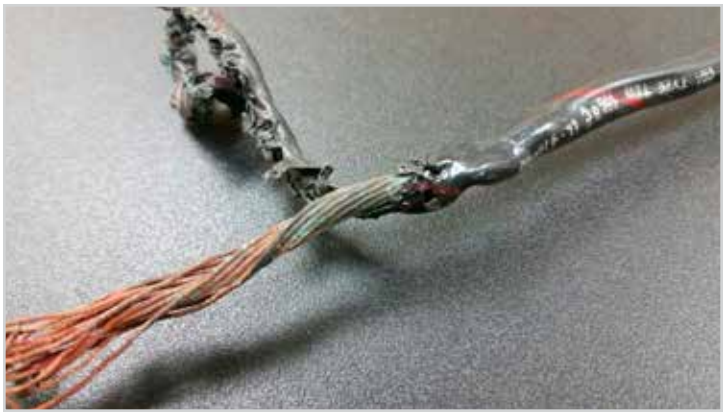
American Dish Service™
Manufacturers of Ware Washing Equipment

TECHNICAL SUPPORT MATERIAL

Routine & Preventative Maintenance
Motor Electrical Failures

Items to inspect to determine the cause of a motor failure:

- What size wire is feeding the machine, are there different sizes used in the distance from the breaker box to the machine.
- What size breaker for the machine, will it cycle on and off. Is it a new breaker.
- Is it a clean circuit, no other machines, lights, or motors on the dishmachine circuit.
- Condition of the wire, are all the strands used, are they clean, bright, tight.
- What is the actual voltage under load. Does it vary during the work period. Only 98 volts would be a problem, just 102 volts would cause heated wire for a 120v motor.
- Are the flag wire connectors tight on the spades of the motor. Is the "crimp" on the copper or the plastic or partial.
- When motor failed, did it just stop, does it hum, does it try to turn, will it run momentarily.
- Can you smell burning insulation--hot plastic smell



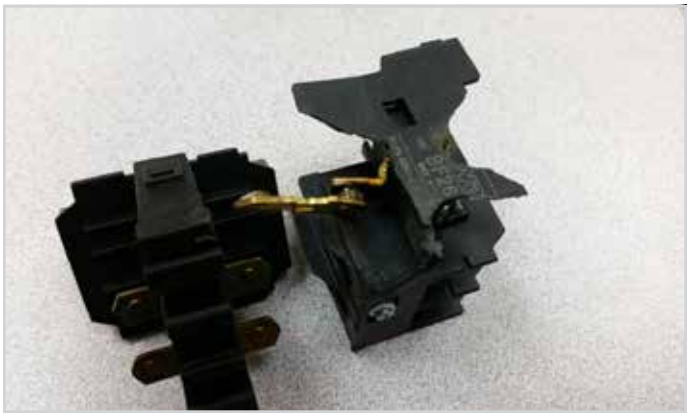
These are burned wires and should not be reused to transfer electrical power to motors or heaters.

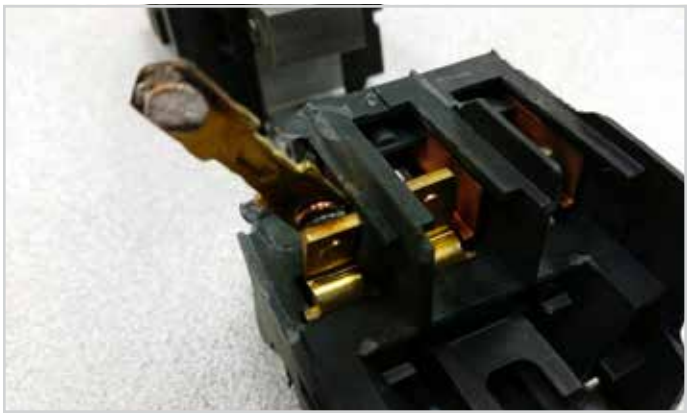
The answers to these questions are pathways to determining causes for failure. A motor is a electro-mechanical machine, a failure can be the result of part failure, part damage, improper assembly, improper power supply, compromised supply devices, improper connections to power, poor quality or corrupted power (such as hot summer days in large cities).

Rule for Motors—If you have a (1) sound motor/pump, (2) clean adequate voltage, (3) correct wires, (4) sound switches and contactors, (5) tight connections, then the motor is going to turn. If the motor does not move, the problem will be found in one or more of the 5 elements above.

