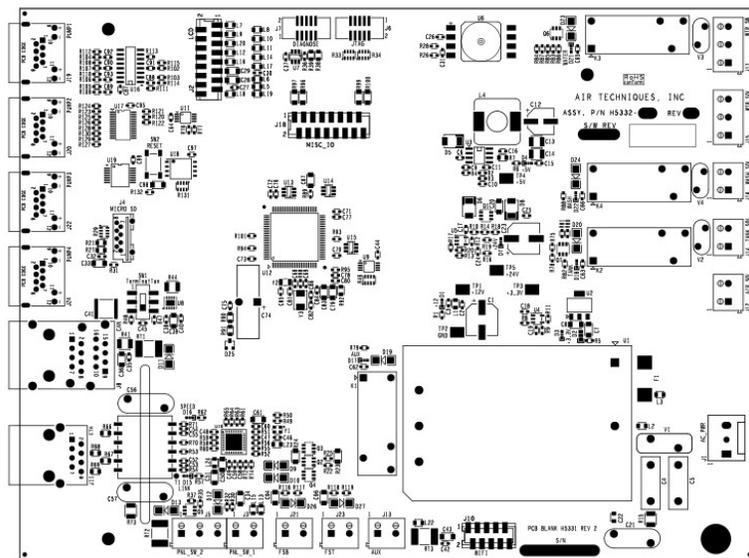


Figure 15. MOJAVE Pump Power Connection

**Master Controller Connections.** The Master Controller is connected to a dedicated 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.

**Note:** Use 18 Gauge for interconnect cable to connect between unit and remote switch.

**Remote Switch Connection Options.** The Master Controller is connected to a dedicated hospital grade grounded receptacle using remote switch installation. Refer to Figure 15 with associated connection list and make the necessary connections required for your specific **MOJAVE** system.



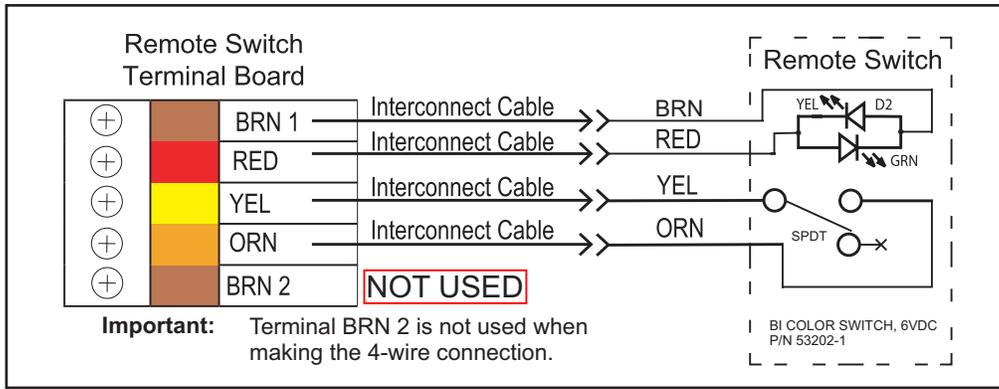
**Note 1:** The 10-foot Line Cord is the Mains disconnect device for the Master Controller.

**Note 2:** (2) and (3) refers to old style Air Techniques rocker switches. Do not connect (4).

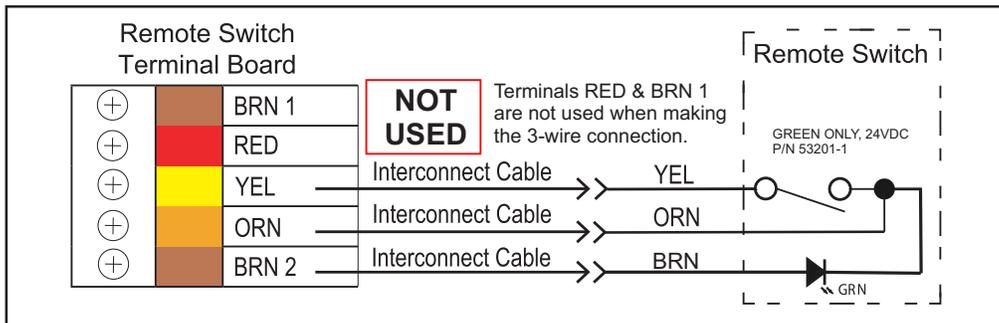
**Note 3:** Although Air Techniques supplies a remote panel switch (#53202-1) for use with the MMC-M, any remote switch can be used connected to MMC-M J13 only. All remote system status indication is lost when using switches other than switch #53202-1 provided. The 4 to 3 wire conversion only works with the supplied switch, #53202-1.

