



EC-1-DV 'Suction Lift' Condensate Pump

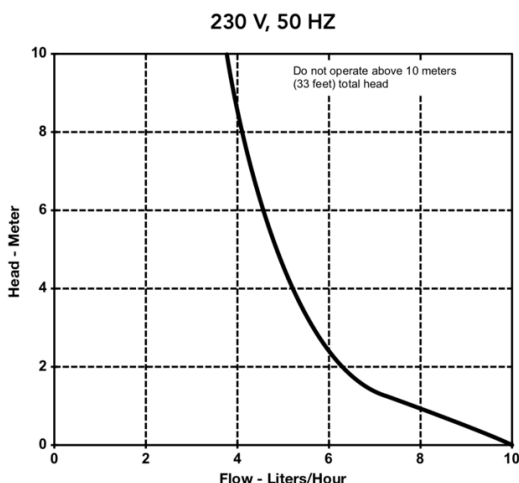
The EC-1-DV model is designed to accommodate multiple electrical requirements within one pump. The DV suffix indicates that the pump is capable of operating from a wider range of supply voltages to maintain consistent performance. Similar to our EC-1 model, this model includes improved noise reduction, reliable solid-state switching technology, and easy to install mounting brackets to create a pump that benefits contractors, installers, and end-users.

- Normally-closed relay rated at 8 A resistive - 250 V alarm
- 21 dB(A)
- 6 mm pump discharge outlet
- Elastomeric mounting grommets on pump housing bracket
- Elastomeric passive vibration isolator used to dampen pump vibration
- Separate wall bracket for pump and reservoir (included)
- Thermal protection: 80 °C
- 1.5 m power cable
- 1 m communications cable (pump to reservoir)
- Ambient temperature range: 0 °C - 60 °C
- Maximum water temperature: 60 °C
- Clear reservoir for instant visual inspection of water level, float, and filter
- Hall effect on/off level sensors with high water safety sensor feature
- Extra-large filter screen for longer intervals between cleaning
- Multi-step drain hose adapter (14 mm, 16 mm, 18 mm, and 20 mm)
- Simple to open reservoir for easy maintenance
- Height: 104mm Length: 46mm Width: 58mm



**NOTE: Use on A/C units up to 6kW...
No larger!**

Suction Lift:	1m
Shut Off:	10m
Liquid Temp:	60°C
Discharge:	6. mm
Electrical:	230V, 50Hz
MODEL:	553502



**IMPORTANT
INSTALLATION BY HVAC-R
PROFESSIONALS ONLY**

EC-1-DV

Introduction

This instruction sheet provides you with the information required to safely own and operate your Little Giant pump. Retain these instructions for future reference.

The Little Giant EC-1 pump series comprises the following models: EC-1, EC-1-DV, EC-1K, and EC-1K-DV. The EC-1 and EC-1K models include a variety of pumps to accommodate varying electrical requirements (i.e. voltage and frequency) while the EC-1-DV and EC-1K-DV accommodate multiple electrical requirements within one pump. The "DV" suffix indicates a pump model that senses the application's voltage and frequency (within the rated range), then automatically adjusts internally to maintain pump performance.

The entire EC-1 Series of pumps (hereafter referred to as "EC-1") are automatic condensate removal systems designed to remove the water from a ductless mini-split air conditioner evaporative coil when gravity-feed drainage is not possible or practical. Even where gravity drainage is possible, the EC-1 may be a better choice, minimizing the opportunity for property damage due to a clogged or air-locked gravity drain line. Additionally using the EC-1 allows the placement of the indoor air handler anywhere in the room, not just located on an outside wall, to take advantage of gravity draining of condensate to the outside.

The EC-1 pump is only suitable for intermittent use in applications with a maximum 50% pump duty cycle and maximum 3-minute pump ON cycle. To maintain a maximum 50% duty cycle, the pump must have at least twice the flow rate of the condensate produced at the head required by the application.

