



# DISHWASHER SERVICE TRAINING MANUAL

**BOSCH**

**SIEMENS**

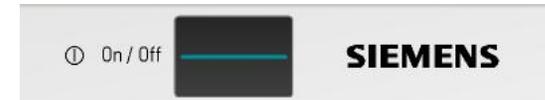
**GAGGENAU**

***Thermador***<sup>®</sup>

# Dishwasher Service Training Manual

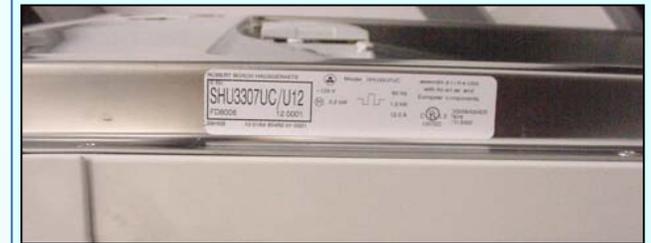
## Each section contains:

- Access/Disassembly
- Installation/Reassembly
- Service Tips



This manual is only to be used  
by trained service personnel.

# Warranty Serial # Info



*The serial label is fastened to the right edge of the inner door.*

## **FD8303 00001**

### Understanding FD Serial # (used for warranty)

The FD # shows the Fabrication Date

- The first 2 #s represent the year: 83 = 2003
- The next 2 #s represent the month: 03 = March
- The next 5 #s represent the unit made that month: 00011 = 11th SHU3307UC made that month

*This helps the factory investigate product problems.*

## **10 3 03 0081344 00011 5**

### Understanding Factory Serial #

- The first 2 #s represent a factory code: 10 = New Bern dishwasher, 82 = New Bern cooking
- The 3<sup>rd</sup> # represents the last digit of the year: 3 = 2003
- The next 2 #s represent the month: 03 = March
- The next 7 #s represent the model: 0081344 = SHY99S05UC
- The next 5 #s represent the unit made that month: 00011 = 11th SHY99A05UC made that month
- The last # represents a check digit = 5 in this case (is dependent on all preceding #'s)

***Please hold all warranty parts for (60) days for possible return for analysis.***

# Basic Dishwasher Installation (1) – General

## VERY IMPORTANT INSTRUCTIONS - TO BE READ

### ⚠ WARNING - OBSERVE ALL WARNINGS AND CAUTIONS

These instructions are intended for use by qualified installers only.

In addition to these instructions, the dishwasher shall be installed:

- In accordance with all local codes or, in the absence of a local code,
- In the United States, with the National Electric Code.
- In Canada, with the Canadian Electric Code C22.1 - latest edition/Provincial and Municipal codes and/or local codes.

Before attempting installation, read these installation instructions completely and follow them carefully. They will save you time and effort and help to ensure safety and optimum dishwasher performance.

**CAUTION:** If the dishwasher is installed in a location that experiences freezing temperatures (e.g., in a holiday home), you must drain all the water from the dishwasher's interior. Turn off the water supply, disconnect the drain hose, and allow your dishwasher to completely drain into an appropriate receptacle. Water system ruptures that occur as a result of freezing are not covered by warranty.

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

## MATERIALS NEEDED

(Additional materials may be required to comply with local codes.)



- Electrical Supply Cable - Minimum #14 AWG, 2 conductor, 1 ground, insulated copper conductors.



- Hot Water Supply Line - Minimum 3/8" O.D. copper tubing or metal braided dishwasher supply line.



- Shut-off valve and fittings appropriate for hot water supply line (copper tubing/compression fitting, or braided hose).



- 90° elbow with 3/8" N.P.T. male threads on one leg, and sized to fit your water supply line (copper tubing/compression fitting, or braided hose) on the other leg.



- Teflon tape or other pipe thread compound to seal plumbing connections.



- UL listed conduit connector or strain relief (3/8" or 1/2" size with .875" diameter).

## IMPORTANT

- **The dishwasher drain hose must be installed with a portion of it at least 20" (508mm) off the cabinet floor; otherwise the dishwasher may not drain properly.**
- Bosch dishwashers are intended for residential use only, and should not be used in commercial food service establishments.
- **NEW INSTALLATION** - If the dishwasher is a new installation, most of the work must be done before the dishwasher is moved into place.
- **REPLACEMENT** - If the dishwasher is replacing another dishwasher, check the existing dishwasher connections for compatibility with the new dishwasher, and replace parts as necessary.

## **Inspect the Dishwasher**

After unpacking the dishwasher and prior to installation, thoroughly inspect the dishwasher for possible freight or cosmetic damage. Report any damage immediately. Cosmetic defects must be reported within 5 days of installation.

**NOTE:** Do not discard any bags or items that come with the original package until after the entire installation has been completed.

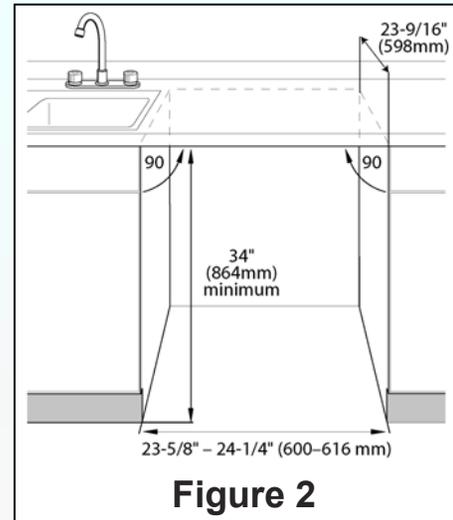
# Basic Dishwasher Installation (2) – Enclosure Prep

## ENCLOSURE PREPARATION

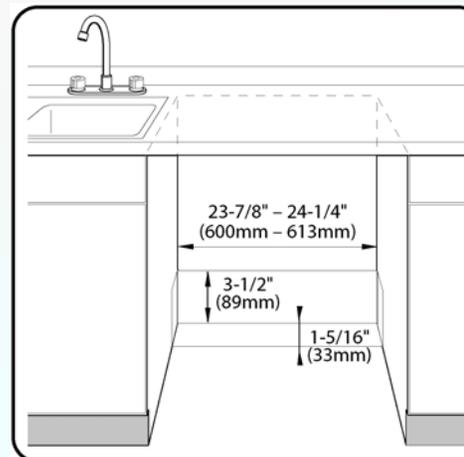
**⚠ WARNING: INJURY HAZARD** - Serious injury could result if cabinet work is performed by unqualified persons. Only qualified carpenters or cabinetmakers should perform cabinet work.

**NOTE:** Bosch dishwashers are designed to be enclosed on the top and both sides by standard residential kitchen cabinetry. Select a location as close to the sink as possible for easy access to water supply and drain lines. For proper dishwasher operation and appearance, ensure that the enclosure is square and has the dimensions shown in Figure 2. If the dishwasher is to be installed in a corner, make sure that there is adequate clearance to open the door, as shown in Figure 3, letter A.

**⚠ WARNING: ELECTRICAL SHOCK/FIRE HAZARD** - Heat from the hot water supply line can cause electrical cable's insulation to break down, presenting risk of electrical shock or fire. Do not run the electrical supply cable and the hot water supply line through the same enclosure opening. If the enclosure requires openings for the electrical supply cable, hot water supply line, and dishwasher drain hose, place them within the dimensions shown by the shaded area of Figure 4 to avoid interference with the dishwasher frame or other components. Make the openings for the electrical supply cable and hot water supply line 1" (25.4mm) diameter. Make the opening for the dishwasher drain hose 1-1/4" (32mm) diameter. If the openings are made through wood, sand them smooth. If the openings are made through metal, make them large enough to accommodate grommets or other protective sheaths with inside diameters of 1" (25.4mm) for the electrical supply cable and the hot water supply line, and 1-1/4" (32mm) for the dishwasher drain hose.



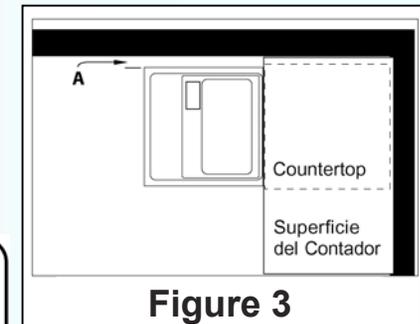
**Figure 2**



**Figure 4**

## Enclosure Dimensions

## Corner Door Clearance



**Figure 3**

## Supply Clearances

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

# Basic Dishwasher Installation (3) – Electrical Prep

## ELECTRICAL PREPARATION

**⚠ WARNING: ELECTRICAL SHOCK HAZARD** - Working on an energized circuit could result in serious injury or death. Only qualified electricians should perform electrical work. Do not attempt any work on the dishwasher electric supply circuit until you are certain the circuit is de-energized.

**⚠ WARNING: Improper electrical work can cause arcing** - Only qualified electricians should perform electrical work.

### Electrical Supply

The customer has the responsibility of ensuring that the dishwasher electrical installation is in compliance with all national and local electrical codes and ordinances. The dishwasher is designed for an electrical supply of 120V, 60 Hz, AC, connected to a dishwasher-dedicated, properly grounded electrical circuit with a fuse or breaker rated for 15 amps. If the dishwasher is connected with a food disposer, a 20 amp (and no higher) fuse or circuit breaker may be used. Electrical supply conductors shall be a minimum #14 AWG copper wire. Regardless of where the electrical supply cable enters the enclosure (following the guidelines on page 4), position the cable 21" (533mm) from the enclosure's left side, as shown in Figure 5, letter A. Extend the cable 30" (762mm) from the enclosure's back, as shown in Figure 5, letter B. Remove 3" - 4" (75mm - 100mm) of the cable's outer casing, as shown in Figure 6, letter C, then remove 3/8" - 1/2" (9 - 13mm) of insulation from each conductor, as shown in Figure 6, letter D.

### Dishwasher Electrical Ratings

Volts	Hertz	Amps	Watts
120	60	15	1,450 (max.)

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

### Supply Cable/Cord Length

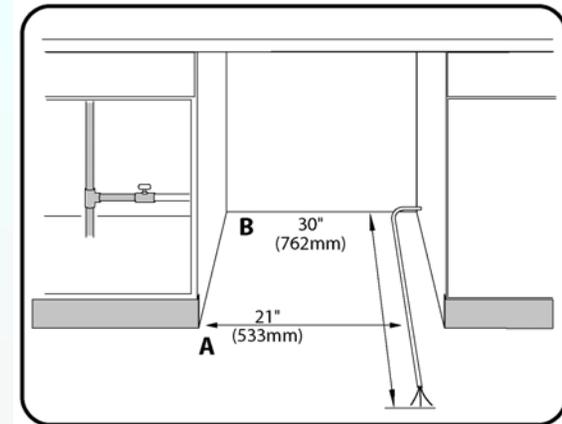


Figure 5

### Stripping Wire

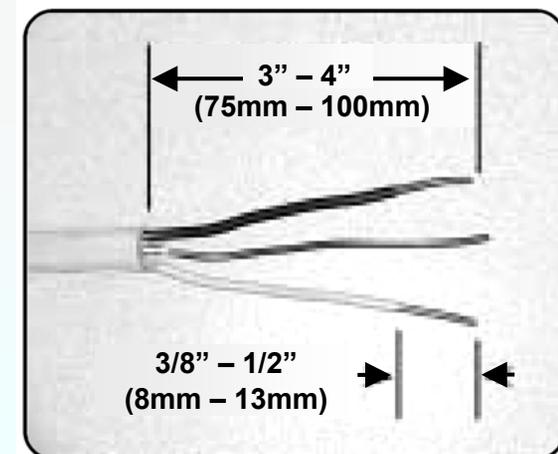


Figure 6

# Basic Dishwasher Installation (4) – Plumbing Prep

## PLUMBING PREPARATION

**⚠ WARNING: SCALD HAZARD** - Serious injury could result if work is performed on a charged hot water line. Only qualified plumbers should perform plumbing work. Do not attempt any work on the dishwasher hot water supply plumbing until you are certain the hot water supply is shut off.

**CAUTION:** Temperatures required for soldering and sweating will damage the dishwasher's base and water inlet valve. If plumbing lines are to be soldered or sweated, keep the heat source at least 6 inches (152.4 mm) away from the dishwasher's base and water inlet valve.

### Hot Water Supply

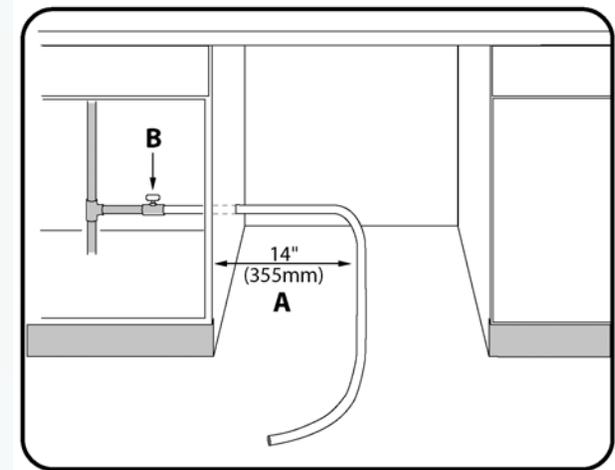
The hot water supply pressure must be between 5 - 120 psi (0.3 - 8.27 bars). Bosch recommends the hot water heater be set to deliver approximately 120° F (49° C) water to the dishwasher. Lower water temperatures will increase run times. Along with different water temperatures, using different detergents will give different washing results.

### Hot Water Supply Plumbing

**NOTE:** Regardless of where the hot water supply line enters the enclosure (following the guidelines on page 8), position the line 14" (355mm) from the enclosure's left side, as shown in Figure 7, letter A.

**NOTE:** Decide whether braided hose or copper tubing will be used for the hot water supply plumbing, and purchase the correct type of hot water supply shut-off valve, 90° elbow, and necessary fittings for the hot water supply plumbing. Install an easily accessible shut-off valve (not supplied) in the hot water supply line, as shown in Figure 7, letter B. All solder connections must be made before the water line is connected to the dishwasher's water inlet valve. Water may also be supplied to the dishwasher by using a braided hose line. Check with your local plumbing supply sources for the proper hose and 90° elbow fitting.

### Locating Hot Water Supply



**Figure 7**

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

# Basic Dishwasher Installation (5) – Plumbing/DW Prep

## PLUMBING PREPARATION (continued)

### Drain Plumbing

**Dishwasher Connection Piece** Whether the dishwasher will drain directly into the household drain plumbing or through an air gap, install a dishwasher connection piece under the sink (see Figure 8, letter A). Place a high loop in the drain hose at least 20" above the floor (see page 66).

**Installing an Air Gap** If local ordinances require an air gap (see Figure 9, letter B), install it according to the manufacturer's instructions.

**Disposer** If a disposer will be installed (see Figure 10, letter C), install it according to the manufacturer's instructions. Whether the disposer is newly installed or existing, remove the disposer's dishwasher drain connection plug. If not using an air gap, place a high loop in the drain hose at least 20" above the floor (see page 66).

## DISHWASHER PREPARATION

Dishwasher preparation involves four tasks:

- Installing the Mounting Brackets
- Removing the Toe Panel
- Installing the 90° elbow fitting
- Junction Box Preparation

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

### Installing the Mounting Brackets

**CAUTION:** Before installing the supplied mounting brackets, decide which method of securing the dishwasher into its enclosure will be used. Once the mounting brackets are installed on the dishwasher, removing them is difficult and will damage the mounting brackets and the dishwasher. The dishwasher can be secured into its enclosure in two ways:

- 1) **Top Mount** is used for countertops made of wood or other materials that can easily drilled. Orient the mounting brackets as shown in Figure 11, letter A, and position the two small tabs on the mounting brackets over the two slots on the dishwasher's front corners. Push the mounting brackets down firmly to insert the tabs into the slots.
- 2) **Side Mount** is used for countertops made of marble, granite, or other very hard materials that cannot be easily drilled. Bend the mounting brackets along the small holes and in the same direction as the two small tabs. Orient the mounting brackets as shown in Figure 11, letter B, and position the two small tabs on the mounting brackets over the two slots on the dishwasher's front corners. Push the mounting brackets down firmly to insert the tabs into the slots.

### Drain Connection

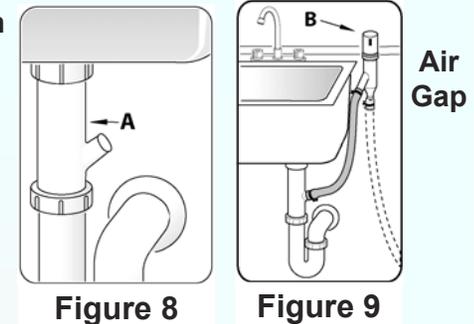


Figure 8

Figure 9

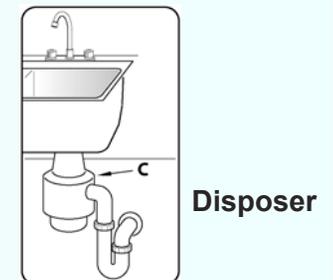
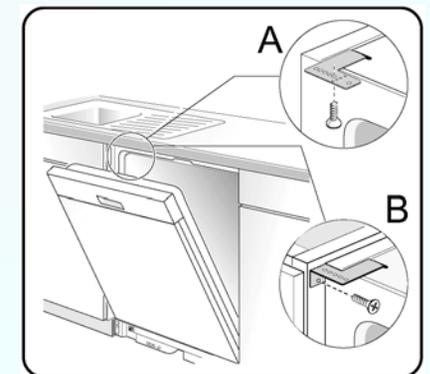


Figure 10



Mounting Brackets

Figure 11

# Basic Dishwasher Installation (6) – Dishwasher Prep

## DISHWASHER PREPARATION (continued)

### Removing the Toe Panel

#### Regular Toe Panel

The toe panel is loosely attached with tape. Remove the tape and pull the toe panel away from the dishwasher. Set the toe panel aside. It will be reinstalled later.

#### SHY66 and SHX56 Base and Toe Panel

The base and toe panel are in place on the dishwasher, but are not attached. Remove the toe panel first, as shown in Figure 12, letter A, then remove the base, as shown in Figure 12, letter B.

### Installing the 90° Elbow Fitting

**NOTE:** The 90° elbow fitting is not supplied with the dishwasher, and must be purchased separately. If the dishwasher's hot water supply line is to be copper tubing, make certain the elbow has a compression fitting. Apply Teflon tape or other pipe sealant to pipe thread connectors – don't use pipe sealant on compression fittings. Orient the hot water supply connection leg of the elbow toward the channel opening in the dishwasher base.

### Junction Box Preparation

- 1) Remove the junction box cover by removing the screw on the left side of the junction box, as shown in Figure 13, letter C, and lifting the junction box cover up and off.
- 2) Remove the strain relief plate by removing the screw at the back of the junction box, as shown in Figure 14, letter D and sliding the strain relief plate out.
- 3) Set the junction box cover, strain relief plate, and screws aside. They will be re-installed later.

**TIP:** Water line and 90° elbow fitting aren't provided and must be purchased separately.

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

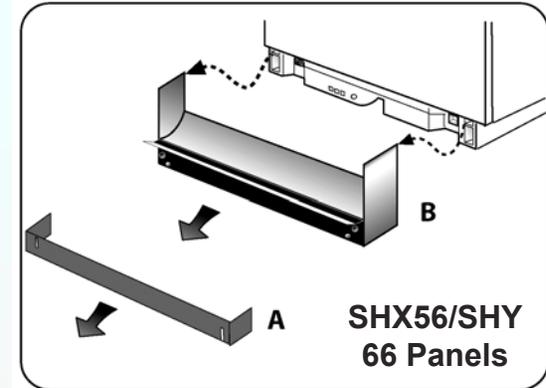


Figure 12

**CAUTION:** To avoid possible damage to water valves, don't overtighten 90° fittings or water lines.

### Removing J-box Cover

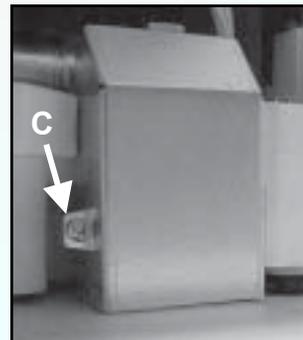


Figure 13

### Removing Strain Relief

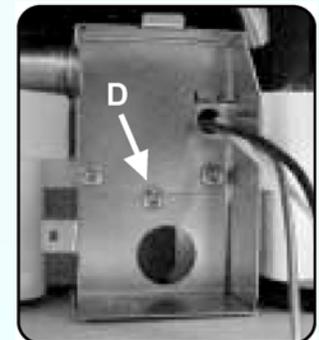


Figure 14

# Basic Dishwasher Installation (7) – Door Panel Install

## DOOR PANEL INSTALLATION

### SHU Models - Accessory Panel Installation

If you have an SHU model and have ordered an accessory panel kit, install the panel prior to sliding the dishwasher into place. The panel dimensions are shown in Figure 15.

### SHI Models - Panel Installation

SHI models come with additional mounting hardware and a template sheet with installation instructions. The stainless steel models of the SHI series also come with two extension pieces. The extension pieces are used to match the control panel height (Figure 16, "B" dimension) to the horizontal drawer line of the cabinets, and must be installed as shown in on the template sheet. The standard piece is used for drawer heights up to 6" (152mm); the long piece is used for drawer heights greater than 6" (152mm) but 6-7/16" (164mm) or less. If your drawers are taller than 6-7/16", you can either slide the extension piece in as far as it will go, or remove it and fit the door panel directly below the control panel.

### SHI/SHV Models - Panel Installation

SHV models come with additional mounting hardware and a template sheet that will show you how to mount the panel. One side of the template shows how to mount a one piece panel; the other side shows how to mount a two piece panel. Decide which type of installation you want before proceeding with the installation.

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

Fig. 17 Dimension	Panel Dimension
D (SHI)	20-11/16" - 25" (526mm - 635mm)
E (SHI & SHV)	27-3/16" - 30-5/16" (690mm - 770mm)
F (SHI & SHV)	23-3/16" - 23-3/8" (589mm - 594mm)

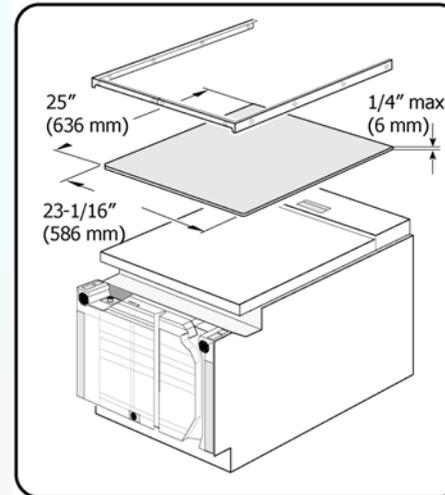


Figure 15

### SHU Panel Kits

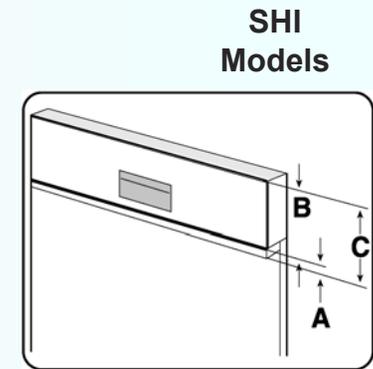


Figure 16

### Panel Dimensions

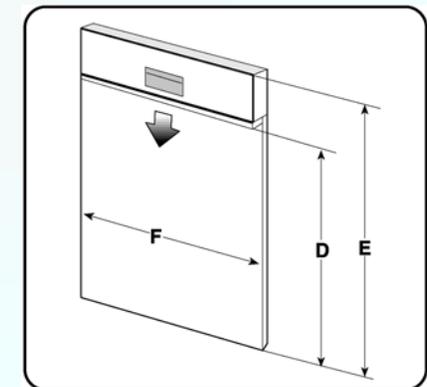


Figure 17

# Basic Dishwasher Installation (8) – Placing/Securing

## PLACING THE DISHWASHER

- 1) Straighten and position the hot water supply line and the electrical supply cable as shown in Figure 18 so that they will align with their channels under the dishwasher base.
- 2) Position the dishwasher close enough to the enclosure so that you can run the dishwasher drain hose to the under sink drain connection. Make certain that the hot water supply line and the electrical supply cable are in their channels under the dishwasher base, as shown in Figure 19, letter A.
- 3) Place the dishwasher directly in front of the enclosure.
- 4) Perform a level check as shown in Figure 19. Adjust the rear leveler by turning the center screw at the front of the dishwasher, as shown in Figure 20, letter B. Turning the screw clockwise raises the rear of the dishwasher. Adjust the front levelers by turning them with a screwdriver, as shown in Figure 20, letter C. Turning the levelers to the right raises the dishwasher. If additional height is needed, shims may be added under the leveler feet.
- 5) Push the dishwasher into the enclosure.

## SECURING THE DISHWASHER

Drive the mounting screws through the holes in the mounting brackets, as shown in Figure 20, letter A for top mount, or as shown in Figure 21, letter B for side mount.

**CAUTION:** Level dishwashers before securing them. If not, dishwasher doors can be misaligned, causing leaking.

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

### Align Supplies with Base Channels

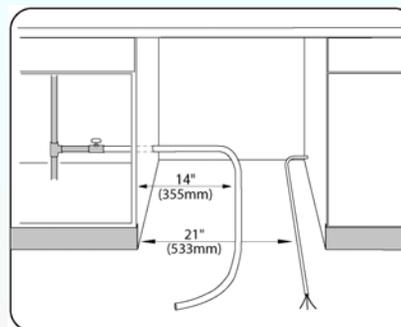


Figure 18

### Align Supplies / Check Level

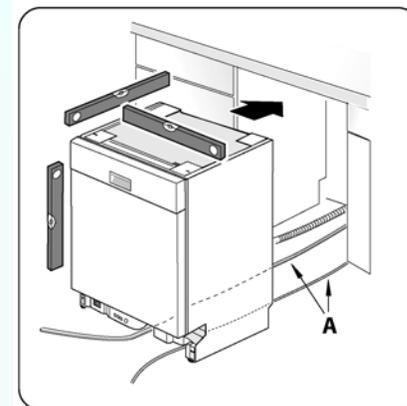


Figure 19

### Adjust Level / Top Mount

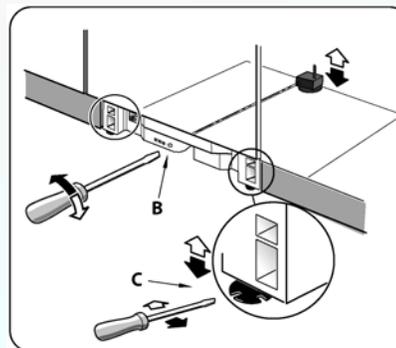


Figure 20

### Side Mount

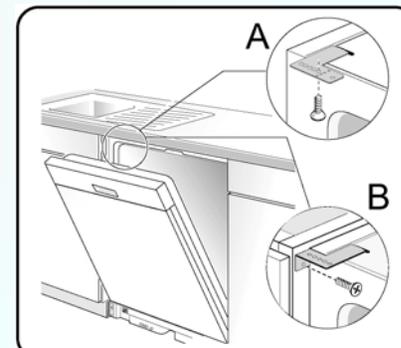


Figure 21

# Basic Dishwasher Installation (8A) – Placing/Securing

In addition to the instructions for leveling provided in the **Installation Instructions**, please follow the steps below to properly level your unit.

## Important Dishwasher Leveling Instructions

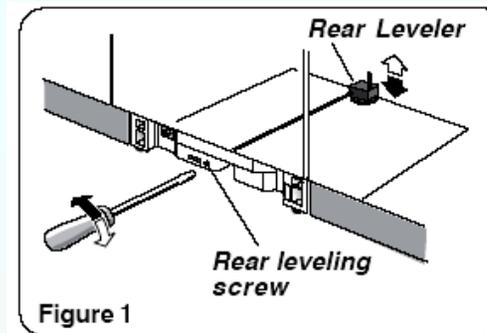
**Please read all instructions before installing your dishwasher.**

1. Place and level your dishwasher according to the **Installation Instructions** included with this unit.
2. Adjust the rear leveler by turning the center screw at the front of the dishwasher, as shown in Figure 1. Turning the screw clockwise raises the rear of the dishwasher.
3. Adjust the front levelers by turning them with a screwdriver as shown in Figure 2. Turning the levelers to the right raises the dishwasher. If additional height is needed, shims may be added under the leveler feet.
4. Secure the dishwasher by attaching the mounting brackets as shown in the **Installation Instructions**.
5. After the unit is installed in the enclosure, leveled and secured, lock the two front leg levelers in place by driving the enclosed T-20 screws (gold colored) into each screw boss located in front of the levelers. See Figure 3.
6. Tighten screws until they are flush with the surface of the bosses.

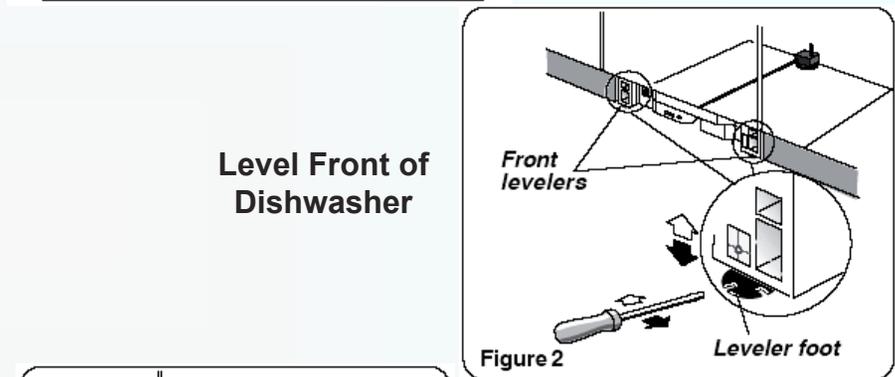
**CAUTION:** Level dishwashers before securing them. If not, dishwasher doors can be misaligned, causing leaking.

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

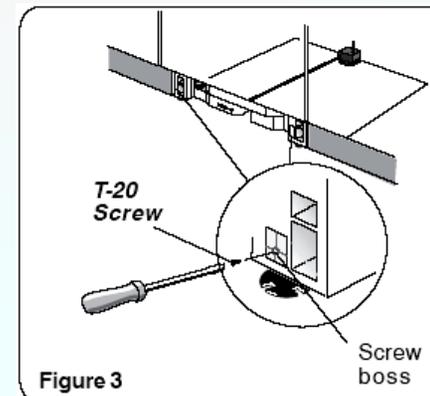
**NOTE:** These additional instructions apply to dishwashers made after 11/5/04.