Connector	Function	Connector	Function
J17	Main Water Panel Switch (optional)	J21	Float Switch Bottom (CT20-M only - pre-wired)
J15	Main Water Solenoid (optional)	J23	Float Switch Top MT10-M Tank & CT20-M Tank (pre-wired)
J16	Washout Solenoid (pre-wired)		
J7	Tank Solenoid (CT20-M only - pre-wired)	J19, J20,	10-foot CAT 5 Cable to each Pump
J14	Air Solenoid (CT20-M only - pre-wired)	J22, J24	
J13	AUX - Alarm	J11	Ethernet Jack
J8	AUX - Jack (future use)		

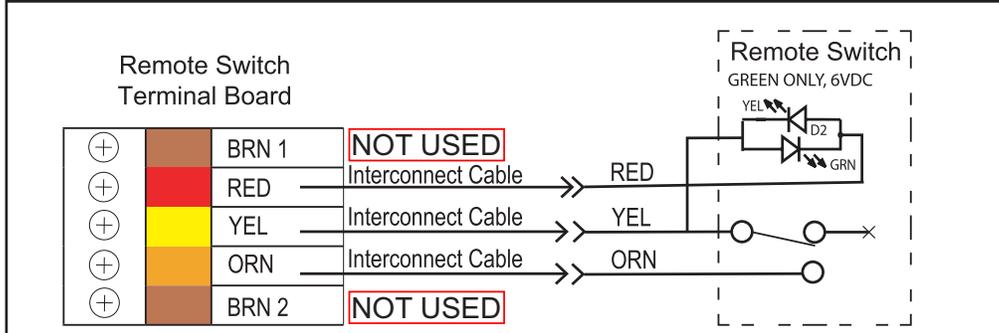
Figure 16. Master Controller Wiring Diagram



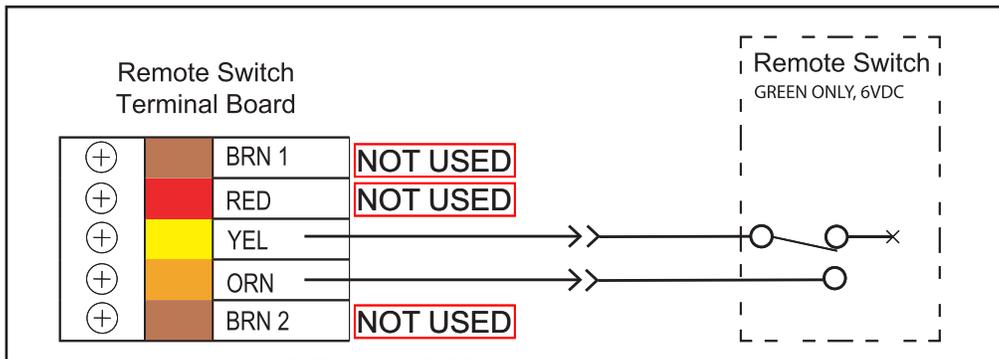
View A. 4-Wire Green & Yellow Indicators 6 VDC Remote Switch Installation



View B. 3-WIRE GREEN INDICATOR ONLY 24 VDC REMOTE SWITCH INSTALLATION



View C. 3-WIRE GREEN INDICATOR ONLY 6 VDC REMOTE SWITCH INSTALLATION



View D. 2-WIRE NO INDICATOR DRY CONTACT REMOTE SWITCH INSTALLATION  
Figure 15. Remote Switch Connection Options

## OPERATING INFORMATION

### General.

- ❑ The vacuum level is factory preset at 10.0 inHg. This vacuum set point is adjustable from 8.0 to 15.0 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.

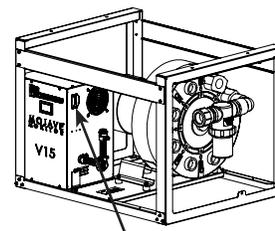
As the mains power disconnect of the associated pump, this combination switch and circuit breaker controls application of the connected input power and protects the pump from overloads and short circuits.

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 controls 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 50 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.



Pump Power On/Off Switch and Circuit Breaker

**START UP BY TOUCH SCREEN**

1. Set the motor **Mains Circuit Breaker** in the **ON** position.
2. Observe that the color touch screen illuminates and depress the blue **Standby** button.
3. Observe that the **Standby** button changes to a green **Running** button, that the unit is running and the **Vacuum** widget shows increasing pressure.