Contactor Failures

The same problems that cause motor failures are the problems that largely cause contactor failures too. Contactors are a conduit for electricity. Their very structure can be compromised by the flow of that electrical force if the connections are loose, if the power is too low or too high, if the power is not clean, or if the power is subject to spikes or surges. High current carrying loads create heat at the contact point, these can actually weld in a closed position. So the condition of the voltage is directly related to the life of the contactor.





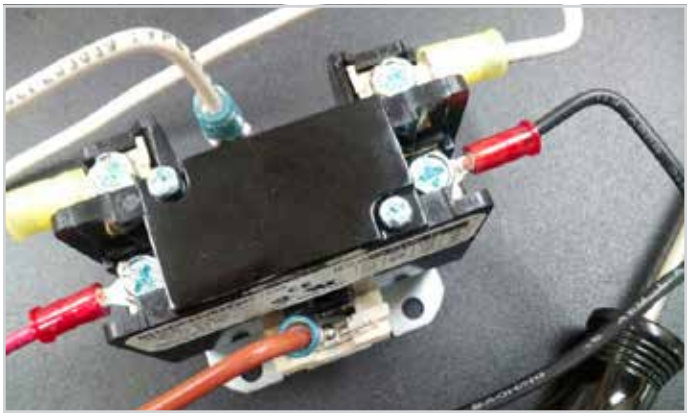
Showing inside of the contactor where contact points burned together (welded). This was caused by loose screw terminal.

Troubleshooting

Question: Does the Wash Motor run all the time?

Is the cam timer running also?—If Yes, then the problem is a control problem, auto start relay or the master timer switch or 7th switch on the cam timer, or the delime switch. (Part failure or wired incorrectly)

No, the cam timer is not running. Then the cause will be contactor points are welded shut or wired incorrectly on the contactor. (Correct the wire placement—see picture below. Or replace the contactor)



Showing correct wiring of contactor, NOTE white neutral wires connect across the common bar and red power wire connects across contact points (points are under black cover) to black wire for the motor. Often, by mistake these wires are reversed in positions when a replacement contactor is installed, causing the motor to run any time power is turned on.

Question: Motor will not run? Is the cam timer running?

ANSWER, If Yes, test brown wire on the contactor for 110v to white or neutral. If voltage is present but contactor will not pull in, the problem is a bad coil on the contactor. (Replace contactor)

ANSWER, If there is no voltage present, test cam timer switch for brown wire located on the 7th cam, middle terminal for 110v. If no voltage is present as the cam timer runs through a cycle, (replace switch).

ANSWER, No, the cam timer is not turning. Then test the two wires going to the cam timer motor for 110v while pushing the start button. If there is voltage but the motor will not turn, (replace the cam timer motor).

If there is power on the coil of the contactor, if the contactor is pulled in, if there is power coming from the contactor on the heavy black wire as tested to a white wire, then the problem will be the motor or the connection to the motor.

III-Phase Motors vs. Single-Phase Motors

For a III-phase, 3-HP motor running on 208v is rated at FLA 8 amps over a clean circuit.

For a Single-phase, 3-HP motor running on 208v is rated at FLA 14 amps over a clean circuit.

With the same load on both motors, almost twice the amps are needed for the single-phase to keep up. Amperage is equivalent to "electricity working," more amps = working harder. The single-phase equipment requires larger wire and connections to carry the higher amperage to accomplish the same amount of work. The electrical parts run hotter. When a problem comes, damage can occur quicker. All of the faults and failures listed above for motors in general are increased for single-phase compared to III-phase motors.

If, for example, the line voltage is low (204-200v) the motor will run hot and have a shortened life (motor life is measured in starts). If there are periods of low voltage because the building's amp limit to the circuit breaker panel box has been exceeded, a large single-phase motor would be the first to feel the effects and run hot. Heat is a major contributor to motor failure. If connections and wires have been burned as a result of a failed motor and are not replaced also, the new motor will fail sooner.

The III-phase equipment operates cooler, lasts longer.

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Manufacturer of low and high temperature Commercial Dishwashers and Glasswashers

900 Blake Street | Edwardsville, Kansas, 66111
913.422.3700 | Toll-Free: 800.922.2178 | Fax: 913.422.6630
orders@americandish.com | **americandish.com**

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