The EC-1 is suitable for most ductless mini-split A/C units up to 34,000 BTU/hr, but the amount of condensate produced by an air conditioner is dependent on the properties of the inside and outside air and the characteristics of the air conditioner used. Check with the air conditioner manufacturer for the amount of condensate that will be produced for a given application. Make certain that you have determined that the flow rate of the EC-1 is enough to remove the condensate during the most severe temperature conditions. See performance curve for typical pump flow rate and maximum amount of condensate that can be removed for any given discharge head. Failure to consider this could result in overflowing of water from the condensate pump reservoir.

The EC-1 consists of two main parts, the water collection reservoir and control unit/pump. The water collection reservoir is to be positioned near the bottom of the air handler. The control unit/ pump can be affixed internal or external to the air handler.

The EC-1 operates automatically when condensate water drains into the reservoir by gravity. The reservoir contains switches controlled by a float that rises and falls depending upon the amount of water inside the reservoir. As water enters the reservoir, a float rises and causes a switch to activate the pump. As the pump empties the reservoir, the float lowers and causes a switch to deactivate the pump when the reservoir is almost empty. A small amount of water always remains in the reservoir after each pump cycle.

The reservoir also includes a filter screen that should be inspected periodically and cleaned when necessary. Failure to inspect and clean the filter screen may result in blockage inside the reservoir resulting in water overflowing from the reservoir.

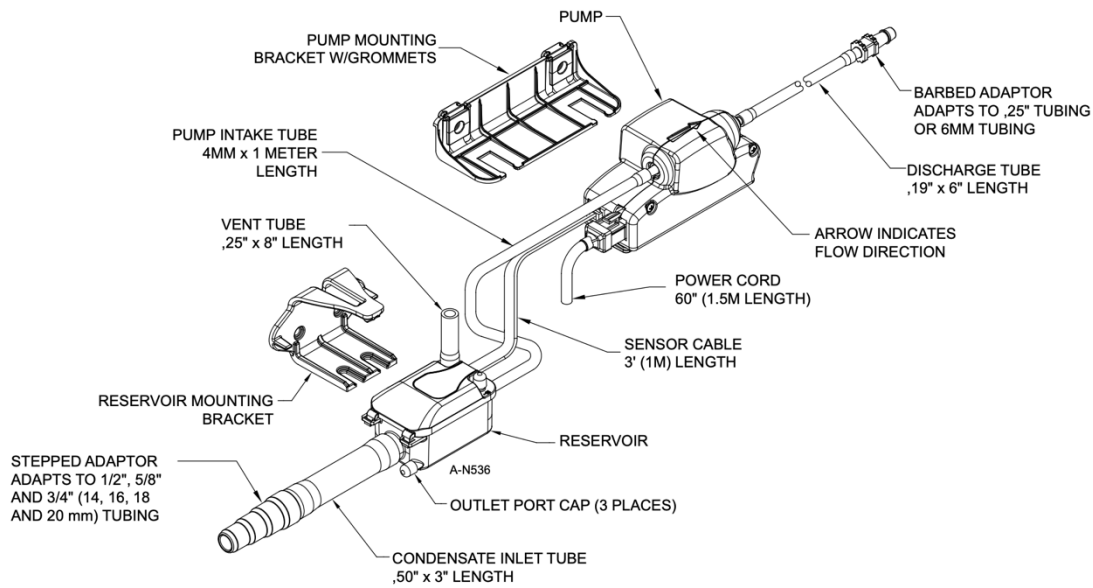
The pump also includes an overflow protection switch circuit that can be connected to stop the air conditioner equipment if the pump is unable to empty the reservoir. This feature should be used as it can prevent property damage due to overflowing water from the air conditioner. The use of this feature is described in detail below under electrical connections.

The Little Giant pump you have purchased is of the highest quality workmanship and material, and has been engineered to give you long and reliable service.

