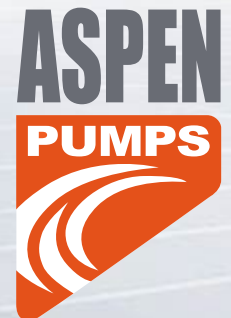




A CSW Industrials Company

Aspen Pumps

Condensate Pumps for Mini-Split Systems



Who are we?



Founded in 1937, RectorSeal started as a manufacturer of specialty chemical sealants. Since these beginnings, we have continued to grow by expanding our offering of chemical and mechanical products to support tradesman in their work.

Our growth has centered around a simple mission:
To provide innovative solutions to the professional trades.



Agenda

What is a Mini Pump?

Introducing Aspen Pumps

Definitions

Why Aspen?

Aspen Pumps Detail

Competition

Best Practices And Maintenance

Troubleshooting

What is a mini pump?



An Aspen mini pump is a small pump designed to intermittently and rapidly move small amounts of condensate great distances while maintaining a low noise level.



Tank pump vs. mini condensate pump



How are mini condensate pumps different from traditional condensate pumps known as a tank pumps?

Size

- Mini pumps are a **fraction of the size of a tank pump.**
- Mini pumps are **designed to work specifically with ductless and VRF/V systems.**

Noise

- Mini pumps are **designed to operate at very low sound levels** compared to a tank pump.
- Tank pumps operate around 45 *dBA while **Aspen pumps are as quiet as 19 dBA**

Performance

- Tank pumps are **capable of moving up to 132 GPH** while Aspen Mini Pumps average between 3-8 GPH
- Tank pumps usually **discharge between 15 to 25 feet** while mini pumps range from 33 to 50 Feet

Cost

- Tank pumps are about **1/3 or less the cost of mini pumps.**

Tank pump vs. mini condensate pump



Moves more gallons per hour

VS



Cheaper

Why would I buy a mini pump?

Why would I buy a mini pump?



**Because people
will accept this**

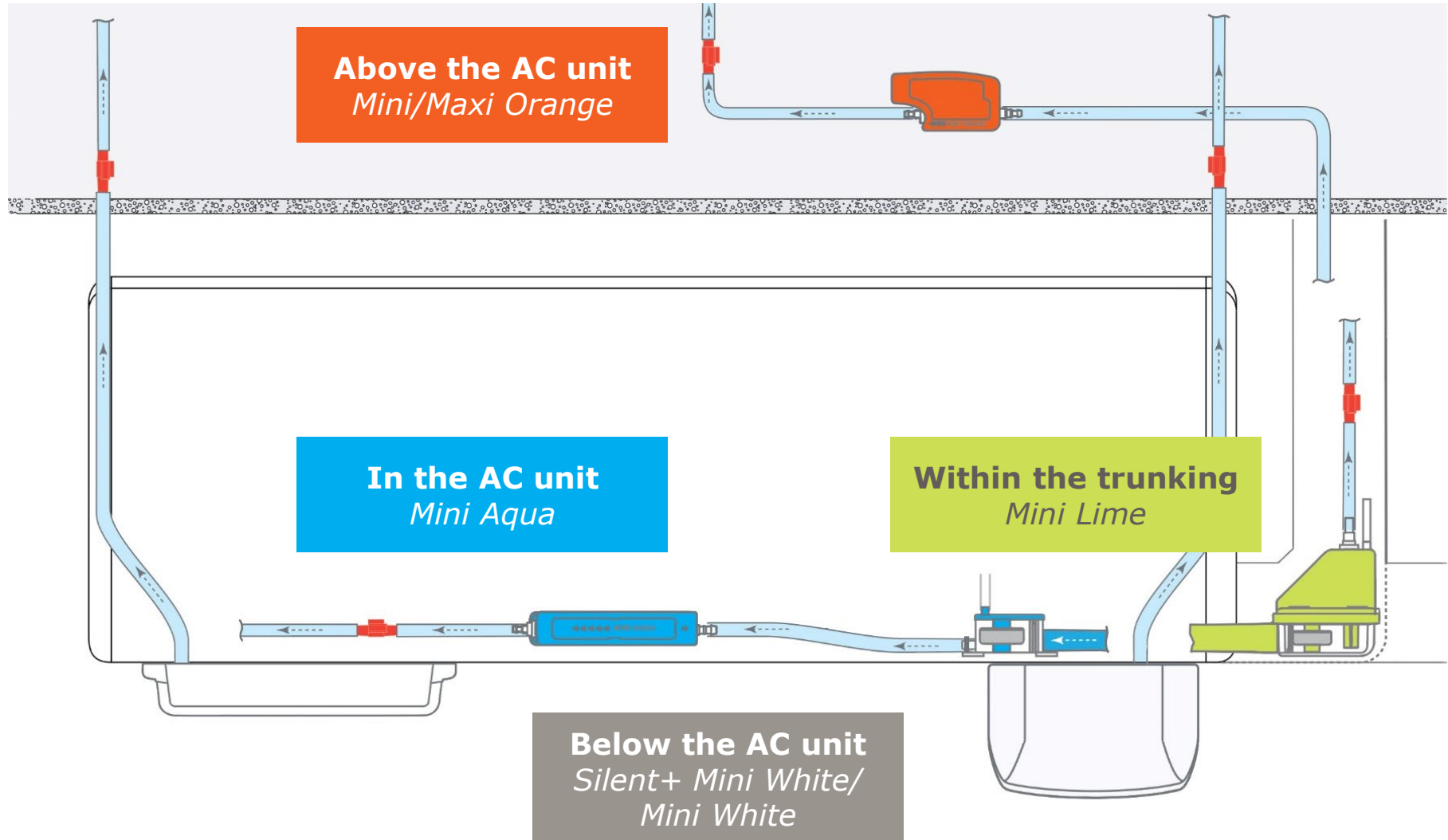
But not this!



Why choose Aspen mini pumps: Application specific



A CSW Industrials Company



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Pumps with remote reservoirs



Mini Aqua

Mini/Maxi Orange



Pumps with attached or no reservoirs

Mini Lime



Mini Tank Pump



Mini White



Silent+ Mini White



Features to consider in pump selection



○ **Reliability**

○ **Ease of installation**

○ **Silence**

○ **Siphoning**

○ **Voltage variations**

○ **Maintenance**

Agenda

What is a Mini Pump

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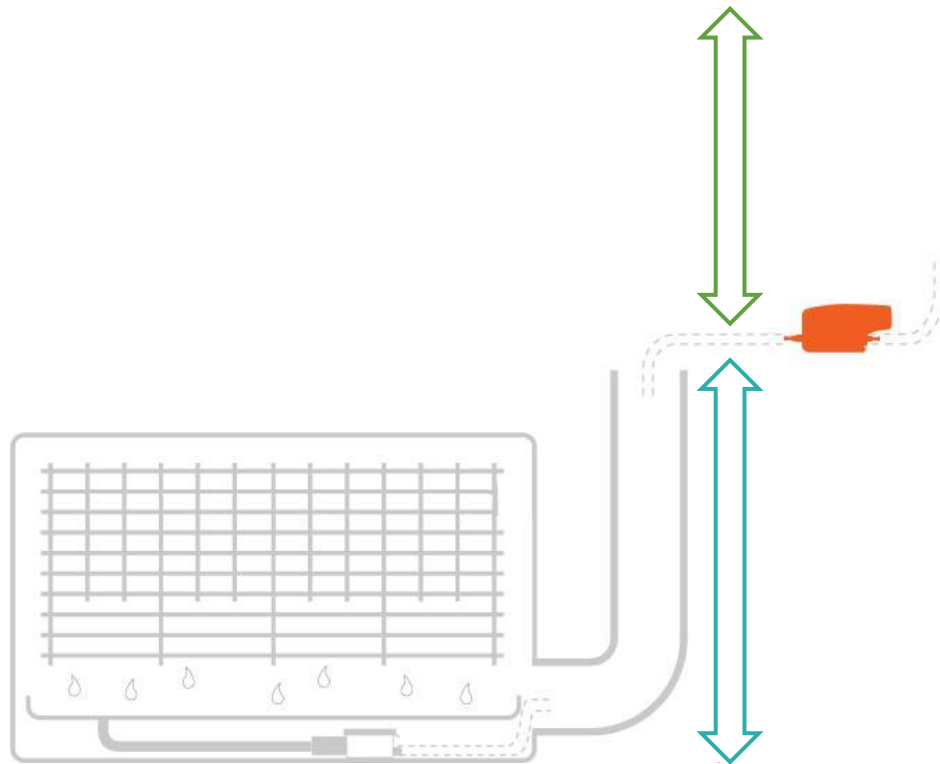
Aspen Pumps Detail

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Key definitions for condensate pumps



