

## Frequently Asked Questions (ADS Batch-type Dishmachines)

### “What is the dishmachine’s cycle of operation—how does it work?”

Operation: Put the pump filter screen in the sump after cleaning, Put spray arm in upper and lower spray base and lock in. Push fill button and fill to the water level decal located on the sump (or approximately  $\frac{3}{4}$  up the drain ball tube in the sump. Open the door, push in a loaded rack of dishware, and close the door to begin the cycle. Typically, the wash will last for 45-seconds, drain will last for 15-seconds, and refill/rinse will end after 30-seconds. After the full 90-seconds, the cycle will end. There are optional cam timers for varying cycle times. Lift the door and remove the rack, replace with a newly loaded rack of soiled dishes and close the door to begin the second cycle.

### Installation Errors

Installation errors account for a high percentage of all service calls and questions. Please refer to the ADS **Installation Instructions** for specific models. These documents are available on-line and come with the new machines. They can be emailed or faxed during normal working hours. Electrical requirements, plumbing needs, control adjustments, cautions, and start up information are contained in the Installation Instructions.

### Category 1, ELECTRICAL WIRING ISSUES

#### “Why did the wire burn at its connection?”

A burned wire with black or green colored copper and insulation melted back an inch or two indicates a loose connection, which creates resistance, which produces heat over time. The problem’s source will be located at the end of the burned wire or the connection point. The burned wire can also be caused by a shorted switch that causes the same resistance as a loose connection.

#### “What size wire should I use to power the machine?”

The manufacturer recommends NEC wire codes--or better. For a 120v, 20-amp machine, 10 ga. wire is recommended.

#### “Can you use a fuse instead of circuit breakers?”

Yes, as long as it is a 20-amp fuse for a single rack, 40-amp for a double rack (or two circuits, each 20-amp).

#### “Can the machine be plugged into a common wall outlet?”

NEC codes states that a 20-amp service shall have its own circuit breaker, this usually means the machine will need to be hard wired to provide a **clean circuit**. The success of GFI outlets for commercial appliances has had poor results. These outlets were primarily developed around 1968 to protect people from electrocution in residential tubs and spa bathrooms, which became popular in residential housing. If a GFCI is required locally for commercial equipment, there has been more success in using GFCI circuit breakers instead of an outlet.

#### **GFCI's –**

National Electric Code (NEC) states that homes must have a GFCI protection in almost every outlet in the home. Several years ago, GFCI outlets were only required for some outlets near water. But as of 2008, all 125 volt, single phase, 15 & 20 amp receptacles in residential buildings, basements, garages and accessory buildings are required to be GFCI protected. Previously, outlets serving larger appliances, such as washing machines, were not included in the code..

#### **“Why does the circuit breaker keep tripping after the machine runs for a while?”**

Circuit breakers become weaker as they are repeatedly tripped or if they are hit by an unusually strong short. Consequently, a breaker can begin ‘nuisance tripping’ and should be replaced.

Another cause can be a motor that is getting ready to fail.

And wires that have melted and allow current carrying load to come close to the neutral or other phase will trip. (A test to see if this has happened is to take the wires out and separate them, if they are stuck together that means they have melted and should be replaced.) When copper burns, the metal can become porous or exhibit very small holes, making it difficult to obtain a tight connection. This will cause resistance—and will burn again.

#### **“Why does the circuit breaker trip as soon as I turn on the machine?”**

This usually indicates a serious short, a grounded circuit, or a crossed phase. For a 20 amp breaker to trip so violently, this means a powerful contact such as a grounded motor or solid connection to neutral has occurred.

#### **“Machine runs on all the time, why?”**

Lift the door to see if it will stop, if it does NOT stop, the problem is a faulty door switch.

If it does stop, the problem is likely the ‘Auto-start’ relay. You can test by removing the yellow wire for terminal #1 and run a cycle; if the machine turns off normally at the end of the cycle, the problem is a faulty relay and should be replaced (P/N 091-3059). A failed “start” push button, de-lime switch, or the master (on/off) switch on the cam timer can also cause this problem.