Little Giant pumps are carefully tested, inspected, and packaged to ensure safe delivery and operation. Please examine your pump carefully to ensure that no damage occurred during shipment. If damage has occurred, please contact the place of purchase. They will assist you in replacement or repair, if required.

READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE, OR SERVICE YOUR LITTLE GIANT PUMP. KNOW THE PUMP'S APPLICATION,

LIMITATIONS, AND POTENTIAL HAZARDS. PROTECT YOURSELF AND OTHERS BY OBSERVING ALL SAFETY INFORMATION. FAILURE TO COMPLY WITH THESE INSTRUCTIONS COULD RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE!



SAFETY GUIDELINES

SHUT OFF ELECTRICAL POWER AT FUSE- OR BREAKER- BOX BEFORE ATTEMPTING TO SERVICE, DISCONNECT CONNECTOR, OR REMOVE ANY COMPONENT!

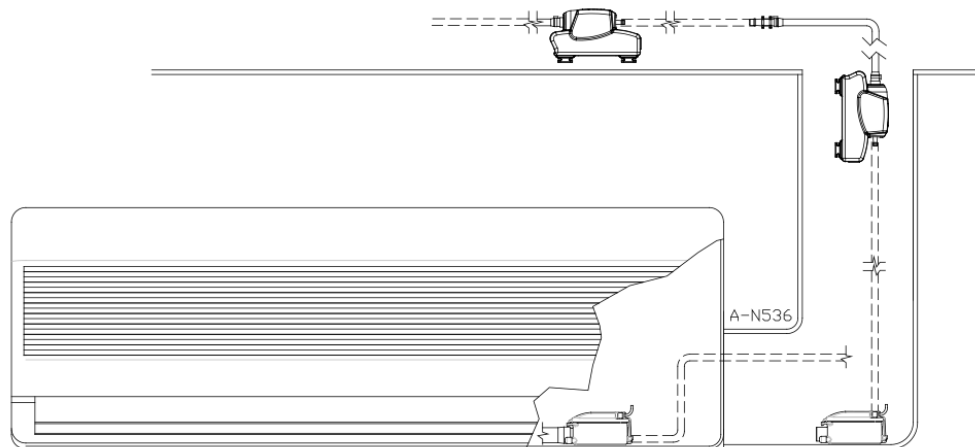
1. Do not use to pump flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. Do not use in explosive atmospheres.
2. Do not handle unit with wet hands or when standing on wet or damp surface or in water.
3. In any installation where property damage and/or personal injury might result from an inoperative or leaking pump due to power outages, discharge line blockage, or any reason, a backup system(s) and/or alarm should be used.
4. Support pump and piping/tubing when assembling and when installed. Failure to do so may cause piping/tubing to break, become disconnected from pump and/or cause pump to fail or not operate correctly, etc.
5. The control unit/pump is not submersible and must be installed so that water cannot be dripped, splashed or sprayed onto the control unit/pump.
6. If the supplied power cord is missing or damaged, it must be replaced with a special cord available from the manufacturer or its service representative.
7. For proper automatic operation, the reservoir must be positioned level and horizontal. Do not operate the pump with the filter screen removed.
8. Do not run this pump dry.

INSTALLATION

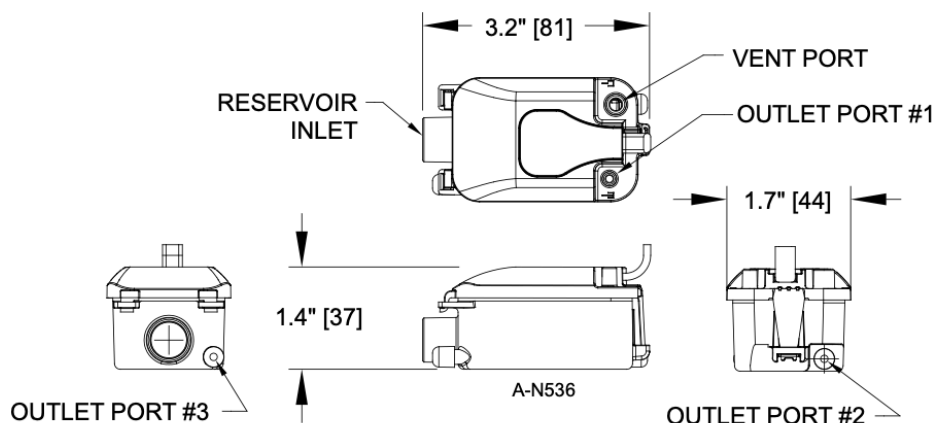
This section guides the user to install the EC-1 using the most common configuration of condensate water removal from wall-mount, ductless mini-split air conditioners.