**Level Rear of Dishwasher**



**Level Front of Dishwasher**



**Secure Front Dishwasher Feet**

# Basic Dishwasher Installation (9) – Drain Hose

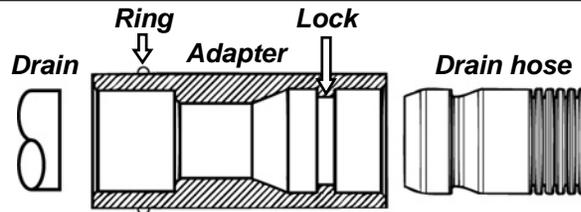
## DRAIN HOSE CONNECTION

The dishwasher drain hose may be connected to the drain plumbing in one of four ways:

- 1) Directly to the undersink dishwasher drain connection, as shown in Figure 22.
  - 2) Directly to a disposer dishwasher drain connection, as shown in Figure 23.
  - 3) To the undersink dishwasher drain connection through an air gap, as shown in Figure 24.
  - 4) To a disposer dishwasher drain connection through an air gap, as shown on Figure 25.
- Information on installing air gaps and disposers can be found in the Plumbing Preparation section of the installation instructions.

**NOTE:** If the dishwasher drain hose is to be connected to a disposer dishwasher drain connection, remove the plug from the disposer's dishwasher drain connection. Use the supplied Rubber Connection Hose and Drain Hose Clamps (letter G in the Materials Supplied section of the installation instructions) to connect the dishwasher drain hose to the plumbing drain connection. Use the spring clamp to secure the Rubber Connection Hose to the dishwasher drain hose. Use the screw clamp to secure the Rubber Connection Hose to the plumbing drain connection. If the dishwasher drain hose is connected directly to either an undersink dishwasher drain connection, as shown in Figure 22, or to a disposer dishwasher drain connection, as shown in Figure 23, form a high loop in the dishwasher drain hose and secure a portion of the loop at least 20" (508mm) above the cabinet floor.

**TIP:** Use drain hose adapter provided, connecting end with ring (on outside of adapter) to disposer or drain. Press other end onto drain hose until hose locks in. Don't clamp directly onto drain hose to avoid damaging hose.



Directly to  
Drain

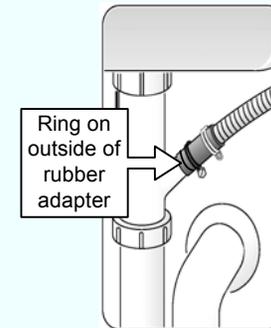


Figure 22

Directly to  
Disposer

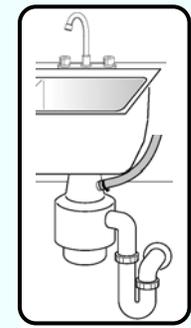


Figure 23

Through  
an Air Gap

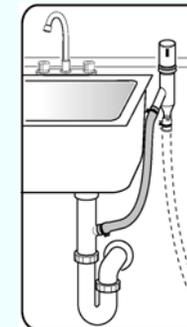


Figure 24

To Disposer  
Through an  
Air Gap

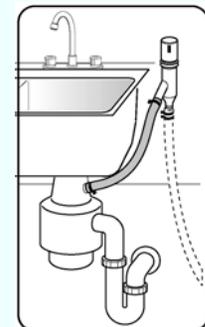


Figure 25

**CAUTION:** Don't connect condensation tubes to drain connections. Condensation tubes drain into dishwasher bases and must not be connected.

**CAUTION:** Drain hoses must be connected according to national and local codes -- install an air gap or put a high loop in drain hoses (at least 20" high) depending on applicable codes (see page 66).

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

# Basic Dishwasher Installation (10) – Hot Water Supply

## HOT WATER CONNECTION

**⚠ WARNING: SCALD HAZARD** - Working on a charged hot water line could result in serious injury or death. Do not attempt any work on the dishwasher hot water supply plumbing until you are certain the hot water supply is shut off.

**NOTE:** Make certain that the correct 90° elbow fitting (not supplied) for the hot water supply line has been purchased and installed on the dishwasher as described in the Dishwasher Preparation section of the installation instructions. The hot water supply line may be connected to the dishwasher in one of two ways:

- 1) With braided hose
- 2) With copper tubing

### Braided Hose

Ensure that all threaded connections are sealed with Teflon tape or pipe thread compound.

### Copper Tubing

**CAUTION:** Temperatures required for soldering and sweating will damage the dishwasher's water inlet valve. If plumbing lines are to be soldered or sweated, keep the heat source at least 6 inches (152.4 mm) away from the dishwasher's water inlet valve.

- If using a solder joint instead of a compression fitting, be sure to make all solder connections before connecting the water line to the dishwasher.
- Make certain there are no sharp bends or kinks in the water line that might restrict water flow.
- When connecting threaded pipe use pipe thread compound or Teflon tape to seal the connection.
- Before connecting the copper hot water supply line to the dishwasher, flush it with hot water to clear any foreign material.
- Turn on the water supply to check for leaks after making connections.

**NOTE:** Its not recommended to use on-demand (in-line) water heaters with dishwashers as they don't provide an adequate volume of water. Dishwashers heat water adequately without using on-demand (in-line) water heaters.

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

# Basic Dishwasher Installation (11) – Electrical Supply (1)

## ELECTRICAL CONNECTION

**⚠ WARNING: ELECTRICAL SHOCK HAZARD** - Working on an energized circuit could result in serious injury or death. Only qualified electricians should perform electrical work. Do not attempt any work on the dishwasher electric supply circuit until you are certain the circuit is de-energized.

**⚠ WARNING: Improper electrical work can cause arcing** - Only qualified electricians should perform electrical work.

### Grounding Instructions

The dishwasher must be properly grounded before operating. This appliance must be connected to a grounded metal permanent wiring system, or an equipment grounding conductor must be run with the circuit conductors and connected to the equipment grounding terminal or lead on the dishwasher. Make sure that the dishwasher is connected to a suitable ground in compliance with all local codes or, in the absence of a local code, with the NATIONAL ELECTRICAL CODE in the United States or the CANADIAN ELECTRIC CODE C22.1- latest edition in Canada as well as any provincial/state or municipal or local codes that apply.

- 1) Retrieve the strain relief plate, and install a strain relief (not supplied) into the opening on the strain relief plate. **NOTE:** Orient the strain relief as shown in Figure 26.
- 2) Pass the electrical supply cable through the strain relief, as shown in Figure 27. Leave 3 - 4 inches of insulated wire extending through the strain relief plate.
- 3) Tighten the strain relief screws.
- 4) Slide the strain relief plate into the junction box, and secure it to the junction box with the supplied screw.

**CAUTION:** Dishwashers are rated 120VAC, 60 Hz. Don't connect to 240VAC circuits, common in kitchens (for ovens / cooktops). Check line-neutral (BK-WH), line-ground & neutral-ground voltages on house circuits before wiring dishwashers.

**TIP:** Confirm all wire nut connections are tight before turning power on to dishwasher. It can be helpful to tape wire nuts to wires to help prevent wire nuts from loosening.

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

Strain Relief Orientation

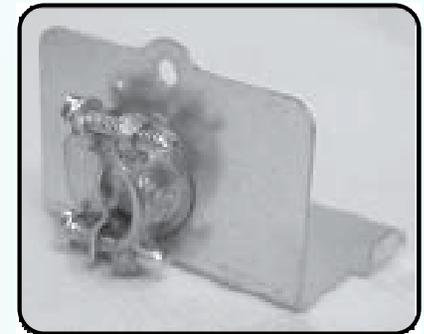


Figure 26

Installing Cord/Wire Through Strain Relief



Figure 27

# Basic Dishwasher Installation (12) – Electrical Supply (2)

## ELECTRICAL CONNECTION (continued)

**⚠ WARNING:** – LOOSE OR IMPROPER ELECTRICAL CONNECTIONS CAN CAUSE ARCING. MAKE CERTAIN ALL ELECTRICAL CONNECTIONS ARE PROPERLY MADE.

- Do not pre-twist the wires before connecting them with wire nuts.
  - Extend the dishwasher's stranded wires 1/8" (3mm) beyond the power supply cable's solid wires, as shown in Figure 28.
- 5) Using the supplied wire nuts, connect the electrical supply wires to the dishwasher's wires, black to black, white to white, and green or bare to green or bare. Make certain that the insulated wires show no bare wire from the bottoms of the wire nuts. Gently tug the wires to make certain they are securely connected.
  - 6) Press the wires into the junction box. Make certain that the wire nuts do not loosen.
  - 7) Place the cover on the junction box and secure it to the junction box with the supplied screw.

## DOOR TENSION ADJUSTMENT (on SHI and SHV models & SGZ1042 / 1046 kits)

After the dishwasher is installed, open and close the door several times to make sure that it does so with ease. If the door closes too quickly or if the door falls open, the spring tension needs to be adjusted.

To Adjust the Spring Tension:

- 1) Obtain the provided Door Tension Screws (Figure 1, letter K) from the SHI/ SHV parts bag.
- 2) Insert the screws as shown in Figure 29. Turning the screw clockwise increases the spring tension. Turning the screws counter-clockwise decreases the spring tension.

## BASE AND TOE PANEL

### Regular Toe Panel Installation

Use the toe panel screws (Figure 1, letter D) from the Dishwasher Installation Kit and a Torx screwdriver to install the toe panel as shown in Figure 30.

(Continued on next page)

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

### Aligning Wires

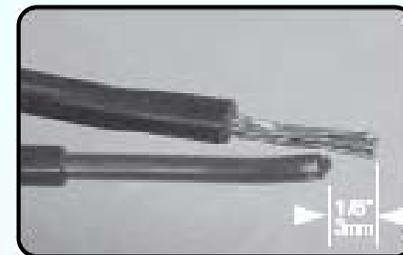


Figure 28

### Installing Adjusting Screws

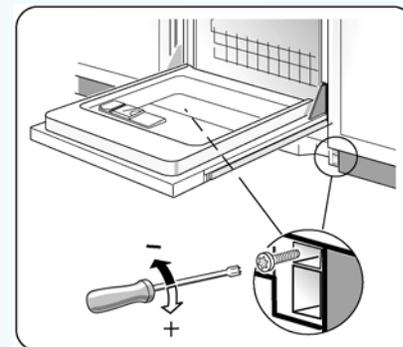
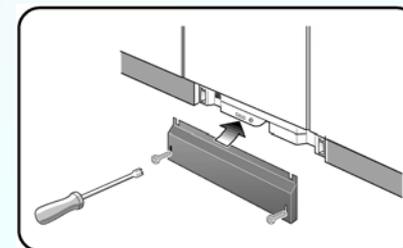


Figure 29



Installing  
Toe Panel

Figure 30

# Basic Dishwasher Installation (13) – Base/Toe Panel

## BASE AND TOE PANEL (continued)

### SHY66 & SHX56 Models Base and Toe Panel Installation

- 1) Place the Base Part under and up the front bottom panel of the dishwasher, as shown in Figure 31.
- 2) Insert the Base Part screws (Figure 1, letter O) into the Base Part, as shown in Figure 31, letter B. Tighten the Base Part Screws.
- 3) Place the Cotton Insulation Strip (Figure 1, letter C) under the unit, between the bottom of the Base Part and the floor, as shown in Figure 31, letter C.
- 4) Place the toe panel over the Cotton Insulation Strip, and use the toe panel screws (Figure 1, letter N) to secure the toe panel in place, as shown in Figure 31, letter D.

## FINAL INSTRUCTIONS

- 1) Energize the dishwasher power supply circuit.
- 2) Consult the Bosch Dishwasher Use and Care Manual, and run the dishwasher through one complete cycle. If the dishwasher does not operate properly, refer to the Self-Help section of the Use and Care Manual. If the dishwasher still does not operate properly, refer to the Customer Service Section of the Use and Care Manual.

**NOTE:** Do not use screws other than those provided to attach base parts (base extensions) to bases. If other screws are used, cords for door pulley assemblies will be damaged or cut.

**TIP:** Consult the Installation Instructions included with the dishwasher for specific instructions.

### Installing SHX56 / SHY66 Toe Panel

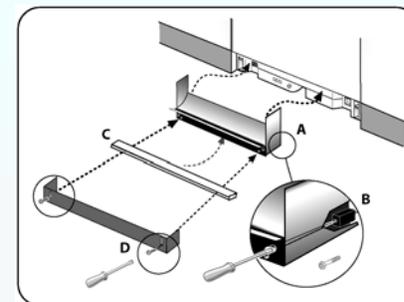


Figure 31

# Table of Contents

• Water valves.....	17
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**NOTE:** Dishwashers are rated 120V, 60 Hz, 15A, 1450W (max.). Maximum amp draw when heaters running ~ 11A.

This 5th edition replaces the 4th edition and is intended for trained service personnel.

# Part # 1 -- Water Valve (1)

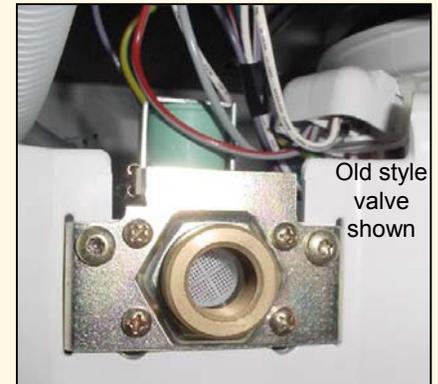
## ***Disassembly***

The water valve is accessed from the front of the dishwasher base by removing the toe kick.

### ***To remove water valve:***

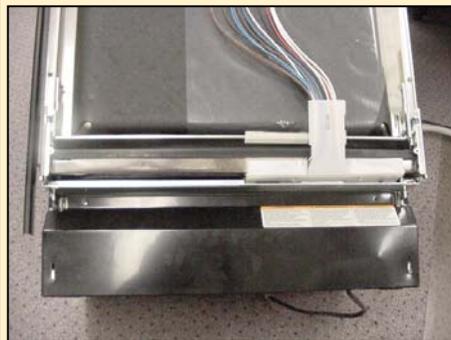
*Tools needed: T20 Torx screwdriver & pliers.*

1. Remove two (2) T-20 Torx screws from toe kick and tilt toe kick out from under dishwasher.
2. Remove base insulation (on models with insulation).
3. Move sump inlet hose away from water valve (without disconnecting it).
4. Disconnect wires from water valve, including ground wire.
5. Remove two (2) T-20 Torx screws from water valve.
6. Pull valve out from dishwasher and disconnect water hose from rear of valve. Remove any water from sump & base.

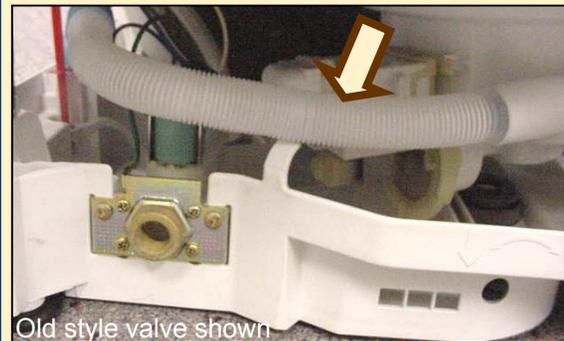


**CONNECTION HINTS:** Water connection 3/8" NPT female. Inlet water pressure range 5 - 120 psi (0.3 – 8.27 bars).

### ***Removing toe kick***



### ***Moving sump hose***



### ***Removing hose clamp***



# Part # 1 -- Water Valve (2)

## Service Tips

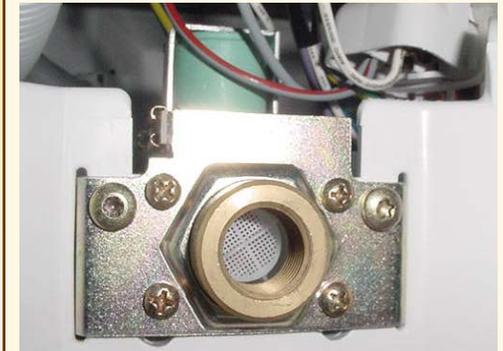
New  
style

425458 &  
189533



Old  
style

580009  
(yellow stem)  
or 167081  
(white stem)



### HINTS:

**NOTE:** Water valves have been upgraded several times since 1st 1/4 of 1999.

- New time-fill valve (part # **425458**) looks like pressure-fill valve (part # **189533**), but isn't the same. Don't use # **189533** to replace it.
- Current pressure-fill valve (part # **189533**) has a horizontally mounted solenoid and water fitting held in place by the metal mounting bracket. Its the only replacement pressure-fill valve available and replaces all other valves.
- Older pressure-fill valves (**580009** & **167081**) were both replaced by **189533**.

- When reconnecting the water supply to the water valve, don't overtighten the elbow fitting. On valves with vertical solenoids, the plastic can crack and cause leaking if excessive force is used.
- Using Teflon tape on water fittings can help prevent leaking.
- The water valve can be accessed without removing outer door or base cover. However, removing them will provide easier access.

# Part # 2 -- Circulation Pump & Impeller (1)

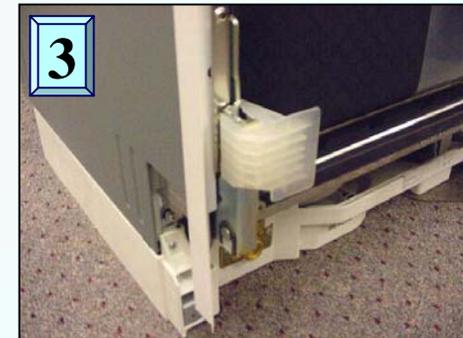
## **Access**

The circulation pump & capacitor are accessed from the right side of the dishwasher by removing the right side panel and blocking the tank. Use same process to access heater & Apexx modules.

### **To remove outer door:**

*Tools needed: T20 Torx screwdriver.*

1. Remove six T-20 Torx inner door screws below fascia panel -- three per side (1).
2. Carefully pull bottom of outer door out from dishwasher until top door tabs clear, then pull door down until it releases from dishwasher (2). Take care to not scratch outer door.
3. Remove two plastic door guards (3). They occasionally fall out when the outer door is removed.



**NOTE:** Circulation pump motor rated 120V, 60 Hz, 160W, insulation class A. Motor has an auto-reset thermal protector and uses a 10 $\mu$ F capacitor.

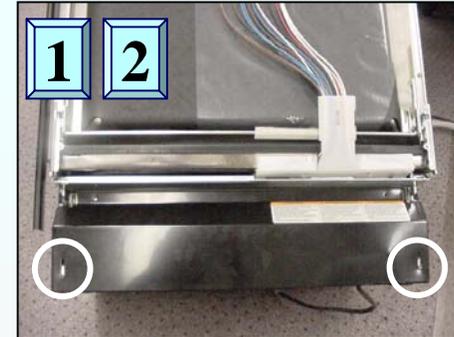
**HINT:** The fascia panel and door don't need to be removed to access the circulation pump. However, they must be removed to completely remove the tank.

# Part # 2 -- Circulation Pump & Impeller (2)

## To remove toe kick:

Tools needed: T20 Torx screwdriver.

1. Remove two T-20 Torx screws from toe kick (1).
2. Tilt toe kick out from under dishwasher (2).

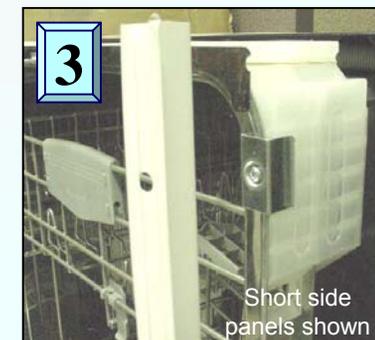
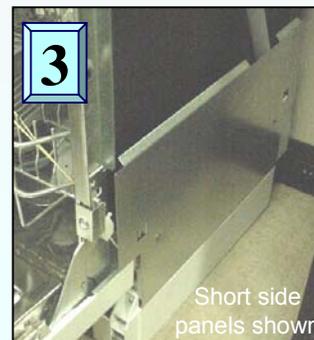


## To remove right & left side panels:

Tools needed: T20 Torx screwdriver.

Dishwashers may have long or short side panels, depending on model. Removing the left side panel isn't necessary for access, but allows the right side of the tank to be blocked upward.

1. For models with long side panels, remove two T-20 Torx side panel screws through holes in right & left trim strips (1).
2. To remove long side panels, lift panels with trim strips up and out from dishwasher (2).
3. To remove short side panels, remove two T-20 Torx screws (3). To avoid damaging trim strips (while blocking tanks), slide trim strips up until they clear dishwasher bases.

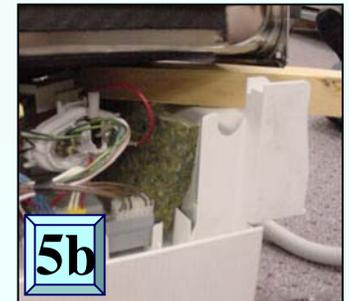
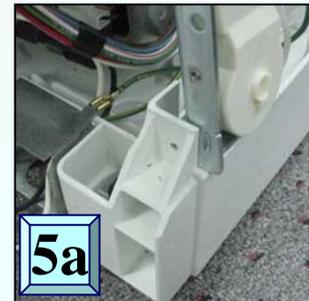
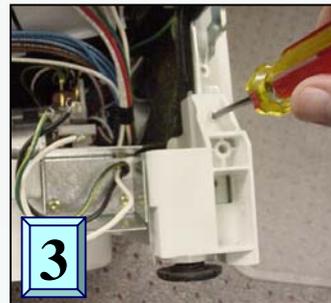


# Part # 2 -- Circulation Pump & Impeller (3)

## To raise right side of tank for circulation pump access:

Tools needed: T20 Torx screwdriver and pliers.

1. Remove one T-20 Torx screw from both rear corners holding tank to base (1) -- removing screw from both sides allows tank to be blocked upward.
2. Remove right toe kick bracket by removing T-20 Torx screw (2).
3. Remove T-20 Torx screws from front right bottom corner holding tank to base (3).
4. Remove right hinge cover (4a), release right door tension cord from hinge (4b) & remove ground wire (4c).
5. Raise and block up tank as shown with strut onto base (5a), sliding a piece of wood or other solid material between the tank and base to keep tank from falling back onto base (5b).



**CAUTION:** Don't turn dishwashers upside-down for tank access. When dishwashers are turned upside-down, water can flow into the water fill assembly diaphragm and cause water to not fill properly.

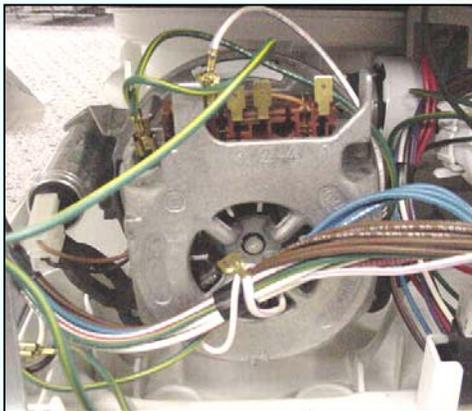
# Part # 2 -- Circulation Pump & Impeller (4)

## Disassembly

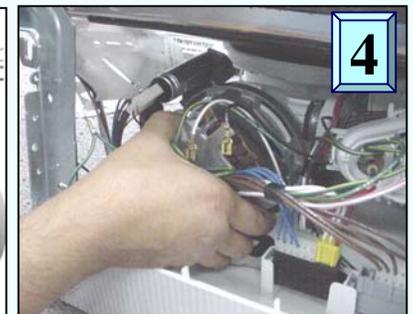
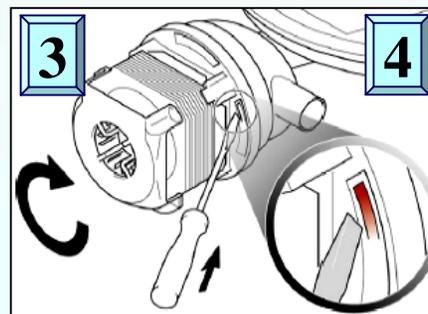
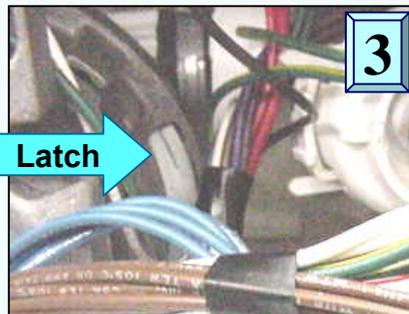
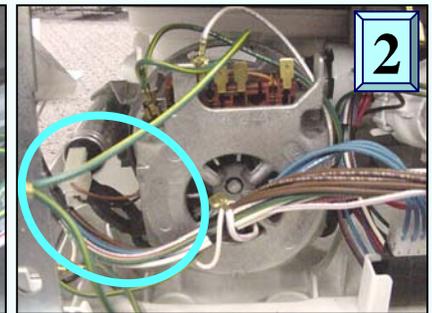
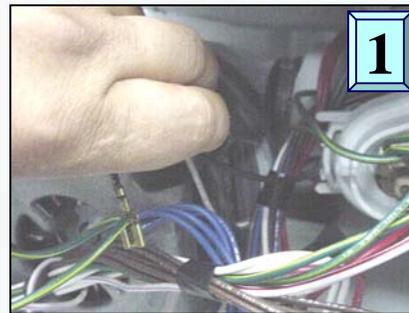
**To remove motor to access impeller or change complete pump:**

*Tools needed: flat blade screwdriver.*

1. Disconnect wire harness from motor after carefully noting connections (1).
2. For UC/11 & later models with softer bearing, lift up rubber straps from both sides of motor (2). For older models, lift motor up from base.
3. To release plastic latch on pump/motor housing (@ 2:30 position), carefully push onto latch with screwdriver (3).
4. To release motor from pump housing, twist motor to the right (clockwise). Some force may be required. Capacitor should be ~ 11:00 position (4). Pull motor out from pump housing.



**HINT:** When replacing circulation pumps for softer bearing models (UC/11 & later), reusing existing front pump housings can save time by not changing hose clamps. If desired, order # **172272** hose clamps & replace entire pumps.



**CAUTION:** Don't grab motor next to the capacitor to avoid jamming your hand on the capacitor.

See page 24 for pump types.

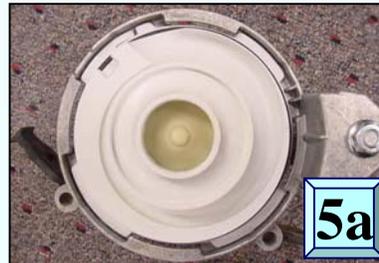
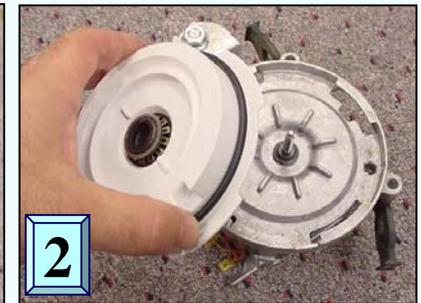
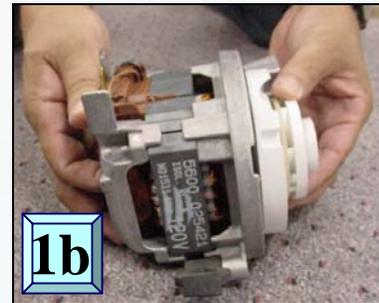
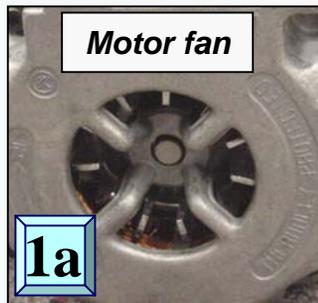
# Part # 2 -- Circulation Pump & Impeller (5)

## Reassembly

To remove & install impeller (using kit # 167085):

*Tools needed: flat blade screwdriver.*

1. While holding motor fan so shaft won't spin (1a), unscrew impeller counterclockwise (1b).
2. Rotate pump housing counterclockwise until tabs clear, then lift housing from motor (2).
3. Remove spring and O-ring from pump housing, then lift spacer up from motor shaft (3).
4. Place replacement spacer onto motor shaft (4). Note larger end goes onto shaft 1st.
5. Install replacement spring & O-ring onto pump housing, then line up housing-motor tabs to screw pump housing onto motor (5a). Screw replacement impeller onto motor shaft (5b).
6. Align motor to pump housing with capacitor @ 11:00 position to facilitate reassembly.

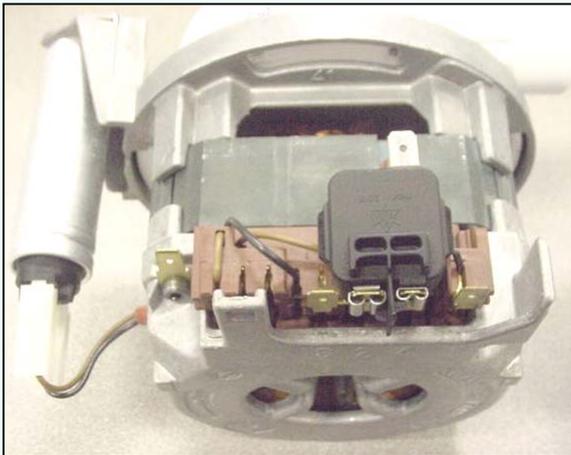


5b

# Service Tips -- Comparing Circulation Pump Versions (1)

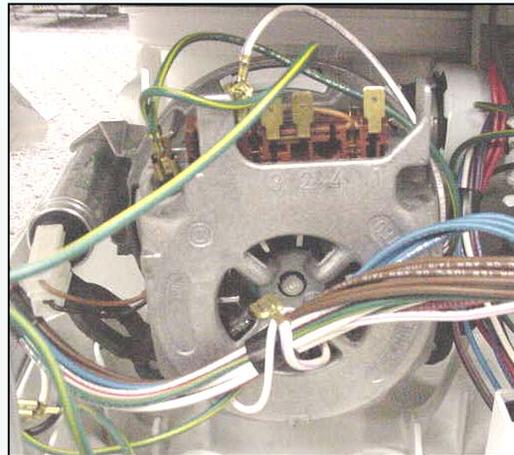
Depending on models and features, dishwashers can have one of three types of circulation pumps. Since the different pump types use different control modules, wire harnesses, heaters & sump filters, replace pumps with identical replacement pumps.