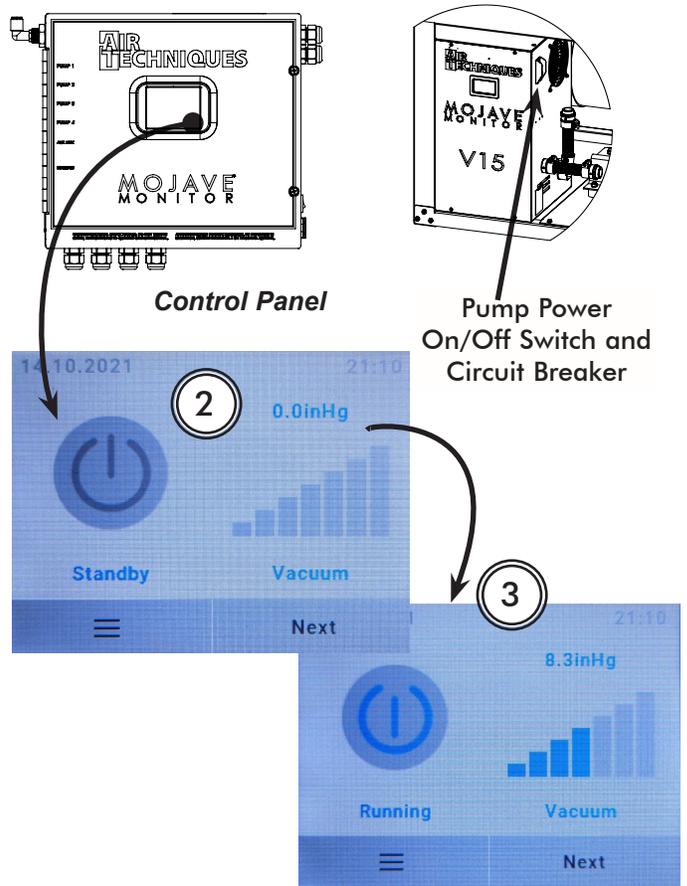
**START UP BY OPTIONAL REMOTE SWITCH**

1. Set the motor **Mains Circuit Breaker** to the **ON** position.
2. Observe that the when in **Standby** with no errors the push button indicator is extinguished.

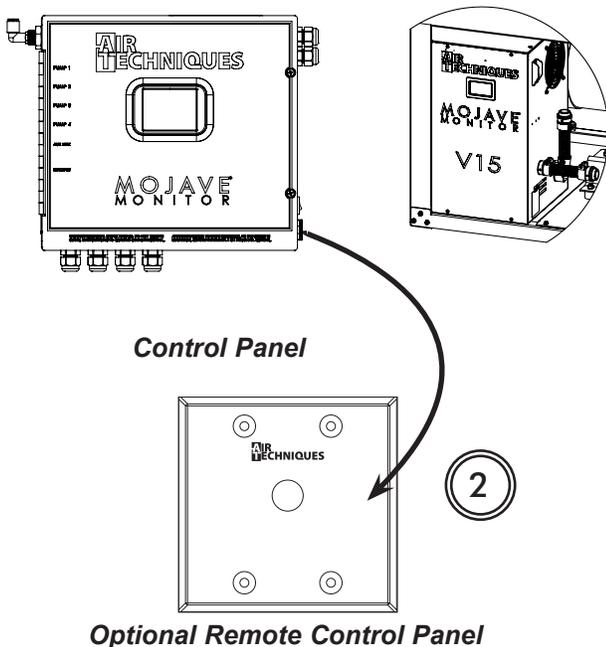
**Note a:** Depending on the site installation, the remote switch can be either a Bi-Color LED 6VDC switch (included) or a single green LED 24 VDC switch.

Refer to the tables below for the LED conditions for each switch during operation.

3. Depress the push button switch and observe that the associated indicator illuminates as listed for the corresponding switch.



**Color LCD Touch Screen Display**



6V DC Bi-Color Green / Yellow Indicators (See Note a.)		
Bi-Color LED Condition	Run State	Condition Description
None	Standby	No errors
Solid Green	Running	No errors
Flashing Yellow	Standby	Error present
Alternating Green / Yellow	Running	Error present

24V DC Green Indicator Only (See Note a.)		
Green LED Condition	Run State	Condition Description
None	Standby	No errors
Solid Green	Running	No errors
Flashing Green – Slow	Standby	Error present
Green – Fast	Running	Error present

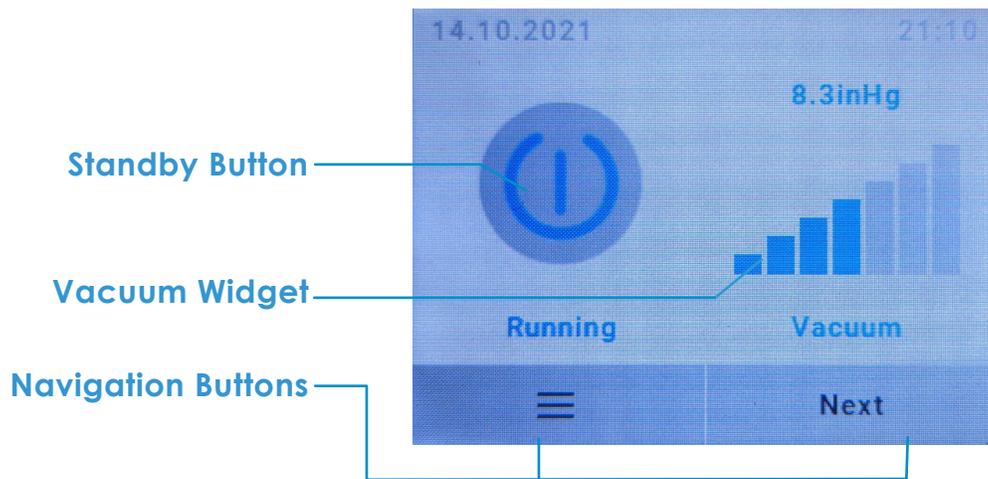
# TOUCHSCREEN CONTROLS

**Note:** The motor power circuit breaker must be kept in the **ON** position to operate the color LCD touch screen display. See Operating Information on page 28.