In this configuration, the reservoir is installed inside and behind the air handler, with the reservoir inlet connected directly to the air handler condensate drain hose. The pump is installed outside the air handler.

It is best to position the reservoir and pump first before connecting tubing and electrical wiring.



Installing the Collection Reservoir:



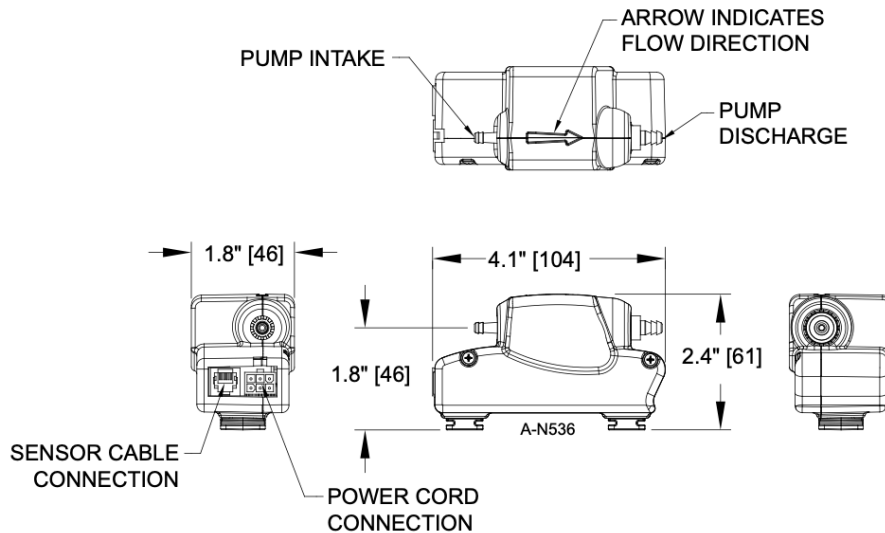
Inspect the air conditioner for presence of loose packing material (Styrofoam, cardboard etc.) and remove. We recommend to rinse the coil and drip tray with an approved coil cleaning product to remove any foreign material before connecting the EC-1 reservoir.

FAILURE TO DO SO MAY CAUSE PREMATURE FAILURE OF THE PUMP AND/OR DAMAGE TO PROPERTY

1. Installing reservoir inside air handler: Position reservoir on flat surface near end of drain hose with reservoir inlet facing air handler drain hose. Locate the collection reservoir in a suitable position where the reservoir can be gravity-fed by condensate water from the air handler's drip tray.
2. Use supplied double-sided foam tape to secure bottom of reservoir to horizontal surface.
3. Installing reservoir outside air handler: Use supplied reservoir mounting bracket and wall anchors to secure bracket to wall, side of equipment or horizontal surface. The bracket may also be installed on horizontal surface using double-sided tape.
4. Position reservoir bracket level and provide clearance for reservoir assembly to slip into and out of bracket.
5. Mark the screw hole locations using the bracket as a template. Using a level, ensure the two mounting holes are level within (+/- 8) degrees.
6. If using the supplied wall anchors, drill a 3/16" (5mm) hole x 1" (26mm) deep at each point marked on the wall, then insert an anchor fully into each hole.
7. Using the supplied screws, attach the mounting bracket to the wall.