Head

Lift

Distance

dBA

Univolt Technology

Piston Pump

Rotary Diaphragm Pump

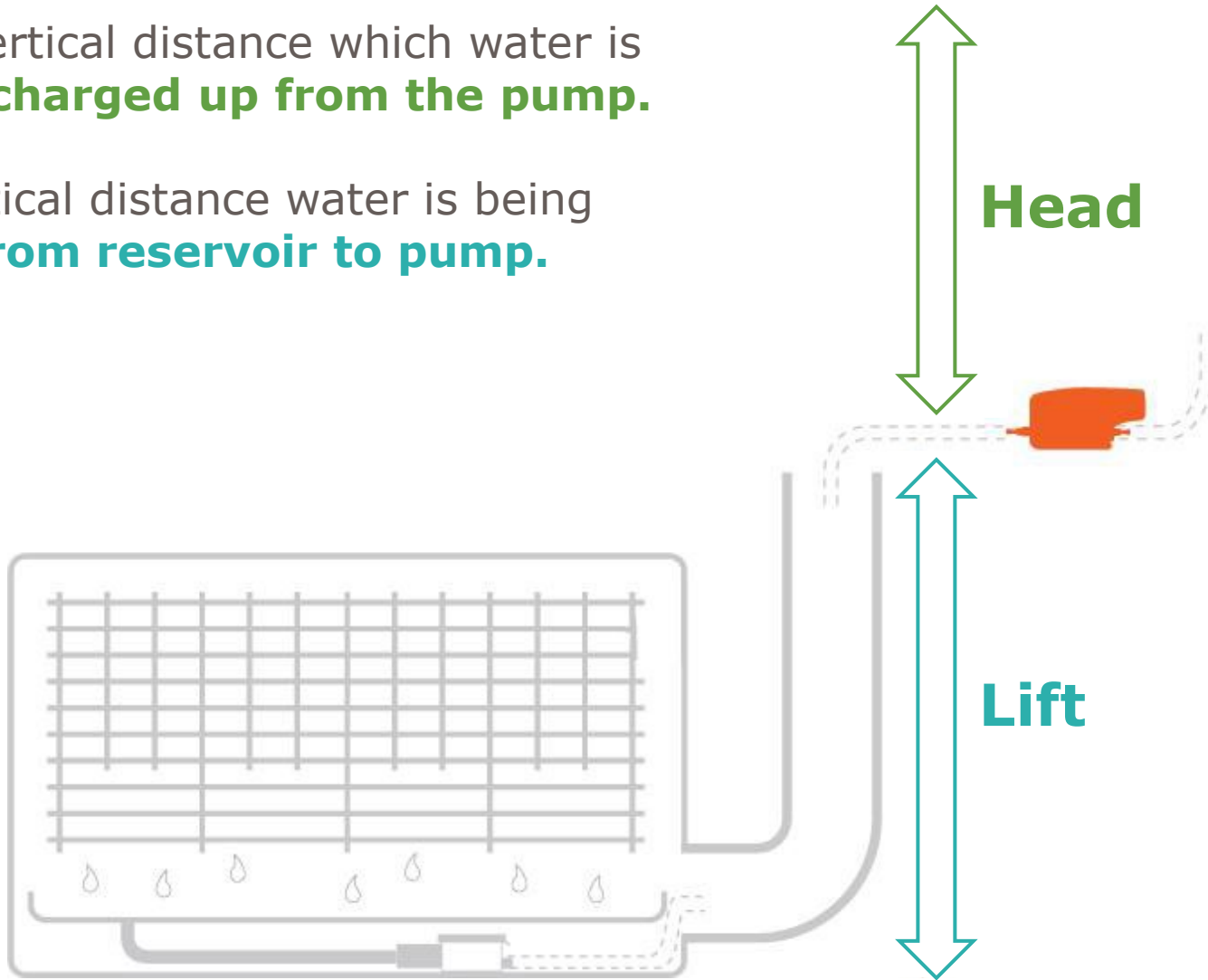
Potting

GPH

Suction lift and head

Head is vertical distance which water is being **discharged up from the pump.**

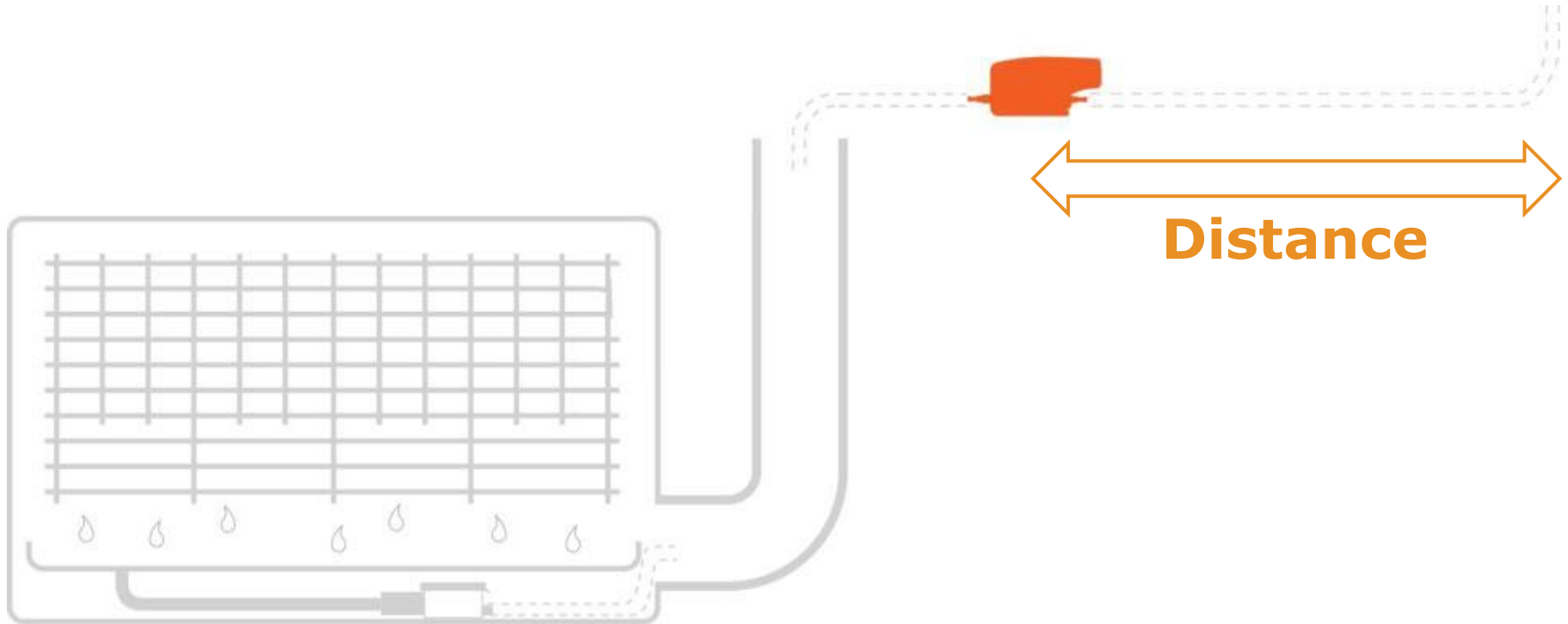
Lift is vertical distance water is being **sucked from reservoir to pump.**



Distance

Distance is the **total length the water is pumped.**

Distance accounts for **both the vertical and horizontal portions of the run.**



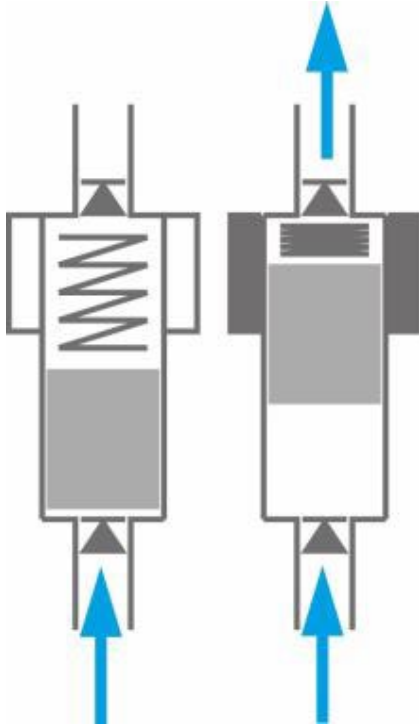
dBA is the **unit of measurement for noise levels.**

Sound level is an important consideration when selecting a pump.

Painful acoustic trauma	140	Shotgun blast
	130	Jet engine 100 feet away
	120	Rock concert
Extremely loud	110	Car horn
	100	Chainsaw
	90	Motorcycle
Very loud	80	Vacuum cleaner
Loud	70	City traffic
	60	Conversation
Moderate	50	Rainfall
Faint	40	Refrigerator
	30	Whisper
Aspen Pumps mini pumps	20	Watch ticking
Aspen Pumps Silent+ mini pumps	<20	

- Sound levels are **reduced by 6dBA every time distance is doubled.**
 - If the sound level of a pump is measured at 40dBA at a distance of 4" from the pump, the sound level will be 34dBA at 8", 28dBA at 16" and 22dBA at 32".
- **An increase of 10dBA doubles the sound level,** therefore, 20dBA is twice as loud as 10dBA.
- The published noise level of an Aspen pump is **measured at a distance of 3.3ft .**

Piston pumps (Positive displacement)



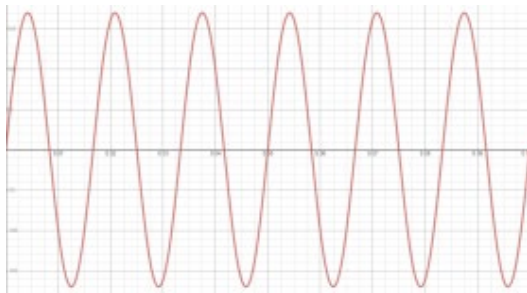
The heart of a mini pump is a 'piston'.

This includes a steel piston, a spring and two non return valves which are housed in a plastic body.

Outside the body is a copper coil.

As electricity passes through the copper coil it produces a magnetic field which pulls the piston forward.

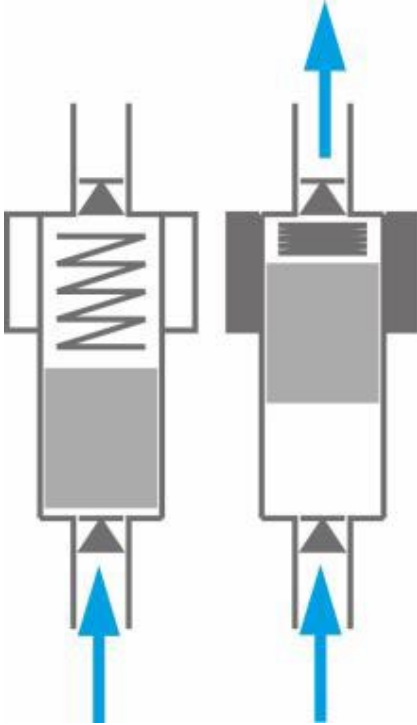
When the electricity is switched off the spring pushes the steel piston back.



Mini pump pistons are energized 60 times a second.

This movement creates suction into the pump, and discharge out of the pump

Piston pumps (Positive displacement)

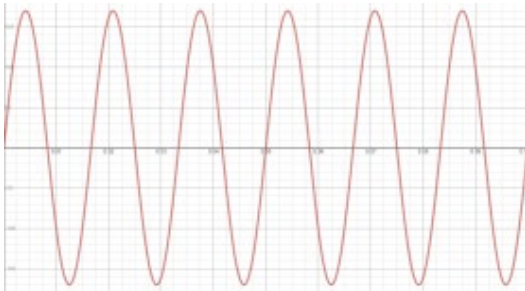


The non return valves ensure water can only flow in one direction.

Water acts as cooling and lubricant for these pumps (like oil in a car engine). This is why it is important that the pumps do not run dry.

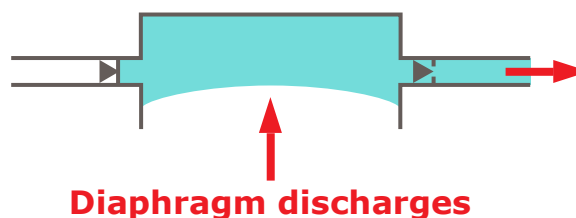
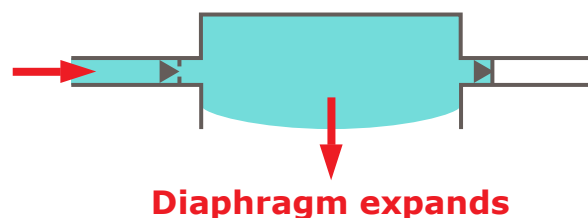
Piston pumps can 'self prime'.

Piston pumps are good for high head and longer distances, they are not so good for flow rates.



Rotary Diaphragm pump

Rotary diaphragm pumps use the alternation of expansion and contraction to generate pressure imbalance moving condensate from a high-pressure space to a low-pressure space.



As the pump's rotor depresses its multiple pots, condensate is discharged.

Benefits

**Increased
flow rates/head**

**Good dry
running capacity**

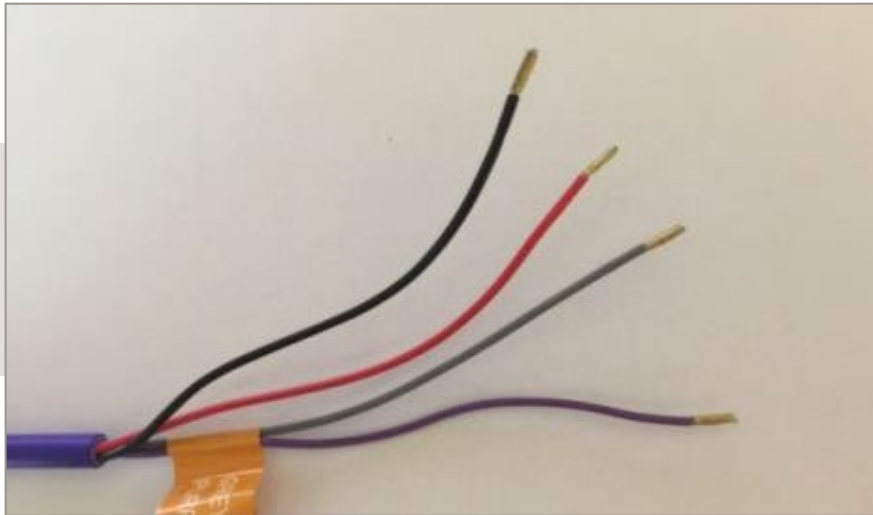
**Mitigates noise at
higher flow rates**

Capacitance Sensing Technology

The pump utilizes capacitance sensing technology to regulate the speed at which the pump needs to operate. With approximately 1,000 preset levels along the length of the sensor the pump can ascertain both volume and incoming flow rate to match its output accordingly

UNIVOLT

Univolt pumps accept voltage inputs from 100-250V; **reducing failure from spikes and drops in voltage from an unstable power grid.**

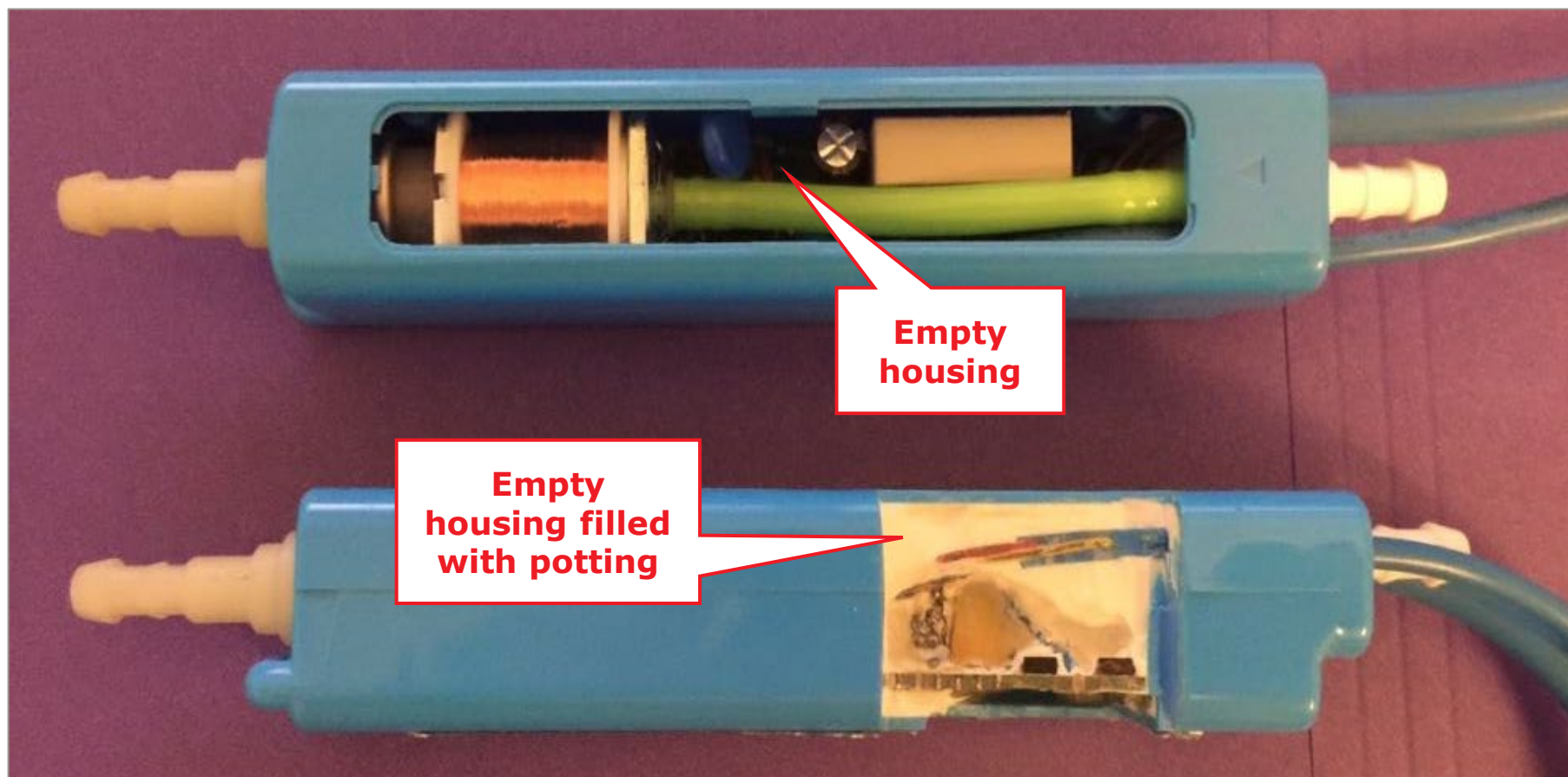


Aspen uses U.S. wire colors to help cut down on mistakes, confusion, and allows for flexibility when wiring equipment with specific requirements



"Plug & Play" pigtails allows for quick installation.