All **MOJAVE** units have a color LCD touch screen display located on the front control box panel. This display is used to start the unit and show system operating status. It also serves as an input for controlling operation and adjusting system parameters.

The display shows two screens during normal operation; a Home Screen and a Settings Screen. The Home Screen is used to start and monitor operation of the **MOJAVE**, while the Settings Screen allows changes to operating parameters.

The screens are comprised of operation Buttons, Navigation Buttons and Widgets as described below.



## Operation Buttons

**Standby Button** - Home Screen Standby Button that when blue, indicates the system is in the "Standby" mode. When pressed, this switch starts the compressor operation.

**Running Button** - Home Screen Standby Button that when green indicates the system is in the "Running" mode. When pressed, this switch stops **MOJAVE** operation and returns to the "Standby" (blue button) mode.

**Error Button** - Home Screen Standby Button that when red indicates an error is present causing the **MOJAVE** to shut down operation.

**Navigation Buttons** - located on the bottom of the screen these buttons allow the user to migrate within a screen by going to the next screen level or to transfer between the Home Screen and a Settings Screen.

**Widget** - an element of a graphical user interface (gui) that is used to display information during vacuum operation. The Home Screen normally shows the Vacuum Widget while the Motor Frequency, Separator RPMs, Voltage and Temperature widgets are accessed by pressing the **Next** Navigation Button.

**1. HOME SCREEN**

a. STANDBY BUTTON / VACUUM SCREEN

i. **Standby Button**

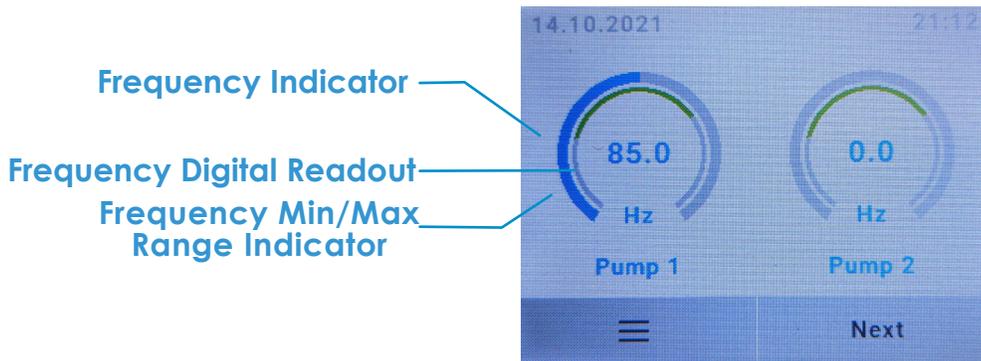
- Running: Motor and separator run to maintain the set vacuum level of 8.0 to 15.0 inHg.
- Standby: Motor and separator are not running.
- Error: Motor and separator do not run.

ii. **Vacuum Widget** - Displays current vacuum level.



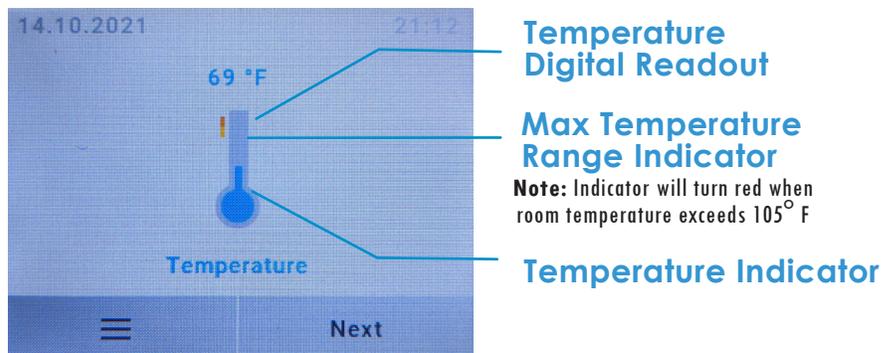
b. PUMP / SEPARATOR SCREEN

- i. **Pump Frequency Widget** - Displays current frequency level with min/max range indicator.
- ii. **Separator RPM Widget** - Displays current RPM value with min/max range indicator.