## # 437345 pump for water switches



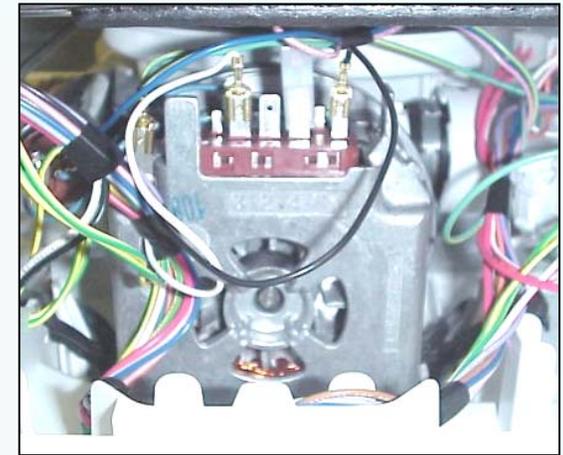
- More powerful for use with water switches (Apexx & ExactWash models).
- Has separate motor starter (# 182318).
- Must use with heaters with water switches & sumps with extra filter cylinder.
- Can use # 167085 impeller kit.
- Older (& Apexx) models have separate control & base wire harnesses, while newer (non-Apexx) models have single wire harnesses.

## # 239144 pump



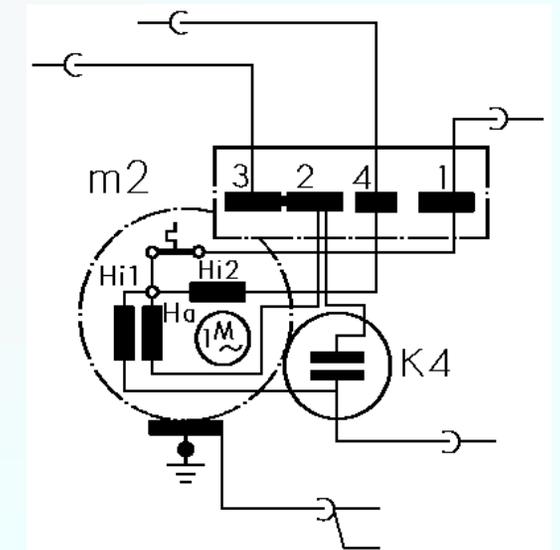
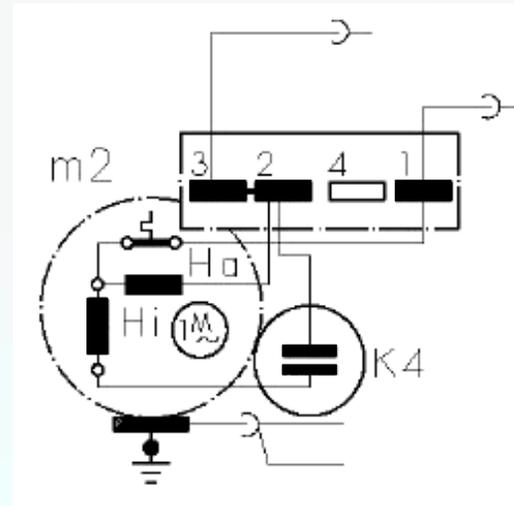
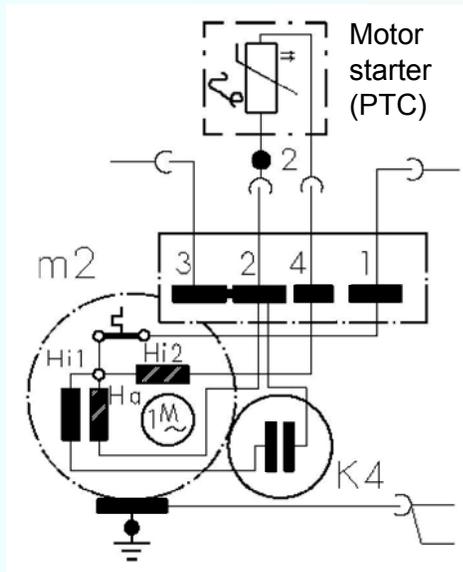
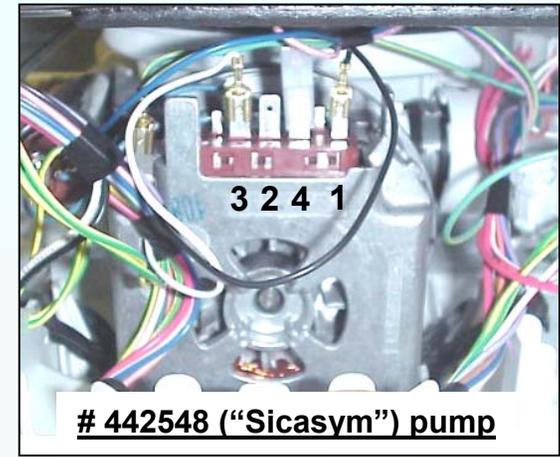
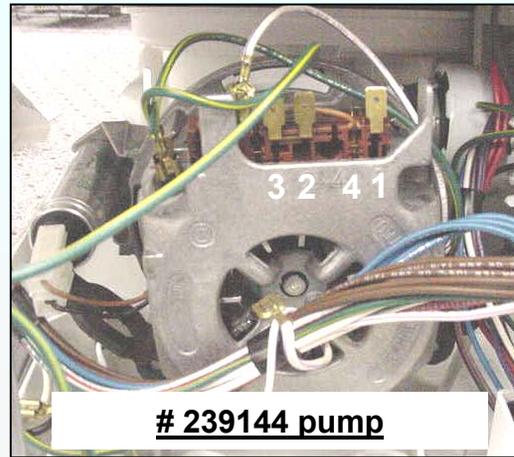
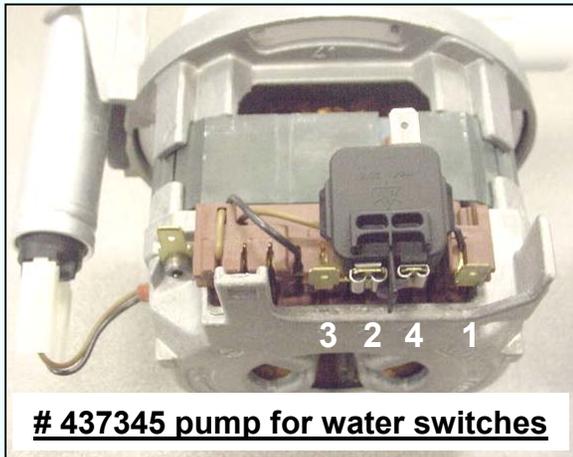
- Most commonly used pump.
- Can buy # 266511 motor separately.
- Can use # 167085 impeller kit.
- Older models have separate control & base wire harnesses, while newer models have single wire harnesses.
- Used on some time-fill models.

## # 442548 ("Sicasym") pump



- New pump (starting on models with UC/21 index). Smaller size than standard pump.
- Used only on time-fill models – cannot be used on models with pressure-fill.
- Used with control modules & single wire harnesses designed specifically for Sicasym pumps & time-fill.
- Cannot use # 167085 impeller kit.

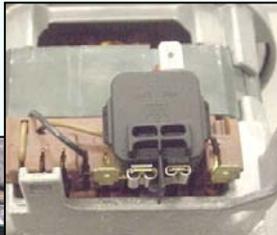
# Service Tips -- Comparing Circulation Pump Versions (2)



**HINT:** Check wiring diagram for specific wire colors.

# Service Tips -- Checking (PTC) Pump Motor Starter (1)

The (PTC) circulation pump motor starter (# 182318) is used on **SHX99A-B / SHV99A / SHY99A / DWHD94** ("Apexx"), **SL95A & SHX56B / SHV66A / SHY56A-66C** ("ExactWash") models with water switches. The matching circulation pump (# 437345) has three slightly smaller & more efficient windings compared to the traditional pump with two larger windings (# 266511 motor / # 239144 pump). The 3rd (start) winding is cut out when the motor gets running. This stronger pump is needed due to the increased water flow resistance from the water switch.



**NOTE:** Install starter with terminal pointing inward.

**NOTE:** Pump # 437345 includes starter # 182318.

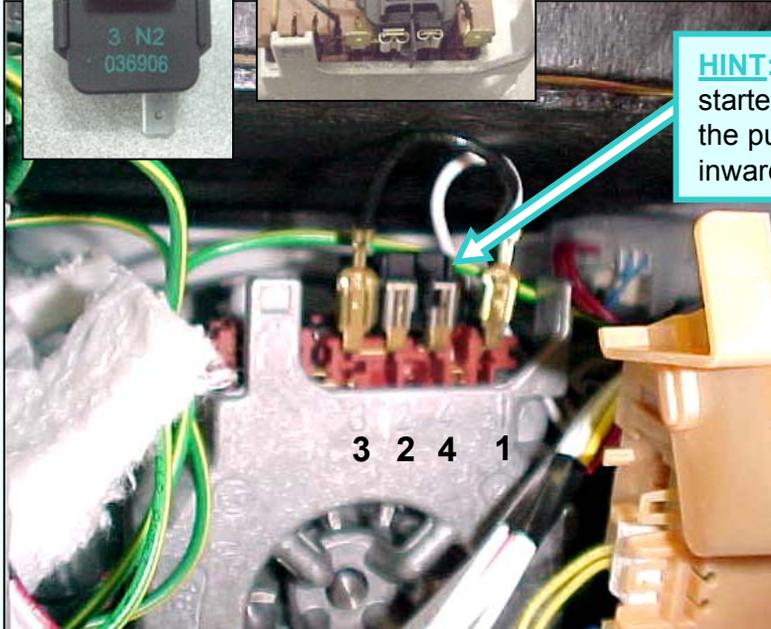
**HINT:** (PTC) motor starter is located on top of the pump motor and faces inward over the motor.



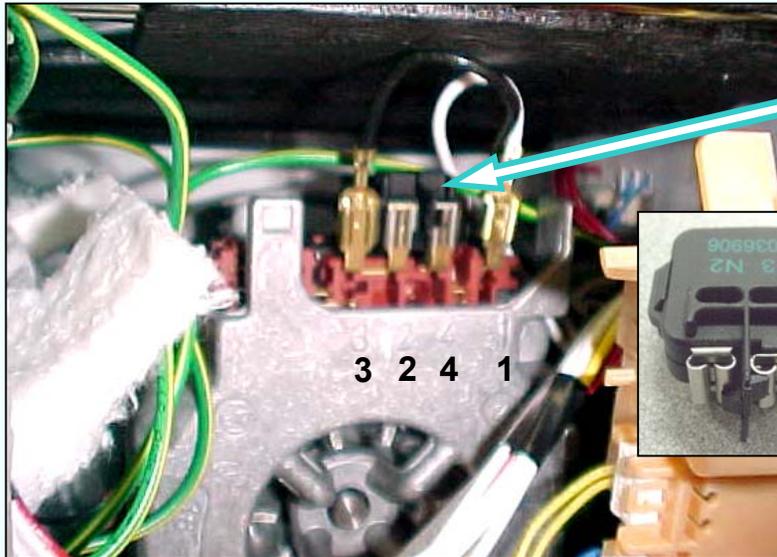
To install (PTC) motor starters, push female terminals over pump motor terminals 2 & 4. The terminals are different sizes to match the smaller motor terminal 4.

The (PTC) motor starter helps start the circulation pump. It's a ceramic thermal switch which conducts current & heats up, cutting out the 3rd (start) winding at a preset temperature. The two main windings (with the start/run capacitor) have power whenever the pump is running.

- Check the motor starter if the pump motor won't start (starter stuck open) or runs hot (starter stuck closed).



# Service Tips -- Checking (PTC) Pump Motor Starter (2)



**PTC**

**NOTE:** Unlike standard two-winding pump motors, these three-winding pump motors have four terminals instead of three.



Apexx model shown

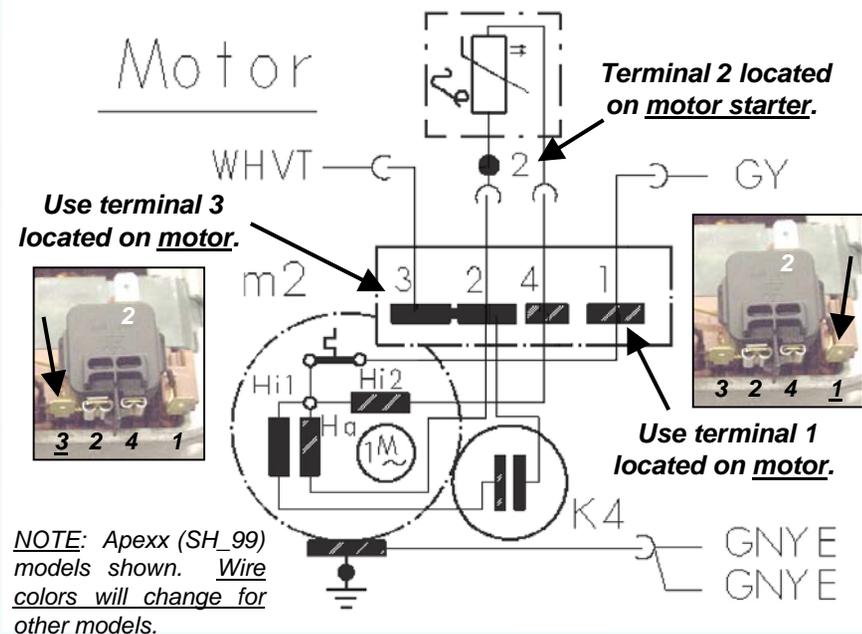
**NOTE:** Encountering original equipment pumps & motor starters:

- **11/11/03 & later:** Circulation pump # **437345** (with 135°C OVLP) with motor starter # **182318** (4.7 – 4.8Ω).
- **9/16/03 – 11/11/03:** Circulation pump # **239129** (with 120°C OVLP) with motor starter # **423023** (16.8Ω).
- **6/6/02 – 9/16/03:** Circulation pump # **239129** (with 120°C OVLP) with motor starter # **182318** (4.7 – 4.8Ω).

**TECH TIPS:** Resistance measurements:

- Between terminals 1 - 2 is ~ **7 Ω** (one of the main run windings).
- Won't help between terminals 2 - 4 (start winding, a run winding & the motor starter). The motor starter can't be measured since the windings are always connected. Must disconnect PTC 1st to measure its continuity.

## Starter-PTC



**NOTE:** Motor terminals 2 - 3 and both PTC terminals are tied together. Although factory units are connected to motor terminal 3, it doesn't matter if motor terminal 3 or PTC terminal 2 is used (both will work). Use motor terminal 3 to be consistent with factory units.

# Service Tips – Water Switch Pump Nuisance Tripping (1)

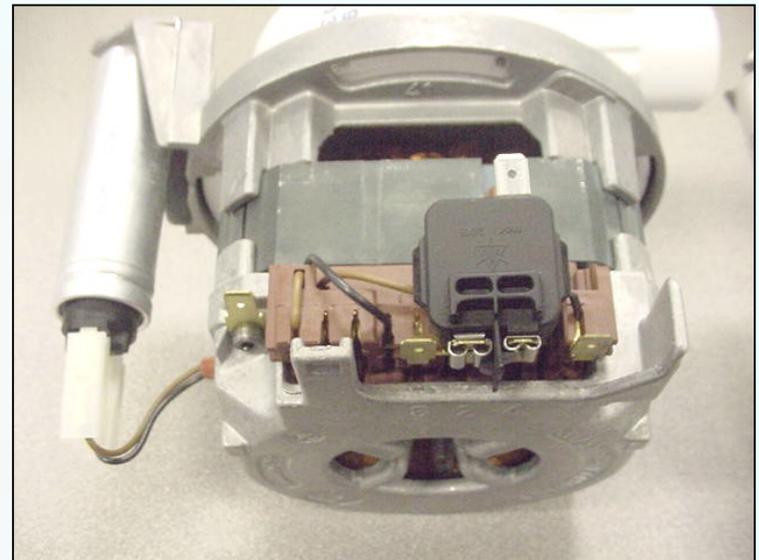
There was some nuisance tripping & failing of motor thermal protectors on three-winding circulation pumps for water switches (# **239129**) on units built on or before October, 2003 (FD # 8310 or before). To prevent this, motors have been superseded by ones with upgraded thermal protectors (# **437345**).

**NOTE:** Circulation pump # **437345** includes motor starter # **182318**. When replacing any pump, **always** replace the motor starter as well.

**NOTE:** Encountering original equipment pumps & motor starters:

- **11/11/03 & later:** Circulation pump # **437345** (with 135°C OVLP) with motor starter # **182318** (4.7 – 4.8Ω).
- **9/16/03 – 11/11/03:** Circulation pump # **239129** (with 120°C OVLP) with motor starter # **423023** (16.8Ω).
- **6/6/02 – 9/16/03:** Circulation pump # **239129** (with 120°C OVLP) with motor starter # **182318** (4.7 – 4.8Ω).

**TECH NOTES:** Motor starter # **423023** (16.8Ω) has a larger resistance to limit current draw through pump motor start windings. Winding temperatures are reduced, but starting torque is reduced as well (by **10%**). To obtain designed start torque and keep UL certification, do **not** use motor starter # **423023** with circulation pump # **437345**. Use **only** motor starter # **182318** with circulation pump # **437345**.



**TECH TIPS:** All circulation pump motors use auto-reset thermal protectors. Once motor windings cool below a preset temperature, protectors reset and pumps will work again. If thermal protectors fail to reset, replace pumps.

# Service Tips – Water Switch Pump Nuisance Tripping (2)

Circulation pumps and motor starters can be readily identified by numbers on their housings.

## **HINTS:** Identifying circulation pumps & motor starters:

- Circulation pump # 437345 – look for # “5600 060022” stamped on housing.
- Motor starter # 182318 – look for # “036906” stamped on housing.
- Circulation pump # 239129 – look for # “5600 050139” stamped on housing.
- Motor starter # 423023 – look for # “041692” stamped on housing.

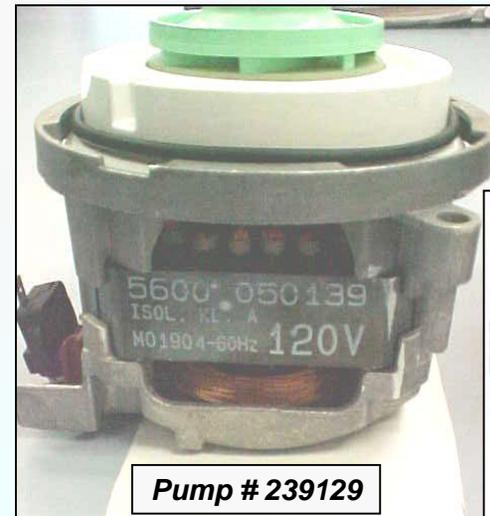
**NOTE:** Replace motor starters when pump motors are replaced.



**Pump # 437345**



**Motor starter  
182318**



**Pump # 239129**



**Motor starter  
423023**

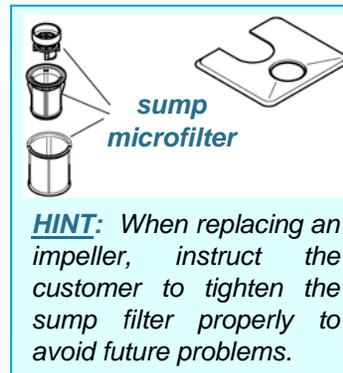
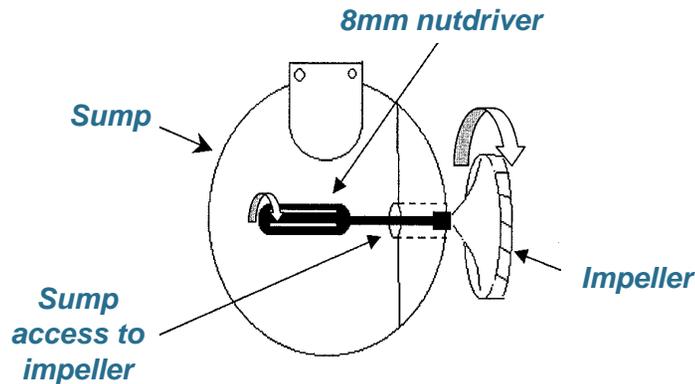
# Service Tips -- Impeller Troubleshooting

<b>Symptom</b>	<b>Problem</b>	<b>Solution</b>
Impeller won't turn.	Impeller is frozen.	Replace impeller with impeller kit # <b>167085</b> . If not able to replace impeller immediately, place 8mm nutdriver on 8mm stud on impeller and rotate clockwise twice until impeller is freed up (for temporary fix until impeller can be replaced).
Impeller won't turn.	Debris binding pump.	Open sump & remove sump pump cover, then carefully remove debris from impeller. Check for broken glass to avoid being cut.
Impeller won't turn.	Motor is faulty.	Check resistance at motor terminals or at control panel (~ 7Ω with water switch or 10Ω without). Replace motor if faulty.

**WARNING!** Unplug dishwasher before starting any repairs.

# Service Tips -- Replacing Impellers (1)

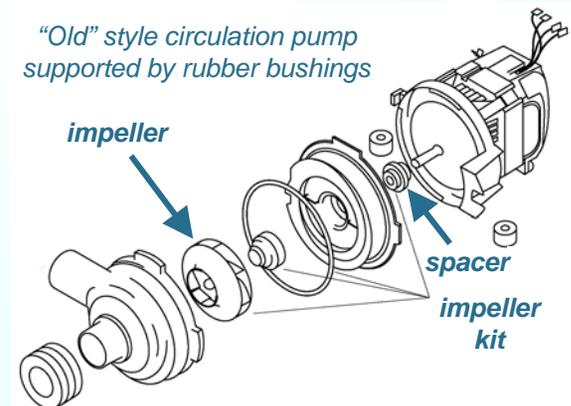
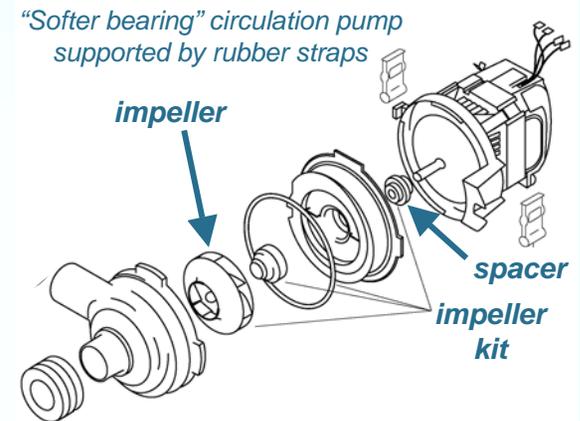
Occasionally, a circulation pump impeller can stick if a dishwasher hasn't been used for a long time. Impeller ceramic rings and carbon rings were changed (during January, 2001) to reduce or eliminate impeller sticking (ceramic rings are located around shaft on rear of impeller). For temporary repairs when impeller replacement isn't possible, loosen impellers by rotating them (accessed through the sump) using an **8mm nutdriver** (replace impellers shortly thereafter when repairs are possible).



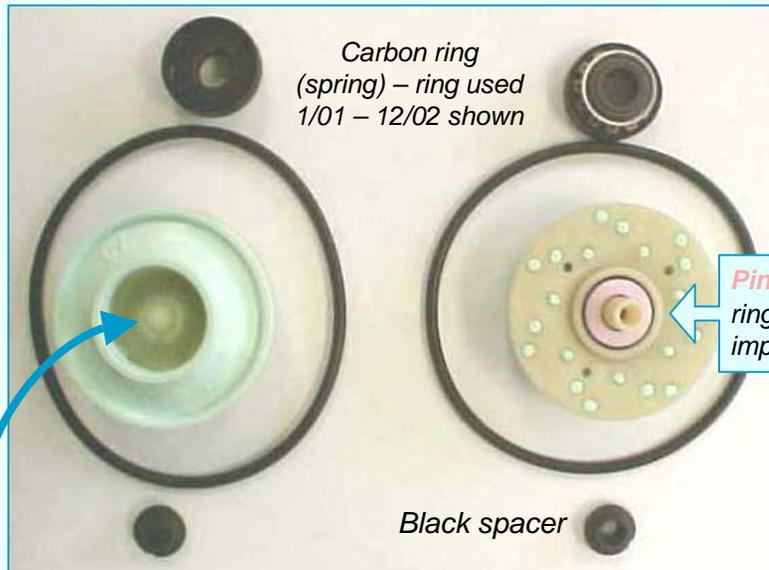
**INSTRUCTIONS FOR LOOSENING IMPELLER:** Replace impellers, not loosen them, whenever possible. To temporarily loosen stuck impellers, remove microfilter and sump screen for access. Place 8mm nutdriver through sump hole onto impeller stud and carefully rotate impeller clockwise until it frees up (at least two full revolutions).

**CAUTION:** When replacing an impeller, install the black spacer between the pump motor and the rear pump housing. Failure to do so may lock up the pump and damage the rear pump housing!

Circulation pumps occasionally jam when debris gets inside when sump filters weren't tightened down or when dishwashers haven't been used for months. Often circulation pumps are replaced when changing **impellers** (kit # **167085**) will solve the problem.



# Service Tips -- Replacing Impellers (2)



Impeller kit # **167085**, showing front and rear sides of impeller and carbon ring (spring).

**HINT:** To remove or temporarily break loose an impeller, place a 8mm nut driver on 8mm stud in center of impeller. Freed impellers should be replaced as soon as possible.

## **HINTS:**

- Impellers fit 239144 (std.) & 437345 (water sw.) pumps.
- Check color of impeller ceramic rings to those shown at right – replace impellers if they have dull white or cream ceramic rings.
- **Make sure black spacer is reinstalled** -- failure to reinstall spacer can cause motor to bind.



**NOTE:** Starting January, 2003, carbon rings were upgraded with a smaller contact surface and an improved contact surface treatment. **167085** impeller kits include these upgraded carbon rings.

## **HINT: Impeller ceramic ring color code:**

**Bright white -- upgraded ring**

**Pink -- upgraded ring**

**Dull yellow/cream -- old ring (impeller should be replaced)**

**Dull white (off white) -- old ring (impeller should be replaced)**



# Service Tips -- UC/07, 11 & 12 Parts Changes

<i>Part description</i>	<i>Old part #</i>	<i>Models used on</i>	<i>Softer bearing part #</i>	<i>Models used on</i>
<b>Circulation pump</b>	<b>263835</b> (motor only)	All models (index #'s UC/06 & UC/09)	<b>491434 (pump)</b> or <b>266511</b> (motor only)	All models (index #'s UC/07, UC/11 & UC/12)
<b>Pump support bushings</b>	<b>167244</b>	All models (index #'s UC/06 & UC/09)	-----	-----
<b>Pump support straps</b>	-----	-----	<b>171596</b>	All models (index #'s UC/07, UC/11 & UC/12)
<b>Gasket (pump to heater)</b>	<b>165268</b>	All models (index #'s UC/06 & UC/09)	-----	-----
<b>Pipe clamp (pump to heater)</b>	-----	-----	<b>172272</b>	All models (index #'s UC/07, UC/11 & UC/12)
<b>Pump rear housing</b>	<b>263314</b>	All models (index #'s UC/06 & UC/09)	<b>267739</b>	All models (index #'s UC/07, UC/11 & UC/12)
<b>Pump front housing</b>	<b>263838</b>	All models (index #'s UC/06 & UC/09)	<b>266514</b>	All models (index #'s UC/07, UC/11 & UC/12)
<b>Seal (pump to sump)</b>	<b>165269</b>	All models (index #'s UC/06 & UC/09)	<b>171598</b>	All models (index #'s UC/07, UC/11 & UC/12)

**NOTE:** Most circulation pump part #'s have changed due to the “softer bearing” upgrade -- the circulation pump has been suspended by flexible straps instead of being mounted onto the base (onto rubber bushings) to make the dishwashers quieter. The impeller kit hasn't changed – its still # **167085**.

**NOTE:** Parts can be changed without notice. Please refer to published CD parts lists for up to date part #'s.

# Service Tips -- UC/14 Water Switch Parts Changes

<i>Part description</i>	<i>Old part #</i>	<i>Models used on</i>	<i>Water switch part #</i>	<i>Models used on</i>
<b>Circulation pump</b>	<b>491434 (pump) or 266511 (motor only)</b>	All models (index #'s UC/07, UC/11 & UC/12)	<b>437345 (pump)</b>	All <i>ExactWash</i> & <i>Apexx</i> models (index # UC/14)
<b>Pump motor starter</b>	-----	-----	<b>182318</b>	All <i>ExactWash</i> & <i>Apexx</i> models (index # UC/14)
<b>Heater assembly</b>	<b>Various</b>	Various	<b>219639 or 431412</b>	All <i>ExactWash</i> & <i>Apexx</i> models (index # UC/14)
<b>Sump</b>	<b>263103</b>	All models (index #'s UC/07, UC/11 & UC/12)	<b>482035</b>	All <i>ExactWash</i> & <i>Apexx</i> models (index # UC/14)
<b>Pump support straps</b>	<b>171596</b>	All models (index #'s UC/07, UC/11 & UC/12)	<b>171596</b>	All models (index #'s UC/07, UC/11, UC/12 & UC/14)
<b>Pipe clamp (pump to heater)</b>	<b>172272</b>	All models (index #'s UC/07, UC/11 & UC/12)	<b>172272</b>	All models (index #'s UC/07, UC/11, UC/12 & UC/14)
<b>Pump rear housing</b>	<b>267739</b>	All models (index #'s UC/07, UC/11 & UC/12)	<b>267739</b>	All models (index #'s UC/07, UC/11, UC/12 & UC/14)
<b>Pump front housing</b>	<b>266514</b>	All models (index #'s UC/07, UC/11 & UC/12)	<b>266514</b>	All models (index #'s UC/07, UC/11, UC/12 & UC/14)

**NOTE:** This affects (*ExactWash* & *Apexx*) models with water switches -- **SH\_56, SHV/Y66 & SH\_99.**

**NOTE:** Parts can be changed without notice. Please refer to published CD parts lists for up to date part #'s.



**NOTE:** This does **not** affect (*Sensotronic*) UC/14 models without water switches. They use the same parts used on models from UC/06 through UC/12.

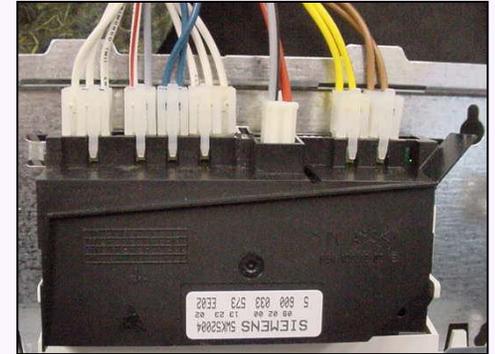
# Part # 3 -- Control Module (1)

## **Disassembly** **(SHU 9922 shown)**

Control modules are easily removed from fascia panels by bending console tabs.

*Tools needed: T-20 Torx & flat blade screwdrivers.*

1. Remove fascia panel by removing T-20 Torx inner door screws.
2. Disconnect wire harnesses from module after noting connector locations.
3. Pry out metal console tabs holding module to console.
4. Carefully pry back plastic tabs, then slide module from console.