Helps reduce/eliminate water intrusion, fight against vibration, and provides a stouter pump.



GPH: Gallons Per Hour

Published max GPH is listed at zero head.

(Industry standard benchmark)

Capacity

2.9-3.2 GPH @ 0' Head /
1.2-1.6 GPH @ 33' Head



Mini Aqua Univolt

Mini-Split Condensate Pump Kit 100-250v
83809 (ASP-MA-UNI)

Project Information:

Job Name: _____
Location: _____
Engineer: _____
Submitted to: _____
For: ☐ Reference ☐ Approval ☐ Construction
Submitted by: _____
Reference: _____

Submittal Information:

Approval: _____
Date: _____
Construction: _____
Unit #: _____
Drawing #: _____

(Sec. I) Product Specifications:

Pump Length	6.5"
Pump Width	1.125"
Pump Height	1.125"
Capacity	2.9-3.2 GPH @ 0' Head / 1.2-1.6 GPH @ 33' Head
Max BTUs	49,500
Max Head in Feet	33
Max Temperature	104°F
Max Suction Lift	5'
Sound Level	21dB(A)
Dry Contact Rating	3A NC
Voltage	100-250v
Amperes	.2 MAX
Watts	16
Remote Reservoir	Y
Plenum Rated	N
Cable Length	6'

Sound level and pump performance varies with voltage frequency.

Pump Selector & Wiring Diagrams Available at

<http://www.rectorseal.com/aspump.html>



(Sec. II) Ordering Information:

Product Code 83809
Model ASPMAUNI
Carton Qty 1
Carton Weight 1.5

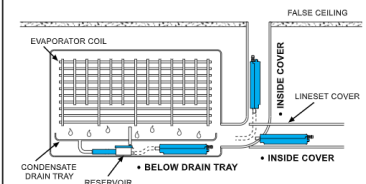
(Sec. III) Carton Contents:

Pump Assembly	Inline Fuse
Inline Reservoir	Cable Ties (6)
8"x5/8" i.d. Inlet Tube	Self Adhesive Velcro
5"x1/4" i.d. Vinyl Discharge Tube	Strips (2)
Installation Manual	Anti-siphon (1)
6"x1/4" i.d. Vinyl Breather Tube	90° Elbow
Drain Hose Adaptor	

(Fig. I) Product Image:



(Fig. II) Typical Pump Locations:



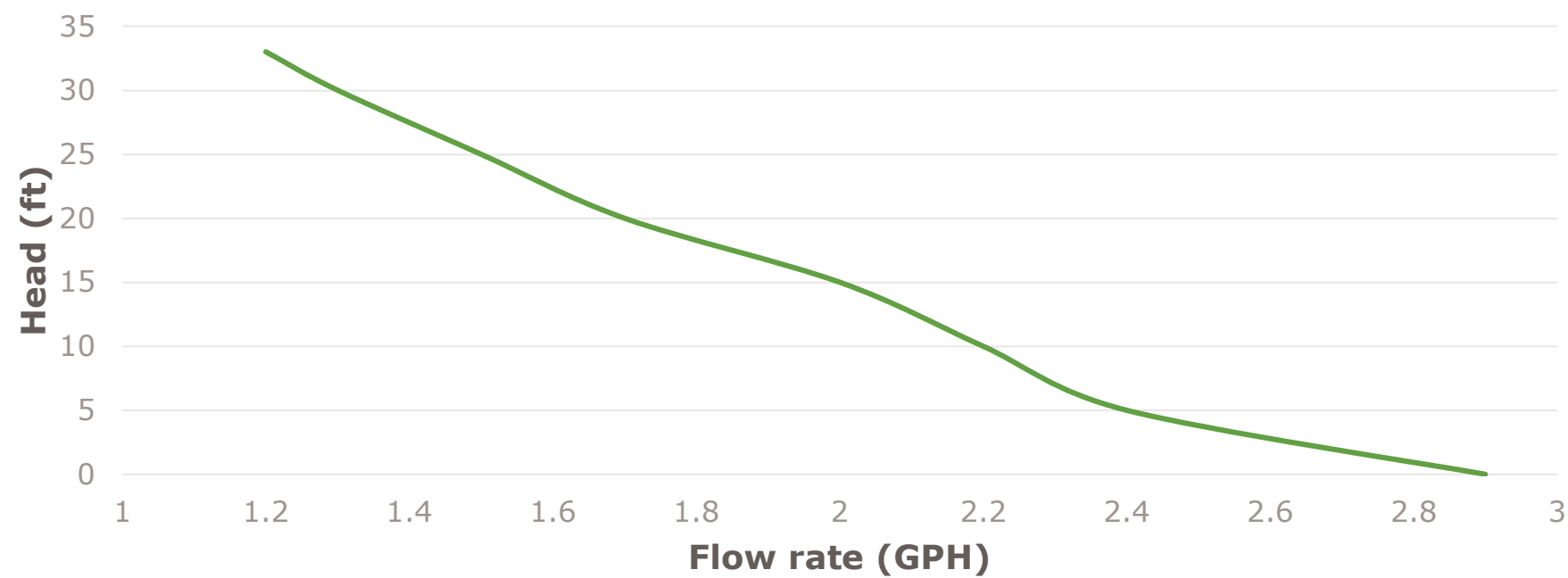
(RectorSeal's products are subject to continuous improvement; RectorSeal reserves the right to modify product design, specifications & information in this data sheet without notice and without incurring any obligation)
ASPEN® is a registered trademark of Aspen Oilco Limited Company UK

GPH: Gallons Per Hour



GPH are reduced as vertical distance increases.

Mini Aqua 230v 60Hz



Head	0	5	10	15	20	25	30	33
GPH	2.9	2.4	2.2	2.0	1.7	1.5	1.3	1.2
BTU	49,500	42,000	37,500	34,000	29,250	25,800	22,400	20,600

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Troubleshooting

Why Rectorseal/Aspen?



**Application
specific pump
choices**

**Large US
based
company**

Support staff

**OEM
relationships**

**Make and model
specific OEM
approved wiring
diagrams**

**Submittal
sheets**

**Wide breadth of
products with
emphasis on the
ductless market.
Easy to bundle**

**Innovative
products**

**Fully and partially
potted pumps**

**Univolt
technology**

Training

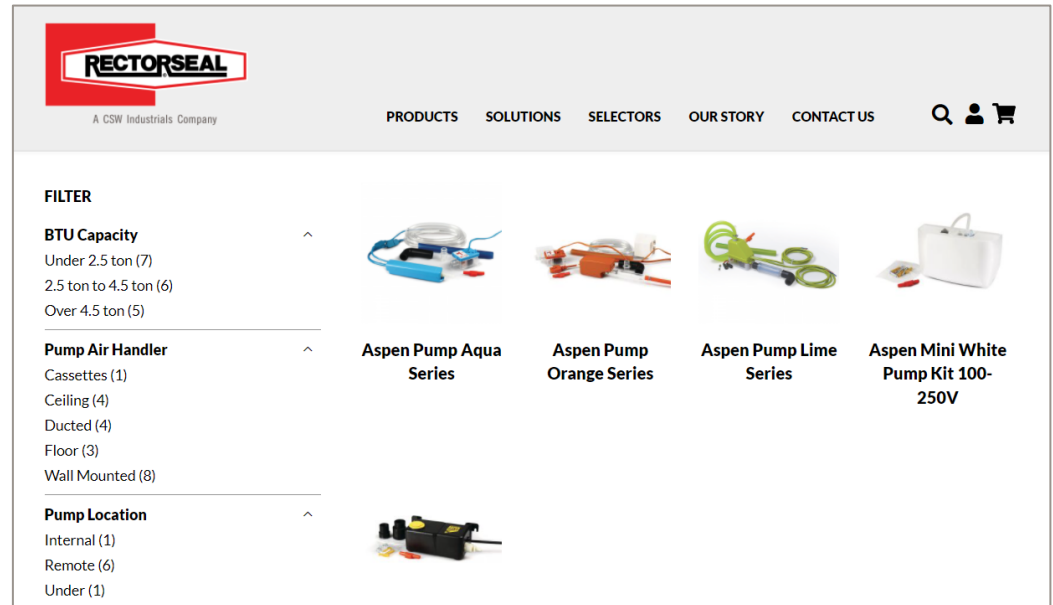
**Industry
involvement**

OEM specific wiring diagrams are available for most brands



RectorSeal has an excellent pump selector on our website and includes the appropriate PDF wiring diagrams for many specific units.

rectorseal.com/products/pump-selector/



Rectorseal helps our distributor and contractor partners by offering **submittal data sheets** for all Aspen Pumps making the bid process easier.



Mini Orange Silent+

Mini-Split Condensate Pump Kit 230v
83912 (ASP-MO-230-SP)

Project Information:

Job Name:

Location:

Engineer:

Submitted to:

For: ☐ Reference ☐ Approval ☐ Construction

Submitted by:

Reference:

Submittal Information:

Approval:

Date:

Construction:

Unit #:

Drawing #:

(Sec. I) Product Specifications:

Pump Length 4.25"



A CSW Industrials Company

(Sec. II) Ordering Information:

Product Code	83912
Model	ASPMO230SP
Carton Qty	1
Carton Weight	2

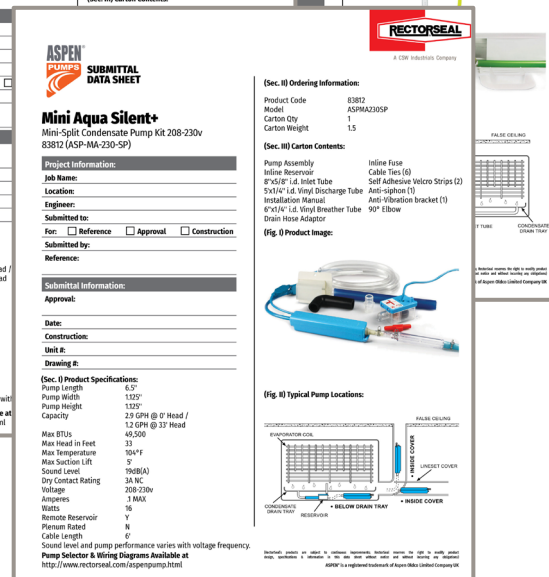
(Sec. III) Carton Contents:

Pump Assembly	Cable Ties (6)
Inline Reservoir	Self-Adhesive Velcro Strips (2)
Submersible Reservoir	8"x5/8" i.d. Inlet Tube
5"x1/4" i.d. Vinyl Discharge Tube	Installation Manual
Modular 6' Power Cable	Anti-Siphon (1)
6"x1/4" i.d. Vinyl Breather Tube	90° Elbow
Drain Hose Adaptor	
Inline Fuse	

(Fig. I) Product Image:



ASPMO230SP (ASP-MO-230-SP) © 2022 RectorSeal



OEM relationship: Daikin specific sheets

Aspen Mini Aqua Daikin DACA-CP1-1

- Internally mounted
- Smallest pump in industry
- 33 foot head
- Up to 49,500 BTU
- Accepts voltage from 100-250V

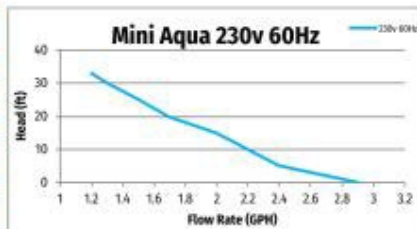
Mini Aqua Univolt

Mini-Split Condensate Pump Kit 100-250v
83809 (ASP-MA-UNI)



Aspen Pump BTU Calculator

Mini Aqua 230v 60Hz		
Head	GPH	BTU
0	2.9	49500
5	2.4	42000
10	2.2	37500
15	2	34000
20	1.7	29250
25	1.5	25800
30	1.3	23400
33	1.2	20600



Submittal Data Sheet



DACA-CP1-1

Mini Univolt 100-250 Pump Kit
DACA-CP1-1

Project Information:

Job Name: _____
Location: _____
Engineer: _____
Submitted to: _____
For: ☐ Reference ☐ Approval ☐ Construction
Submitted by: _____
Reference: _____

Submittal Information:

Approval: _____
Date: _____
Construction: _____
Unit #: _____
Drawing #: _____

(Sec. I) Product Specifications:

Pump Length - 6.5"
Pump Width - 1.125"
Pump Height - 1.125"
Capacity - 3.2 GPH @ 0' Head
Max BTUs - 30000
Max Head in Feet - 33
Max Temperature - 104F
Max Suction Lift - 3'3"
Sound Level - 25dB(A)
Dry Contact Rating - 3A NC
Voltage - 100-250
Amperes - .15 MAX
Watts - 16
Remote Reservoir - Y
Plenum Rated - N
Cable Length - 6'

Pump Selector & Wiring Diagrams Available at
<http://www.rectorseal.com/index.php/daikin/>

www.rectorseal.com 2601 Spennick Drive, Houston, TX 77055

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DAIKIN

(Sec. II) Ordering Information:

Product Code - DACA-CP1-1
Model - DACA-CP1-1
Carton Qty - 1
Carton Weight - 1.5

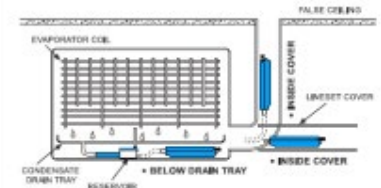
(Sec. III) Carton Contents:

Pump Assembly	Drain Hose Adaptor
Inline Reservoir	Inline Fuse
8"x5/8" I.d. Inlet Tube	Cable Ties (6)
5"x1/4" I.d. Vinyl Discharge Tube	Self Adhesive Velcro
6"x1/4" I.d. Vinyl Breather Tube	Strips (2)
	Anti-siphon (1)

(Fig. I) Product Image:



(Fig. II) Typical Pump Locations:



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713.263.8001 - 800.231.3345 713.263.7577 - 800.441.0051

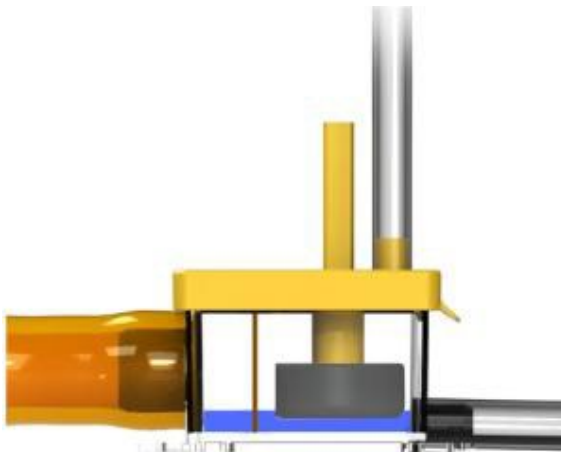
H-AP-E_83809-13

Aspen reservoir

- Most Aspen pumps use a **reservoir to activate the pump operation.**
- Aspen reservoirs use **hall effect sensors** to turn the pump on, off, and to open the 5 amp normally closed hi level safety switch.
- A magnet is mounted in the float. Three hall effect sensors are located in the central pillar in the reservoir. **The sensors detect the levels of the magnet.**

Sensor bottom

Pump off



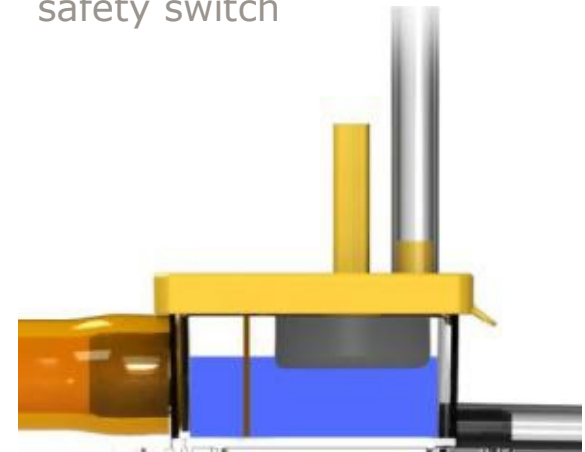
Sensor middle

Pump on



Sensor top

Open hi-level
safety switch



Performance



Mini performance (differs based on voltage)

115V 3.2 GPH, 54,600 BTU, 5ft lift, 33ft head

230V 2.9 GPH, 49,500 BTU, 5ft lift, 33ft head

Maxi performance

Orange 8.9 GPH, 157,000 BTU, 5ft lift, 49ft head

Silent+ models

Includes anti-siphon device, surge baffle, and silicone tubing. Voltage specific options.

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Best Practices And Maintenance

Troubleshooting

Aqua Mini Flexible install options, easy to conceal



Suitable AC models:

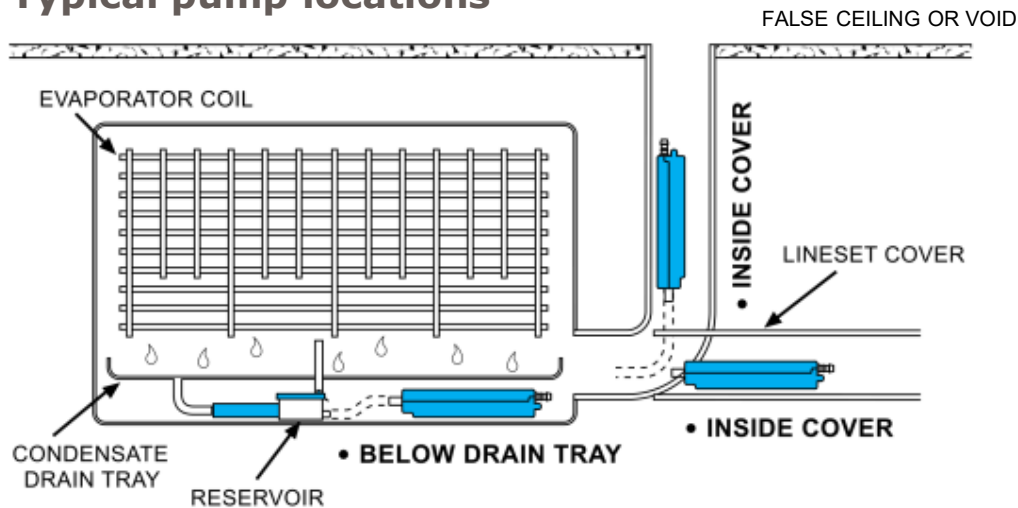
Up to 4 Tons

Lift: 5 feet

Head: 33 feet

Voltage: 100V to 250V

Typical pump locations



- Ultra-slim profile and Integral hanging loop and separate reservoir facilitates attachment in vertical applications.
- Self priming.
- Modular terminals for fast connection.
- Voltage specific Silent+ models and Univolt models available.

Orange series

Orange Mini For remote mounted pump applications



Suitable AC models:

Up to 4 Tons

Lift: 5 feet

Head: 33 feet

Voltage: 100V to 250V

Orange Maxi For higher head or larger BTU applications



Suitable AC models:

Up to 13 Tons

Lift: 5 feet

Head: 49 feet

Voltage: 100V to 250V

- Self priming.
- Pump installs remotely above ceiling or inside lineset cover.
- Pan mount and inline style reservoir included.
- Modular terminals for fast connection.
- Gravity inlet.
- Quiet and fully potted.
- Voltage specific Silent+ models and Univolt models available.

White Mini: Easiest to install and maintain



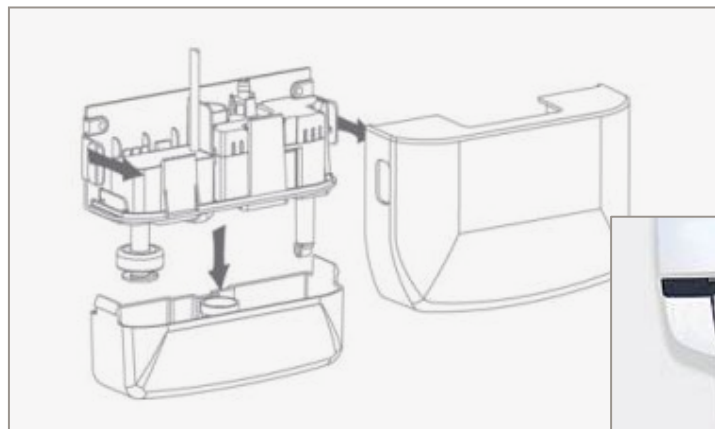
Suitable AC models:

Up to 4 Tons

Lift: 0 feet

Head: 33 feet

Voltage: 100V to 250V



- Accepts standard 5/8" drain hose from any mini-split.
- Extra large reservoir capacity minimizes pump operation.
- Cleanable replaceable plastic filter accepts water treatment tablet.
- No need to disturb evaporator to clean filter, reservoir clips out from front for easy removal and replacement.
- All components clip apart for easy disassembly without tools.
- Quiet and fully potted.

Silent+ Mini White: For high wall indoor units. Easy to install.



Suitable AC models:

Up to 4.5 Tons

Lift: 0 feet

Head: 33 feet

Voltage: 100V to 250V



- Low profile unit designed to be positioned within high wall unit shadow line
- Quietest pump on the market
- Capacitance technology: Industry's first self-regulating and variable speed pump
- Rotary Diaphragm pump mitigates noise at higher flow rates
- Can run dry
- Optional easy fit installation insert provided
- Position inlet left or right for installation flexibility
- Univolt technology

Lime Mini: Ideal solution to conceal linesets

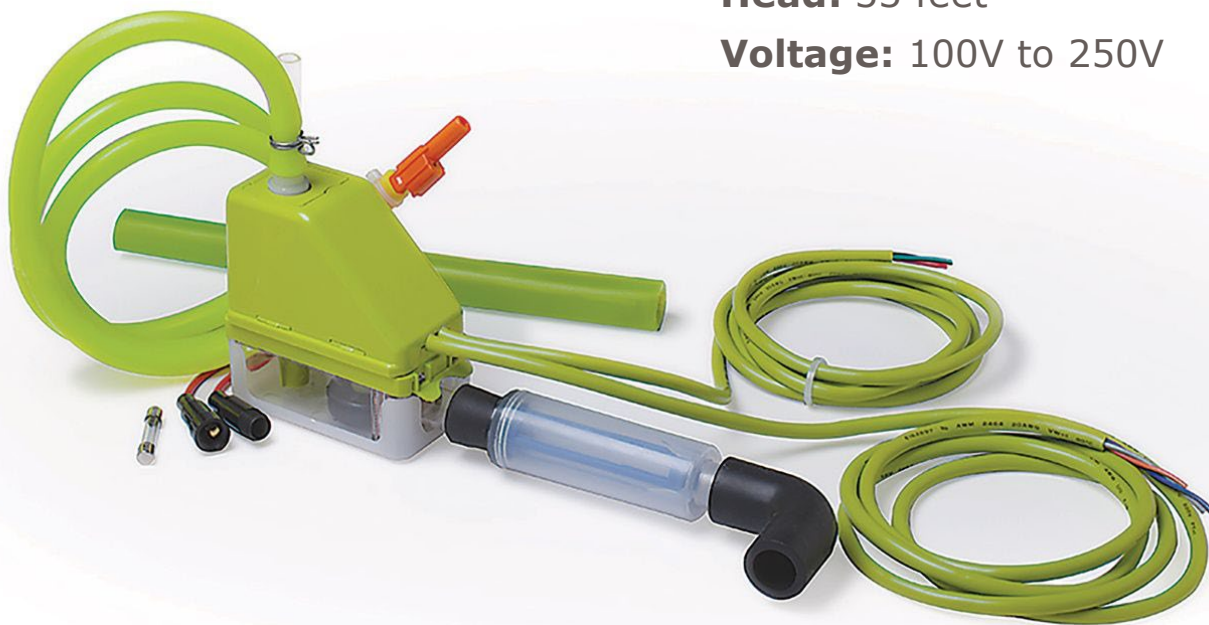
Suitable AC models:

Up to 4 Tons

Lift: 0 feet

Head: 33 feet

Voltage: 100V to 250V



- Left or right install.
- Easily accessed for filter cleaning.
- Two lineset cover styles available – Slimline or Fortress.
- Quiet and fully potted.
- Voltage specific Silent+ models and Univolt models available.
- Available with or without line set cover.

Mini Tank

Designed for use with ceiling cassettes



Suitable AC models:

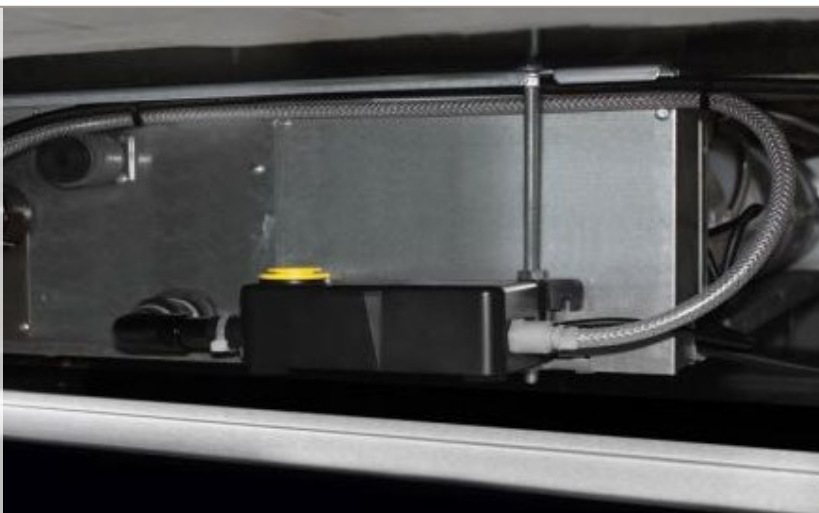
Up to 13 Tons

Lift: 0 feet

Head: 49 feet

Voltage: 230V

Included accessories



- High performance piston technology, Includes anti-siphon device and Thermal protection
- Accepts standard 5/8" drain hose from any mini-split, Extra large reservoir capacity minimizes pump operation

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False claims from competition



Some of our competitors try to get away with selling one or two styles of pumps and expect the contractor to **“just make it work”**.

One size does not fit all!