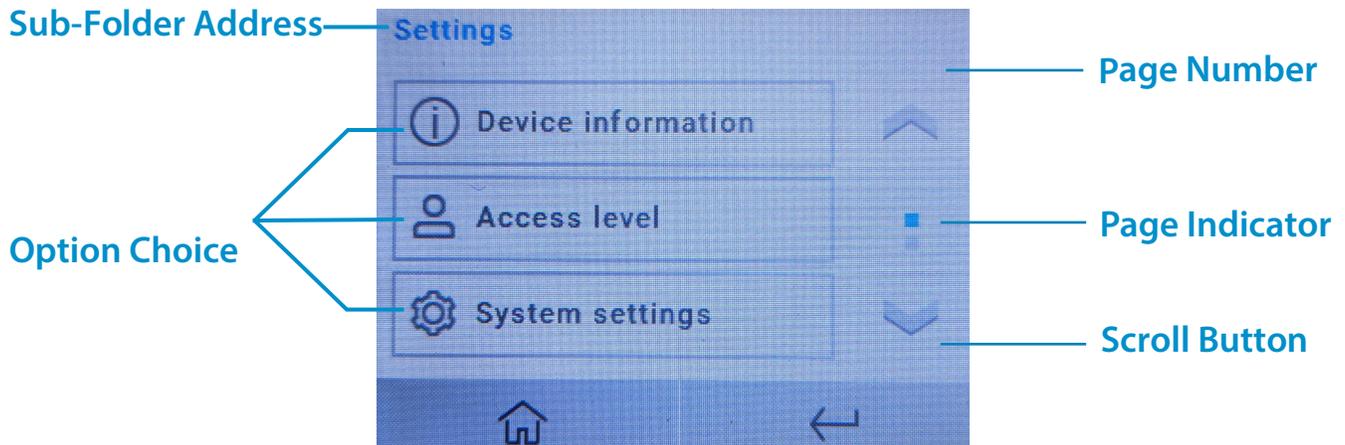


c. VOLTAGE / TEMPERATURE SCREEN

- i. **Voltage (V) Widget** - Current line voltage with min/max range indicator.
- ii. **Temperature (°F) Widget** - Current ambient temperature of room with max temperature limit indicator.



SETTINGS SCREEN



## 2. SETTINGS SCREEN



### a. INFORMATION

- i. **Model** - Air Techniques model number.
- ii. **SN** - Unit serial number.
- iii. **PCB** - Indicates control board serial number.
- iv. **Firmware** - Indicates latest installed firmware and revision.
- v. **VFD Code** - Indicates VFD Code number.

### b. ACCESS

- i. **User** - Default setting on startup, this access level should be used when unit is not being serviced by a technician. Set level by pressing the radio button.
- ii. **Technician** - This access level is used when unit is being serviced by a technician to access all option choices. Set level by pressing the radio button.

**Note:** Access will save on exit by either HOME or BACK buttons

### c. PARAMETERS

- i. **Set Point** - Sets vacuum level between 8-15 inHg in 0.5 inHg increments by pressing up or down arrows. Press the **SAVE** button to accept setting.
- ii. **Tank Config** - Configures system tank as single or dual.
- iii. **System Config** - Select pump types as either V3M, V5M, V7M or V15M

### d. DATE / TIME

- i. **Date** - Sets to current date. Set date by pressing up or down arrows above or below each digit, then press the **SAVE** button.  
**Note:** When the time zone (UTC) is reset, the time setting may need to be set to match location.
- ii. **Time** - Sets current time for selected time zone. Set time by pressing up or down arrows above or below each digit, then press the **SAVE** button.
- iii. **Time Zone** - Sets time zone. Set appropriate UTC (see table) by pressing up or down arrows above or below each digit. Press the **SAVE** button and then power cycle (power off then on) device to save setting. After completing power cycle, verify the time matches location.

Time Zones Currently Being Used in United States			
Time Offset	Time Zone		Example City
	Abbreviation	Name	
UTC - 5	EST	Eastern Standard Time	New York
UTC - 6	CST	Central Standard Time	Chicago
UTC - 7	MST	Mountain Standard Time	Salt Lake City
UTC - 8	PST	Pacific Standard Time	Los Angeles
UTC - 9	AKST	Alaska Standard Time	Anchorage
UTC - 10	HAST	Hawaii-Aleutian Standard Time	Honolulu

e. NETWORK 

- i. **Hint:** - Password "Hint"
- ii. **DHCP:** - Indicates DHCP enabled for connected network
- iii. **IP-Address:** - Indicates IP-Address of connected network
- iv. **Netmask:** - Indicates Netmask of connected network
- v. **Gateway:** - Indicates Gateway of connected network
- vi. **MAC Address:** - Indicates MAC address of unit

f. STATISTICS 

- i. **On-Time** - Shows time that system has been powered on (hours)
- ii. **Run-Time** - Shows time that system has been running (hours)

g. ALARM HISTORY 

Shows the last forty (40) alarms triggered. Push any listed **ALARM** button to get details of alarm, such as suggested tasks and date alarm was triggered.