ADS provides wire diagrams on the various models for troubleshooting electrical problems. Go to [americandish.com](http://americandish.com) to download technical and electrical helps.

### **Category 2. MACHINE FUNCTION ISSUES**

#### **PUMP PROBLEMS**

#### **“The machine is full of water and we hear the motor turning, but there is no spray action from the pump?”**

High temperatures (above 150-160F depending) will cause the centrifugal pump to air lock, meaning entrained gas is released from the liquid in the low pressure center of the impeller. High pressure liquid at the perimeter of the impeller confines the gas bubble to the “eye” of the impeller, causing a suction block. The result is no liquid transfer. TO FIX: Reduce the incoming temperature (min. 120 max. 140 F). Make sure the “burp cycle” is on, it turns off the pump motor just after the drain and lets the pump fill up with water before turning on again (usually this is controlled by the 7<sup>th</sup> cam).

#### **“Why is the pump filter being clogged with string fiber?”**

People do not eat string or cotton fiber, historically string fiber in the pump filter comes from washing mop heads and bus towels in the dishwasher. However, this practice introduces floor bacteria to the internal parts of the machine and is difficult to remove without complete disassembly. These kinds of bacteria and soils cause sickness and can be deposited on clean ware. **Operators should be warned not use the dishwasher in this manner.** It also creates mechanical problems in manifold, seals and spray arm systems.

## SPRAY ARMS

### “Why does it seem like the spray arms are turning slow or have low pressure sprays?”

Spray arm rotation comes from water pressure, water pressure is pump generated in these models. Reduction of pressure comes mostly from clogged impellers, restricted manifolds, worn spray arm bearings or worn spray tips. Pressure tested at the lower spray arm end cap (test kit # 088-1048) will help identify the problem, see service manuals for specific pressures per model.

### “Why is water spraying out of the top of the doors or out of the sump and tables?”

A missing spray arm end cap will cause water to rush out of the inside of the machine, causing splashing out of openings. Look for the missing end cap in the sump or scrap box. If it can not be found, an emergency fix would be to screw a carrot into the open arm.

### “Why is the spray arm turning slow with no fan spray pattern, just six jets of water shooting up like pencils?”

The spray tip openings erode over time and lose their fan pattern when water is sprayed through them; the spray becomes a column. There is no repair. The arm needs to be replaced.

## DRAIN SOLENOID

### “Why won't the drain ball lift and let the water drain out?”

It can be caused by mechanical or electrical problems. The attachment to the solenoid plunger can be missing. The adjustment could be too little. Electrically, the solenoid coil could fail; the wire has come off the terminal, a missing neutral wire, or a faulty switch.

### “Why won't the drain ball drop down and let the water refill?”

It can be caused by mechanical or electrical problems. The attachments can become entangled, especially if the plastic cover is missing from the drain chain. The solenoid itself can become charged with residual magnetism and remain closed. This can only be resolved by replacing the solenoid itself. If this is the case, be sure to check that the machine is not wired in reverse polarity. Power must be on the incoming black wire and neutral on the white wire.

### “Why does the drain solenoid have a loud buzz?”

The buzz you hear is actually a 60-cycle vibration from the coil and its housing. It means the coil is very close to failing, needs replacement. It can also be caused by something interfering with the plunger.

### “Why does the drain ball keep leaking the water out of the tank?”

The drain ball is made of rubber-like material and over time, or as a result of chemical action, can become uneven (like car tires). This causes an uneven seat against the drain plate in the bottom of the sump, which causes the leak. Replace the drain ball with a new one. Or in an emergency, turn the ball over and use the other end.

## FILL SOLENOID

### “Will the machine fill automatically when I turn on the machine?”

The answer is NO; it must be filled manually when it is first turned on. Then it will drain and fill automatically after that.

### “Why does the machine NOT fill with water when I push the button?”

If there is no “fill” it can be a result of an electrical problem from a faulty switch, loose wire, or a failed coil. Or it can be a result of no water supply to the machine, check to see if the valve has been turned off.