Competitor deficiencies

Sauermann



- No potting/
case isn't sealed
- Voltage specific
- European wire colors
- One wiring diagram
- Very little marketing/
social media presence

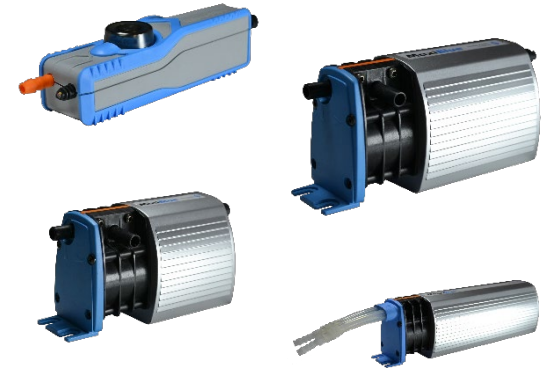
Diversitech



- Heavy and expensive
- PCB has potting but
the case isn't sealed.
- Electronic detection on
selected products only
- Not heavy focus
on pumps
- Support is questionable

Blue Diamond

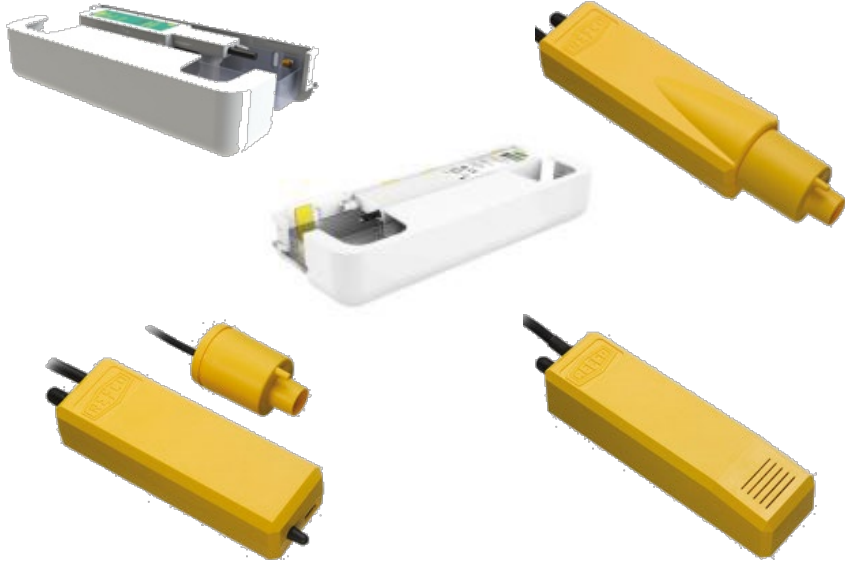
(Charles Austen)



- Poor instructions
- No potting/
case isn't sealed
- Class 1 appliance and
unreliable plugs
- Little to no support
- No mini-pump
specialist

Competitor deficiencies

Refco



- Pumps are an afterthought
- Requires installer to preset flow rates
- Quiet mode give minimal flow rate
- Class 1 requires ground wire
- Requires 2 fuses
- Little support

Little Giant



- Not focused on Mini Pumps
- No potting partially coated PCB/ case isn't sealed
- Class 1 requires ground wire
- Little to no support

Silent+ Mini White Tech Spec Comparison



**Aspen
Silent+
Mini White**



**Refco
Gobi II**



Feature	Aspen Silent+ Mini White	Refco Gobi II
Color	White Satin finish RAL9003	White RAL9003
Max Flow (High)	12USG/hr (45lph)	11USG/hr (42lph)
Maximum Head (High)	33ft (10m)	66ft (20m)
Suction Head	n/a	10ft (3m)
Noise Level (Low)	19dB(A)	19dB(A)
Motor Technology	Rotary diaphragm	Rotary diaphragm
Sensing Technology (Off/On/HLS)	Adaptive level sensing capacitance technology	Capacitance technology
Motor Flow Control (4 Speeds)	Dynamic (variable speed) flow control	Speed must be selected on install (Factory set in Medium Low flow mode)
Power Supply	Univolt 100-250VAC; 50/60Hz	100-240VAC; 50/60Hz
Power Rating	Continuously rated	Continuously rated
Safety Switch	5A volt-free N.C. / N.O. contacts rated at 5A inductive COS $\phi = 1$ 85°C	Interchangeable NO or NC, rated 250VAC, 6.3A or 28VDC, 6.3A
LED Diagnostics	n/a	Included
Water Ingress Rating	IPx4	IPx4

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Best practices

Increased technical awareness covering the installation and maintenance of mini pumps will:

- Set **better expectations**
- Create **contractor understanding**
- Drastically **reduce installation errors and frustration**



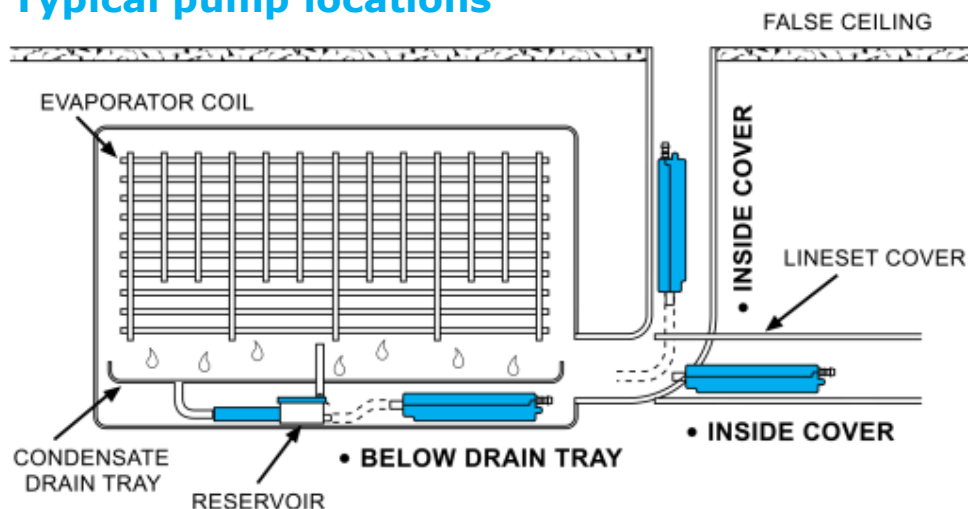
Remember: Always follow the AC unit and pump manufacturers printed recommendations!

Pump and reservoir

Applicable to pumps with remote reservoirs.

- Ensure all wiring and tubing is long enough **prior to installing the pump and reservoir.**
- The reservoir (float) should be installed **close to and level with, or below, the drain pan spout** on a horizontally flat surface using supplied Velcro strip.

Typical pump locations



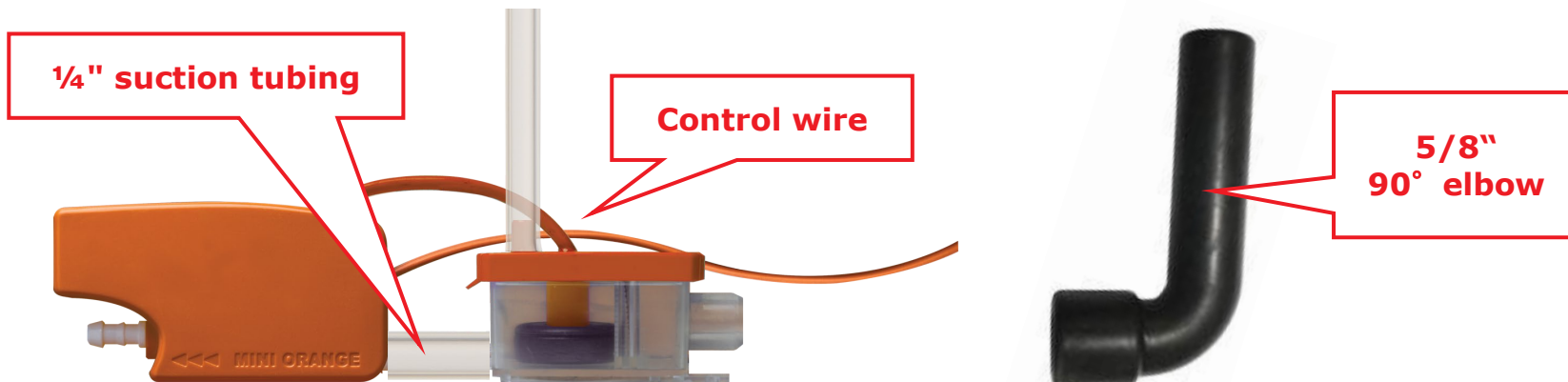
Ensure the included 6" vent tube is installed into the lid's vent port.



- The pump should be installed **above the reservoir** (1" to 5') and can be installed in any orientation using the supplied Velcro or mount.

Pump and reservoir (cont.)

Applicable to pumps with remote reservoirs.



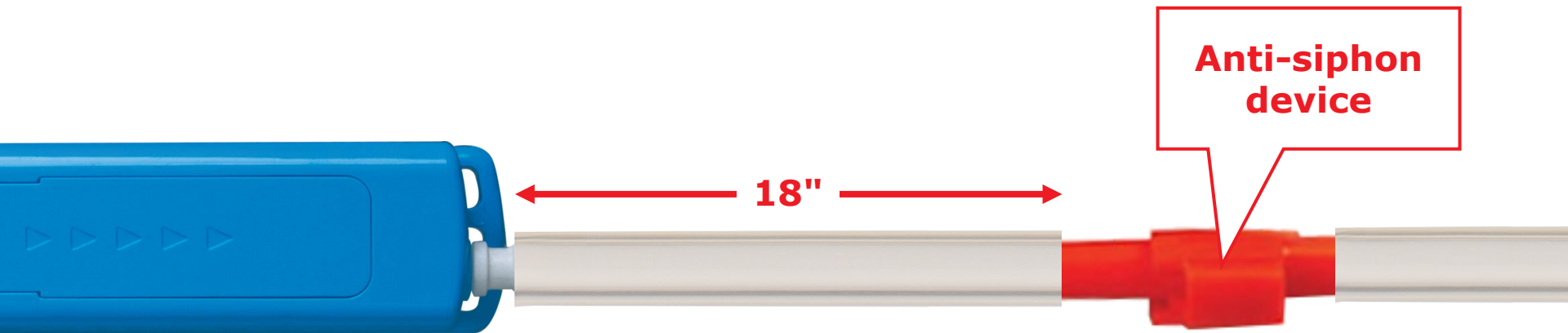
- The pump is connected to the reservoir with the **control wire and 1/4" suction tubing.**
- 5/8" 90° elbow **connects drain line from wall unit to reservoir** without tube kinking.
- The pump is directional and the **indicated flow direction must be followed.**
- All tubing connections should be **carefully secured with zip ties.**
- The pump is **wired to the terminal block inside the evaporator***

*See wiring directions

Pump and reservoir (cont.)

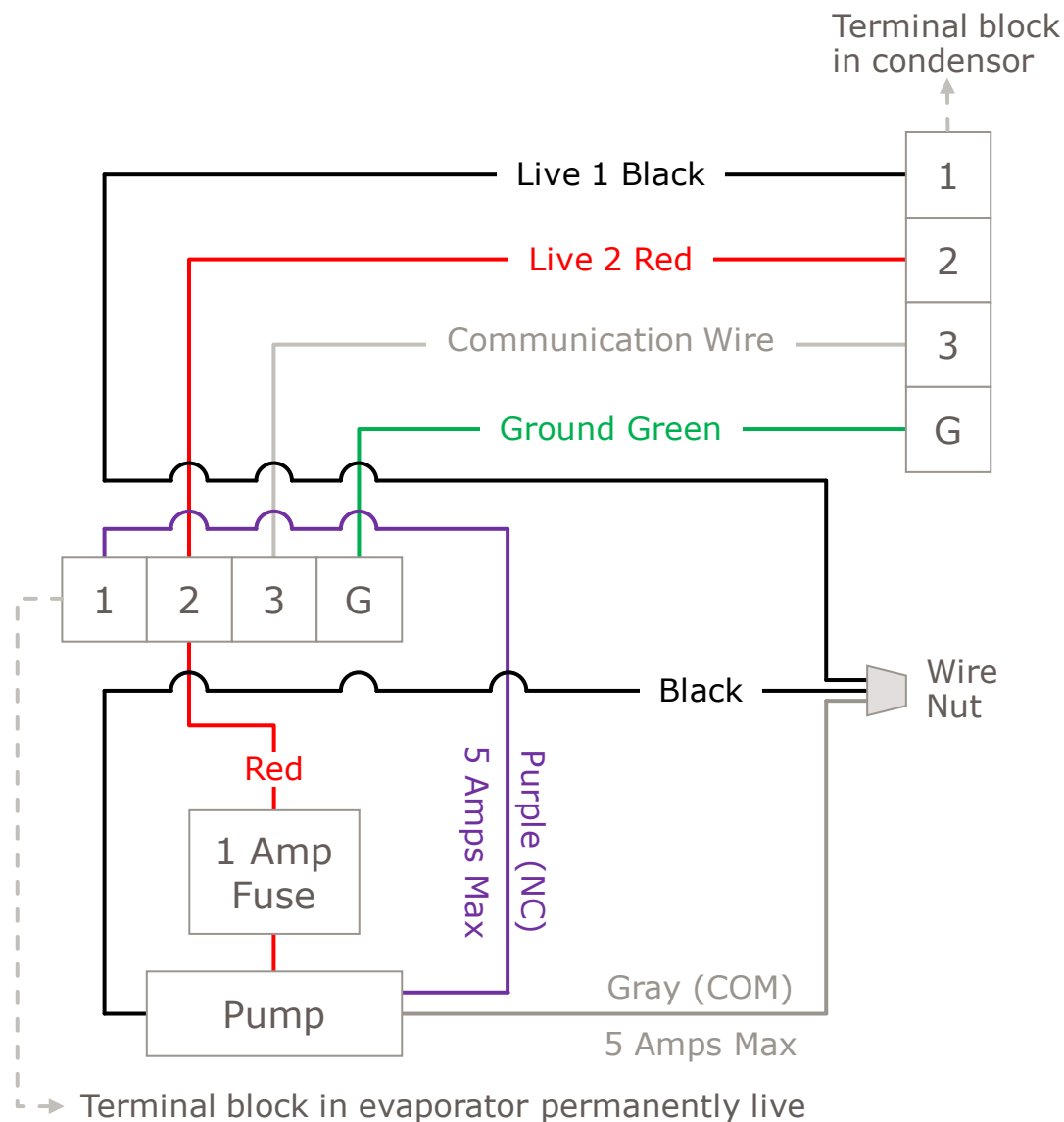
Applicable to pumps with remote reservoirs.