# TOUCHSCREEN CONTROLS

## ALARMS

**MOJAVE** checks operation via the Intelligent Monitoring System and alerts the user to problems by displaying Warnings or Errors in the upper left corner of the Home Screen. Warnings notify the user of conditions effecting operation while Errors are critical problems disabling operation. As shown below, explanation of the Warning or Error is expanded by pressing the displayed alert. Also refer to TROUBLESHOOTING, page 38, to correct additional problems.

### a. WARNINGS

- i Low Vacuum Vacuum level is less than 0.5 inHg for 1 minute.
- ii High Temp Room temperature too high is above 130°F.
- iii Low Temp Room temperature too low is below 40°F.
- iv Aux Link Link between Control and Auxiliary unit has been lost.
- v Feedback Frequency feedback not detected.  
Loss of serial Communication Link.



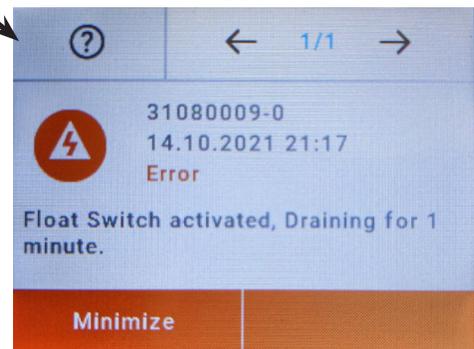
b. ERRORS 

- i Pressure Sensor Pressure sensor is malfunctioning. Readings are consistently negative.
- ii High Vacuum The Vacuum level has been 1 inHg above the set-point for 1 minute.
- iii VFD A Pump VFD has reported an error via its relay contact.
- iv Control A Pump is running that the Master Controller did not instruct to run.
- v Tank A Float Switch has been tripped to prevent water from entering the Pumps.
- vi Drain Tripped Floats that caused an Active Drain condition are still tripped after the 1 Minute Active Drain delay.
- vii Critical Temp The Room Temperature is above 150 °F.
- viii Connection No pumps are connected to the Master Controller.

Pressure Sensor Malfunction Alert Example



Home Screen Showing Error



Example Error Screen

## OPERATION

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**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, 40 AMP 3-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 outlet and the AC Power IEC Receptacle of the Master Controller. The Master Controller is now in the Standby mode. Observe the following:
  - a. Touchscreen is illuminated showing the default Normal Display Mode view.
  - b. The Master Controller shows Standby (idle).
  - 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 Standby button located on the Master Controller Touchscreen. This places the Master Controller in the Running mode where at least one Pump is operating. Observe the following.
  - a. Touchscreen Standby button turns **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 Touchscreen Standby 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. Navigate to **Access Menu** item by pressing the SETTINGS button and select
7. Change the **Tank Config** as follows:
  - a. Navigate to the **Tank Config** top menu item by pressing the SETTINGS button.
  - b. Press the Parameters button then press the **Tank Config** button.
  - c. Finally, select **Dual Tanks**.
  - d. Navigate to the **System Config** menu item by pressing the SETTINGS button.
  - e. Press the Parameters button then press the **System Config** button.
  - f. Finally, select V15 then press the **Home** button.

**Note:** The optional Remote Control Panel switch may be used instead of the Touchscreen Standby button.

**Normal Operation.** The **MOJAVE** system is normally operated by simply pressing the Touchscreen Standby 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.