### “Why does it take so long to fill the machine?”

A typical batch-type, low temp dishmachine should have a flow rate of about 15-17 psi WHEN FILLING. You can test this by emptying the machine, then refilling while counting the seconds. It should take no longer than 10-seconds to refill. This leaves 20-seconds for final rinsing. 10-seconds is the requirement. Reasons for slow filling can be undersized piping (1/2” pipe min), restricted pipes, water heater type, and building water pressure problems. **Caution: Tankless or on-demand water heaters are not recommended for batch-type, low temp dishmachines because of restricted pressure and long fill times.**

### “What should we do if the water is too cold?”

There are no heaters in a batch-type, low temp dishmachine. All water temperature comes from the building’s hot water heater. If the heater is too far away, pipes need to be insulated, if the heater is not sized for the demand, it needs to be upgraded. If it is turned down too far, it needs to be set up (120F min at the machine). **Caution: tankless heaters reduce flow and make it difficult for the dishmachine to recover after draining.**

## Category 3. GENERAL QUESTIONS

### “How do I turn “on” the machine?”

There is a master switch located at the rear of the control box. Once this has been turned on, lift the door and close to begin a cycle or push the start button.

### “The machine did not turn on, what do I do next?”

Check the circuit breaker. Push in the door switch plunger on the back of the machine. Check master switch to see if it will operate. If these quick answers don’t work, it will require a service call.

## CHEMICAL FEEDERS

### “Why won’t the chemical peristaltic pump dispense chemical into the tank, it is turning?”

The supply bucket may be out of chemical, check this first. Look through the pick up chemical lines to see if liquid is in the line. Prime the pump to see if the liquid in the line will move. It could be that the pick up tubing has a hole and breaks the suction, or that the pick tubing is not all the way down in the tube stiffener.

### “How often do I need to change the peristaltic squeeze tubes?”

Typical use would require new tubes every 4-6 months. But it is dependent on usage and time. If the machine were to sit idle for months, the tube material can shrink or distort causing a loss of compression and may need replacement.

### “How can I tell if a peristaltic squeeze tube is bad?”

A test to see if a tube is worn beyond its service life, is push the prime switch and observe the liquid level in the supply tubing. If it only moves back and forth an inch or so, and never feeds out of the end, that probably indicates a worn tube; certainly it is telling of a problem in the pick up or squeeze tubes. Another way is to roll the tube between your fingers, if you feel a flat spot or it seems squashed, that indicates it is badly worn.

### “What happened, I pushed the prime switch but nothing moved?”

It probably means the prime switch has failed or the chemical pump motor overloaded. Let it set for a time and try again. If it still does not operate, it will need replacement of the switch or motor.

## PLUMBING DRAINS

### “If there is a grease trap but the machine drains are just a little higher than the trap, can it still be used to connect the dishmachine drain?”

The answer is no, water only drains down hill.

### “If there is a wall drain but the machine drains are just a little higher than the wall drain, can it be used to connect the dishmachine?”

The answer is no, water drains down hill. And for a wall drain you must install a trap to prevent sewer gas from entering the room through the pipe. This will bring your wall drain access even lower. This problem is common with poorly executed installations and causes water to stand in the scrap box becoming foul and odorous. It will cause leaks from the scrap box.

### “The drains are just too high up the wall; can I remove the scrap box and drain the sump drain elbow directly to the wall drain?”

No, the soil load will clog the drain line with “nesting” and cause repeated service calls and flooding.

## LEAKS

### “Water is leaking out of the vacuum breaker, why?”

If the water leaks all the time or at night, it is from a worn diaphragm in the water solenoid and the solenoid must be serviced or replaced? If it only leaks when the machine is filling, it is the breaker's poppet and gasket. If it leaks when the pump is running, the leak comes from a faulty check valve in the fill line. This does not apply to air-gap filling machines.