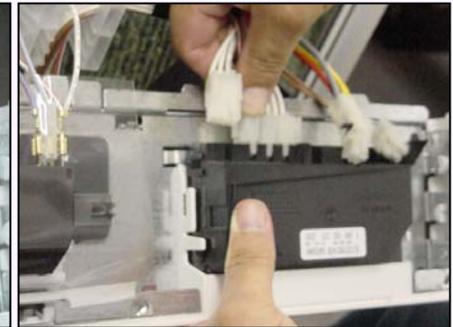
**Removing door screws**



**Removing fascia panel**



**Viewing control module**



**Disconnecting wires**



**Bending back tabs**



**Sliding module out**



**Console without module**

**NOTE:** Control modules for non-integrated models look differently and have different tabs, but are removed using the same procedure.

# Part # 3 -- Control Module (2)

## **Disassembly** **(SHU 995x shown)**

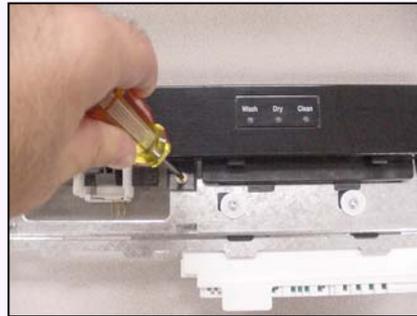
**SL95A, SHY56A/66C, SHU 995x & SHV 68** control modules are removed differently than other modules.

*Tools needed: T-20 Torx & flat blade screwdrivers.*

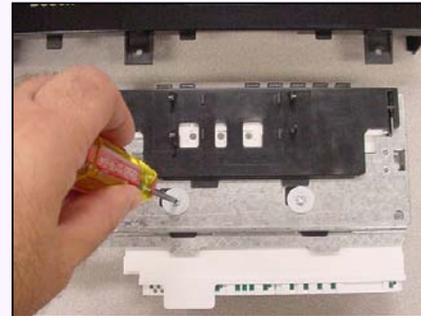
1. Remove fascia panel by removing six (6) T-20 Torx inner door screws.
2. Disconnect wire harnesses from module after noting connector locations.
3. Remove fascia panel from console by removing four (4) T-20 Torx screws.
4. Remove two (2) T-20 Torx screws holding module to console.
5. Carefully pry back locking tabs on each front corner of module, then remove module from console. Remove button pad from module.



**Removing door screws**



**Removing fascia screws**



**Removing module screws**



**Prying back module tabs**



**Sliding module out**



**Removing button pad -- buttons can come off pad**



**Align tabs when reassembling**

# Part # 3 – Control Modules with Displays

## Disassembly



*These instructions apply only to SHY66C models.*

**SHY66C** control modules have separate 3-digit display modules (# 489021) mounted on the front of fascia panels.

*Tools needed: T-20 Torx & flat blade screwdrivers.*

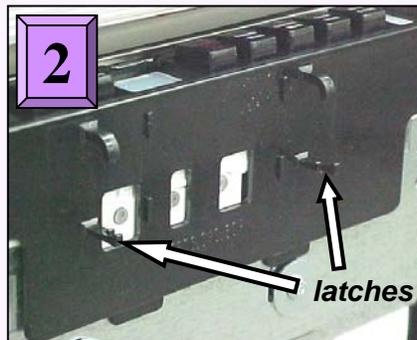
### To remove/install display module:

1. Remove outer door & fascia panel.
2. Confirm the (4) pushbutton carrier display latches are intact.
3. Route display wire harness through (door latch) console opening, press harness onto pushbutton carrier wire guide & connect terminal.
4. Insert display into top latches (on pushbutton carrier), then push bottom of display up and rotate it into bottom latches.

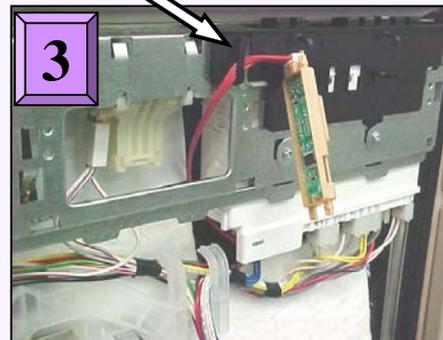
wire guide



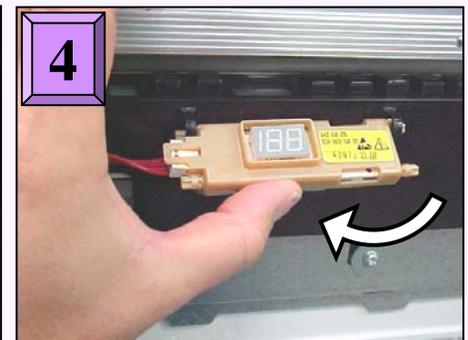
Removing door & fascia



Checking display latches



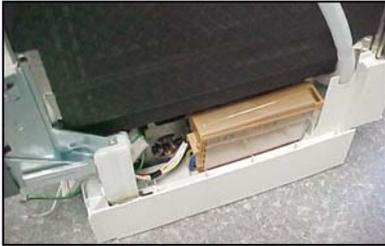
Connecting wire harness



Locking display in place

# Part # 3 – Apexx Control Modules (1)

## Disassembly



*These instructions apply to SHV/SHX/SHY99A models.*

**HINT:** Apexx control modules cannot be checked or have resistances measured from the front of dishwashers.

**NOTE:** Modules were moved to the base to make room for the larger full text displays in the fascia panel.

Apexx (SHV99A/SHX99A-B/SHY99A, DWHD94) control modules are different than other models and are removed differently. Modules are mounted on the base (where base wiring connectors were), not behind fascia panels. This means:

- **Dishwashers must be pulled out to change control modules.**
- **Dishwashers must be pulled out to measure voltages & resistances.**

### For access to Apexx control modules:

Tools needed: T-20 Torx screwdriver & pliers.

1. **Remove outer door** – see page 19.
2. **Remove toe kick** – see page 20.
3. **Remove right/left side panels** – see page 20.
4. **Raise right side of tank** – see page 21.

**HINT:** Its helpful, but not necessary, to remove outer doors to access Apexx control modules.

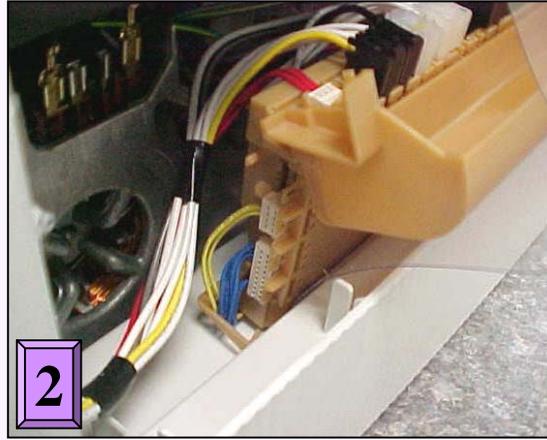
**HINT:** It may be possible to reach behind modules without blocking up tanks. If not, then follow these instructions to block up tanks.

# Part # 3 -- Apexx Control Modules (2)



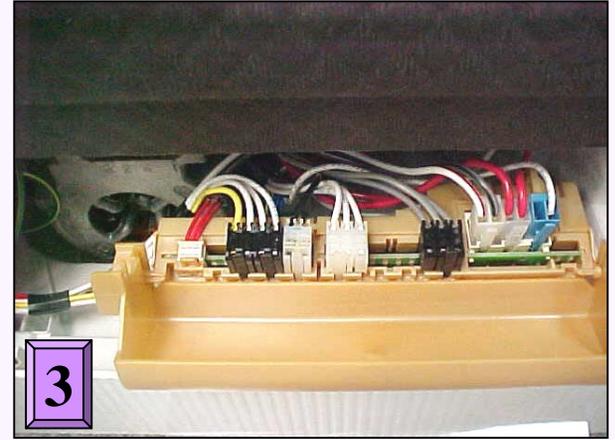
1

*Locating module in base*



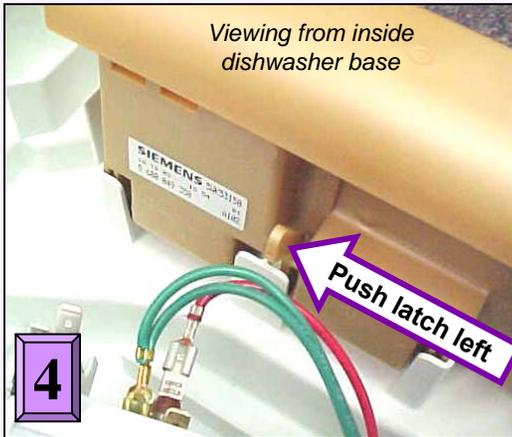
2

*Opening module cover*



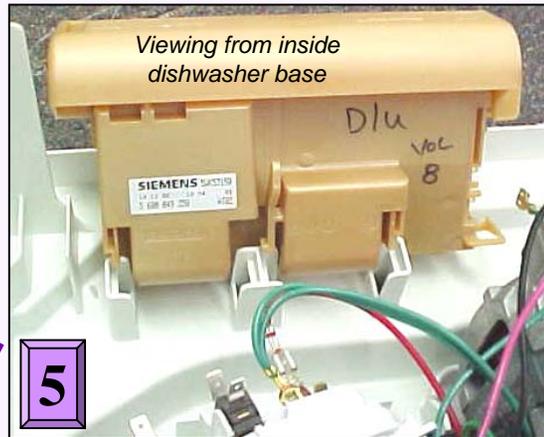
3

*Disconnecting module terminals*



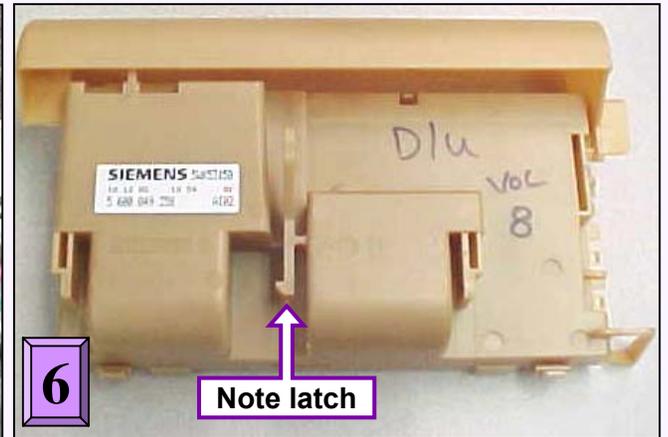
4

*Pushing back module latch*



5

*Sliding module out*

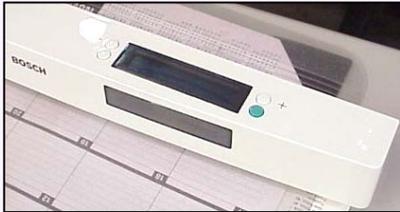


6

*Align module tabs when reassembling*

# Part # 3 – Apexx Display Modules

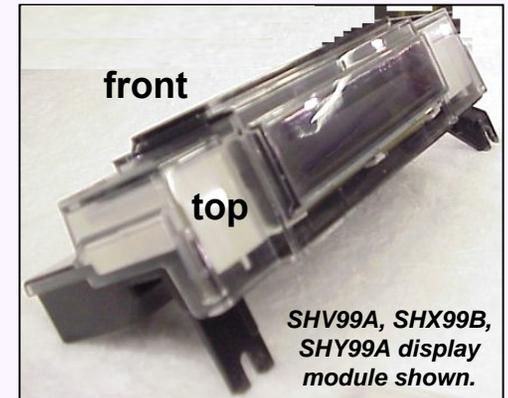
## Disassembly



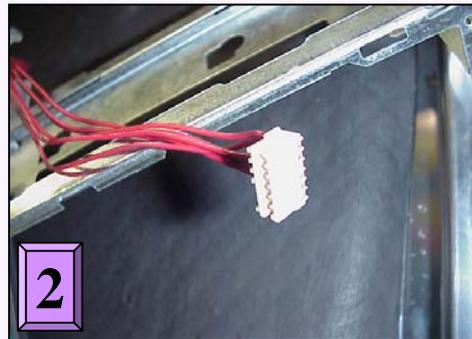
These instructions apply to SHV99A, SHX99A-B, SHY99A & DWHD94 models.

**NOTE:** Control modules were moved to the base to make room for full text displays in the fascia panel.

Apexx (SHV99A, SHX99A-B, SHY99A & DWHD94) display modules are mounted on fascia panels (where control modules are mounted on other models).



Removing fascia screws



Removing wire harness



Removing display module

# Part # 3 – Control Modules with Knobs (1)

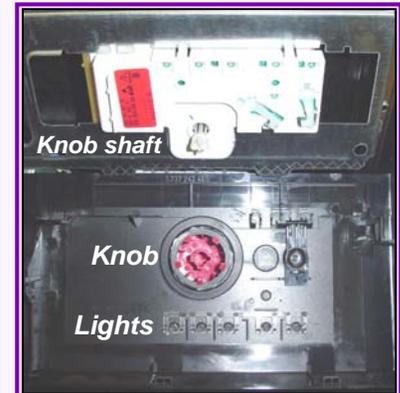
## Disassembly

SHU43E/53E/66E models are operated by a single knob instead of a row of buttons. Fascia panels snap onto consoles with four plastic latches. Control modules are held into consoles by four plastic tabs.

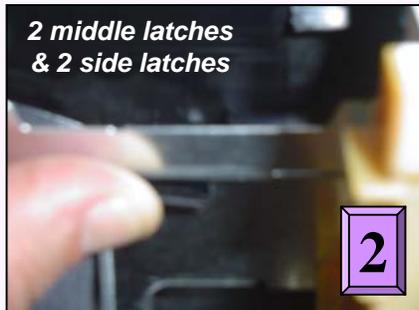


These instructions apply to SHU43E/53E/66E models.

**HINT:** Knobs are an integral part of fascia panels. Remove modules from knobs, not knobs from panels.

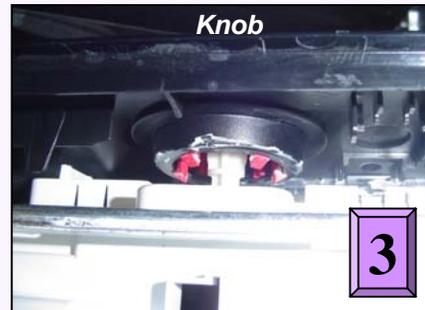


1



2 middle latches & 2 side latches

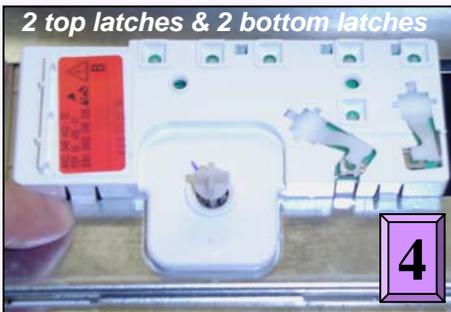
2



Knob

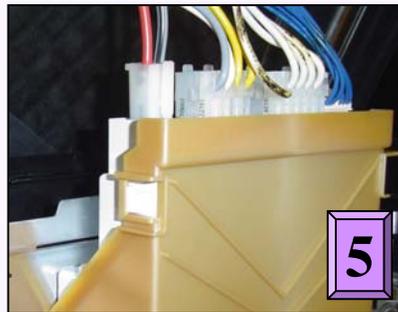
3

Removing fascia screws    Unlatching fascia from console    Removing fascia from module

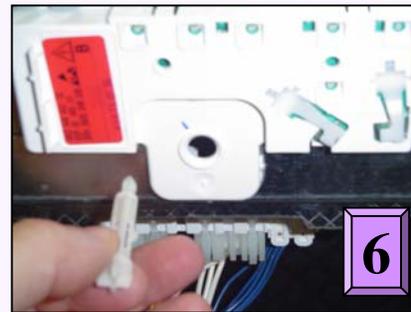


2 top latches & 2 bottom latches

4



5



6

Unlatching module from console    Removing wire harnesses    Removing knob shaft

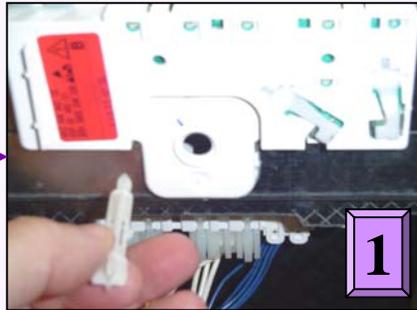
Inside of fascia panel and front of control module showing knob shaft & rear of knob

**TIP:** Short end of "cross" on shaft lines up with knob pointer

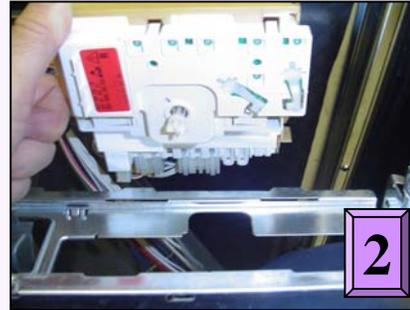


# Part # 3 – Control Modules with Knobs (2)

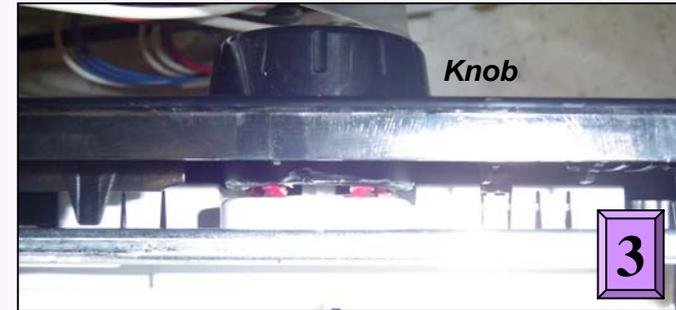
## Reassembly



1



2



3

Inserting knob shaft into module

Snapping module into console

Snapping fascia onto console

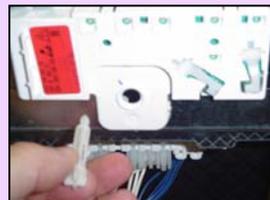
Make sure short end of “cross” on shaft points (↑) up when module is right-side-up



**CAUTION:** Knob shafts can be inserted into modules in any of four positions (with short side of shaft “cross” up, left, right or down). Make sure shaft is inserted correctly or else wash programs won’t match fascia panels.



**HINT:** Knobs are an integral part of fascia panels. Insert the knob shaft straight into the module until it latches, then attach the module to the fascia panel (console).



**HINT:** Control module snaps into console only one way -- it can't be mounted upside-down.



**HINT:** Knob shaft fits into knob only one way – line up knob with “cross” on knob shaft before attaching fascia panel to console.



# Service Tips – Test Programs (1)

Using test programs for various models (UC/06 - UC/17)

Models	Buttons to Enter Test Program
SHU/SHI430x, SHU431x	Power Scrub Plus + Regular Wash
SHU33/DLX	Power Scrub Plus + Rinse & Hold
SHU43C, SL34A, SHU432x	Regular Wash + Rinse & Hold
SHU53/66C/68, SHI66A/68	Scrub Wash + Delicate/Econo
SHU53A, SHX/SHY56, SL95A	Regular Wash + Quick Wash
SHU88	Power Scrub Plus + Quick Wash
SHU990x, SHV43/48	Power Scrub Plus + Regular Wash
SHU991x (thru UC/11)	Power Scrub Plus + Quick Wash
SHU991x (UC/12), SHU992x	Power Scrub Plus + Delicate/Econo
SHU995x	Regular Wash + Delicate Wash
SHV66A, SHY66A	Scrub Wash + Delicate/Econo
SHV68	Scrub Wash + Regular Wash
GI976/966, GM276	Intensive + Delicate
DW44	Heavy Wash + Light Wash

- To enter test programs, hold down buttons above (2nd & 4th from left), then turn dishwasher on by pushing on/off button. Push buttons above a 2nd time to start test program. Allow program to finish to see fault codes. Turn dishwasher off to exit test program.

**HINT:** Dishwasher test programs heat water to 150°F, so test programs will generally run > 20 minutes for incoming water temperatures ~ 120°F.

**HINT:** Open door to select test program for fully-integrated models, then close door to run program.

**NOTE:** Flow through heaters heat water ~ 2°F / minute.

Example of a Test Program (varies by model)

TEST	TIME	NOTES
Entering test program	----	Press <i>On/Off</i> button at the same time you press both the <i>Power Scrub Plus</i> & <i>Regular Wash</i> buttons (SHU/I 43 models) or the <i>Scrub Wash</i> & <i>Delicate/Econo</i> buttons (SHU/I 53 & 68 models). Indicating lights will flash.
Starting test program	----	Press both the <i>Power Scrub Plus</i> & <i>Regular Wash</i> buttons (SHU/I 43 models) or the <i>Scrub Wash</i> & <i>Delicate/Econo</i> buttons (SHU/I 53 & 68 models) a 2nd time.
Skipping a test	----	Press <i>Scrub Wash</i> button (SHU/I 43 models) or <i>Regular Wash</i> button (SHU/I 53 & 68 models).
Draining	30 seconds	Allow dishwasher to drain.
Aqua Sensor calibration	65 seconds	Not on SHU/I 43 models. Skip this test.
Filling	Until water level switch closes	Can't skip this test
Heating & Circulating	Until water reaches 150°F (rises ~ 2°F/minute)	Don't run entire test (to save time) -- when water starts circulating, measure current in main power line to dishwasher. Skip test once current has been measured. If current is ~ 11A, heater, flow switch and Hi-Limit are OK. If current ~ 1.5-2A, turn off dishwasher, remove or block up tank and measure resistance of heater, Hi-Limit & flow switch (see below).
Draining	60 seconds	Last test. To end test program, press <i>On/Off</i> button (all models).

# Service Tips – Test Programs (2)

Using test programs for various models (UC/14 - UC/17)

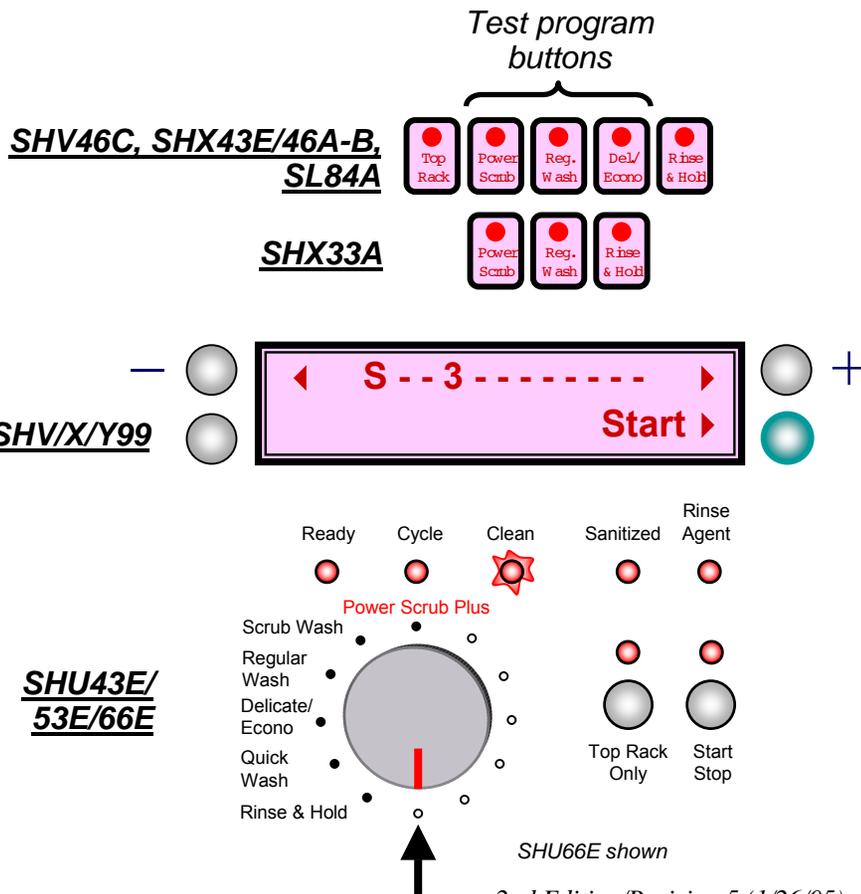
Models	Buttons to Enter Test Program
SHV46C, SL84A, SHX43E/ 46A-B	Regular Wash + Delicate/Econo
SHX33A	Regular Wash + Rinse & Hold
SHU43E/53E/66E	Turn knob (see below) + Start/Stop
SHV99, SHX99, SHY99	(2) left buttons (see below)

**HINT:** Dishwasher test programs heat water to 150°F, so test programs will generally run > 20 minutes for incoming water temperatures ~ 120°F.

**HINT:** Open door to select test program for fully-integrated models, then close door to run program.

**NOTE:** Flow through heaters heat water ~ 2°F / minute.

- To enter SHV46C, SL84A, SHX33A/43E/ 46A-B test programs, hold down buttons above (2nd & 3rd from left of three test program buttons), then turn dishwasher on by pushing on/off button. When in test program, 2nd button light (Regular Wash) will be lit and 3rd button light will flash. Push 2nd button (Regular Wash) to scroll until test program is chosen -- when 3rd button light is lit (.). Push 3rd button to start test program. Allow program to finish to see fault codes. Push 2nd button (Regular Wash) to skip certain steps. Turn dishwasher off to exit test program.
- To enter SHV/X/Y99 test programs, open door, hold down 2 left buttons & turn dishwasher on by pushing on/off button. Press "+" button repeatedly until "S-3-" shows on display, then push start button to check faults on last 8 washes. Close door to begin test program. Allow program to finish to see fault codes. Push "-" button to skip test steps. Turn dishwasher off to exit test program. Choose "S-6-" to clear fault codes.
- To enter SHU43E/53E/66E test programs, 1st rotate knob to 6:00 position (pointing straight down). Hold down Start/Stop button, then turn dishwasher on by pushing on/off button. Push Start/Stop button to start test program. When test program has finished, Clean light light will flash and all other lights will be lit.



# Service Tips – Fault Codes (1)

## DISHWASHER TEST PROGRAM ERROR CODES (on 2 & 3-digit digital displays):

- 0 – No faults
- 1 – Aqua Sensor (Sensotronic) fault
- 2 – Heating system fault (heater, Hi-Limit, flow switch, NTC, control heater relay)
- 4 – Water filling fault
- 8 – NTC (temperature sensor) fault
- 16 – Water switch fault

00

000

**TIP:** Fault codes add up for multiple faults  
(e.g. heating + water filling fault = 2 + 4 = 6)

**HINT:** Apexx heater runs during steps 05 – 08. Press “.” button to skip to test 05 to measure heater amp draw.

## DISHWASHER CUSTOMER USE ERROR CODES (on 2 & 3-digit digital displays):

- F – Water filling fault (underfill, overflow or water in the base)
- 2H – Last wash cycle too long (> 99 minutes). Can be cold inlet water or heating system fault (heater, Hi-Limit, flow switch, NTC, control module heater relay).
- \_h – Delay Start feature (not a fault code)

00

000

## DISHWASHER TEST PROGRAM ERROR CODES (on lower line of full text Apexx SH 99 displays):

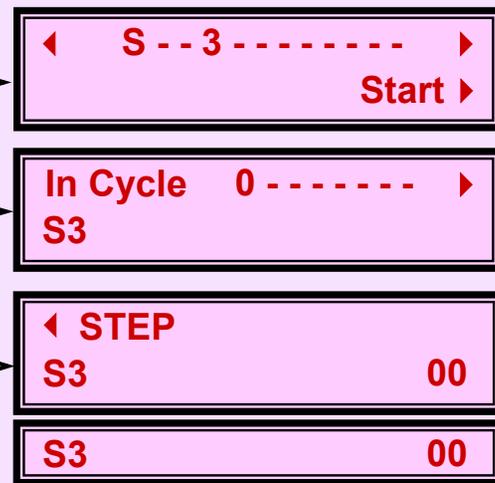
- S3 – No faults
- A – Aqua Sensor (red) fault
- B – Aqua Sensor (green) fault
- E – Water switch fault (no pulses detected)
- F – Water filling fault
- G – Water switch fault (won't stop running)
- H – Heating system fault (heater, Hi-Limit, flow switch, NTC, control module heater relay)
- K – NTC fault (short-circuited or open-circuited)
- xx – Test program step count (testing done when = 00)

**TIP:** Top line shows wash cycle & bottom line shows fault code.

Selecting test program

Checking fault codes

Test program steps



**HINT:** Dishwasher test programs heat water to 150°F, so test programs will generally run > 20 minutes for incoming water temperatures ~ 120°F.

**HINT:** Open door to select test program for fully-integrated models, then close door to run program.

**NOTE:** Flow through heaters heat water ~ 2°F / minute.

# Service Tips – Fault Codes (2)

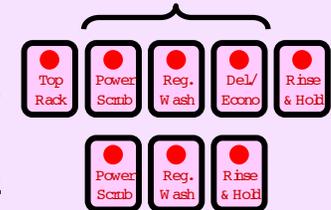
## DISHWASHER TEST PROGRAM ERROR CODES (on SHX33A/43E/46A-B, SHV46C, SL84A models):

- ○ ○ ● – Heating system fault (heater, Hi-Limit, flow switch, control heater relay)
- ○ ● ○ – NTC (temperature sensor) fault
- ○ ● ● – Water filling fault
- ● ○ ○ – N/A
- ● ○ ● – N/A
- ● ● ○ – Aqua Sensor (Sensotronic) fault
- ● ● ● – N/A

SHV46C, SHX43E/46A-B, SL84A

SHX33A

Fault code LED's



**TIP:** Fault codes do NOT add up for multiple faults – shows highest fault code on list above (1<sup>st</sup> – heating, 2<sup>nd</sup> – NTC, 3<sup>rd</sup> – water filling, 4<sup>th</sup> – aqua sensor)

## DISHWASHER TEST PROGRAM ERROR CODES (on SHU43E/53E/66E models):

Faults	LED Fault Codes			
0 - No faults	READY LED flashes	CYCLE LED off	CLEAN LED flashes	NSF LED off
1 - Heater Element	READY LED lit	CYCLE LED off	CLEAN LED flashes	NSF LED off
2 - Water Filling	READY LED flashes	CYCLE LED lit	CLEAN LED flashes	NSF LED off
3 - NTC	READY LED flashes	CYCLE LED off	CLEAN LED lit	NSF LED off
4 - Aquasensor	READY LED flashes	CYCLE LED off	CLEAN LED flashes	NSF LED lit

- LED flashes
- LED lit
- LED off

**NOTE:** Flow through heaters heat water ~ 2°F / minute.

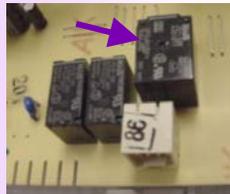
**HINT:** Open door to select test program for fully-integrated models, then close door to run program.