**Automated Self Diagnostic Feature.** Every 2 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.

**Table 8. Master Controller Assembly Warning and Error Reporting**

<b>Alert</b>	<b>Alert Type</b>	<b>What Caused the Alert?</b>	<b>How is System Affected?</b>	<b>Warning / Error Condition(s) Reset Method(s)</b>
Low Vacuum	Warning	Vacuum Level is below 0.5 inHg for 1 minute	<ul style="list-style-type: none"> <li>Warning message displayed</li> </ul>	<ul style="list-style-type: none"> <li>Automatic, once the vacuum level returns to the normal range</li> <li>Cycle System "Running" Status</li> <li>Cycle. MMC-M Power</li> </ul>
High Temp	Warning	The Room Temperature is above 130°F	<ul style="list-style-type: none"> <li>Warning message displayed</li> </ul>	<ul style="list-style-type: none"> <li>Automatic, once room temperature returns to the normal range</li> </ul>
Low Temp	Warning	The Room Temperature is below 40°F	<ul style="list-style-type: none"> <li>Warning message displayed</li> </ul>	<ul style="list-style-type: none"> <li>Automatic, once the room temperature returns to the normal range</li> </ul>
Aux Link	Warning	Link between a Control and Auxiliary unit has been lost	<ul style="list-style-type: none"> <li>Warning message displayed</li> </ul>	<ul style="list-style-type: none"> <li>Automatic, once the link is re-established</li> </ul>
Feedback	Warning	Frequency feedback not detected. Loss of serial Communication Link.	<ul style="list-style-type: none"> <li>If pump is also the Primary it is shutdown.</li> <li>Warning message displayed</li> </ul>	<ul style="list-style-type: none"> <li>Automated Self Diagnostic Function</li> <li>Disconnect Pump</li> <li>Cycle. MMC-M Power</li> </ul>
Pressure Sensor	Error	The Pressure sensor is Malfunctioning. Readings are consistently negative.	<ul style="list-style-type: none"> <li>All running pumps are shutdown</li> <li>Error message displayed</li> </ul>	<ul style="list-style-type: none"> <li>Cycle System "Running" Status</li> <li>Cycle. MMC-M Power</li> </ul>
High Vacuum	Error	The Vacuum level has been 1 inHg above the set-point for 1 minute	<ul style="list-style-type: none"> <li>All running pumps are shutdown</li> <li>Error message displayed</li> </ul>	<ul style="list-style-type: none"> <li>Cycle System "Running" Status</li> <li>Cycle. MMC-M Power</li> </ul>
VFD	Error	A Pump VFD has reported an error via its relay contact	<ul style="list-style-type: none"> <li>This pump is shutdown</li> <li>Error status is displayed</li> </ul>	<ul style="list-style-type: none"> <li>Automatic, once the fault is diagnosed and resolved.</li> </ul>
Control	Error	A Pump is running that the Master Controller did not instruct to run	<ul style="list-style-type: none"> <li>Error message displayed</li> </ul>	<ul style="list-style-type: none"> <li>Automatic, once the fault is diagnosed and resolved</li> <li>Disconnect Pump</li> </ul>
Tank	Error	A Float Switch has been tripped to prevent water from entering the Pumps	<ul style="list-style-type: none"> <li>All running pumps are shutdown</li> <li>Error status is displayed</li> </ul>	<ul style="list-style-type: none"> <li>Automatic, after a 1 Minute "Active Drain" delay.</li> </ul>
Drain	Error	Tripped Floats causing an Active Drain condition still tripped after the 1 Minute Active Drain delay.	<ul style="list-style-type: none"> <li>Error status is displayed</li> </ul>	<ul style="list-style-type: none"> <li>Automatic, once an active float switch deactivates.</li> <li>Cycle. MMC-M Power</li> </ul>
Critical Temp	Error	The Room Temperature is above 150 °F	<ul style="list-style-type: none"> <li>All running pumps are shutdown</li> <li>Error status is displayed</li> </ul>	<ul style="list-style-type: none"> <li>Automatic, once room has cooled.</li> </ul>
Connection	Error	No pumps are connected to the Master Controller	<ul style="list-style-type: none"> <li>Error status is displayed</li> </ul>	<ul style="list-style-type: none"> <li>Automatic, once a pump is connected</li> </ul>

**Table 9. Troubleshooting**

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

## Vision Monitor Remote Monitoring Solution

Vision Monitor is a cloud based remote monitoring solution that provides valuable, real-time status information from your network connected Mojave Monitor directly to any internet devices via the web interface or mobile app. Connect your equipment to allow service technicians to quickly diagnose problems, update parameters remotely, check usage history, and minimize downtime. Vision Monitor will also notify you when the equipment requires maintenance to ensure optimal performance and reliability year over year from your Mojave Monitor.

## System Requirements

Vision Monitor software server installation requirements for a server or practice computer network:

Operating system:	Windows Server 2016 Microsoft Windows 10, 64-bit
Graphics board:	Resolution <sup>3</sup> 1280 x 1024 (recommended)
Interface:	Ethernet, DHCP/dynamic allocation of IP addresses Internet
Ports required:	502, 512, 514, 45123 - 45126, 50123
Additionally required software:	Mozilla Firefox, Google Chrome or Microsoft Edge (in the current version)
Peripheral equipment required:	Sound board, loudspeaker
	Just a browser is needed for the user interface of the cloud. The network connection of the devices needs to be stable, e.g. via LAN or via a stable WLAN For stability reasons the use of e.g. PowerLAN is not recommended.

## Installation

Please review the Vision Monitor Installation Instruction at <https://www.airtechniques.com/wp-content/uploads/2203V002.pdf> for the complete guide on connecting and installing your Mojave Monitor to Vision Monitor.

The Vision Monitor software that must be installed at the dental practice can be downloaded from this link: <https://www.airtechniques.com/en/drivers/>

# MAINTENANCE

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## 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-M and CT34-M Continuum tanks, check for buildup at the check valve connecting the two tank sections to verify proper liquid flow.



**WARNING!**

Always use the proper personal protective equipment when in contact with biohazard waste.

**Caution:** The use of the following materials will result in equipment damage, loss of system performance and/or will void the warranty. **DO NOT USE:**

- Foaming cleaners
- Household cleaning agents
- Instrument cleaners/disinfectants
- Cleaning agents containing chlorine
- Abrasive Cleaners
- Solvents like acetone

**Daily Maintenance - Clean Vacuum Lines**

Clean all vacuum lines in the vacuum system with CleanStream 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 CleanStream Cleaner, PN 57850 and the CleanStream dispenser system, PN 57665.