### “Why is water leaking out of the pump next to the motor?”

It is a failed pump shaft seal. The next question is “But I just put a new one in.” It may have been put in dirty, facing the wrong way, or it was cracked or chipped. Use some liquid dish soap to re-assemble, do not use grease or oil. Use a wooden dowel to tamp the ceramic half in the rubber boot into place in the pump housing, with the shiny side facing you. Install the black or graphite half facing the ceramic and slide down the motor shaft using some liquid soap to lubricate. Spring goes on with the top cap facing the impeller, tighten the impeller hand tight.

### “Why is water splashing out of the doors or sump?”

Check for missing spray arm end cap

## DOOR ARM ISSUES

### “Why is the door hard to raise and will not stay up?”

The metal door guides could be bent inward causing binding on the door, the door guides could be out of alignment, or the door springs could be tensioned too little

### “Why does one door stay up an inch when the other door is closed?”

This means one arm has been pulled up too hard—probably because the doors were sticking or hard to move. Free up the door movement. Then bend the door arm back into alignment by holding one arm down and lifting up on the other. This will be hard to do and may take another person to hold one arm down.

### “Why won't the door stay closed, it raises a little after the machine begins to run?”

This means the tension on the door springs is too great and should be adjusted. **Caution: take the tension off the eye bolt and nut before turning.** Otherwise it is likely to gall the stainless threads when turning the nut, this usually requires cutting off the eye-bolt and nut.

## UNDERCOUNTER MODELS

### “What causes the leak at the bottom of the sump on the gravity-drain model of the ET-AF?”

Three things can cause this leak: backed up drain, missing o-ring on the push rod, and running with the water level too high. You can test for a backed up drain by opening the door, looking into the sump, push the drain button, and count the number of seconds the sump takes to go dry. If it takes over 8-9 seconds that means the drain is slow running and needs to be cleaned out, or it is running up hill, or has too many elbows. Second, the push rod must have an air tight seal with the drain tube's cap to keep from leaking. Check for missing o-ring under the top of the drain

tube cap and/or missing wing-nut to hold and seal the drain tube cap. Third, reduce the operating water level.

“The heater in the pumped drain model of the ET-AF will not heat up the water?”

That is correct; it is not designed to heat the water—it is only a sustainer heater that helps keep the incoming water temperature from falling when sitting idle. It should not be confused with a booster heater. It has a fixed snap-action thermostat that can not be adjusted. It should keep incoming heated water around 120F but can not raise water temperature for wash cycles.

“Why is the ET front door opening while it is running, letting water spray out?”

Weak or broken door springs, replace. Also, high temperature in the incoming water (150F+) can over pressurize the cabinet causing the door to open on start up releasing the steam vapor.

“An ET-AF with pumped drain is filling up with water, won’t drain, and results look terrible, why?”

This model has a pump filter basket system that is designed to catch soil solids (seeds, straws, picks). The basket with the pull handle is one part of that system. When the operator INCORRECTLY reaches in and pulls this basket out and then pushes the drain button to empty out the machine—that lets some of the soils plug the impeller of the drain pump. This will require servicing of the machine and disassembly of the drain pump to clear. **CORRECT DRAINING PROCEDURE: The operator should push the drain button to empty the machine, then take the basket out and empty the scrap.**

Also, a burned out motor of the drain pump can cause the same symptom. The drain hose supplied with the pump drain ET-AF, should not be connected to a drain line that is over 18 inches off the floor,

## Category 4, REGULARLY PERFORMED PROCEDURES

### END OF SHIFT DUTIES

“When I change chemical buckets, do I have to prime the lines again?”

Yes, always prime the supply so chemical is available for the next cycle.

“How often do I have to clean out the pump filter, spray arms, or scrap box tray?”

They should be cleaned after every meal period

“Does the machine need to be turned off at night?”

Yes, always turn off electrical equipment when not in use or when the facility is closed.

“Can they wash their floor mats in the dishmachine?”

No. The floor mats carry floor bacteria and soils into the dishmachine; **Hazard: this should never be done in a machine used for cleaning public eating utensils.**

“Can the dishmachine be washed down during clean up?”