**HINT:** Dishwasher test programs heat water to 150°F, so test programs will generally run > 20 minutes for incoming water temperatures ~ 120°F.

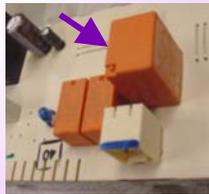
# Service Tips -- Control Module Heater Relays

**HINT:** Occasionally, a heater relay terminal soldered to a # **266746**, **263832** or **264461** control module pc board may fail. **If so, do not resolder the relay, but replace the control module.**

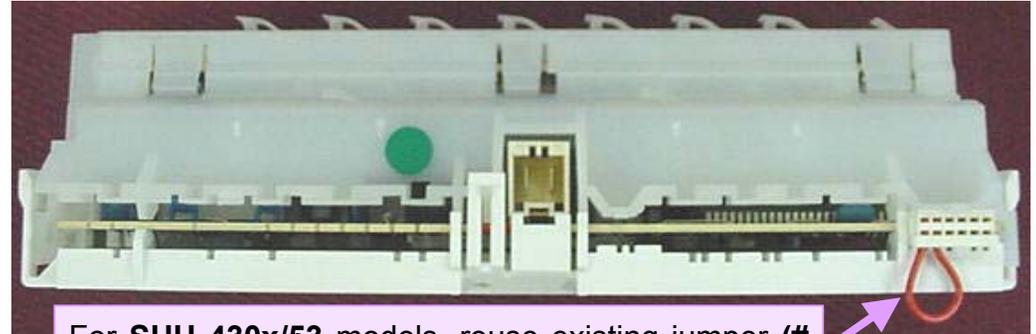
The heater relay is the **largest** of three relays in the **center** of the pc board & can be **black** or **orange**:



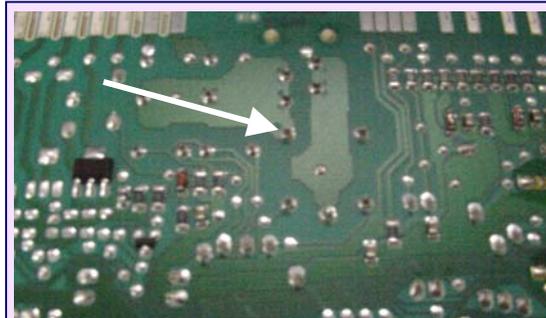
**Black**



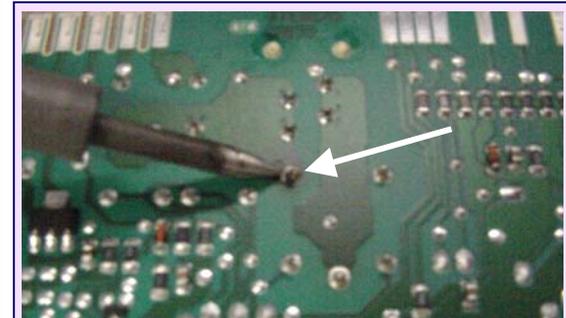
**Orange**



For **SHU 430x/53** models, reuse existing jumper (# **167782**) for replacement module (SHU 53 shown).



**Good board** -- showing proper soldering on back of pc board.



**Burned board** -- showing burned terminal on back of pc board.

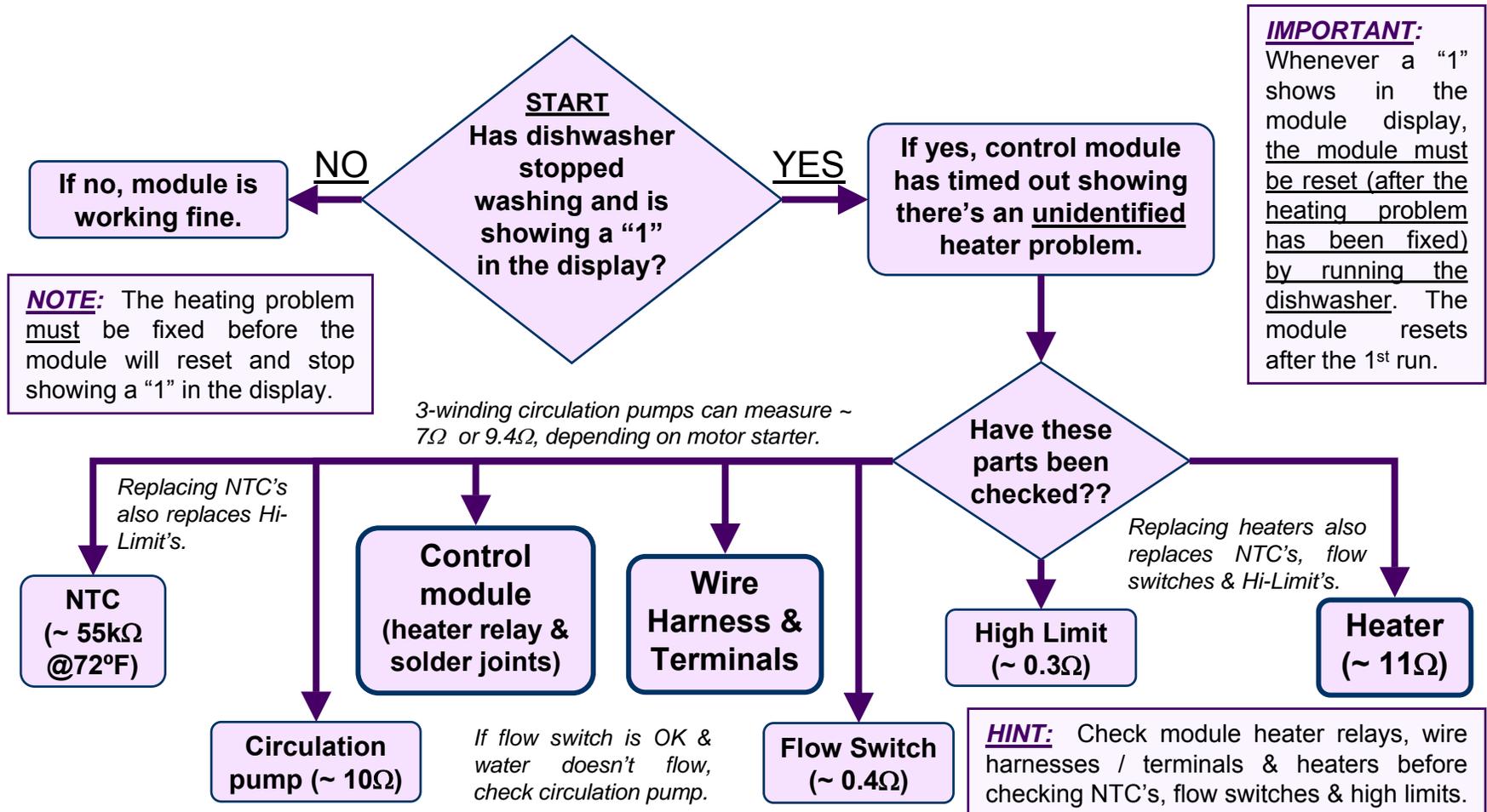
**HINT:** Faulty heater relays can cause modules to count down to "1" and stop.

Please hold all warranty parts for (60) days for possible return for analysis.

**NOTE:** Replace all faulty control modules and hold them for (60) days for possible return for analysis. **Do not resolder control module pc boards.**

# Service Tips -- Modules Displaying "1"

Occasionally dishwashers can run for hours, not finish washing & show a "1" in the display. This means the module has timed out due to an unidentified heating problem -- all heating related parts must be checked until the problem is found.



# Service Tips – Single Wire Harnesses & Short Side Panels

Wire harnesses have been changed during March – April, 2004 on most models to single harnesses instead of separate control module and base harnesses (with base terminal blocks). Short side panels were upgraded on 9/8/03 – they're fastened with different screws and don't need ground terminals.

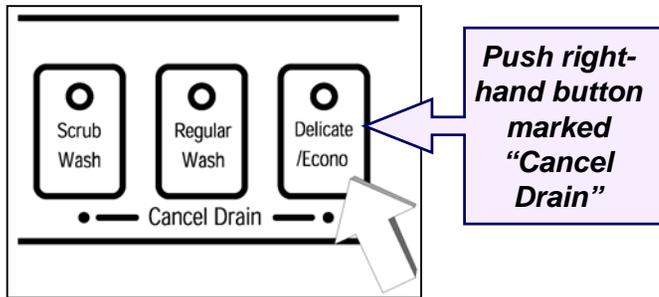
Brand	Models	Single Harness Part #	Change Date	New Short Side Panel Part #	New Side Panel Screw Part #	Change Date	Old Short Side Panel Part #	Old Side Panel Screw Part #	Control Harness Part #	Base Harness Part # (newer w/o gnd. term.)	Change Date (w/o gnd. term.)	Part # (older w/ gnd. term.)			
BOSCH	SHI66A	439473	3/22/04	----	----	----	----	----	431428	431429	----	431429			
BOSCH	SHU66C		4/15/04								----				
BOSCH	SHU33A UC/17	439474	4/26/04	441047	425997	9/8/03	359470	186926	492930	492927	----	----			
BOSCH	SHU43C UC/17	439475	4/26/04			9/8/03					492929	----	----		
BOSCH	SHU53A UC/17		3/29/04			9/8/03					----	----			
BOSCH	SHV46C / SHX46B	439476	4/12/04	441047	425997	9/8/03	238426	186926	431012	494179	9/8/03	431894			
BOSCH	SHX46A		4/22/04								----		----	----	9/8/03
SIEMENS	SL84A		4/7/04								----		----	----	9/8/03
Thermador	DW44Z / DW44FI		3/30/04								----		----	----	9/8/03
BOSCH	SHX33A	439477	4/19/04	441047	425997	9/8/03	238426	186926	494814	494814	9/8/03	431748			
BOSCH	SHX43E		4/5/04								441047		425997	9/8/03	359470
BOSCH	SHV66A	439478	4/12/04	----	----	----	----	----	431588	431694	----	431694			
BOSCH	SHX56B		4/8/04	----	----	----	----	----							
BOSCH	SHY66C		4/15/04	----	----	----	----	----							
BOSCH	SHY56A	439479	4/27/04	----	----	----	----	----	431695	431695	----	----			
SIEMENS	SL95A		4/15/04	----	----	----	----	----							
SIEMENS	SL34A UC/02	439480	4/22/04	441047	425997	9/8/03	238426	186926	492928	492927	----	----			

**NOTE:** Short side panels were updated on 9/8/03 – new short side panels don't need ground terminals. Single harnesses don't have ground wires needed for older short side panels with ground terminals.

**HINT:** Single wire harnesses can replace newer separate wire harnesses (without ground wires for new short side panels). Separate wire harnesses can't replace single wire harnesses since bases don't have connectors for separate harnesses.

# Service Tips – Turning Off End of Cycle Tones

Control modules on **SHV, SHX & SHY** models have been replaced when end of cycle tones couldn't be turned off, not for module failures. Following these instructions for turning off cycle tones, instead of replacing entire control modules, will save customers time and money.



**HINT:** Open door slightly to access buttons.



## MODELS WITHOUT DISPLAYS:

- While pushing & holding right-hand button marked **Cancel Drain** (regardless of model), push **On/Off** button. When light on button and tone come on, release both buttons.
- Push right-hand button again to scroll through tone volumes until no tone is heard (or desired volume is reached if tone is to be kept on).
- To save changes, push **On/Off** button and close door.

## MODELS WITH DISPLAYS:

- While pushing & holding **Delay Start** button (regardless of model), push **On/Off** button. When display shows a # (**0, 1** or **2**) and tone comes on (if tone is on), release both buttons. (If no tone comes on, tone is already off -- push **On/Off** button to exit change mode.)
- Push **Delay Start** button again to scroll through tone volumes until no tone is heard (or desired volume is reached if tone will be kept on). Volume level on display will show "**0**" when tone is off.
- To save changes, push **On/Off** button and close door.

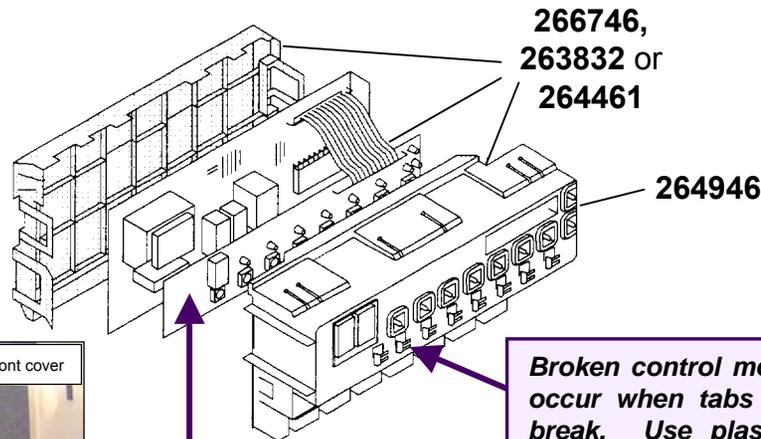
## APEXX (SHV/X/Y99) MODELS WITH FULL TEXT DISPLAYS:

- Open door slightly to access buttons, then push **On/Off** button. Push "Option" button four (**4**) times until "End signal" option shows. The dishwasher then starts playing the present tone volume level.
- Push "+" or "-" buttons to change tone volume: push "+" button to raise volume (**6** is max.) & push "-" button to lower volume (**0** turns tone off).
- If desired, push **green** Main Menu button once to change other options or twice to start the dishwasher (close the door to begin the wash cycle).

# Service Tips -- Using # 264946 Front Cover to Replace Broken # 266746, # 263832 or # 264461 Control Module Buttons

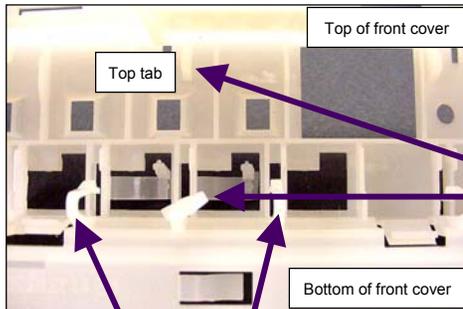
# **266746**, # **263832** or # **264461** control modules have often been replaced when buttons break, not for electronic failures. Replacing the # **264946** front cover when buttons break instead of replacing the entire control module will save customers time and money.

**CAUTION:** Some pc board components are sensitive to static electricity and can be damaged when touched. Personnel handling pc boards should be grounded.



### To install front cover:

1. Carefully insert cover hinge tabs into module housing hinge slots -- rotate front cover (with tabs contacting housing hinge) until cover hinge tabs slide easily into hinge. Do NOT force.
2. Close front cover until all three cover tabs lock.



**Broken control module "buttons" occur when tabs on front cover break. Use plastic front cover when replacing "broken buttons".**

Note cracks in plastic locking tabs.

**CAUTION:** Insert display module board carefully to prevent breaking spring locking tabs on front cover. When installing display module, carefully slide top of board into top of front cover, seating board fully into tabs. Carefully rotate bottom of board into position so spring locking tabs spring back and lock without cracking or breaking. **DO NOT FORCE** bottom or top of display board into position.

**NOTE:** To determine which control module you have, check the model #'s on the following list:

**266746** -- SHU 5302/5304/5305/5306/5312/5314/5315/5316/6802/6805/6806 UC 11 - UC/12, SHU 5307/5317 UC/12 and SHI 6802/6805/6806 UC/11 - UC/12.

**263832** -- SHU 5302/5304/5305/5306/5312/5314/5315/5316/6802/6805/6806 UC 06 and SHI 6802/6805/6806 UC/06.

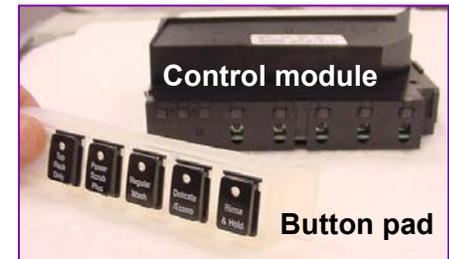
**264461** -- SHU 4302/4306/4312/4316 UC 06 - UC/11 - UC/12 and SHI 4302/4306 UC/06 - UC/11 - UC/12.

# Service Tips -- Using # 481055 Control Modules in SHU 99 and SHV 43/48 Dishwashers (1)

Control module # **265401** for **SHV 43/48** and **SHU 990x/991x UC/06, UC/07 & UC/11** models was replaced by control module # **481055** (for **SHU 99 & SHV 43/48 UC/12** models). Since module # **481055** has slightly different wash cycles and an end of cycle tone (compared to the # **265401** module), follow these instructions to order the correct pushbutton pad and turn off the end of cycle tone.

**NOTE:** When replacing button pads on older **SHV 43/48 & SHU 990x/991x** models with # 265401 modules, use:

- 4-button pad # **170424** (**SHV 43 & SHU 990x/991x** models)
- 5-button pad # **170423** (**SHV 48** models)



**NOTE:** When replacing module # **265401** with # **481055** on older **SHV 43/48 & SHU 990x/991x** models, use:

- 4-button pad # **182605** (**SHV 43 & SHU 990x/991x** models)
- 5-button pad # **182600** (**SHV 48** models).

**NOTE:** When replacing control module # **481055** on **SHV 43/48 & SHU 991x/992x UC/12** models, don't replace button pads. If pads are worn, order:

- 4-button pad # **182605** (**SHV 43 & SHU 991x** models)
- 5-button pad # **182600** (**SHV 48 & SHU 992x** models).

## **INSTRUCTIONS FOR TURNING OFF END OF CYCLE TONE:**

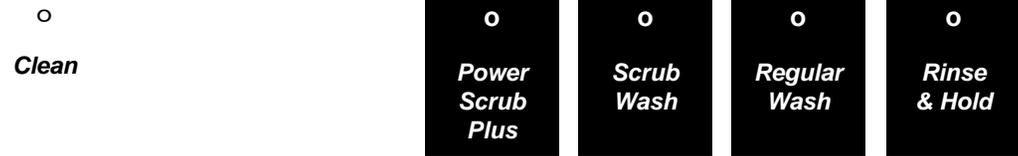
- Open door, push and hold *Delicate/Econo* button, then turn dishwasher on while holding *Delicate/Econo* button.
- Release *Delicate/Econo* button. If module beeps, end of cycle tone is on -- press *Delicate/Econo* button again to disable tone. If module doesn't beep after button is pressed, tone is disabled.
- Turn off dishwasher to save selection.
- **NOTE:** If buttons don't match and there's an end of cycle tone, press 2<sup>nd</sup> button from right instead of *Delicate/Econo* button.

# Service Tips -- Using # 481055 Control Modules in SHU 99 and SHV 43/48 Dishwashers (2)

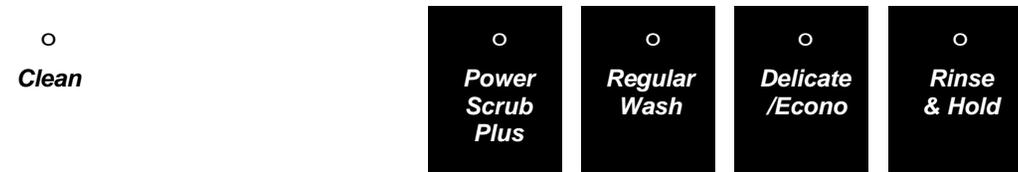
## Comparing button pads:



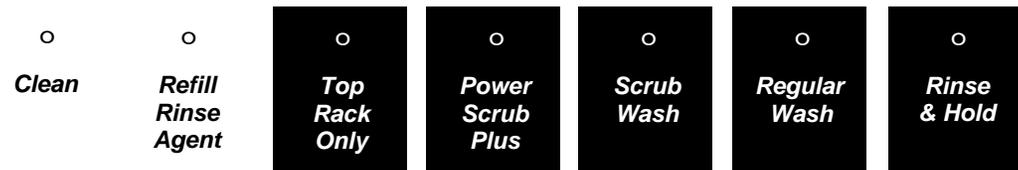
### SHV 4303 UC/06 & UC/11 models program buttons & indicator lights:



### SHV 4303 UC/12 models program buttons & indicator lights:



### SHV 4803 UC/06 & UC/07 models program buttons & indicator lights:



### SHV 4803 UC/12 models program buttons & indicator lights:



# Service Tips -- Using # 481055 Control Modules in SHU 99 and SHV 43/48 Dishwashers (3)

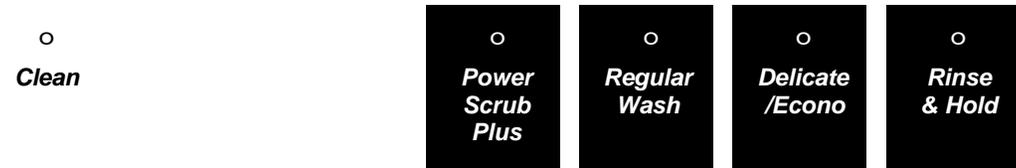
## Comparing button pads:



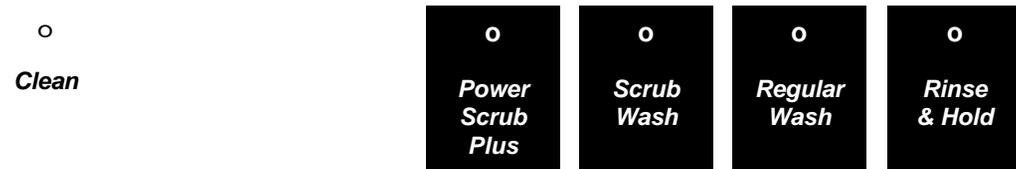
### SHU991x UC/06 & UC/11 models program buttons & indicator lights:



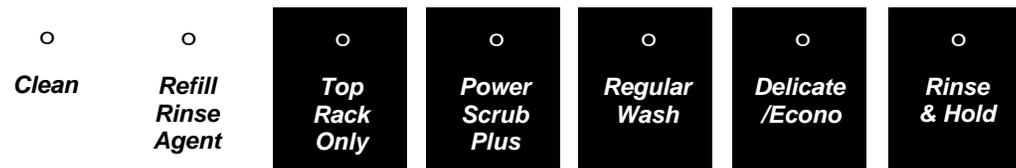
### SHU991x UC/12 models program buttons & indicator lights:



### SHU990x UC/06 Millennium models program buttons & indicator lights:



### SHU992x UC/12 models program buttons & indicator lights:



## Part # 4 -- Heater & NTC (1)

### **Disassembly**

The heater & NTC can be accessed or measured from the right side of the dishwasher, but can only be removed by dropping the entire base (by flipping the dishwasher on its back) since they are wedged underneath the tank.

#### **For access to heaters & NTC's:**

Tools needed: T-20 Torx screwdriver & pliers.

1. **Remove outer door** – see page 19.
2. **Remove toe kick** – see page 20.
3. **Remove right/left side panels** – see page 20.
4. **Raise right side of tank** – see page 21.

**HINT:** The fascia panel and door don't need to be removed to access the heater & NTC. However, the door must be removed to completely remove the tank.

**HINT:** Remove all water from the sump and hoses before accessing the heater -- when the dishwasher is flipped on its back, water can enter the water fill assembly diaphragm and cause the dishwasher to not fill properly.

#### **To separate base from tank (1):**

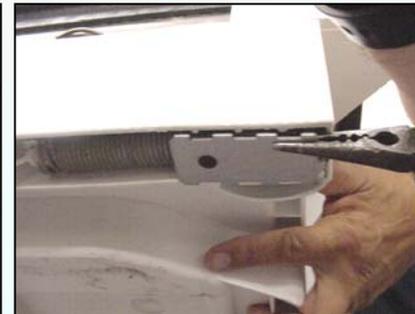
1. Carefully lay dishwasher on its back.
2. Carefully pull door springs out from base.



**Place on back**



**Pull out door springs from base & disconnect cords**



## Part # 4 -- Heater & NTC (2)

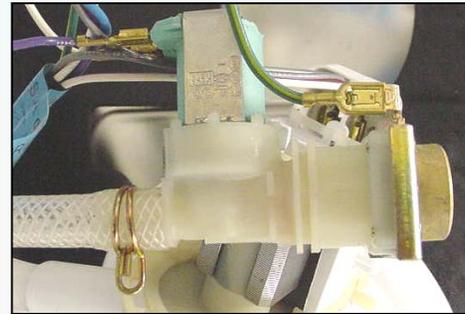
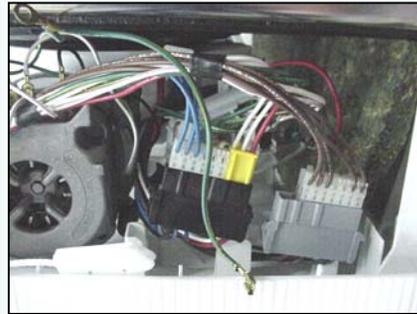
### ***To separate base from tank (2):***

3. Remove terminal blocks from base (for two-piece harnesses).
4. Disconnect hose from water valve (or remove water valve from base if easier).
5. Disconnect J-box ground wire, then pull wires out of J-box.
6. Pull out inlet hose from sump.
7. Carefully pull base away from tank and sump.

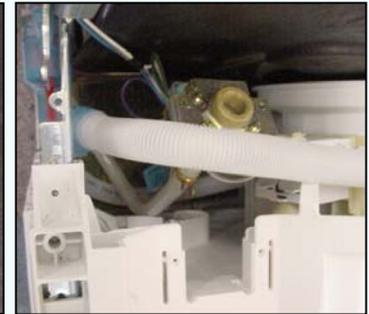
**HINT:** Remove water from sump and hoses before laying dishwasher on its back (to avoid water entering water fill assembly & causing faulty water filling).



***Remove terminal blocks from base***



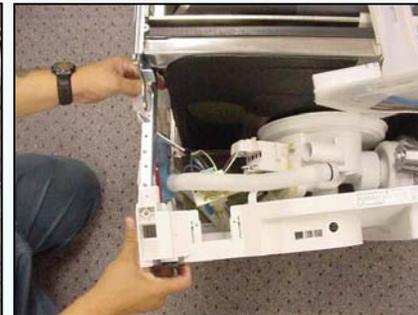
***Disconnect hose from water valve***



***Pull wires from J-box***



***Pull out sump hose***



***Carefully pull base from tank & sump***

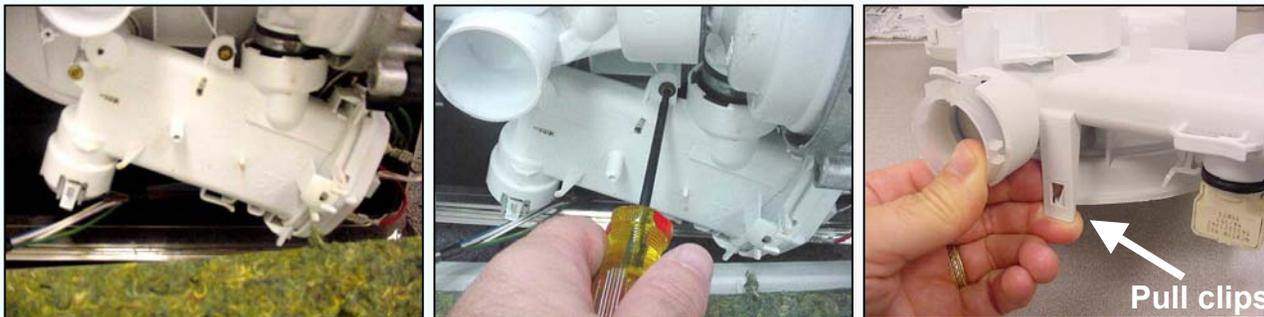


## Part # 4 -- Heater & NTC (3)

### To remove heater & NTC:

1. Remove two (2) T-20 Torx screws holding heater assembly to sump.
2. Disconnect wires from heater, flow switch, NTC & Hi-Limit after noting connections.
3. Pull clips, then carefully pull heater assembly from sump & pump. Note heater comes as an assembly (with housing & gasket).

**NOTE:** Softer bearing & non-softer bearing heater assemblies, circulation pumps and sumps **cannot** be mixed and matched. Softer bearing heaters don't fit in older models and older heaters don't fit in softer bearing models.

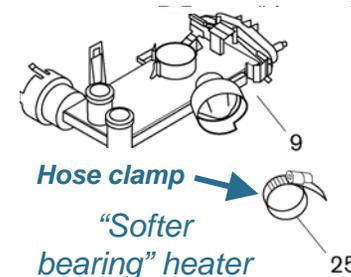


**HINT:** If needed, use rinse-aid to lubricate gaskets to make it easier to assemble heater to sump and pump.

### *Heater assembly    Remove heater screws    Remove heater from sump/pump*

**NOTE:** Softer bearing & non-softer bearing heater assemblies are connected to circulation pumps differently:

- Softer bearing models (UC/11 & above) have gasket assembled to heater and have a separate hose clamp (order # **172272**).
- Older models (UC/06) have a separate gasket and do not have a hose clamp.



**HINT:** Heater assemblies contain NTC's, Hi-Limit's & flow switches (& aqua sensors where applicable). If heaters are replaced, these parts are replaced too.

# Part # 4 -- Heater & NTC (4)

## To remove NTC (from heater):

1. Remove heater assembly -- NTC is located on top of heater assembly.
2. Disconnect wires after noting connections (since NTC & Hi-Limit are included in the same part -- # 165281).
3. Remove NTC cover, pull NTC holding tabs apart and pull NTC out of heater.

**NOTE:** Softer bearing & non-softer bearing heater assemblies, circulation pumps and sumps **cannot** be mixed and matched. Softer bearing heaters don't fit in older models and older heaters don't fit in softer bearing models.