8. Be certain that the bottom of the reservoir is within (+/-) 8 degrees of being level with the optimum performance being when the reservoir is level. Use care to ensure the reservoir will remain level throughout its operating life. If the reservoir is not mounted properly, the float mechanism may not function properly and may cause the unit to overflow.

Installing the Control Unit/Pump:



THE EC-1 PUMP IS NOT SUBMERSIBLE. Ensure that it is located where water cannot be splashed, sprayed, or dripped onto it.

DO NOT locate the pump near insulation or other flammable material.

1. Determine a suitable location to install pump. Pump can be located above, below or adjacent to air handler.
 - a. The maximum suction lift of the pump is 3 ft (1m), therefore the control unit/pump cannot be installed more than 3 ft (1m) higher (vertically) than the collection reservoir.
2. Using the supplied mounting bracket, secure bracket to wall using supplied wall anchors and screws.
3. Using one of the supplied #4 x 1" long self-tapping screws, insert the end of the screw into the hole of the mounting grommet in the pump bracket and work the point down to pierce through the mounting grommet. Perform this step for the second mounting grommet.
4. Place the pump mounting bracket against the wall and use the points of the screw to mark the wall in locations to drill for the wall anchors.
5. If using the supplied wall anchors, drill a 3/16" (5mm) hole x 1" (26mm) deep at each point marked on the wall, then insert an anchor fully into each hole.
6. Using the supplied screws, attach the mounting bracket to the wall. Hand-tighten the wall anchor screws against rubber grommet, being careful so that screw head does not push through rubber grommet.
7. Slide pump onto wall bracket by inserting slots of bracket into flanges of black mounting grommets on side of pump housing.
8. Connect the sensor cable from the collection reservoir to the control unit/pump by inserting the cable connector into the corresponding socket on the control unit/pump.

Drain Hose-to-Reservoir Inlet Tubing:

1. Connect 1/2" ID x 3" (12mm ID x 76mm) tubing to the air handler drain hose.
2. If the air handler's drain hose has a plastic adapter suitable for use with reservoir inlet tubing, there is no need to use the stepped adapter to connect drain hose to reservoir inlet. If the drain hose has a plastic adapter not suitable for use with the reservoir inlet tubing, it may be necessary to cut the hose and remove the adapter. Connect the single-sized end of stepped adapter to the inlet tubing, and fit the stepped adapter to the drain hose. The adapter fits 1/2", 5/8", and 3/4" (14mm, 16mm, 18mm, 20mm) drain hose ID. Use a cable tie or hose clamp to secure the drain hose to the adapter.
3. If the condensate drain has a metal drain port, such as on a fan coil, use the supplied adapter and connect it to the metal drain port using a flexible hose (not supplied).
4. Be certain to support the reservoir when attaching tubing and that tubing is not kinked when reservoir is in place.

Reservoir-to-Pump Tubing:

1. For convenience, the reservoir assembly is equipped with three outlet ports, one vertical and two horizontal. Choose an outlet port on the reservoir assembly, remove port cap, and connect the 5/32" ID x 3 ft (4mm ID x 1m) tubing onto selected port.
 - a. Confirm that all unused outlet ports are capped off (with the provided port caps) or leakage from the reservoir will occur.
2. Use supplied cable tie to secure the tubing.
3. Route the tubing to pump intake (indicated by the direction of flow arrow on the top of pump) and connect.
4. Use supplied cable tie to secure tubing to pump intake port.
5. Be certain the tubing is not kinked when pump is installed.

Pump Discharge Tubing:

The EC-1 pump is supplied with a section of silicone discharge tubing attached to the pump discharge and fitted with a 1/4" (6mm) tubing adapter. Do not remove tubing.