No, it is considered electrical equipment. While it is true the inside tank can be washed out with a hose, **Caution: the machine itself cannot be safely hosed down with water or sprayers.**

### “How do I “de-lime” the machine?”

**This treatment should only be performed by trained authorized personnel. Operators should not be given keys to the control box or access to de-liming agents.** The addition of de-scale acids, if chlorine sanitizer is present, can produce hazardous gas. If the machine has a de-lime service switch, the machine should be drained, clear water added, then the de-lime switch turned on (which only runs the pump), at this point the acid product can be safely added to the water by pouring in at the sump or into the pan. Refer to the printed instructions on the bottle for dilution rates. **Caution: do not let acid sit in the machine unattended or overnight.**

## Category 5, “RESULTS,” OR WHY MY DISHES DID NOT COME OUT CLEAN?

### “Why are the glasses and silverware coming out with streaks and filmy appearance?”

The dishmachine is not capable of making white substances or grease internally. So, if clean heated (120F min) is supplied to the machine, chemicals adjusted correctly, and the five functions of the machine are in place—these kinds of result problems come from procedure or water conditions. Rub the glass with fingers; if the film runs or feels greasy, it is likely a build up of grease and fats. Check temperatures and detergent settings. If the cloudiness or film disappears after placing a glass half way in deliming acid, the film comes from supply water minerals and must be treated separately.

### “Why are the glasses coming out with specs on them?”

Specs that show up on glassware when they are still wet are actually very small but magnified by the light through the curvature of water. These specs are usually food soils. A typical dishwasher can assimilate approximately 60 ml of soil solids per batch. More than this saturates the wash and rinse action leaving specs inside and on dishware. This comes from poor pre-scraping procedures. Washing soil down the table toward the dishmachine door while pre-scraping the next rack, is also a source of contamination. EVIDENCE OF SOIL SATURATION will be thick build up a “light brown grainy oatmeal-like substance” near the top of the doors and hood.

### “Why are black marks showing up on the plates?”

There is nothing in the machine that makes black, carbon black is the source of black specs and comes from grill or hood filter parts. There are professional services available to clean these kinds of parts. They should never be cleaned in a dishwasher. Once the carbon black is inside of the machine, it is costly to remove it.

Note: plates that have lost the porcelain finish from stacking abrasions (it will have a dull white appearance) appear to have smudges. This is the base ceramic material and is easily marked, just like caulk. The carbon black will turn this ceramic dark grey. **The answer is the plate should be replaced for sanitary reasons, and grill components should not be washed in a dishmachine.**

### “Why are stem-ware glasses breaking in this dishwasher?”

Wine glasses have a weighted base and tip over easily when they are upside down, especially the popular slim, tall glasses. The washing process requires mechanical action (spraying),

temperature, chemicals, and time. In an automated dishwasher, specific racks are made with compartments to hold the glass upright—they are called glass racks. They are sized for the various styles of stem ware. The rack should be as tall as the glass. Glasses should not be washed using peg racks or flat racks.

### “Why is my machine foaming?”

Low temperature water, below 120F, will cause the rinse agent to foam. Use the least amount of rinse agent to obtain water sheeting off glassware. Temperatures of 130-140F are recommended. This will make your detergent more active and do a better job of cutting grease and food soil. This higher water temperature will also shorten drying time.

## Category 6, CHEMICALS

### “When do I adjust the chemicals?”

First, the water usage must be adjusted before trying to set up for chemical concentrations.

#### WATER

The Goal: use as little water as possible. This will improve drain time. It decreases fill time. More water is not an advantage (for carrying soil) because the entire batch is dumped each cycle. When the machine is refilling—there is a critical point when the pump reaches full pressure, when the spraying pressure is steady. **THAT IS THE POINT TO STOP ADDING WATER.** These adjustments are done using the “H2O” or “Fill” cam. After the drain ball closes the drain, refilling should last about 10-15 seconds. When the finger of the H2O switch is riding on the low cam that is when voltage is sent to the water solenoid; when the finger rides on the high cam that is when voltage stops. If it is taking longer than 10-seconds to reach this full spray arm pressure, that indicates a low water pressure problem in the building.