- The Pump also has a discharge port. Please follow these steps;
 - Attach approximately 18" of $\frac{1}{4}$ " tubing.
 - Install the included anti-siphon device.
 - Add enough addition $\frac{1}{4}$ " tubing to the discharge side of the anti-siphon device to complete your discharge run.
- WARNING Do not use tubing greater than $\frac{1}{4}$ "!**



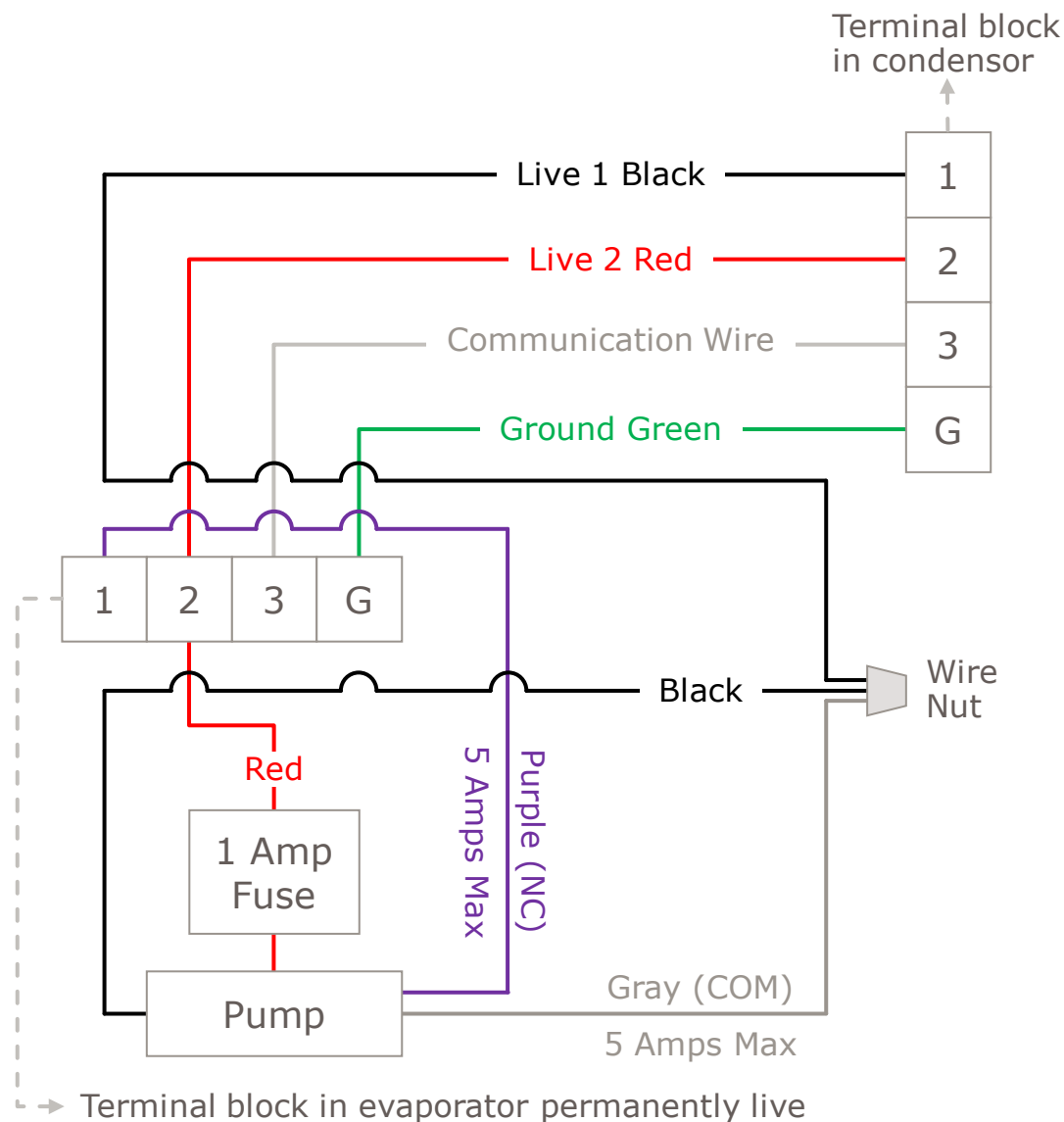
Wiring

- Aspen Pump wiring harnesses have 4 wires; 2 power and 2 safety
- For a standard 230V split system with a 4 block terminal, we recommend the following. This scenario assumes lines 1 and 2 from the outdoor unit are power wires and that **line 1 is BLACK** and **line 2 is RED**.
- Must use 1A fuse
- **We recommend shutting off power and following safe electrical handling procedures prior to wiring the pump.**



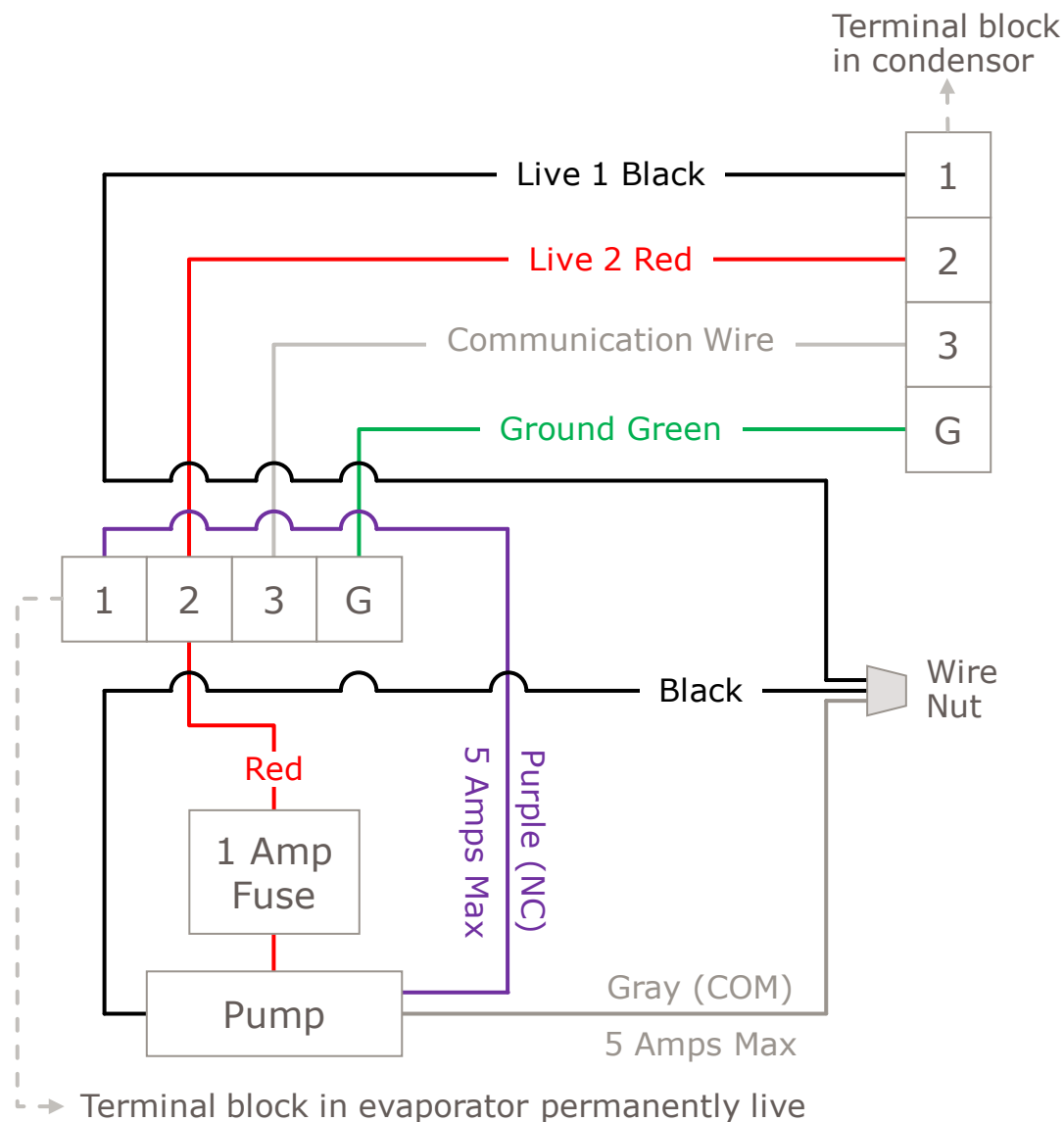
Wiring (cont.)

- Using a wire nut, **tie together the BLACK power wire and the GRAY safety wire from the pumps wiring harness along with the BLACK power wire coming from the outdoor unit.** The wire nut should have 3 wires in it. The black wire from the outdoor unit may already be installed on terminal 1 of the indoor unit, if it is, remove it so it can be tied into the wire nut as described in this section.



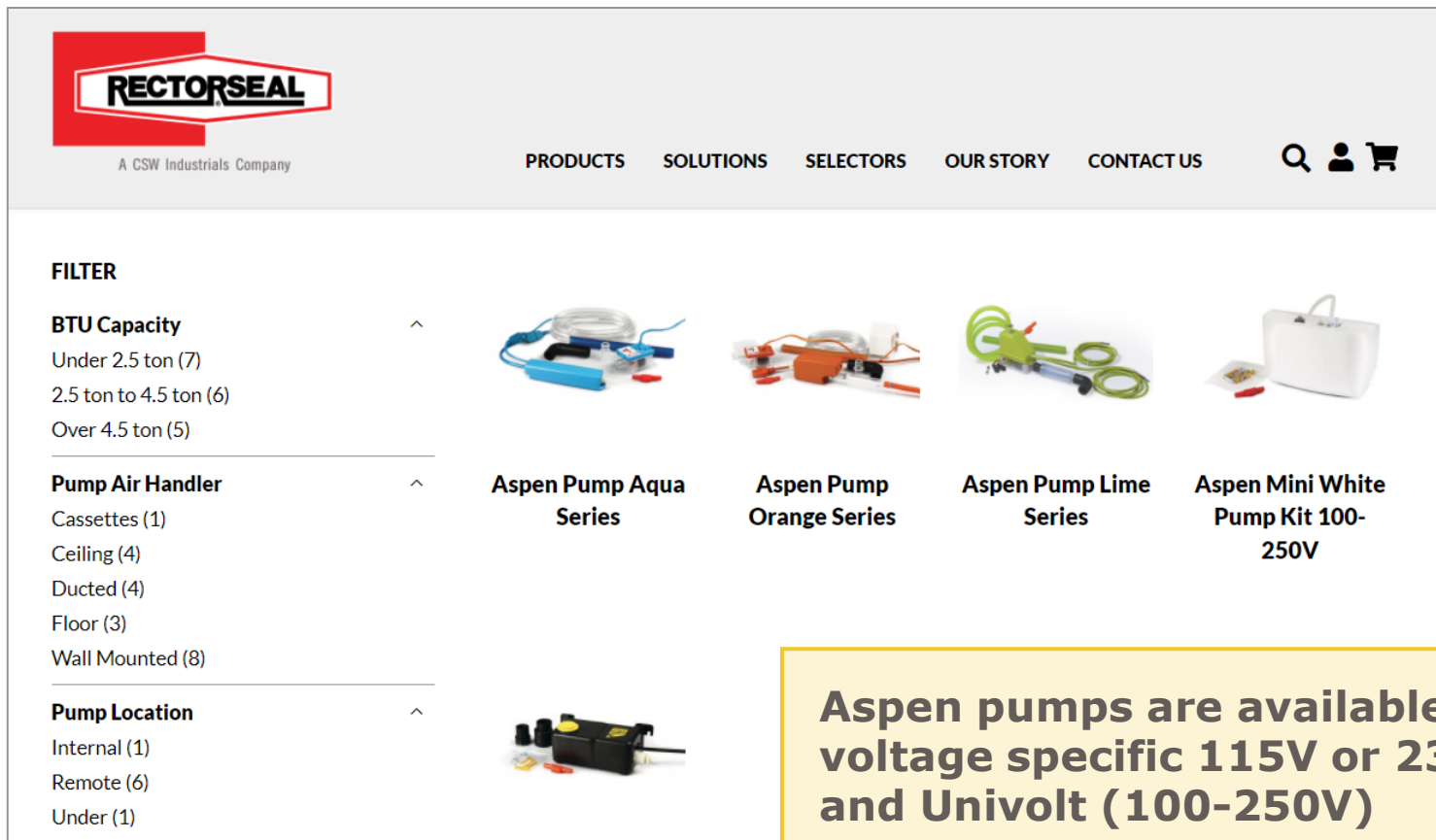
Wiring (cont.)