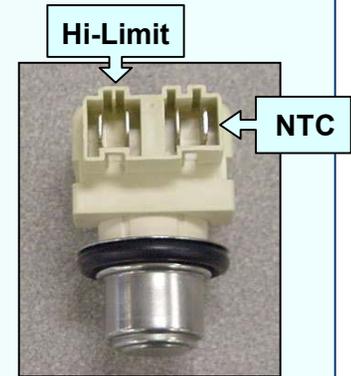
**Disconnect wires**



**Remove cover & pull tabs**



**Remove NTC**



**NTC w/ Hi-Limit**

**NOTE:** To remove flow switch, carefully pry housing away from switch (until tabs clear switch), then snap switch out.

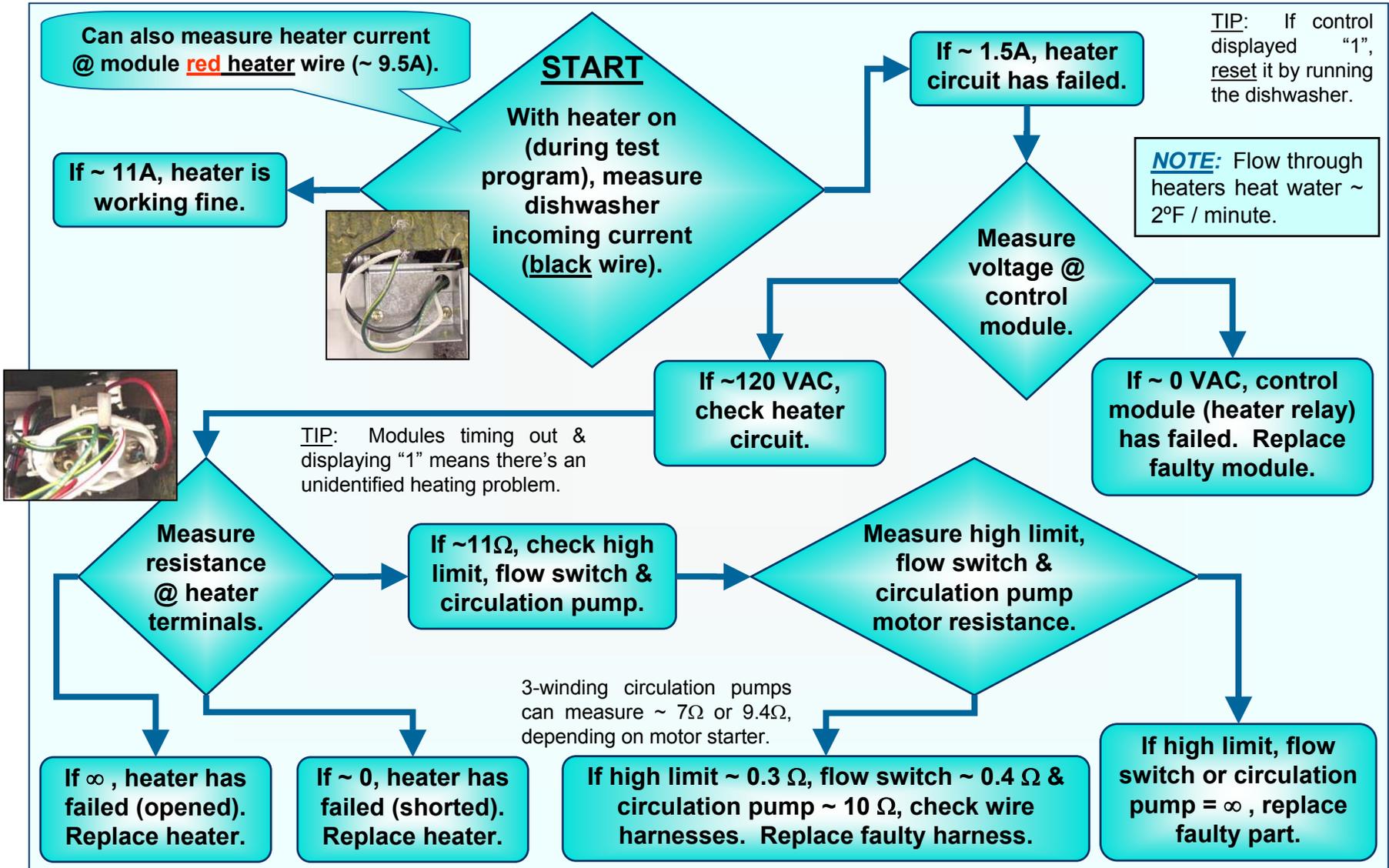


**HINT:** If needed, use rinse-aid to lubricate gaskets to make it easier to assemble heater to sump and pump.

**HINT:** Replacement parts include other parts:

- **Heater assy.** -- includes NTC, Hi-Limit, flow switch (& aqua sensor where applicable).
- **NTC** -- includes Hi-Limit.

# Service Tips -- Heater Troubleshooting Flowchart

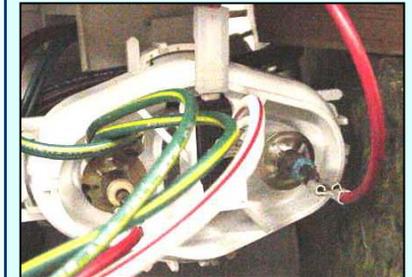


# Service Tips -- Measuring Heater/NTC Resistances (1)

TEST	TIME	NOTES
Entering test program	----	Press <b>On/Off</b> button at the <u>same time</u> you press both the <b>Power Scrub Plus &amp; Regular Wash</b> buttons (SHU/I 43 models) or the <b>Scrub Wash &amp; Delicate/Econo</b> buttons (SHU/I 53 & 68 models). Indicating lights will flash.
Starting test program	----	Press both the <b>Power Scrub Plus &amp; Regular Wash</b> buttons (SHU/I 43 models) or the <b>Scrub Wash &amp; Delicate/Econo</b> buttons (SHU/I 53 & 68 models) a 2nd time.
Skipping a test	----	Press <b>Scrub Wash</b> button (SHU/I 43 models) or <b>Regular Wash</b> button (SHU/I 53 & 68 models).
Draining	30 seconds	Allow dishwasher to drain.
Aqua Sensor calibration	65 seconds	Not on SHU/I 43 models. <u>Skip this test.</u>
Filling	Until water level switch closes	Can't skip this test
Heating & Circulating	Until water reaches 150°F (rises ~ 2°F/minute)	Don't run entire test (to save time) -- when water starts circulating, measure current in main power line to dishwasher. Skip test once current has been measured. If current is ~ 11A, heater, flow switch and Hi-Limit are OK. If current ~ 1.5-2A, turn off dishwasher, remove or block up tank and measure resistance of heater, Hi-Limit & flow switch (see below).
Draining	60 seconds	Last test. To end test program, press <b>On/Off</b> button (all models).

Use dishwasher test program to turn on heater, then measure dishwasher incoming current. If ~ 1.5A, heater, Hi-Limit, flow switch or circulation pump has failed. Check voltage @ module (or timer) -- if 0V, module (or timer) has failed.

For electronic models, current can also be measured through **red heater** wire at control module (~ 9.5A). Since there can be more than one **red** wire, check wiring diagram to select **heater** wire.



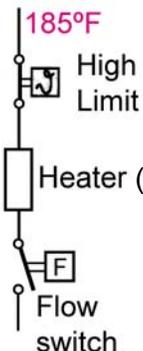
**HINT:** Because the flow switch only closes when water is flowing, the heater resistance can only be measured at the heater terminals (not at the control module).

**NOTE:** Flow through heaters heat water ~ 2°F / minute.

**NOTE:** Open door to run test program for fully-integrated models.



**HINT:** The NTC and High Limit are contained in the same part. When either fails, replace entire part # **165281**.



**NOTE:** Once its found one of these parts is faulty (from incoming current being 1.5 - 2A), check each part (once tank has been removed or blocked up) by measuring its resistance at its terminals:

- **Heater** ~ 11 Ω
- **Hi-Limit** ~ .3 Ω
- **Flow switch** ~ .4 Ω — must remove microswitch from heater housing & close its contacts to measure this. A spring loaded plunger closes microswitch when water is flowing.

# Service Tips -- Measuring Heater/NTC Resistances (2)

## Using test programs for various models (UC/06 - UC/17)

Models	Buttons to Enter Test Program
SHU/SHI430x, SHU431x	Power Scrub Plus + Regular Wash
SHU33/DLX	Power Scrub Plus + Rinse & Hold
SHU43C, SL34A, SHU432x	Regular Wash + Rinse & Hold
SHU53/66C/68, SHI66A/68	Scrub Wash + Delicate/Econo
SHU53A, SHX/SHY56, SL95A	Regular Wash + Quick Wash
SHU88	Power Scrub Plus + Quick Wash
SHU990x, SHV43/48	Power Scrub Plus + Regular Wash
SHU991x (thru UC/11)	Power Scrub Plus + Quick Wash
SHU991x (UC/12), SHU992x	Power Scrub Plus + Delicate/Econo
SHU995x	Regular Wash + Delicate Wash
SHV66A, SHY66A	Scrub Wash + Delicate/Econo
SHV68	Scrub Wash + Regular Wash
GI976/966, GM276	Intensive + Delicate
DW44	Heavy Wash + Light Wash

- To enter test programs, hold down buttons above (2nd & 4th from left), then turn dishwasher on by pushing on/off button. Push buttons above a 2nd time to start test program. Allow program to finish to see fault codes. Turn dishwasher off to exit test program.

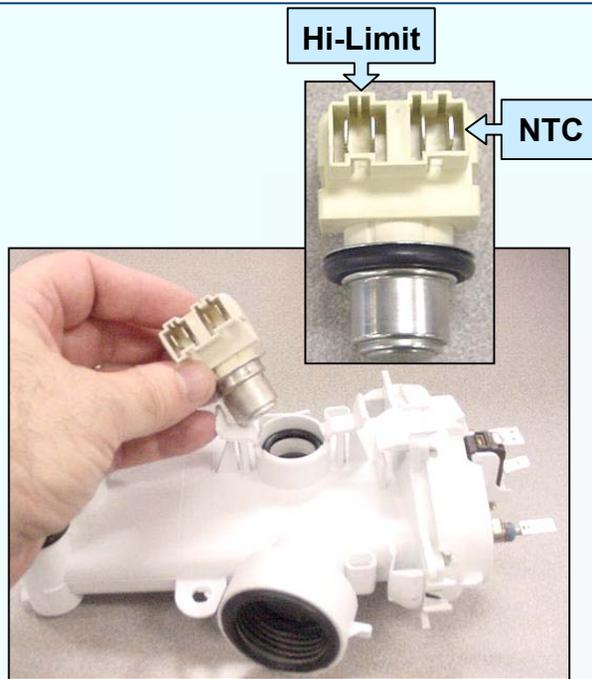
**HINT:** Dishwasher test programs heat water to 150°F, so test programs will generally run > 20 minutes for incoming water temperatures ~ 120°F.

## Using test programs for various models (UC/14 - UC/17)

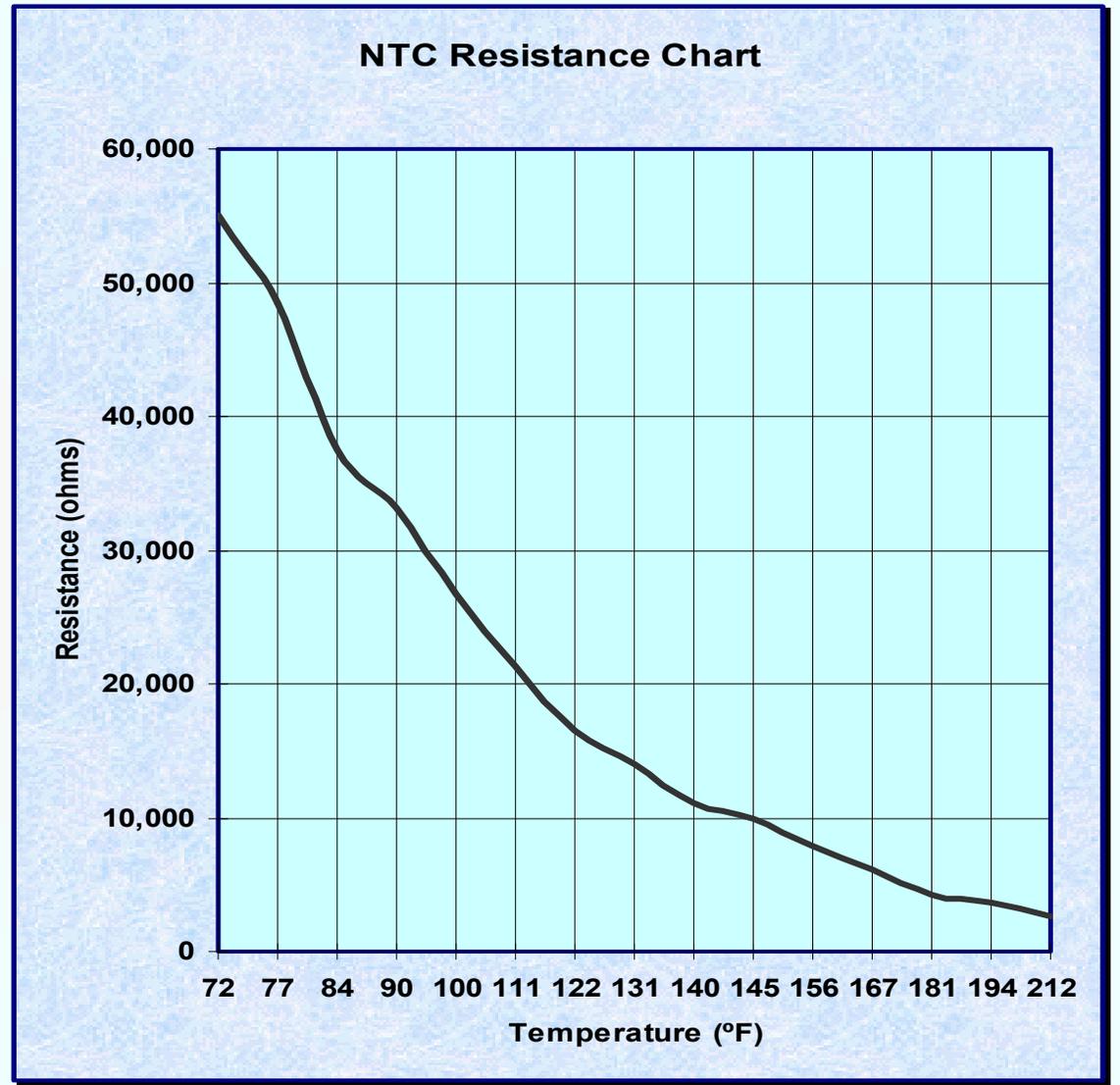
Models	Buttons to Enter Test Program
SHV46C, SL84A, SHX43E/ 46A-B	Regular Wash + Delicate/Econo
SHX33A	Regular Wash + Rinse & Hold
SHU43E/53E/66E	Turn knob (see below) + Start/Stop
SHV99, SHX99, SHY99	(2) left buttons (see below)

- To enter SHV46C, SL84A, SHX33A/43E/ 46A-B test programs, hold down 2nd & 3rd from left of three test program buttons, then turn dishwasher on by pushing on/off button. When in test program, 2nd button light (Regular Wash) will be lit and 3rd button light will flash. Push 2nd button (Regular Wash) to scroll until test program is chosen -- when 3rd button light is lit (.). Push 3rd button to start test program. Allow program to finish to see fault codes. Push 2nd button (Regular Wash) to skip certain steps. Turn dishwasher off to exit test program.
- To enter SHV/X/Y99 test programs, open door, hold down 2 left buttons & turn dishwasher on by pushing on/off button. Press "+" button repeatedly until "S-3-" shows on display, then push start button to check faults on last 8 washes. Close door to begin test program. Allow program to finish to see fault codes. Push "-" button to skip test steps. Turn dishwasher off to exit test program. Choose "S-6-" to clear fault codes.
- To enter SHU43E/53E/66E test programs, 1st rotate knob to 6:00 position (pointing straight down). Hold down Start/Stop button, then turn dishwasher on by pushing on/off button. Push Start/Stop button to start test program. When test program has finished, Clean light light will flash and all other lights will be lit.

# Service Tips – NTC Resistance Chart



Resistance (ohms)	Temperature (°F)
55,000	72
48,409	77
16,542	122
11,067	140
9,859	145
3,713	194
2,665	212



# Service Tips – Replacing Older UC/06 NLA Heaters

Heater assemblies # **264463** (for **SHU3000/4000 UC/06** models) & # **269255** (for **SHU3030 UC/06** models) have been replaced by kits requiring preparing **264463** and # **269255** heater assemblies from # **266662** heater assemblies by replacing thermostats and flow switches.

To create replacement for # **264463** & # **269255** heaters, push latches to remove NTC # **165281**, then replace with thermostat # **168575** (SHU3000 / 4000 UC/06) or # **165384** (SHU3030 UC/06).

**TIP:** To reconnect heater harnesses correctly, note connections before disconnecting old heater or have wiring diagram available.

**NOTE:** **263869** (SHU53/68 models) or **264462** (SHU 33/43/99 models) heater assemblies aren't recommended for conversion since they're needed for popular models with aqua sensors.

**HINT:** Do **not** use softer bearing heater assemblies (UC/11 & later) such as # **480317** on older UC/06 models since the sump, circulation pump, base and heater clamps/gaskets have to be replaced as well for the heaters to fit.

# **168575** thermostat for SHU3000/4000 models

# **165384** thermostat for SHU3030 models

**NOTE:** Kit #'s **264463** and **269255** have all parts for conversions.

**Make sure O-ring is installed.**

**Must** replace 2-terminal # **175711** flow switch with 3-terminal switch # **069796**.

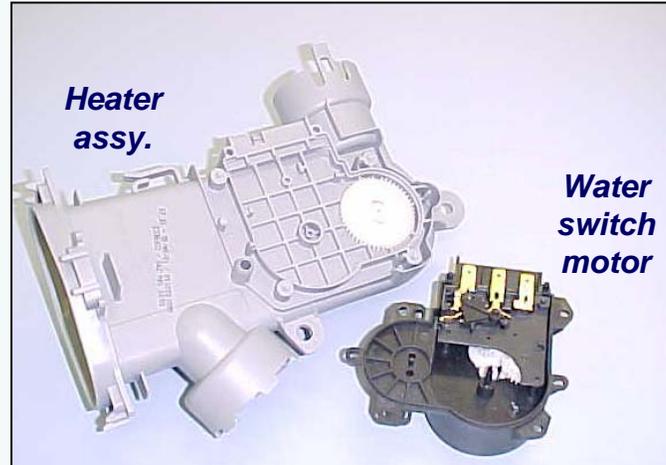
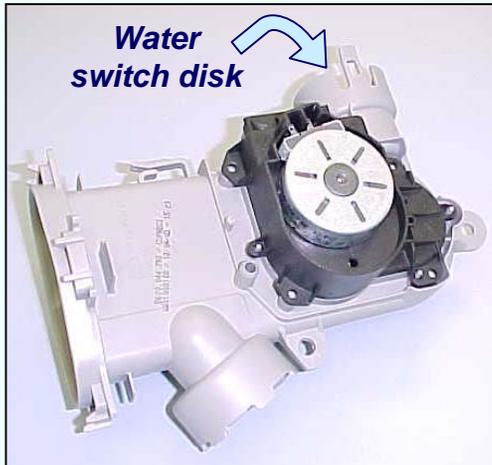
N.C. (to t-stat & water level switch)  
N.O. (to heater)  
C (to timer)  
# **069796**

# **175711**

To replace flow switch, gently pry both sides of housing at top of switch until tabs clear switch, then pull switch out.

# Service Tips -- Water Switch (“Flow Control”)(1)

All **SL95A**, *Apexx* (**SH\_99**, **DWHD94**) & *ExactWash* (**SHX/Y56** & **SHV/Y66**) & model heater assemblies have motor operated water switches inside them, with motors attached where *Top Rack Only* housings have been traditionally mounted (underneath heater assemblies). They consist of a motor-controlled disk (with 3 holes) which rotates to provide precise water flow control -- using both spray arms, upper spray arm only or lower spray arm only.



**HINT:** Models with water switches and *Top Rack Only* use water switches to divert water. No separate actuators are needed.

**HINT:** Models with water switches require stronger circulation pumps (# **437345**) with separate motor starters (# **182318**). Circulation pumps, heaters & sumps for water switch and non-water switch models **cannot** be interchanged.

# Service Tips -- Water Switch (“Flow Control”)(2)

<b>Part description</b>	<b>Old part #</b>	<b>Models used on</b>	<b>Water switch part #</b>	<b>Models used on</b>
<b>Circulation pump</b>	<b>491434 (pump) or 266511 (motor only)</b>	All models (index #'s UC/07, UC/11 & UC/12)	<b>437345 (pump)</b>	All <i>ExactWash</i> & <i>Apexx</i> models (index # UC/14)
<b>Pump motor starter</b>	-----	-----	<b>182318</b>	All <i>ExactWash</i> & <i>Apexx</i> models (index # UC/14)
<b>Heater assembly</b>	<b>Various</b>	Various	<b>219639 or 431412</b>	All <i>ExactWash</i> & <i>Apexx</i> models (index # UC/14)
<b>Sump</b>	<b>263103</b>	All models (index #'s UC/07, UC/11 & UC/12)	<b>482035</b>	All <i>ExactWash</i> & <i>Apexx</i> models (index # UC/14)
<b>Pump support straps</b>	<b>171596</b>	All models (index #'s UC/07, UC/11 & UC/12)	<b>171596</b>	All models (index #'s UC/07, UC/11, UC/12 & UC/14)
<b>Pipe clamp (pump to heater)</b>	<b>172272</b>	All models (index #'s UC/07, UC/11 & UC/12)	<b>172272</b>	All models (index #'s UC/07, UC/11, UC/12 & UC/14)
<b>Pump rear housing</b>	<b>267739</b>	All models (index #'s UC/07, UC/11 & UC/12)	<b>267739</b>	All models (index #'s UC/07, UC/11, UC/12 & UC/14)
<b>Pump front housing</b>	<b>266514</b>	All models (index #'s UC/07, UC/11 & UC/12)	<b>266514</b>	All models (index #'s UC/07, UC/11, UC/12 & UC/14)

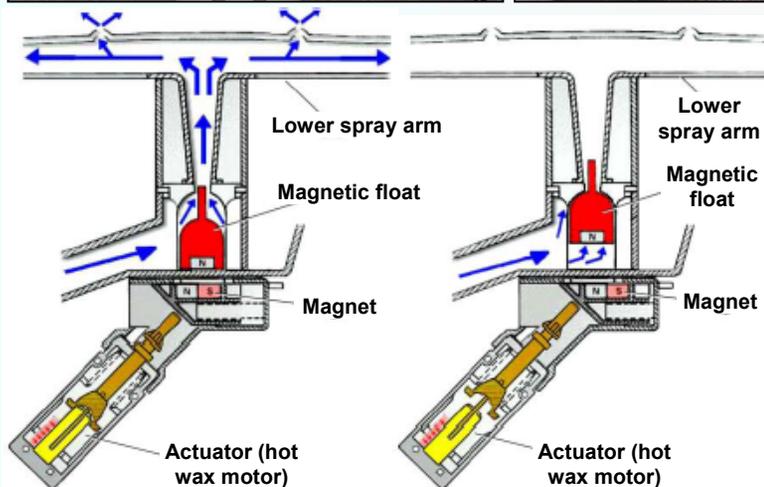
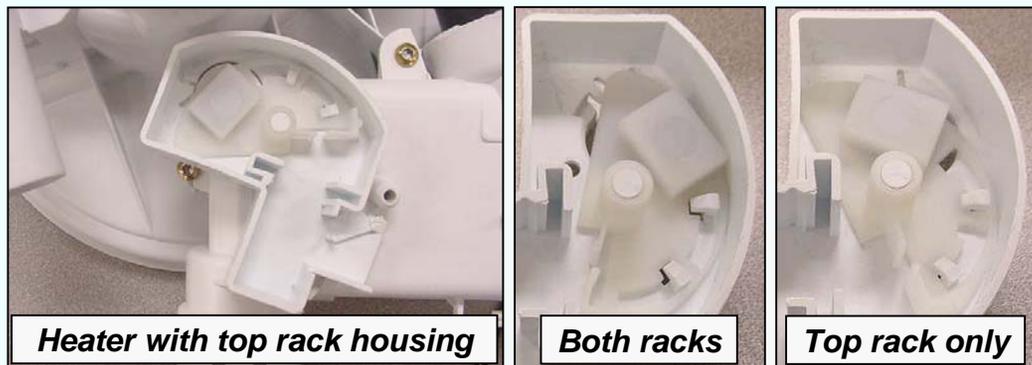
**NOTE:** This affects (*ExactWash* & *Apexx*) models with water switches – **SL95A, SH\_56, SHV/Y66 & SH\_99**.

**NOTE:** Parts can be changed without notice. Please refer to published CD parts lists for up to date part #'s.

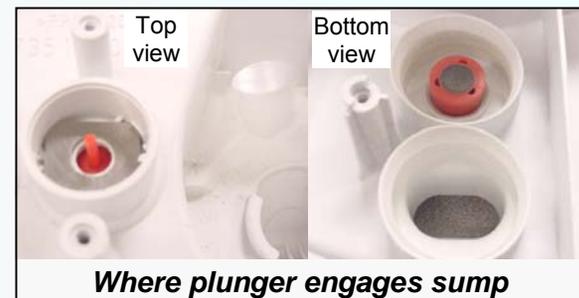
**NOTE:** This does **not** affect (*Sensotronic*) models without water switches. They use the same parts used on models from UC/06 through UC/12.

# Service Tips – Top Rack Only

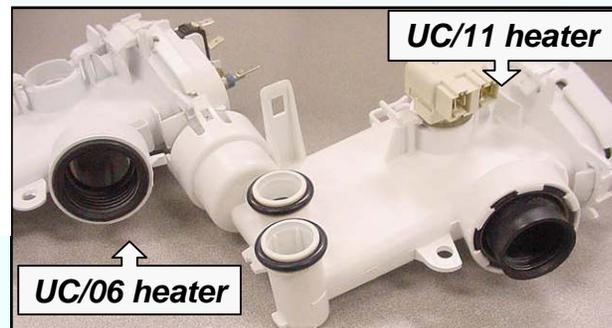
Models with *Top Rack Only* have separate actuators mounted underneath heater assemblies. The actuator moves a magnetic float to block the lower rack port, diverting water to the top rack.



The actuator moves a magnet under the magnetic float so the north poles align, repelling the magnetic float upward until it blocks the water flow to the lower spray arm.



Models with water switches and *Top Rack Only* use water switches to divert water.



**HINT:** Don't use softer bearing heater assemblies (UC/11 & later) on older UC/06 models since sump, circulation pump, base and heater clamps/gaskets have to be replaced as well for heaters to fit.

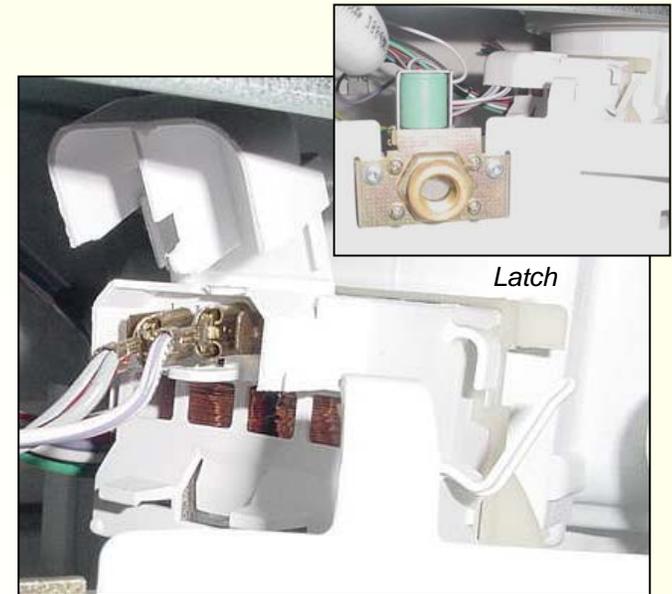
## Part # 5 -- Drain Pumps

Drain pumps are mounted to sumps in the front of dishwashers -- they're easily accessible from the front of dishwashers by removing toe kicks.

### To remove & install drain pump:

*Tools needed: small flat blade screwdriver (for locking terminals).*

- Remove toe kick/base cover, pull up terminal cover and disconnect wires (using screwdriver to unlock locking terminals).
- To remove pump, pull latch (on circular collar) & rotate pump clockwise (cw). To install new pump, insert @ 2:00 position & rotate counterclockwise (ccw).
- Clean water & debris from base, then check float operation.
- Connect wires, then install base cover & toe kick.



**TIP:** Often improper installation issues cause dishwashers to not drain properly, not drain pump problems.

**NOTE:** Drain pump is rated 120V, 60 Hz, 35W, 0.85A.

**NOTE:** Standard 6-vane drain pumps (# **167082**) are quieter and smoother than 4-vane pumps. Drain pumps used in installations (in Washington State) with Johnson Tees must use stronger 4-vane pumps (# **184178**). 4-vane pumps will be slightly noisier, which is normal.



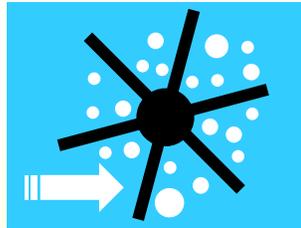
### DRAIN HOSE INSTALLATION TIPS:

- Must have drain hoses with high loops (min. 20" high) or drains with air gaps.
- Drain hoses can be up to 10' long – can add up to 4' to dishwasher hose.
- Secure drain hoses to rear of dishwashers with non-metal bands.
- Make sure drain hoses aren't kinked.

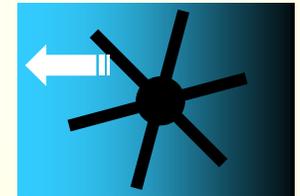
# Service Tips – Improving Pump Flow

Using air gaps or (min. 20”) high loops is crucial to prevent drain pump cavitating and siphoning.

**Cavitating** may occur in any type of pump when impellers spin faster (from low inlet or outlet pressure), creating air pockets around impellers. Cavitating pumps can be noisy. Air gaps/high loops keep water contacting pump outlets, preventing air pockets from forming.



**Siphoning** may occur in any type of drain pump when low water flow allows a siphon (suction) to develop, pulling waste water back into the pump. Sump check valves along with air gaps/high loops prevent siphons from being created.

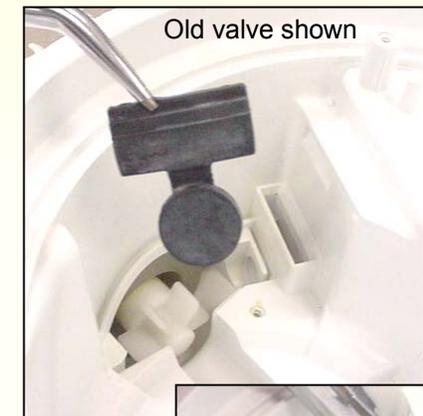


Old cover shown

During mid 2003, drain pump covers were changed to improve water flow and resistance to jamming. Part # is still **165263**.