1. Connect a length of 1/4" (6mm) ID discharge tubing (not provided) to the discharge tubing adapter using a cable tie or hose clamp.
2. The other end of discharge tubing is to be directed into the nearest inside gravity-feed drain, or along the refrigeration lines to an outside gravity-feed drain.
3. Maximum acceptable horizontal run of discharge tubing is dependent on the diameter of tubing used and the vertical lift. The installer should apply a reasonable factor of safety and size the pump to handle a greater flow rate than the maximum condensate to be produced.
4. Do not extend the discharge tubing more than 33 ft (10m) above the level of the pump.
5. NOTE: The end of the discharge tubing must be positioned such that it is no more than 3 ft (1m) below (vertically) the collection reservoir. Otherwise, a siphon effect may occur causing the pump to lose its prime. This condition would cause the pump to re-prime itself during each cycle, resulting in noisy operation and shortened pump life.
6. Ensure that there are no kinks, twists or breaks in the discharge tubing that could cause blockage. If cable ties are used to strap tubing to structures, assure that cable ties do not crush or squeeze-closed the tubing.

Vent Tubing:

1. Connect the 1/4" ID (6mm) tubing to the vent port of the reservoir cover. The free end of the vent tubing must be secured above the highest level of the drip tray in the air conditioner to prevent overflow.
2. Route the vent tubing upward, ensuring that it is not kinked or blocked.
3. Do not remove, cut off, shorten, twist, or sharply bend the vent tube.
4. Do not connect this tube to the air handler; it is for venting only.
5. Be certain that the vent tubing will remain in an upward position during the operating life of the pump.

General Installation Notes:

- After connecting the reservoir inlet, reservoir-to-pump, vent, and discharge tubing, ensure that the reservoir and pump remain positioned correctly.
- Keep all tubing and wires clear of moving parts in the air handler.
- Upon completion of the installation, test the pump and all connections, observing that water is being pumped to the discharge point.

ELECTRICAL CONNECTIONS

BEFORE CONNECTING POWER LEADS, SHUT OFF ELECTRICAL POWER AT FUSE- OR BREAKER-BOX. ALL WIRING MUST COMPLY WITH LOCAL ELECTRICAL AND BUILDING CODES, AS WELL AS THE MOST CURRENT NATIONAL ELECTRIC STANDARDS. CHECK CONTROL UNIT/PUMP LABEL FOR PROPER VOLTAGE REQUIRED. DO NOT CONNECT TO VOLTAGE OTHER THAN THAT SHOWN ON CONTROL UNIT/PUMP LABEL.

The EC-1 is designed to be used with an earth-grounding conductor. To reduce the risk of electrical shock, connect the earth lead to a properly-grounded circuit. The use of a ground fault circuit interrupter is recommended.

All wiring should be performed by a qualified installer approved by local regulations and National Standards. For best performance, connect the control unit/pump to a separate circuit. The control unit/pump **MUST BE CONNECTED TO A CONSTANT POWER SUPPLY, NOT AN INTERMITTENT SOURCE SUCH AS A FAN OR LIMIT CONTROL CIRCUIT.**

Power Supply:

1. Attach power cord lead wires from the control unit/pump to a power supply with voltage output that matches the voltage rating on control unit/pump.
2. The power leads are color-coded as follows: a. BLUE = Neutral (115 V) or L1 (208/230 V) b. BROWN = Live (115 V) or L2 (208/230 V) c. GREEN/YELLOW = earth (ground)
3. A UL listed/VDE-certified fuse (purchased separately) should be fitted in the line lead of the power cable supplying the control unit/pump. The actual current rating of the fuse will depend on the type of fuse and local standards. Typical values by model are shown below:

MODEL (voltage)

EC-1 or EC-1K (115 V)

EC-1 or EC-1K (230 V)

EC-1-DV or EC-1K-DV (110 - 240 V)

FUSE 0.50 A 0.20 A 0.50 A

OVERFLOW PROTECTION SWITCH CONNECTIONS

The unit is equipped with an overflow protection switch with a maximum rated switching current (resistive load) of 3 amps at 250 VAC or 3 amps at 30 VDC. This circuit is intended to drive a low power control or alarm circuit and is not sufficient to operate and switch a large-amperage inductive load.