- Locate the included inline fuse loop, cut and strip the wires. Using a wire nut, attach one end of the inline fuse to the RED power wire from the pumps wiring harness. Now **insert the other end of the RED fuse wire into terminal 2 of the indoor unit along with the RED power wire coming from the outdoor unit.**
- **Insert the PURPLE safety wire from the pumps wiring harness into terminal 1 of the indoor unit all by itself.**



Rectorseal has an excellent pump selector on our website and includes the appropriate PDF wiring diagrams for many specific units.

rectorseal.com/products/pump-selector/



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FILTER

BTU Capacity

- Under 2.5 ton (7)
- 2.5 ton to 4.5 ton (6)
- Over 4.5 ton (5)

Pump Air Handler

- Cassettes (1)
- Ceiling (4)
- Ducted (4)
- Floor (3)
- Wall Mounted (8)

Pump Location

- Internal (1)
- Remote (6)
- Under (1)

Aspen Pump Aqua Series

Aspen Pump Orange Series

Aspen Pump Lime Series

Aspen Mini White Pump Kit 100-250V

Aspen pumps are available in voltage specific 115V or 230V and Univolt (100-250V)

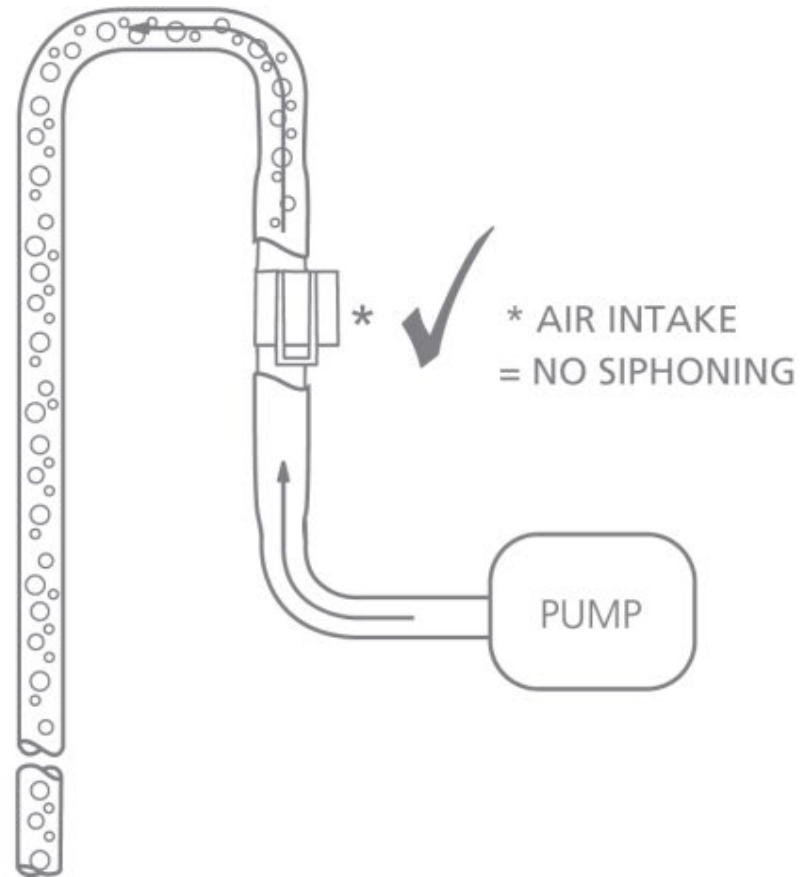
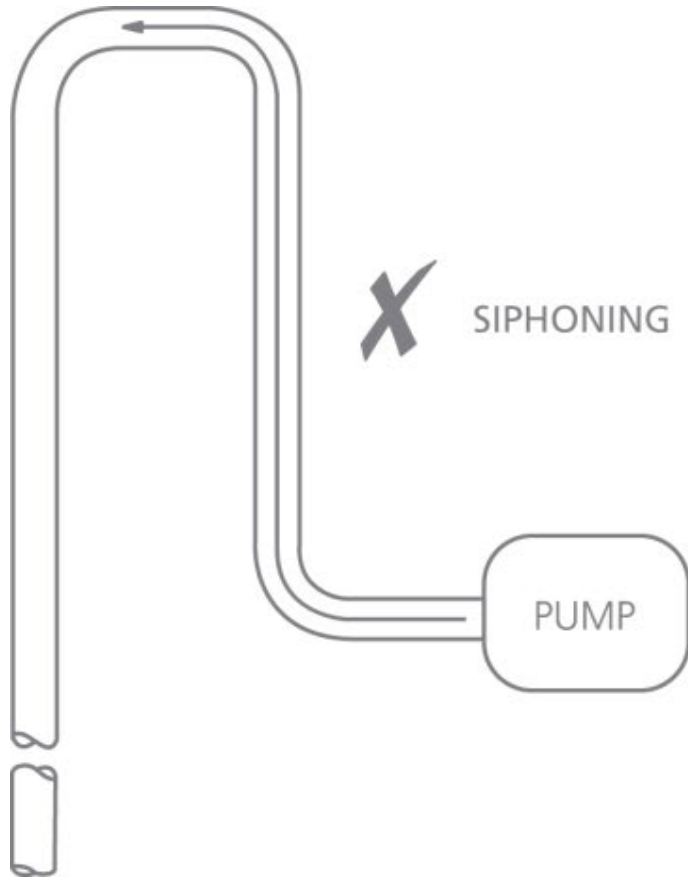
What is it and how does it affect the pump?

- Siphoning occurs when the **discharge tubing terminates below the pump and reservoir**. In this scenario, when the pump stops running, gravity takes over and pulls all the water out of the pump.
- The next time the pump begins to run, it is dry and must self-prime. While self-priming, **the pump is running without water**.
- The pump is lubricated and cooled by water and may **sustain damage anytime it runs without water**.

Where to install the anti-siphon device:

- **All Aspen pumps include the anti-siphon device.** It is pre-installed at the factory on our Silent + models and located inside the box on all other models,. The installer must locate and install the anti-siphon device.
- **The anti-siphon device is an in-line device; it will have tubing on either side of it when correctly installed.** The anti-siphon device must be installed on the discharge side of the pump and ideally should be installed 18" from the pump (this distance may vary to suit your installation) and have additional ¼" tubing leading to the desired discharge location.
- The use of an anti-siphon device allows the discharge tubing to terminate at any location within discharge distance specification of the pump **without causing any potential siphoning effect to reach the pump.**

Anti-siphoning



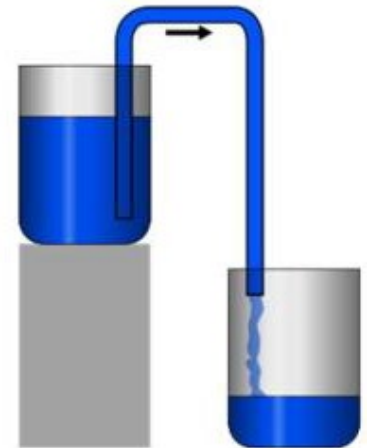
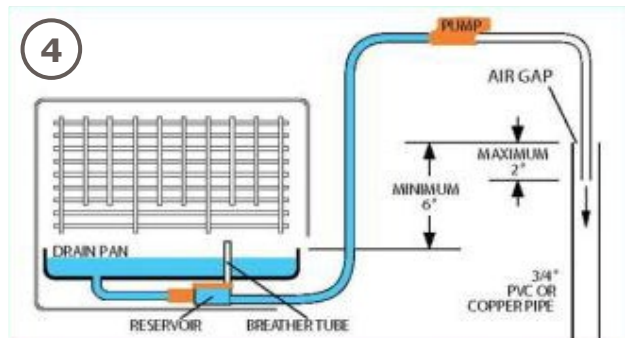
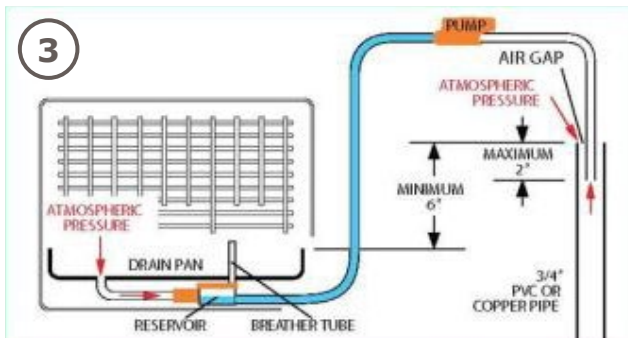
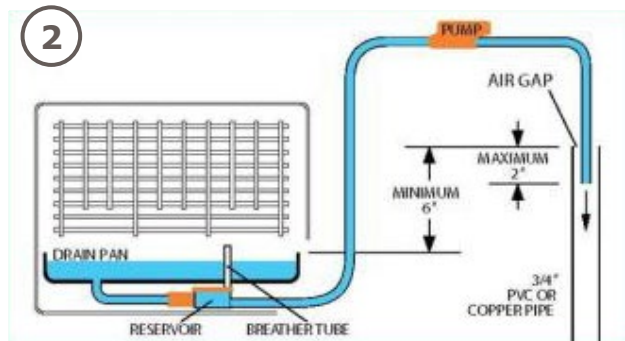
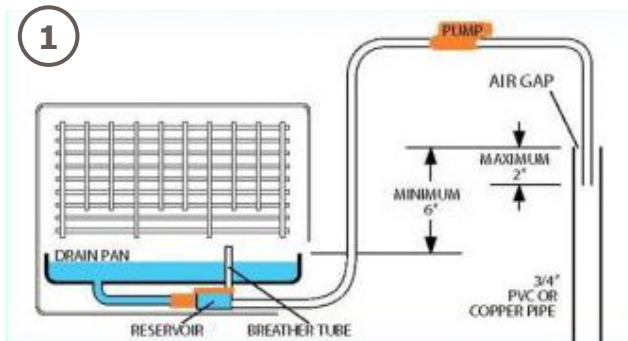
Anti-siphoning



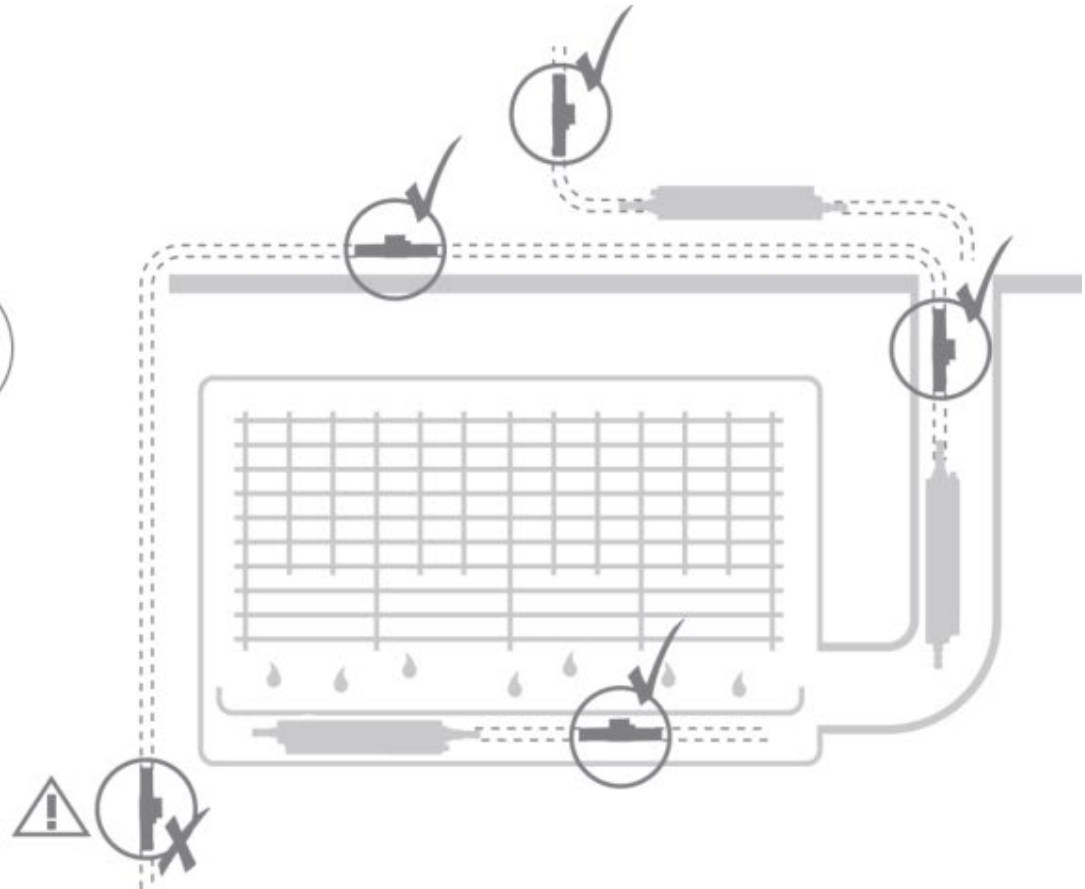
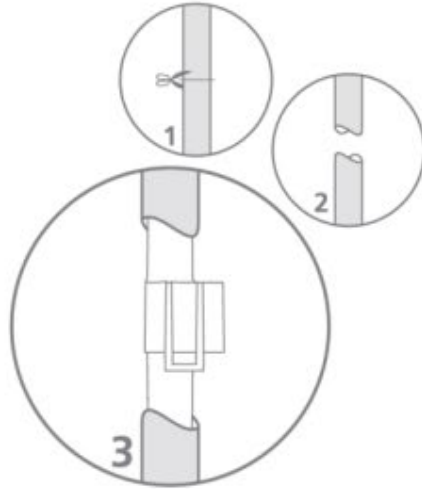
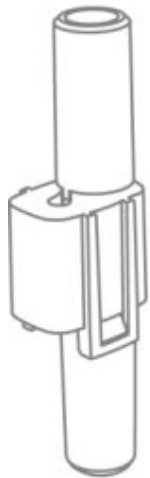
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Correct installation requires an air break to prevent siphoning.