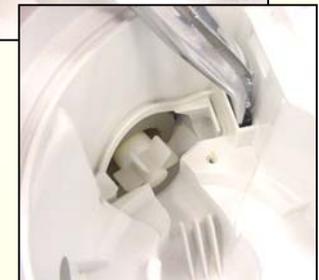


Drain pump performance can be optimized if these parts are replaced when drain pumps are replaced.



Old valve shown

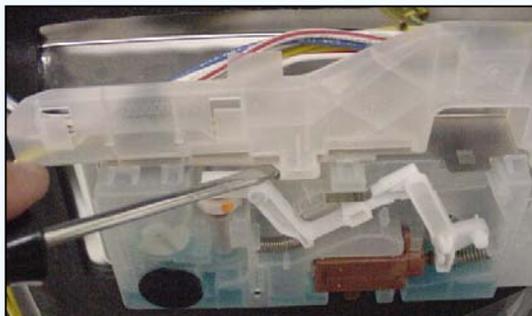
During mid 2003, check (backflow) valves were changed to provide superior leak resistance. The new material is leak proof. Part # is still **165262**.



## Part # 6 -- Dispensers (1)

### ***Disassembly***

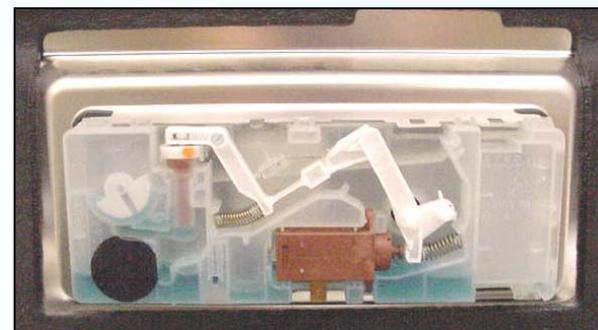
**CAUTION:** Inner door edges are sharp! Cover door edges and remove dispenser carefully.



***Disconnecting wire harness***



***Bending retainer tabs***

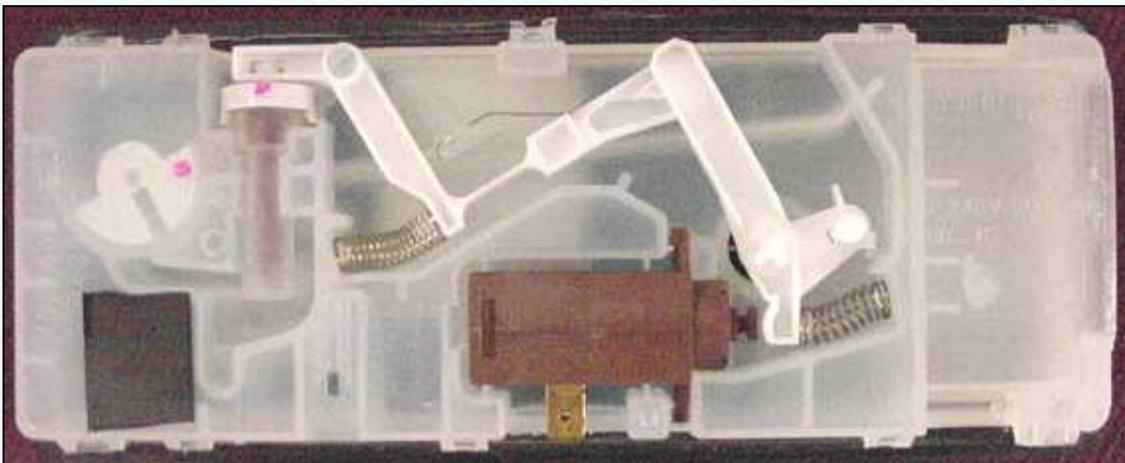


### **HINT: To remove/install dispensers:**

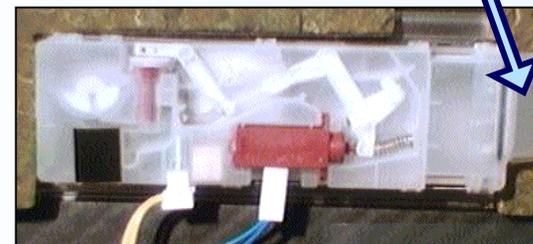
- Remove outer door, remove fascia panel & disconnect wire harness from fascia panel.
- Disconnect wire harness from above dispenser, then remove wires to wax motor & reed switch.
- Disconnect condensation tube (for older models with condensation tubes in doors).
- Remove any tape or wire ties. Bring replacement wire ties for reassembly.
- Bend retainer tabs, then push dispenser inward toward tank. Protect hand with towel as inner door edges are sharp.
- Replace from inside of tank -- position O-ring seal and bend tabs to secure. When replacing dispensers, lubricate O-rings with rinse-aid & support inner doors to avoid damage if O-rings stick.

## Part # 6 -- Dispensers (2)

During each wash program, the wax motor opens twice -- once to dispense detergent and again to dispense rinse-aid. The wax motor opens the same way -- the linkages open the detergent door and operate the rinse-aid dosage plunger. Dispensers can have reed switches or optical rinse-aid sensors.

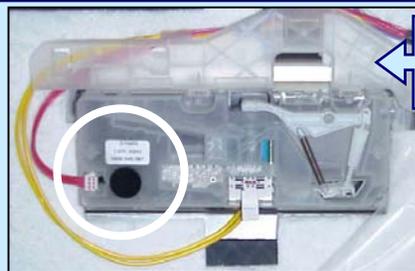


**Condensation tube (for vented dispenser)**



**NOTE:** The white plastic linkage 1st opens the detergent dispenser door, then cocks in place to dispense rinse-aid when the wax motor operates the 2nd time. After the 2nd operation, the linkage resets for the next wash program.

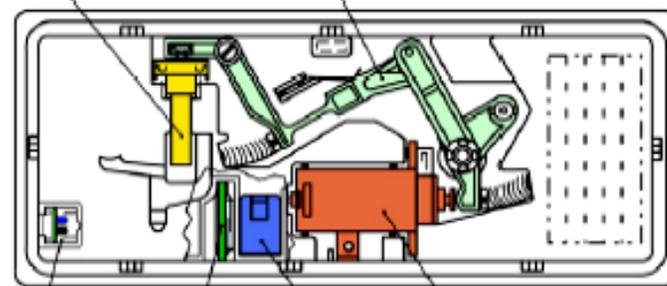
**HINT:** Some models use dispensers with optical rinse-aid sensors instead of reed switches. They have different electrical connections and can't be substituted for reed switch dispensers.



**Cable guide**

**Dosing plunger**

**Linkage**



**Optical sensor**

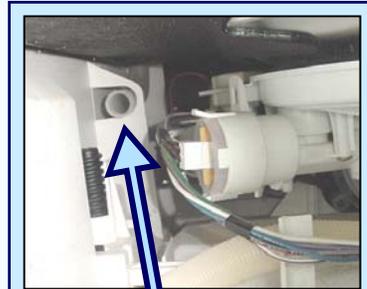
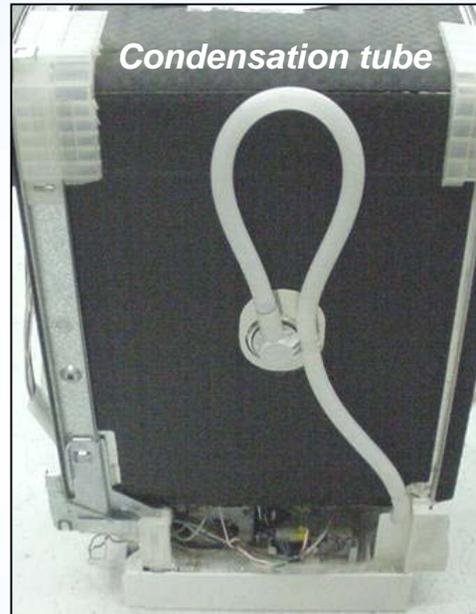
**Reed switch**

**Magnetic float**

**Wax motor**

# Part # 6 -- Dispensers (3)/Condensation Tubes

For UC/12 and later dishwashers, condensation tubes were moved (from dispensers) to the right side of tanks. This required a change from vented dispensers to unvented dispensers.



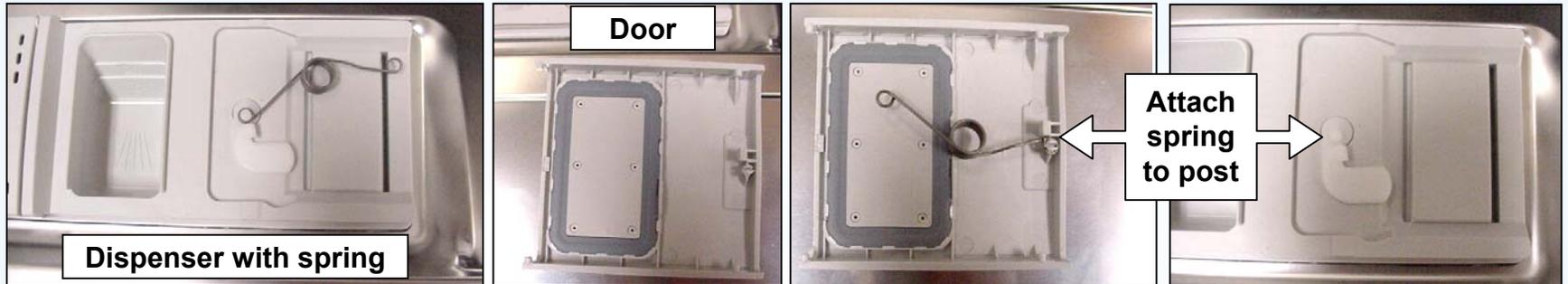
**HINT:** UC/12 model condensation tubes exit in the base behind the sump. There is no drain connection for these tubes.

**HINT:** Vented dispensers cannot be used to replace unvented dispensers. If they are, dishes won't dry properly and there can be water leaking inside dishwasher doors.

**HINT:** There are a limited number of UC/11 dishwashers with condensation tubes in tanks and with unvented dispensers. Treat them like UC/12 dishwashers.

# Service Tips -- Replacing Dispenser Doors

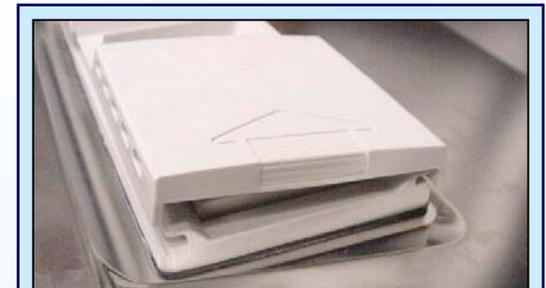
Most dispenser problems occur from dispenser doors being damaged or pulled off (due to misuse). Please follow the instructions below when replacing doors.



1. Connect spring to door & dispenser housing posts.
2. While keeping spring attached to posts, carefully slide door onto housing -- making sure door tabs engage dispenser door rails.
3. Door levers don't need to be preset during installation.



**HINT:** To close dispenser doors, slide doors closed, then push white lever until lever locks (showing doors are closed). Levers don't need to be preset during installation.



**HINT:** Make sure door tabs engage dispenser door rails.

# Service Tips -- Top Load Dispensers (1)

Many high-end models (with digital displays) have top-load dispensers, enabling detergent and rinse-aid to be added while doors are partially open (preferably @ 45°).



**HINT:** Top-load dispensers are mounted similarly to standard dispensers.

**HINT:** Check the Use & Care Manual on changing top-load dispenser rinse-aid dosage using dishwasher controls.

Rinse-aid dosage is shown on the digital display and is changed through the dishwasher controls, not through a dispenser dial.



**Standard dispenser**

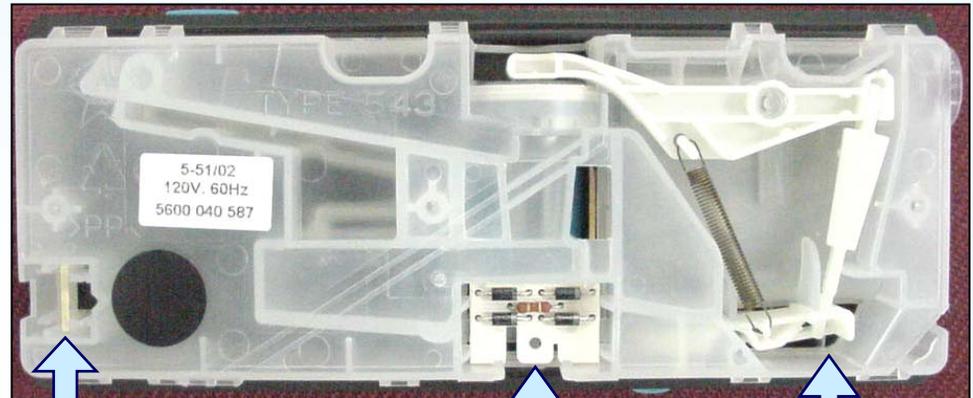
**Top-load dispenser**

**NOTE:** Top-load and standard dispensers are **NOT** interchangeable.

Push onto the **blue** button to release the detergent cup (once the door has been opened).

## Service Tips -- Top Load Dispensers (2)

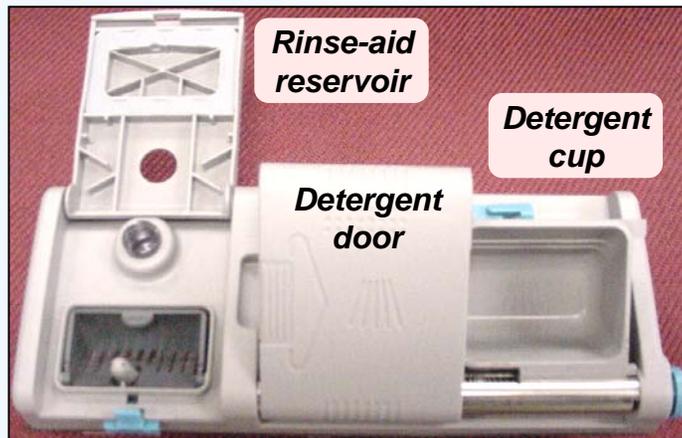
Top-load dispensers measure rinse-aid levels, but not with removable reed switches as with traditional dispensers. The dispensing mechanism also operates differently from traditional dispensers. All top-load dispensers are unvented.



**Rinse-aid level sensor**

**Top-load dispenser actuator terminal**

**Mechanism latches at the bottom of the dispenser**



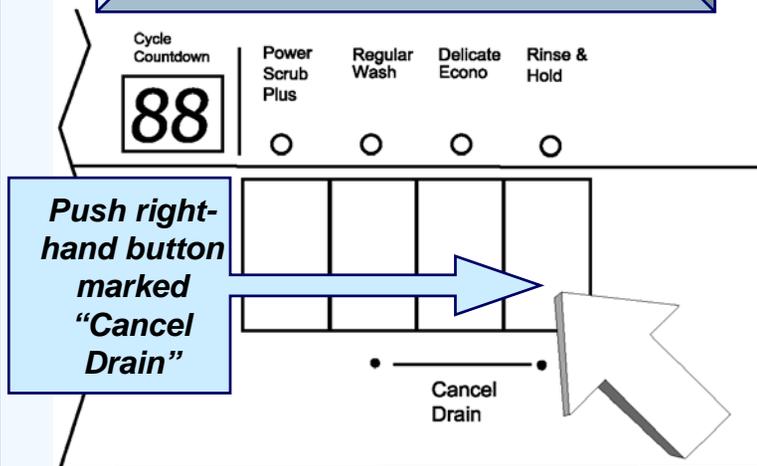
**HINT:** Resistances of actuator and rinse-aid sensor cannot be measured.

# Service Tips -- Top Load Dispensers (3): Rinse-aid Dosage

Unlike with standard dispensers, top-load dispenser rinse-aid dosage is adjusted on the fascia (control) panel. Use these instructions when *Use & Care Manuals* aren't available.

**SHI66A, SHU66C, SHV66A,  
SHX56B, SHY66C**

**SHV99A, SHX99B, SHY99A**



1. While pushing & holding right-hand button marked **Cancel Drain**, push **On/Off** button. Display will show a # from 0 – 6.
2. Push right-hand button again to adjust rinse-aid dosage – higher # to reduce spotting & a lower # to reduce streaking.

1. Open door slightly to access buttons, then push **On/Off** button. Push “**Option**” button **5** times until “**Rinse-aid**” option shows (see above).
2. Push “+” or “-” buttons to adjust rinse-aid dosage: push “+” button to get a higher # to reduce spotting & push “-” button to get a lower # to reduce streaking.
3. If desired, push the **green Main Menu** button once to change other options or twice to start the dishwasher (close the door to begin the wash cycle).

**HINT:** On SHV, SHX & SHY models, open door slightly to access buttons.

## Part # 7 -- Top Ten Dishwasher Cosmetic/Customer Use/Installation Issues

### **Top Ten Cosmetic/Customer Use/Installation Issues:**

1. Not cleaning or locking sump filters....
2. Smelly dishwashers....Often occurs from filters not being cleaned, drain hose high loops missing or drain gases being present. If all else is OK, then problem can be preservative not purged from tank door gasket.
3. Doors leaking or not latching....Usually an installation issue (dishwasher brackets installed before dishwashers are leveled front to back, tanks & doors out of square, wooden doors not drilled accurately). Can be blockage in condensation tubes or having condensation tubes connected to drain hose air gaps.
4. Inner door damage....From upper rack during improper shipping and handling (dishwashers clamped on wrong sides or dropped).
5. Doors hit toe kicks....Toe kick installation issue.
6. Junction boxes....Comes from wires not being connected correctly during installation.
7. Dispensers....Customers using too much detergent, not using rinse-aid & not knowing how to close the door.
8. Drain hoses not installed properly....Often no air gap or high loop + pinched hoses -- causes poor draining & smelly dishwashers. Most drain pumps are mistakenly replaced for drain hose installation issues.
9. Outer doors....Most are dinged during shipment.
10. Damaged water valves....Primarily from fittings being overtightened. A damaged valve can allow some water onto kitchen floors.

# Service Tips -- Water Leaking Past Doors

Water seldom leaks out of bottom of dishwasher doors. Usually it's a customer or installation issue. Occasionally temporary blockages of condensation tubes by air pockets (from standing water in loops) or kinks in tubes causes leaking. Pressure builds in tanks, blowing water past lower door seals (usually at start of cycles). Draining condensation tubes and straightening out kinks solves these occasional problems.

## **Checklist if water leaks past doors:**

- Make sure condensation tubes are inserted into bases, not connected to drains or air gaps.
- Clear and drain condensation tubes, including debris in bases.
- Re-drill wood doors to make them square.
- Straighten kinks in condensation tubes.
- Educate customer on oversudsing (from too much detergent/rinse-aid or overly soft water).
- Level dishwasher before attaching undercounter brackets.
- Replace damaged door seals, including replacements cut too short.
- Refill lower racks overfilled with dishes.
- Move flexible cutting boards to left side of dishwasher.



## Part # 8 -- Door Latches (1)

### Disassembly/ Installation

Other than occasional misalignment, the only door latch repairs will be replacing microswitches on fully integrated models (e.g. **SHV, SHX, SHY, DW44, SHU 88/99, SL84/A95A**, etc.). **SL34A** models also use these door latches.

#### To disassemble door latches for integrated models:

1. Remove T-20 Torx fascia panel screws from inner door.
2. Lower fascia panel from door.
3. Locate door latch in console.
4. Bend out console metal tabs to allow latch removal.

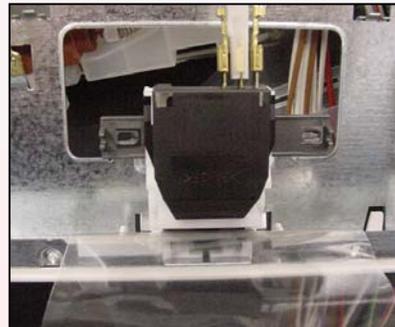
**NOTE:** Door latches for UC/14 & up models are different than UC/06 - UC/12 models -- they cannot be interchanged. Must replace strike plate & door latch together.



**Remove panel screws**



**Lower fascia panel**



**Door latch in console**



**Tabs (inner view)**



**Bend out metal tabs**

## Part # 8 -- Door Latches (2)

### To remove & install door latches for integrated models (continued):

1. Remove door latch from console.
2. Disconnect wire harness, then remove microswitch & cover.
3. Disconnect wires, then remove microswitch from cover.
4. Replace microswitch, then reassemble.

**HINT:** Make sure plastic latch tabs are aligned & metal console tabs are bent back completely during reassembly.



**Remove door latch**



**Remove microswitch**



**Microswitch**



**Replace cover (in slots)**



**Insert latch into tabs**



**Bend tabs back**



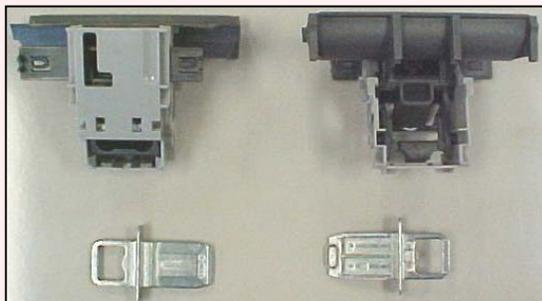
**Replace fascia panel**



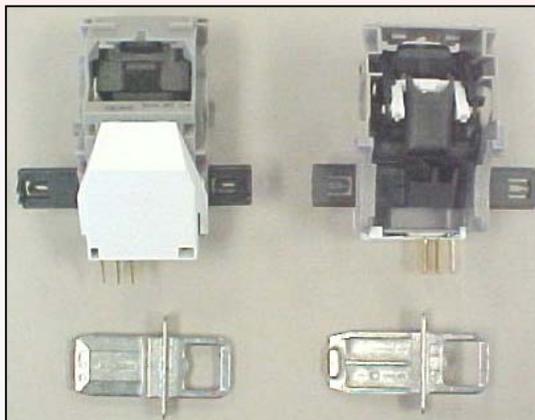
**Replace screws**

## Part # 8 -- Door Latches (3)

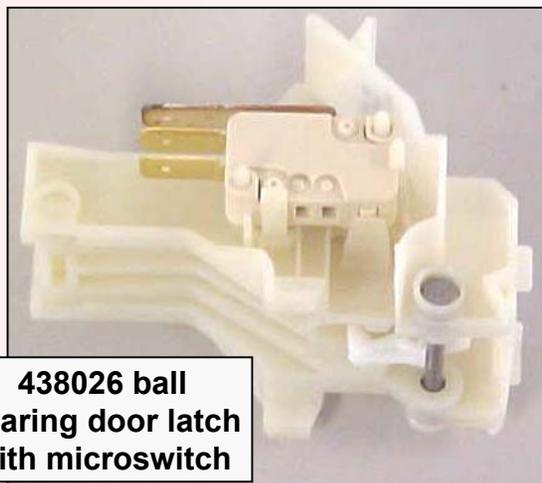
**SHU & SHI** dishwashers have door latches linked mechanically to door switches. All other dishwashers (**SL, SHV, SHX, SHY, SHU88/99, DW44, DWHD94 & GI936**) use electronic door switches (microswitches activated by door latches).



**419827 door latch for SHI/SHU  
(for mechanical linking)**



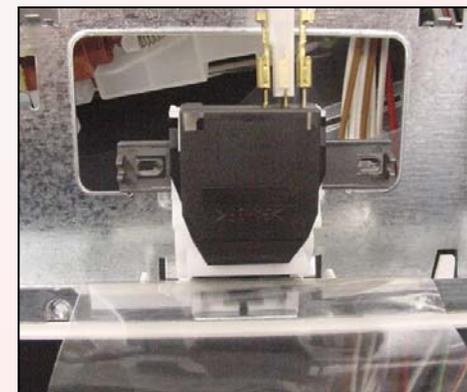
**419828 door latch with  
microswitch**



**438026 ball  
bearing door latch  
with microswitch**

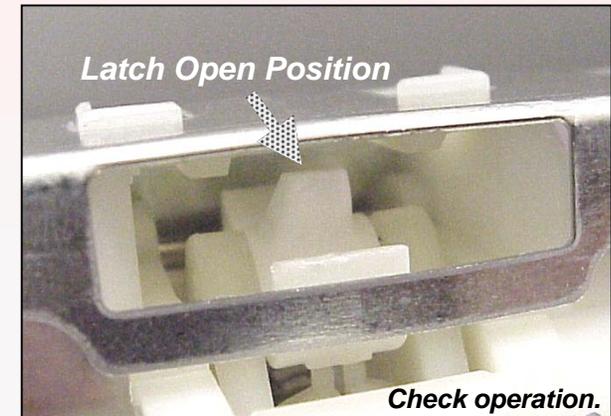
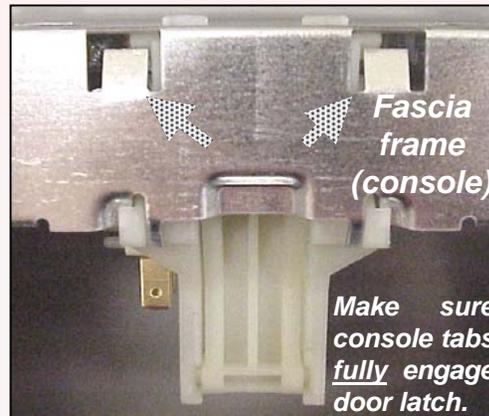
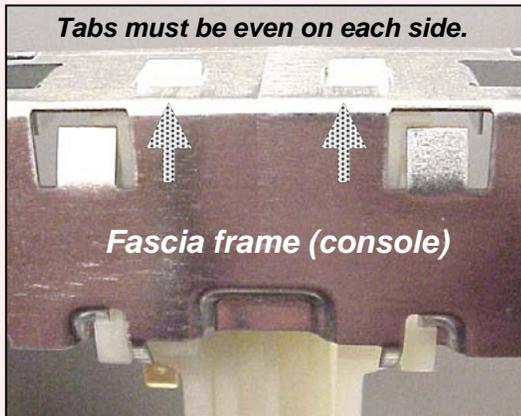


**187184 ball bearing door latch  
with microswitch**



# Service Tips -- Misaligned latches

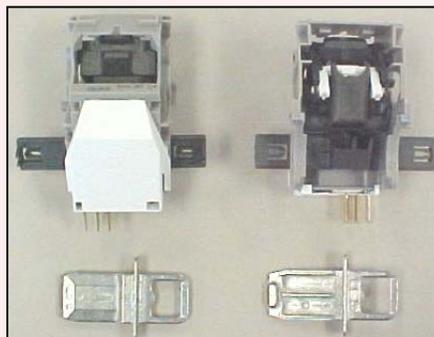
Occasionally integrated dishwasher door latches can be misaligned, causing doors to not close properly or dishwashers to run with doors open (when latches don't reset). Follow these steps to realign door latches.



**Insert latch tabs into frame**

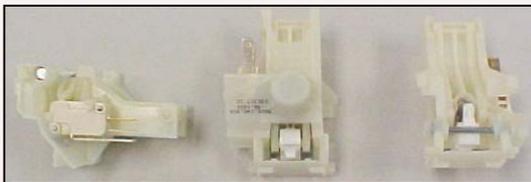
**Bend tabs down into latch**

**Reset latch to open position**



**419828 door latch with microswitch**

**HINT:** Make sure latch tabs are seated, all fascia frame (console) tabs are bent completely, door strikes are aligned with latches and door latches get reset.



**187184 ball bearing door latch with microswitch**

**NOTE:** Integrated dishwashers include the following models: SHV, SHX, SHY, SHU88/99/995x, GI936-760, SL84A/95A & DW44.

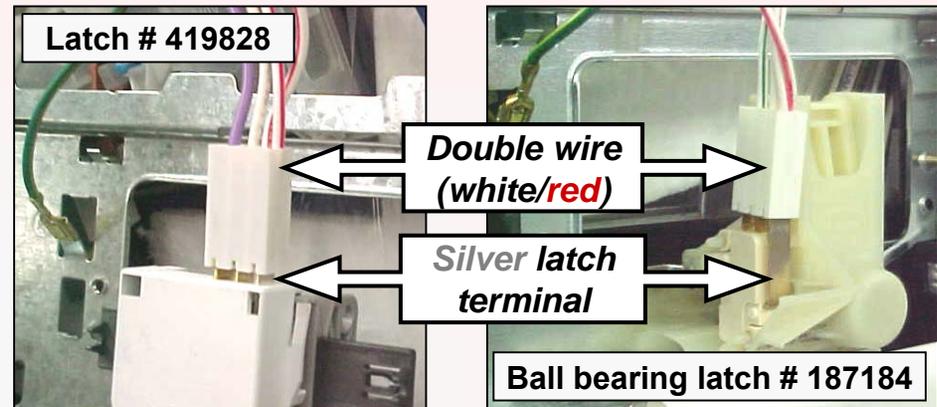
# Service Tips -- Miswired latches

If replacement **SHV46/66**, **SHU995x**, **SHV68**, **SHX33/43/46**, **SHY56/66** or **SL95A** door latches/wire harnesses are miswired (with door latch terminals backwards), dishwashers run with doors open and lights won't turn on when doors are open. Control modules can be irreversibly damaged.



## Rewiring door latches:

- Check wiring to photos at right – the double wire must be connected to the silver door latch terminal.
- With door open, turn on dishwasher – keep door open. If display doesn't turn on, immediately turn off dishwasher and reverse door latch terminal.



**CAUTION:** Operating dishwashers with miswired door latches will cause **irreversible** damage to control modules if doors have been closed and circulation pumps have started – modules must be replaced. Check door latch wiring whenever door latch terminals are changed or disconnected or when displays don't light up when dishwashers are turned on.

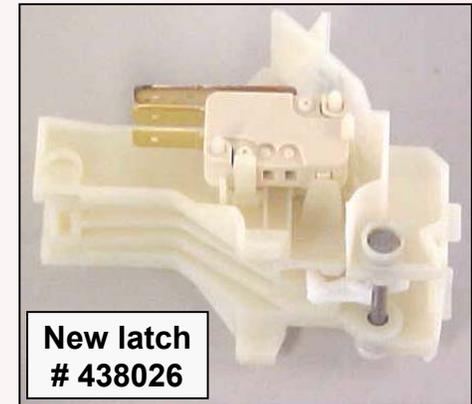
**IMPORTANT:** If dishwashers with miswired door latches are corrected before doors are closed and circulation pumps started, modules can still be used. If displays don't light up, turn off dishwashers and reverse door latch terminals before modules are damaged.