Required - Not Supplied	
Part No.	Description
57850	2.5 Liter Bottle CleanStream Cleaner (125 applications)
57665	Monarch CleanStream Dispenser System w/Vortex Technology



Part No. 57850

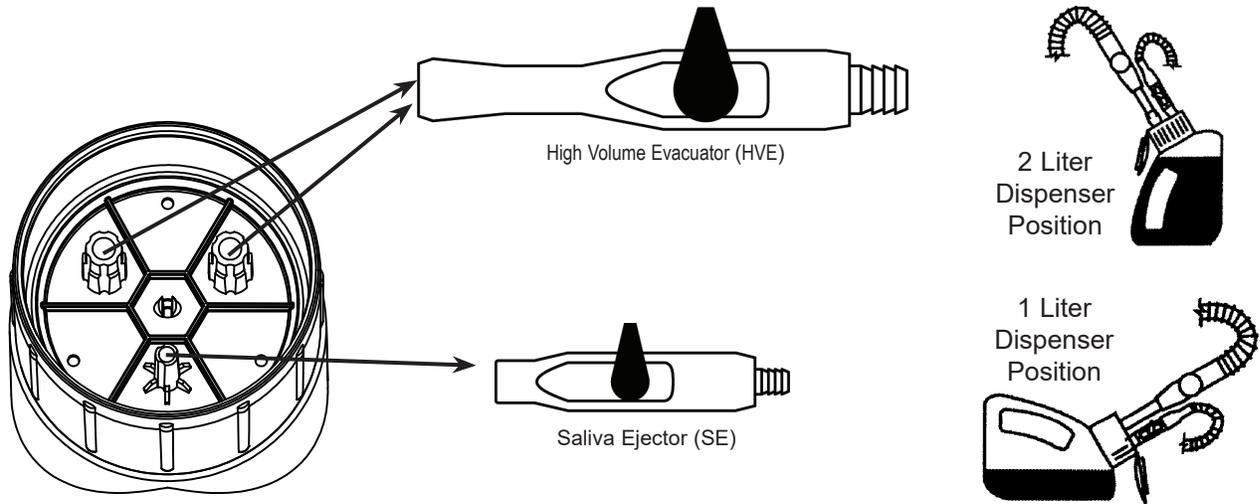


Monarch CleanStream Dispenser System w/Vortex Technology, Part No. 57665

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

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

1. Fill the Monarch CleanStream 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 Monarch CleanStream Cleaner bottle cap, add the Monarch CleanStream Cleaner concentrate to the dispenser as applicable;
  - a. for 1 operator, add 20ml of Monarch CleanStream concentrate to the 1 liter of water
  - b. for 2 operatories, add 40ml of Monarch CleanStream concentrate to the 2 liters of water
3. As shown by Figure 13, the interior of the Monarch CleanStream 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 13 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 Monarch CleanStream solution from dispenser.
6. After each cleansing procedure, disconnect the hand pieces and rinse the dispenser.



**Figure 17. Monarch CleanStream 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.

**REPLACEMENT PARTS**

**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.

System Part No.	Replacement Part No.	
	Pump Only	Power Module
V15M	H5491	H5710

**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.

<u>Part No.</u>	<u>Description</u>
53020, 53021, 53170 & 53173	Remote Water Control Valve Systems
H5217	<b>MOJAVE</b> Replacement Bowl, Screen and Gasket for Inlet Filter
H5454	V15M Drip Shield Kit

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**WARRANTY**

Air Techniques equipment is warranted to be free from defects in material and workmanship from the date of installation for a period as follows

**MOJAVE:**

Full System - 2 years (24 months) warranty.

All Pumps and Motors - 5 years (60 months) warranty.

All part and component returns and replacement of equipment under warranty require a Return Materials Authorization (RMA). Items returned without an RMA, or included with other products for which an RMA has been issued, may be returned to the customer at the discretion of Air Techniques.

Any item returned under warranty, will be repaired or replaced at our option at no charge provided that our inspection shall indicate it to have been defective. Air Techniques, Inc. is not liable for indirect or consequential damages or loss of any nature in connection with this equipment. Dealer labor, shipping and handling charges are not covered by this warranty.

Warranty credit will not be applied to product returns that exhibit damage due to shipping, misuse, careless handling or repairs by unauthorized service personnel. Credit, or partial credit, will not be issued until product/parts have been received and assessed. Warranty is void if product is installed or serviced by anyone other than authorized Air Techniques dealer service personnel.

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.

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**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](http://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 50 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
  - Film Processors
  
- ❑ **Utility Room**
  - Dry Vacuums
  - Wet Vacuums
  - Air Compressors
  - Amalgam Separator
  - Utility Accessories
  - Utility Packages
  
- ❑ **Merchandise**
  - Surface Disinfectant
  - Enzymatic Cleaner
  - Hand Sanitizer and Lotion
  - Waterline Cleaner
  - Evacuation System Cleaner
  - Imaging Accessories
  - Chemistry
  - Processor Accessories



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