1. Connect the wires as described below to obtain the desired response.
2. The overflow protection switch wires are color coded as follows: a. WHITE or GREY = common
b. RED or ORANGE = normally open
c. BLACK or PURPLE = normally closed

Connecting to Common and NC (Normally Closed) Wires:

When a high-water or overflow condition occurs, the normally closed circuit opens to turn off the compressor, thus stopping the flow of condensate water.

1. This is typically done by breaking either the power (R) or cooling (Y) leg of the low-voltage thermostat.
2. Check with the air conditioner manufacturer to confirm that this is acceptable for the air conditioner in the application.
3. If acceptable, confirm which thermostat wire is to be interrupted.
4. This connection can also be used with central control systems to control the air conditioner operation.
5. NOTE: When connected in this manner, if a high water condition occurs, the air conditioner should not run until the high-water condition is fixed. This method should not be used if the cooling or heating requirements are a necessity. The alarm method (normally open circuit) should be used instead.

Connecting to Common and NO (Normally Open) Wires:

When a high-water or overflow condition occurs, the normally open circuit closes to activate a bell or alarm (not provided, purchased separately), or to send a signal to a central control system.

NOTE: When connected in this manner, if a high water or overflow condition occurs, the air conditioner is not shut down and may continue to produce condensation, creating a potential overflow condition and risk of flooding until the high water condition is fixed.

TESTING THE OVERFLOW PROTECTION SWITCH OPERATION

After the installation is complete and power has been restored to the air conditioner and control unit/pump, test the operation of the overflow protection switch to make certain that the installation was done correctly.

1. Turn on the air conditioner.
2. Pour water into the drain tray of the air handler until the pump energizes. NOTE: Do not continue to pour water if an overflow condition (flooding) is imminent.
3. Continue to pour water into the drain tray until the overflow protection switch activates.
4. If the overflow protection switch is wired to the normally closed configuration described above, the air conditioner should turn off. It should remain off until the pump lowers the water level in the reservoir to a middle level associated with alarm-off position.

5. If the overflow protection switch is wired to the normally open configuration described above, the alarm or bell (purchased separately) should sound. The alarm or bell should continue to sound until the pump lowers the water level in the reservoir to a middle level associated with alarm-off position.
6. When the pump has removed enough of the water to allow the overflow protection switch to deactivate, the air conditioner should come on or the alarm or bell should stop sounding, depending on the configuration used.

SERVICE INSTRUCTIONS

WARNING

ENSURE THAT THE UNIT IS DISCONNECTED FROM THE POWER SOURCE BEFORE ATTEMPTING TO SERVICE OR REMOVE ANY COMPONENTS.

The reservoir tank should be inspected and cleaned when air conditioner is serviced and at the beginning of each season. Every application is different, and the reservoir filter's service interval will depend upon the amount of debris trapped by the filter screen.

1. To clean the reservoir, carefully remove the reservoir assembly from its installed position.
 2. Depress the latch on the side of reservoir top and tilt upward to remove, being careful not to damage the reservoir gasket.
 3. Remove the mesh screen and rinse thoroughly under running water.
 4. Use a damp towel to remove dust or debris from the reservoir.
 5. The float should stay in place on the reservoir top; however if it has signs of dirt on its surface or it's up and down movement is impeded, remove it and rinse under water.
 6. To remove the float, slide the float retaining clip away and remove the float from the post. Do not try to disassemble the float. After servicing the float, reinstall float to the post and reinstall the float retaining clip.
 7. Reinstall the mesh screen into the reservoir, being careful to align the bottom edge of the screen in the groove inside the reservoir.
 8. Reinstall the reservoir top by tilting the top to allow for engaging the hinges, then closing the top, ensuring that the latch fully engages the base.
- There are no user-serviceable parts inside the pump. The warranty is limited to replacement only and will be void if the pump is tampered with.