#### DETERGENT

Once the machine is properly set up for the fill water, adjust the amount of detergent chemical at the beginning of the wash cycle. Opening the cam so the finger drops down on the low cam wheel is when power will be sent to the peristaltic chemical pump. It is recommended that a titration kit be used to determine the correct detergent concentration in the wash water.

#### CHLORINE

Use a chlorine test kit to set the correct sanitizing concentration for the amount of rinse water being used in the machine. An indication of 50 ppm meets the NSF requirements. Greater than this can increase the corrosion of the machine's metal parts.

#### RINSE AID

After water has been refilled and full spray arm pressure is rinsing the dishware, rinse aid can be added. Use only enough to accomplish sheeting off the glass ware. This usually only takes a couple of milliliters. If water temperature is below 120F, this product will cause foaming of the water.

### “HOW DO I ADJUST THE CAM TIMER?”

Timer cams (wheels) come as fixed or adjustable. **FIXED** cams are control cams and cannot be altered. Each cam controls a specific function, as noted on the timer decal. **ADJUSTABLE** cams are comprised of two wheels. The outer edge of each wheel is segmented half high and half low. When two of these wheels are placed side by side (a full cam) and counter-rotated, the two low

segments can form a notch in the perimeter of the cam. Above each cam is a timer switch with a metal finger that rides on the edge of the cam. When the finger drops into the notch, the function of that cam starts. To lengthen out the notch increase the time that cam will give a signal through the switch. Close the notch up to reduce the time of signal. There is a tool that will help rotate tight cam wheels and comes with each machine. The factory sets the starting point for each cam timer function using the right side of the cam wheels. Only adjust the left side of the cam.

#1 Cam: The white cam on your left is the master cam. It controls the total time of the cycle and is not adjustable.

#2 Cam: Continuing left to right, this black cam controls detergent. The detergent cam is adjustable.

#3 Cam: This white cam controls the drain. No adjustment is available, it is a fixed cam.

#4 Cam: The H<sub>2</sub>O or fill cam opens the water solenoid. Too little water causes the pump to cavitate. Overfilling does not allow all the water to drain between cycles, causing carry-over. Do not move the right side of the cam wheel (starting point of fill). Adjust left-side of cam wheel to close water solenoid when the dishmachine reaches full spray arm pressure.

#5 Cam: This black cam controls sanitizer. The sanitizer cam is adjustable. Set sanitizer concentrations at 50 ppm (Warning: Do not exceed 100 ppm). Monitor chlorine levels by using chlorine test strips.

#6 Cam: This black cam controls rinse additive. The rinse-aid cam is adjustable.

#7 Cam: This cam is used to pause or “burp” the pump on the 3D-S, ES, 5AG-S, 5 CD and L series. It is set at the factory but can be adjusted.

#8 Cam: Available on 2 ½ minute timers only.

### “How do I treat rust stains on stainless steel?”

When iron or carbon steel particles come in contact with stainless sheet metal or other stainless components, the rust oxides can attach to the stainless surfaces and begin to corrode. High concentrations of chlorine accelerate the oxidation. If this is left unchecked and untreated, the rust will damage the structure of the stainless metal. Clean all rust stains and hand buff the metal clean and shiny with a fiber abrasion pad. **Never use “steel wool” scouring pads to clean stainless or use near the dishmachine for pre-scraping.** Treat with de-lime products after cleaning stains.

### “Is a hood required for a low temp dishmachine?”

In compliance with 2009 IMC section 507.2.2 Type II hoods, a hood is not required where the heat and moisture loads from the [dishmachine] are incorporated into the building’s HVAC, which loads are calculated to be 4770 total Btu/h, “unhooded” for a door-type, chemical sanitizing dishwasher by ASHRAE Nonresidential Cooling and Heating Load Calculations 18.11, Table 5E.