Siphoning, which cause excessive noise and premature burnout is the effect of water being pulled down and out of the pump by gravity

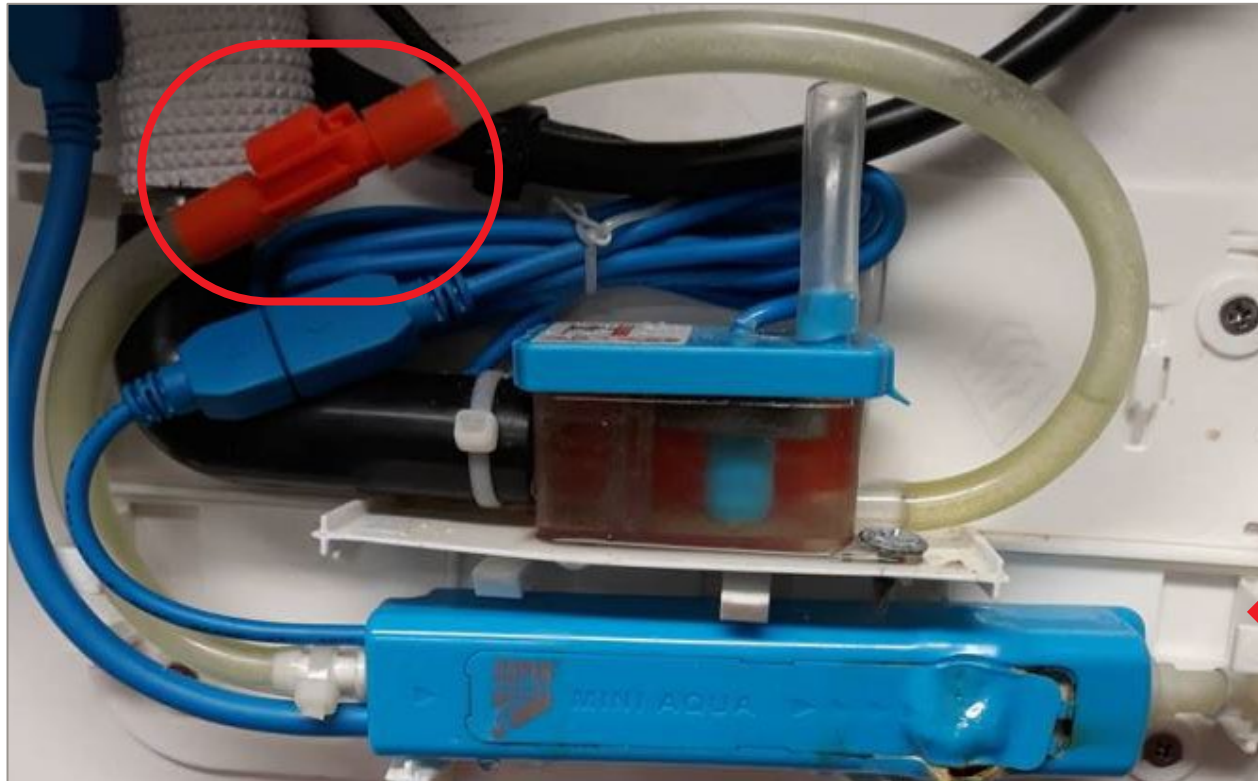


Anti-siphoning



Improper installation failure **(anti siphon device on the return side of the pump)**

- Motor pump failure due to running dry
- Overheating which melted core



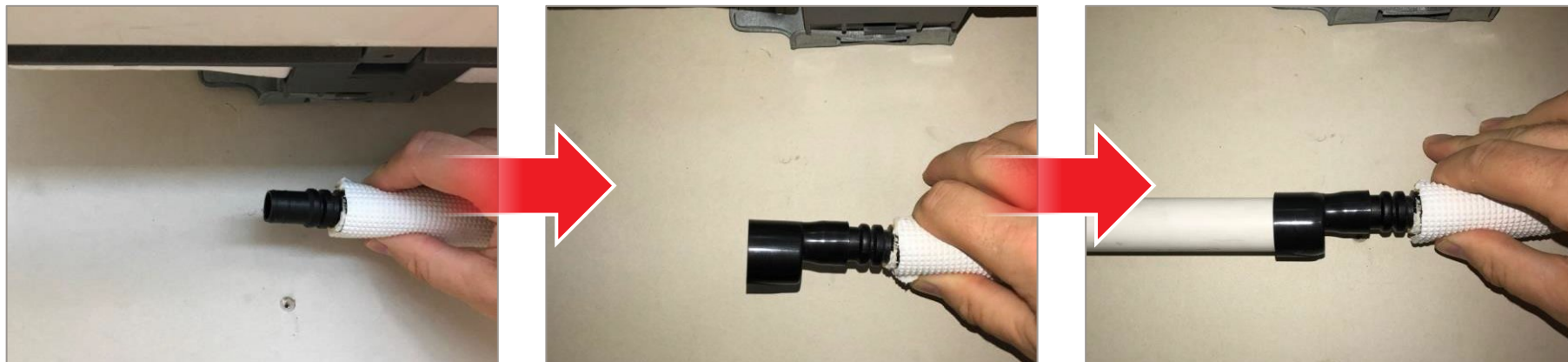
Anti-siphoning



Draining from mini-split to PVC

Aspen Xtra 3/4" PVC to 5/8" Pipe to Pipe Rubber Connector/ Adaptor

Allows the connection of a mini-split OEM drain tube directly to a 3/4" PVC pipe.



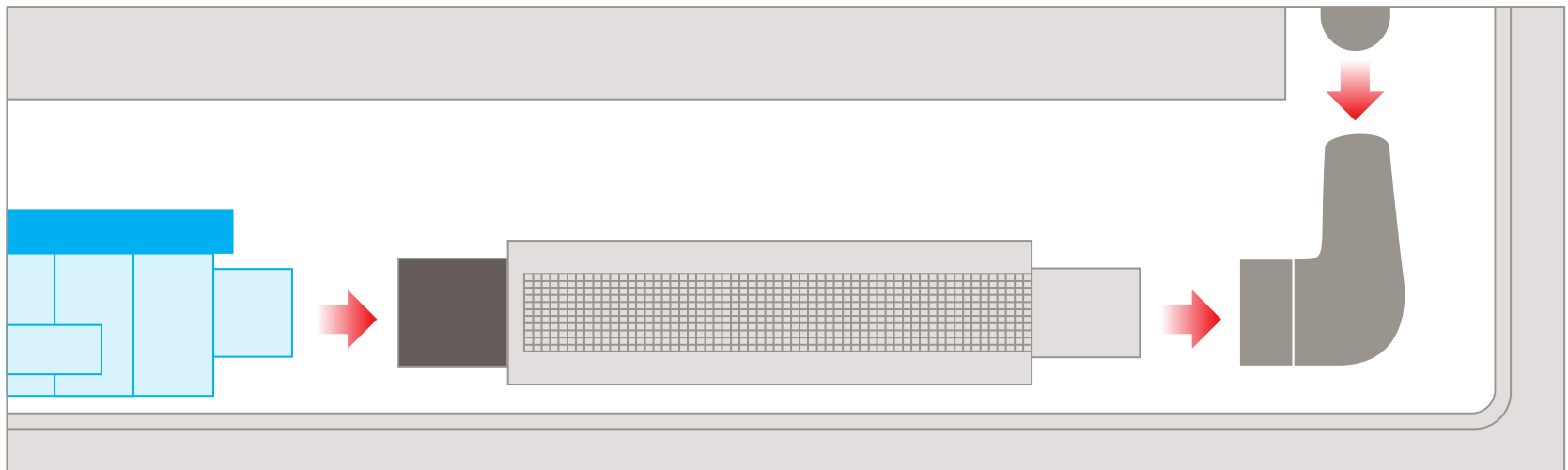
Ensure both ends are fully installed to connector fitting and secured with zip ties.

Annual inspections are recommended and consist of the following:

- **Inspect all electrical, communication and tubing connections to ensure they are tight.**
- **Carefully remove the lid from the reservoir and inspect the mesh filter and inside the reservoir for debris and/or organic growth.** If necessary, remove and clean the reservoir with warm water and mild soap, rinse thoroughly before re-installing.
- **Visually inspect the pump** for any signs of tampering or malfunction and ensure it is securely installed.
- **Inspect the anti-siphon device** to ensure it is installed and is secure.
- **Inspect the termination point of the discharge tubing** to ensure it is secure in discharging the condensate to the appropriate location.
- Do not run any coil or other cleaning products through Aspen pumps or reservoirs. **Remove reservoir prior to cleaning coils.**

Maintenance (cont.)

- Environments with heavy airborne debris such as a dentist office, or hair salon, may require **more frequent maintenance**. The use of an Aspen reservoir pre-filter (Rectorseal Part # 83893) is recommended for environments with a high concentration of airborne debris.



- Aspen uses piston pumps which contain a **rapidly moving piston**.
- The pumps operate at a **normally acceptable decibel level**, however, the piston inside the pump is moving rapidly and does vibrate.
- Most noise complaints are from **improperly installed pumps or improperly chosen pumps** and can easily be corrected.
 - Some Aspen pumps “buzz” three times when first energized to let the installer know the pump has power.
 - Some pump noise is normal during initial set up when the pump is priming.
 - The use of foam insulation may be used to reduce vibration transfer.
 - As long as the pump stays primed, receives proper maintenance, and is well insulated against vibration, you can expect very few problems.
 - Consider using a Mini White Silent+ rather than a standard Mini White in bedrooms and spaces where volume is an important factor

New construction installations



Aspen pumps are intended for use in normal operating conditions in a clean and/or occupied space.

- AC units with Aspen Pumps **should not be run during construction** if possible.
- If AC units must be run, **take all necessary precautions to eliminate airborne debris from entering the AC unit.**
- Large amounts of airborne construction debris will require **frequent maintenance of Aspen reservoir and pump and may cause pump failure, voiding the pump warranty.**
- The use of an Aspen inline reservoir pre-filter (Rectorseal Part # 83893) **is recommended for environments with a high concentration of airborne debris.**

Agenda

What is a Mini Pump

Introducing Aspen Pumps

Definitions

Why Aspen?

Aspen Pumps Detail

Competition

Best Practices And Maintenance

Troubleshooting

Reading through best practices will typically cover most issues.



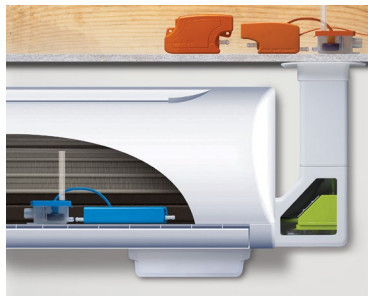
Aspen® Mini Pump Installation Best Practices Aqua, Orange, and Micro V

INTRODUCTION

The following Best Practices are intended to help educate the licensed contractor of ductless & VRF/VRF equipment about the proper installation, use and maintenance of Aspen mini pumps. These Best Practices were created to arm the installing contractor with technical awareness, set better expectations, create general understanding and drastically reduce installation errors and frustration.

Although the percentage of complaints vs. pumps installed is extremely low, by far the primary complaints about mini pumps are noise, premature failure and difficulty with wiring. By following these step by step procedures, you can greatly reduce failures allowing you to install Aspen Mini Pumps with confidence!

NOTE: The following Best Practices are intended as a general guide for "typical" installations. Your installation may vary! Always follow the AC unit & pump manufacturers printed recommendations!



1. Aspen Pump & Reservoir Installation

- Prior to installing the pump and reservoir, set the pump and reservoir in the desired location and run all wiring and tubing in, under, around or through any obstacles to ensure each is long enough to complete your installation.
- The Reservoir (float) should be installed close to and level with or below (not more than 5") the drain pan spout on a horizontally flat surface using the supplied Velcro strip. The reservoir has a 1/4" port on one side to connect to the drain pan using the OEM drain tube or tubing supplied in the pump box. It will have a hard wired communication cord that connects to the pump. It will also have a 1/4" port on the side of the housing that connects to the 1/4" inlet (IRT) port of the pump. And it will have a vent port on the lid, please ensure the included 6" vent tube is installed.
- The Pump should be installed above the reservoir (1 inch to 5 feet) and can be installed in any orientation using the supplied Velcro or mount as long as the discharge side of the pump is level or



Aspen® Mini White® Installation Best Practices

INTRODUCTION

The following Best Practices are intended to help educate the licensed contractor of ductless & VRF/VRF equipment about the proper installation, use and maintenance of Aspen mini pumps. These Best Practices were created to arm the installing contractor with technical awareness, set better expectations, create general understanding and drastically reduce installation errors and frustration.

The most commonly asked questions are related to noise, wiring and premature failure. By following these step-by-step procedures, you can confidently perform great Aspen Mini Pump installations and reduce potential failures.

NOTE: The following Best Practices are intended as a general guide for "typical" installations. Your installation may vary. Always follow the AC unit & pump manufacturers' printed recommendations.



1. Aspen Mini White installation This pump is designed to be mounted directly below the mini-split indoor wall mount unit to either the left or right side of the unit.

a. Installing the Pump Body

- Turn off the power to the indoor unit before installing the Aspen Mini White.
- With the pump cover removed, hold the pump base in the desired location adjacent to the bottom of the AC unit to either the far left or far right side.
- Be sure to line up the "knock out panel" on the bottom of the AC cover with the openings on the top of the Mini White.
- The outside edge of the pump housing should be relatively flush with the outside edge of the AC unit.
- Once you have chosen the desired location and confirmed the alignment, secure the pump base to the wall using the supplied screws and mollys **"DO NOT OVER TIGHTEN"** - The base unit mounting holes include rubber dampers that should be snug but not compressed against the wall!
- Remove the AC unit's cover and remove the appropriate knock out panel on the AC unit cover. Removing the knock out panel allows for the following items to be connected between the pump and the AC unit: 1. OEM Drain line 2. Discharge tubing 3. Pump Wiring Harness
- Position the OEM drain tube with enough slack that it may reach the pump's knockout inlet.



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