# Service Tips – Using 438026 door latch & 494772 door seal

On 1/20/04, door seals and integrated door latches were changed to make doors even easier to open and close. Specifically this meant using new door seal **494772** and new door latch **438026** (instead of door latch **187184**). The new door seal **494772**, softer for use with door latch **438026**, is to be used for all door seal replacements.

## **Replacing integrated dishwasher door latches & all door seals:**

- Always replace **187184** door latch with a **187184** door latch (don't use **438026** door latch to replace a **187184** door latch).
- Replace **438026** door latch with a **438026** door latch. **187184** door latch can work, but will make doors harder to open and close.
- Use **494772** for all door seal replacements (**263096** was superceded by **494772**).



**New latch  
# 438026**



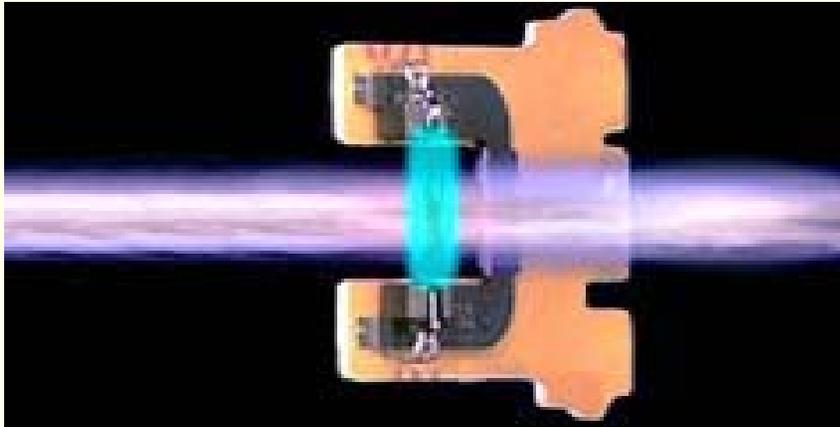
**Old latch  
# 187184**

**CAUTION:** Replacing older **187184** door latches with newer **438026** door latches without replacing door seals with **494772** door seals as well can cause doors to not latch properly.

**TIP:** Use new **494772** door seals for those occasional dishwashers with an odor. Their preservative won't generate odors.

## Part # 9 -- Aqua Sensors (1)

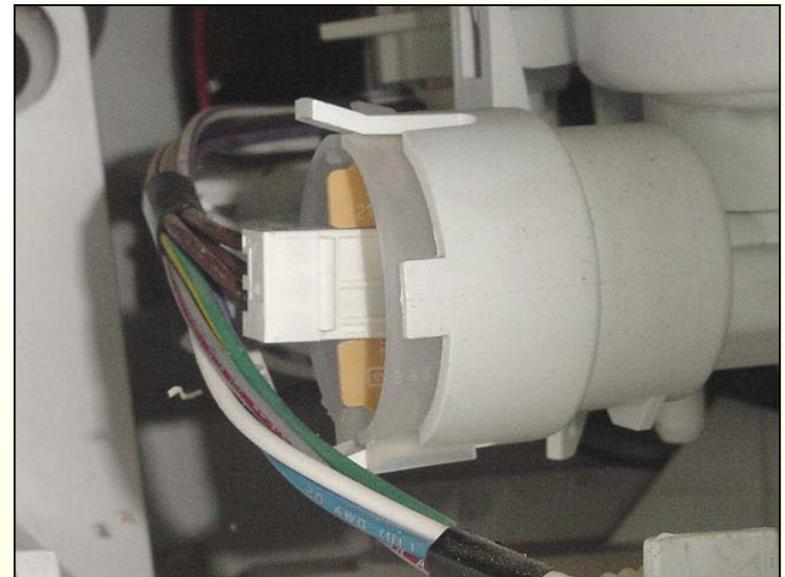
The aqua sensor only affects energy usage, eliminating a pre-wash and/or pre-rinse cycle if water is clean. Most customers won't notice the difference if an aqua sensor fails.



**NOTE:** If pre-wash water is clean enough, it will be kept for the wash cycle. Similarly, if pre-rinse water is clean enough, it will be kept for the final rinse. If not, the aqua sensor directs the dishwasher to add an additional pre-wash or pre-rinse cycle.

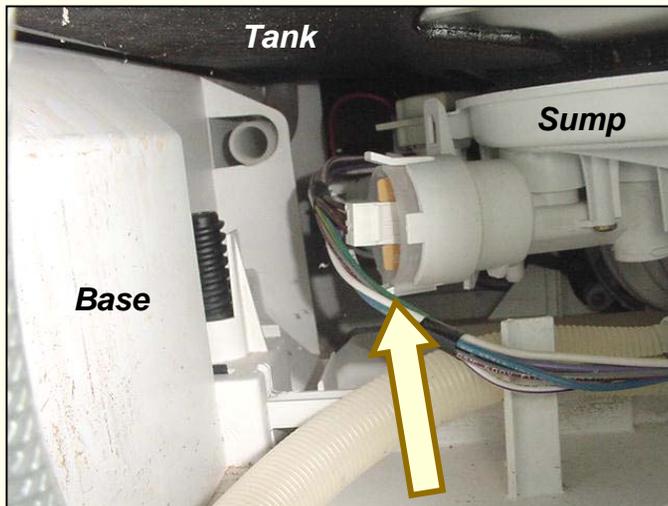
**HINT:** Customers will only notice aqua sensors failing if they see their dishwashers running slightly longer or their electric and water usage getting slightly higher.

**NOTE:** Aqua sensors provide ~ 20% energy savings.



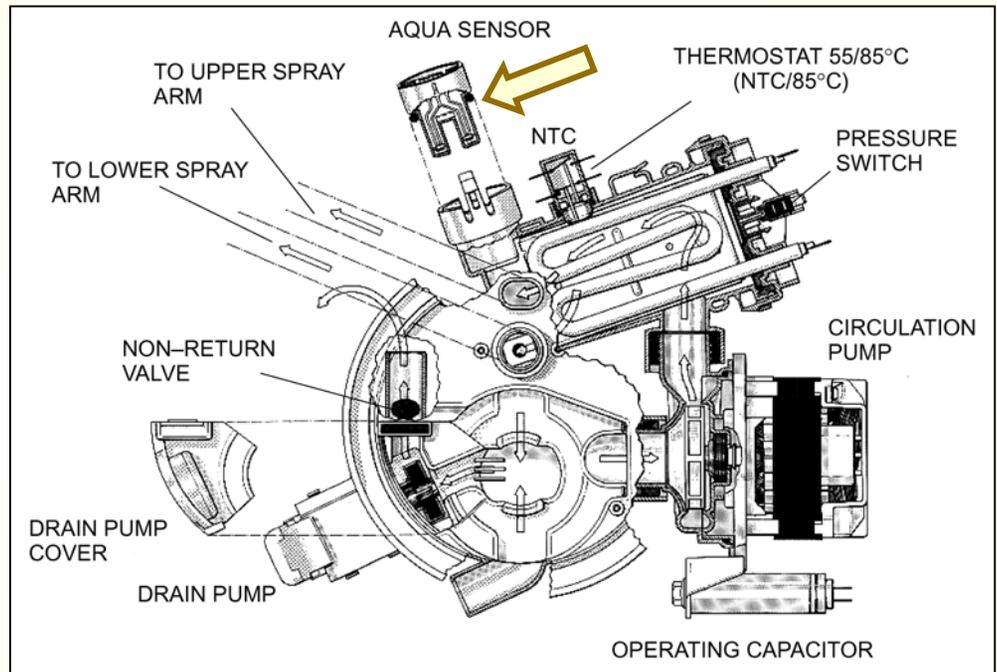
## Part # 9 -- Aqua Sensors (2)

The aqua sensor is located on the rear of the sump. It can be reached through the left side of the dishwasher (after the left side panel is removed – see page 20). Its not necessary to block up the tank to reach the aqua sensor.



**HINT:** To change out the aqua sensor, pull off the connector and pull out the aqua sensor (toward the rear of the dishwasher).

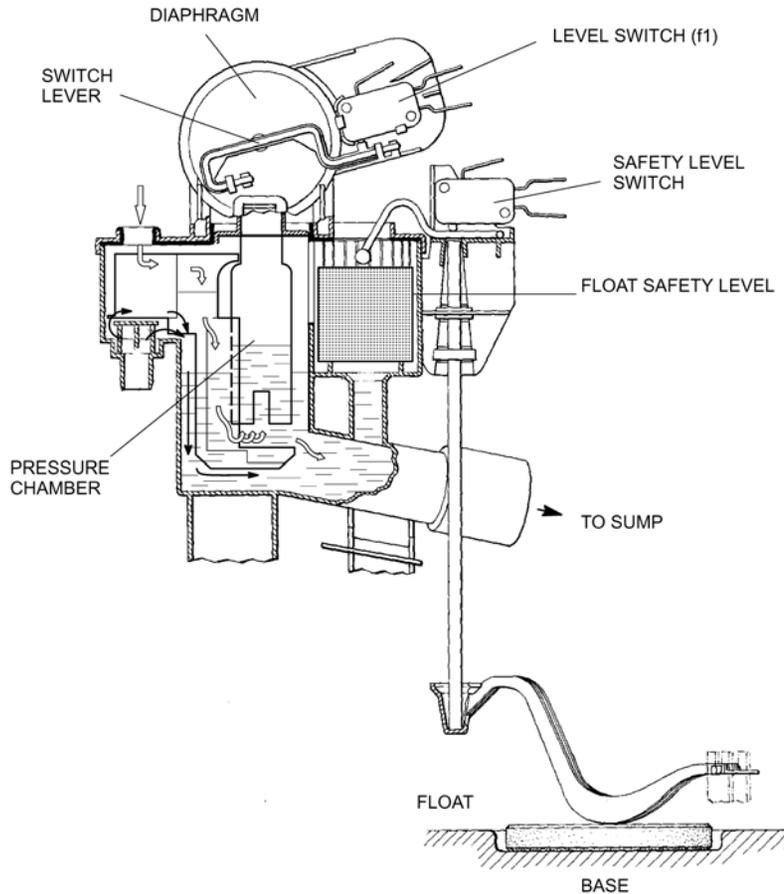
**NOTE:** The *Apexx Sensotronic 2* aqua sensor # **175340** is similar to standard aqua sensor # **165279**, except it has two (red & green) soil sensors. They mount the same way, but are **not** interchangeable.



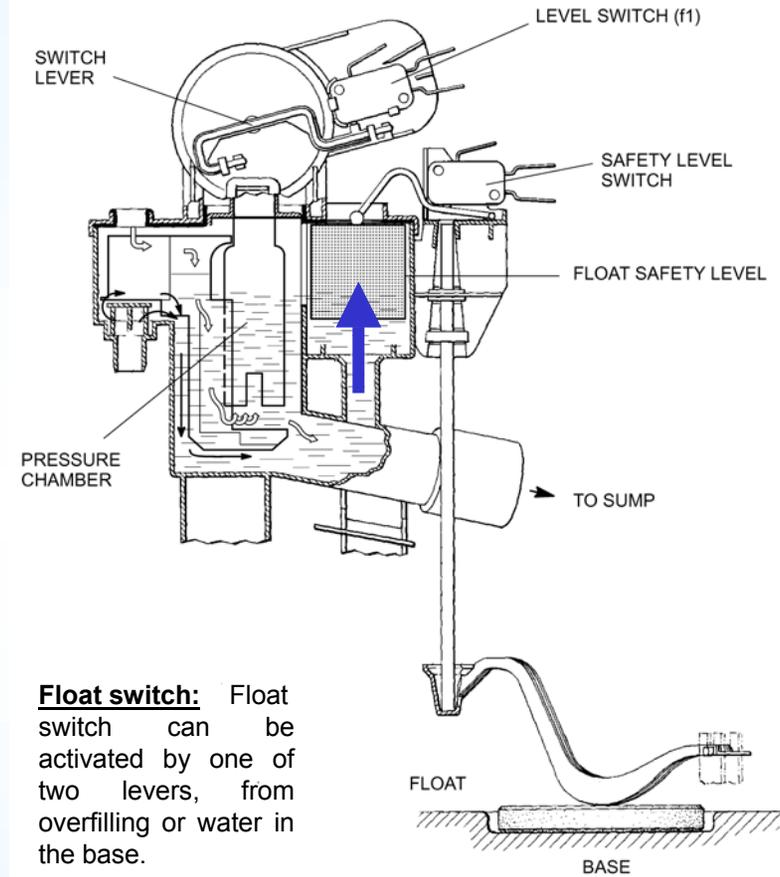
**HINT:** The aqua sensor slides into slots in the sump. Make sure the aqua sensor is properly inserted into the slots.



# Part # 10 -- Water Fill Assembly (2)



**Normal fill:** Water rises to proper level, pushing air in pressure chamber which operates diaphragm.



**Float switch:** Float switch can be activated by one of two levers, from overflowing or water in the base.

**Overfill:** Water rises too high & operates float switch, causing drain pump to remove water from sump.

# Miscellaneous Service Tips – Repairing SHV66A/99A, SHX56B/99B & SHY56A/66C/99A Dishwashers (FD # 8310 & earlier): (1)

Whenever working on **SHV66A/99A**, **SHX56B/99B** & **SHY56A/66C/99A** dishwashers built on or before October, 2003 (FD # 8310 and earlier) for any reason, please also perform the following repairs.

1. **If the pump works**, check ratings on rear of pump motor (see photos below & tech hints on page 100). If pump motor shows # “**5600.060022**” (service # **437345**), pump is OK. If pump motor shows # “**5600.050139**” (service # **239129**), verify motor starter shows # “**041692**” (service # **423023**) by removing starter and turning it upside-down (see photos below). If motor starter shows # “**036906**” (service # **182318**), replace it with starter # **423023**. See page 99 for motor starter installation instructions.

**If the pump has failed**, replace both pump and pump motor starter with pump # **437345**, which includes motor starter # **182318** packed with it.



2. **Check door latch and realign if necessary** (see page 100). Access door latch by removing outer door and fascia panel.

# Miscellaneous Service Tips – Repairing SHV66A/99A, SHX56B/99B & SHY56A/66C/99A Dishwashers (FD # 8310 & earlier): (2)

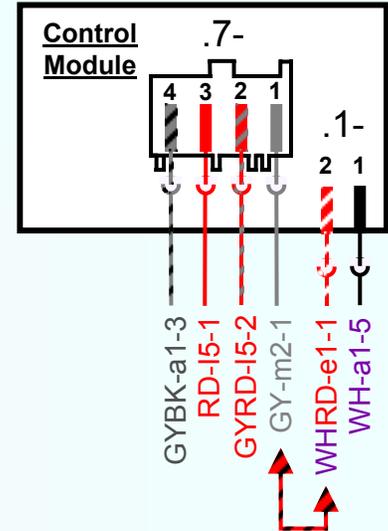
**TECH HINTS:** Checking pump motor & motor starter #'s requires pulling out dishwashers & removing right side panels. To save time working on **SHV66A**, **SHX56B** & **SHY56A/66C** models (since fascia panels must also be removed to check door latch alignment), measure pump resistance at control module – between white/red wire (2<sup>nd</sup> from right) & gray wire (3<sup>rd</sup> from right). Close door or trip door latch before measuring resistances.

- If resistance ~ 9.4Ω, motor & starter are OK.
- If resistance ~ 7Ω, pull out dishwasher and check pump motor & motor starter #'s as shown in #1 on previous page.

Motor Terminals	Motor Only	With Starter # 182318	With Starter # 423023
1-3	14.3Ω	7Ω	9.4Ω
1-4	8.7Ω	6.2Ω	7Ω
2-4	22.4Ω	3.5Ω	9.9Ω

<b>Starter # 182318</b>	4.7-4.8Ω
<b>Starter # 423023</b>	16.8Ω

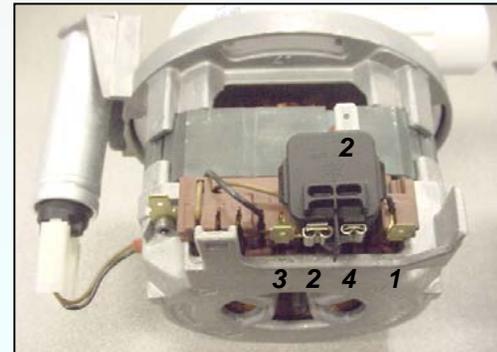
**Resistance Readings  
at Motor Terminals:**



## Installing circulation pump motor starters:

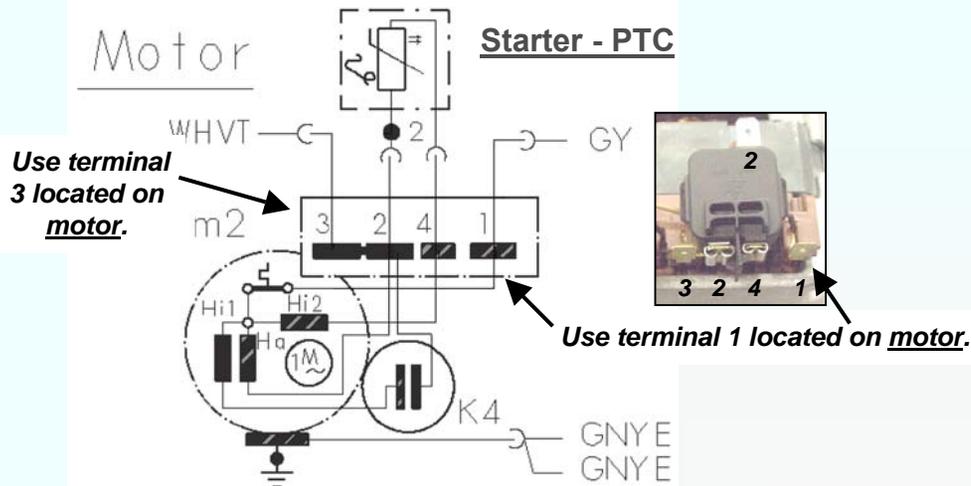


To install (PTC) motor starters, push female terminals over pump motor terminals 2 & 4. The terminals are different sizes to match the smaller motor terminal 4.



**HINT:** (PTC) motor starter is located on top of the pump motor – install it with terminal 2 facing inward (as shown above).

# Miscellaneous Service Tips – Repairing SHV66A/99A, SHX56B/99B & SHY56A/66C/99A Dishwashers (FD # 8310 & earlier): (3)



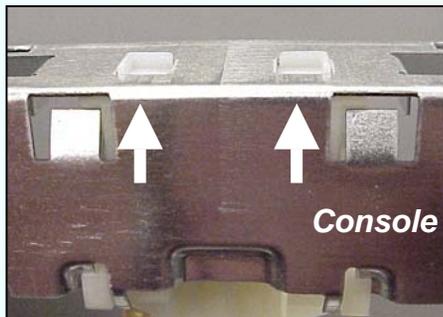
## **HINTS:** Identifying circulation pumps & motor starters:

- Circulation pump # 437345 – # “5600 060022” on housing (on rear of motor).
- Motor starter # 182318 – # “036906” on housing.
- Circulation pump # 239129 – # “5600 050139” on housing (on rear of motor).
- Motor starter # 423023 – # “041692” on housing.

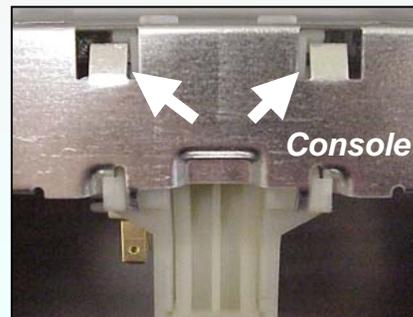
**NOTE:** Circulation pump # **437345** includes motor starter # **182318**. When replacing any pump, **always** replace the motor starter as well.

## **Realigning door latches:**

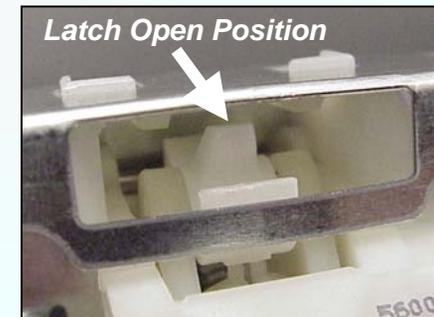
Occasionally dishwasher door latches can be misaligned, causing doors to not close properly or dishwashers to run with doors open (when latches don't reset). Please follow these steps to realign door latches.



**First:** Insert latch tabs into frame, insuring they're even on each side.



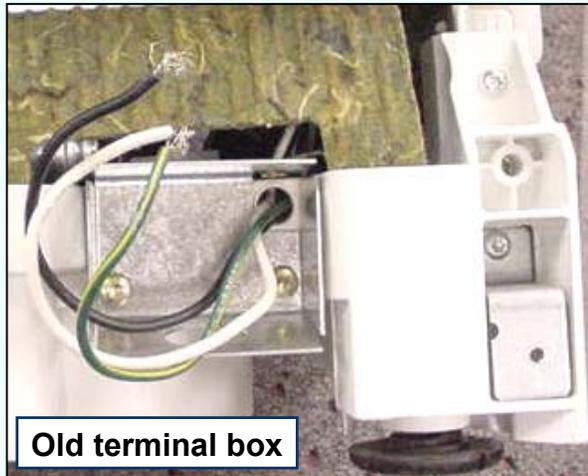
**Second:** Bend console tabs into door latch until they're fully engaging it.



**Third:** Reset latch to the open position and check for proper operation.

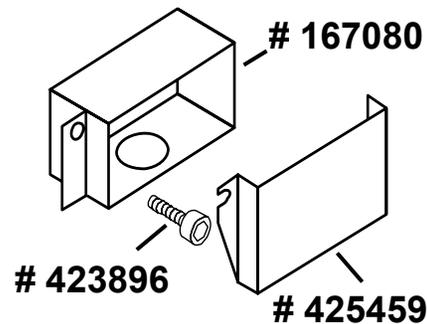
# Miscellaneous Service Tips – Terminal Box Covers

Since 9/23/02, all dishwashers have terminal boxes (“junction boxes” / “J-boxes”) with covers. Boxes were upgraded to new larger style (with conduit exits) on 3/18/03.

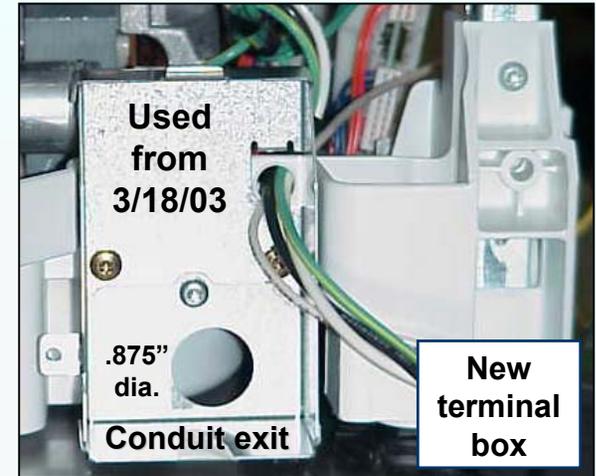


Old terminal box

Used from 9/23/02 – 3/17/03.



Old terminal box with cover



New terminal box

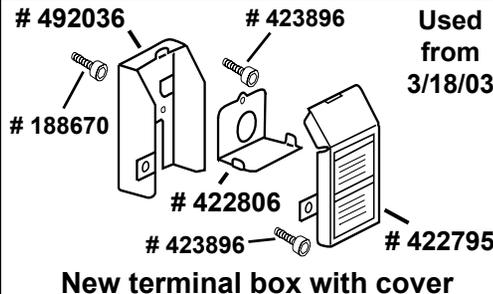
**TIP:** Proper installation requires strain relief on power cords/conduit! Use 3/8” or 1/2” fittings with .875” diameter.

New box with cover



Used from 3/18/03

New box with cover



New terminal box with cover

**NOTE:** Old terminal boxes built before 9/22/02 met UL standards – toe kicks were approved as terminal box covers. There’s no need to change out old terminal boxes. Covers can’t be added to these boxes since they don’t have cover screw holes.

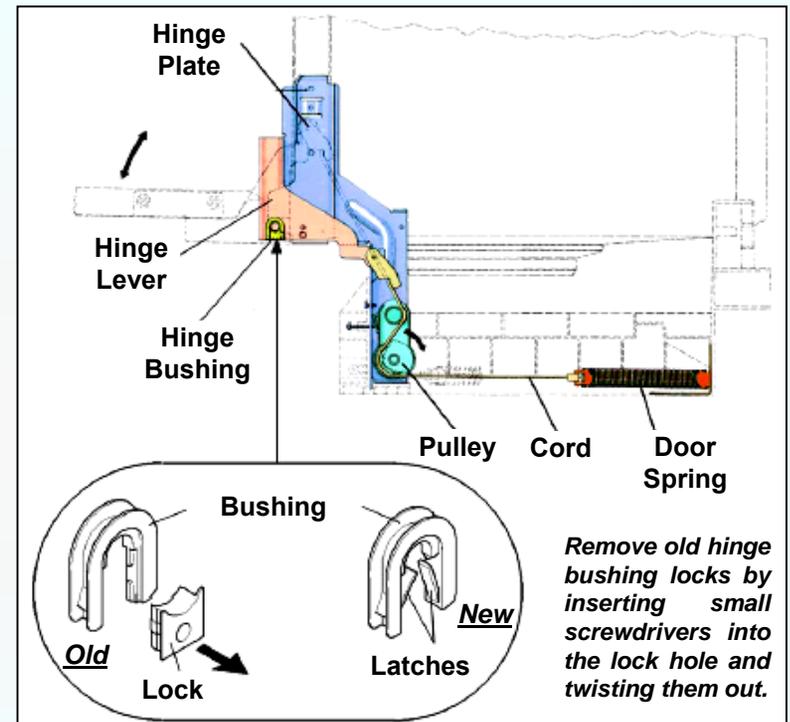
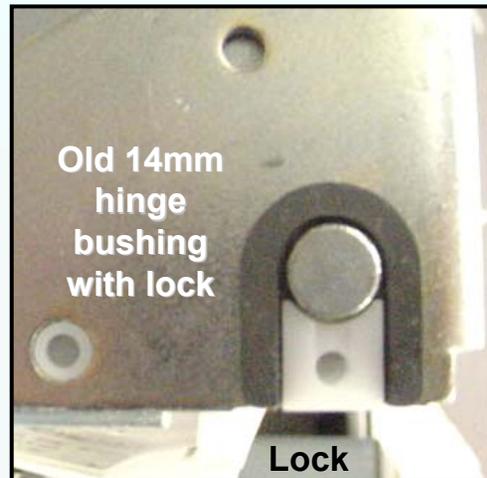
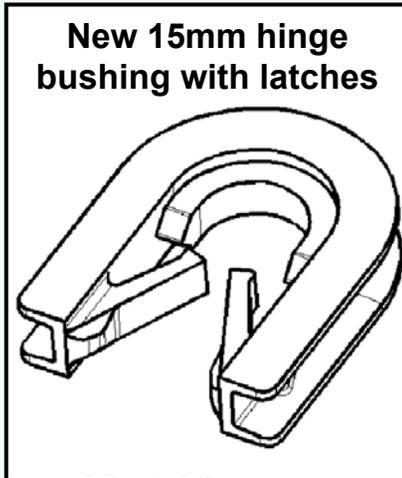
**NOTE:** Power cords entered bottom of old terminal boxes & rear of new terminal boxes.

**NOTE:** SHU68 46dB models used terminal box covers since 2/28/00.

**NOTE:** Replacement 167080 J-boxes have cover screw holes.

# Miscellaneous Service Tips – Hinge Levers & Bushings

Since 12/15/03, all dishwashers have upgraded hinge levers and hinge bushings. New hinge levers and bushings can't be used with old bushings and levers – must replace levers and bushings together.



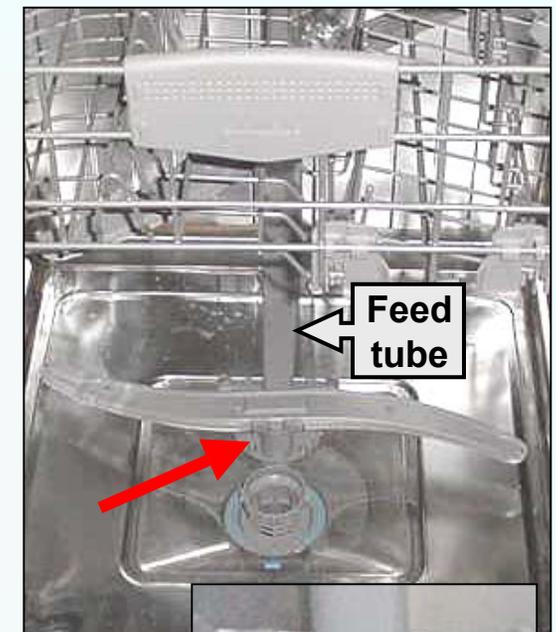
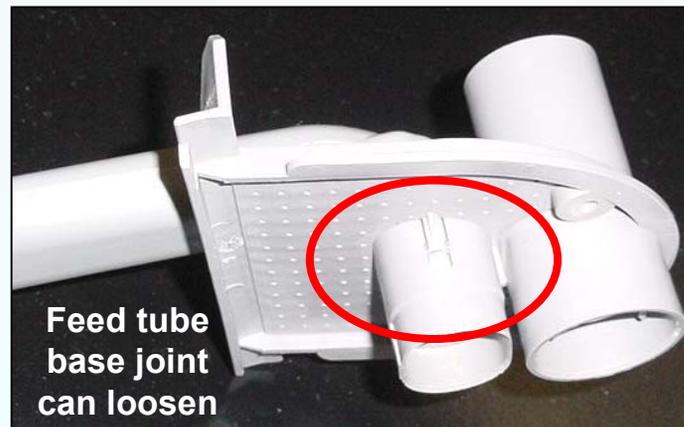
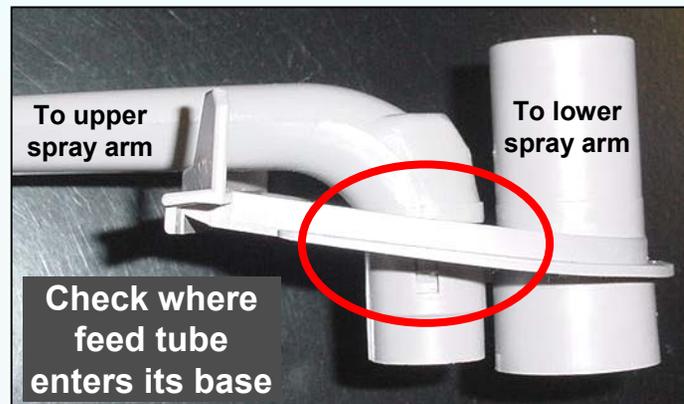
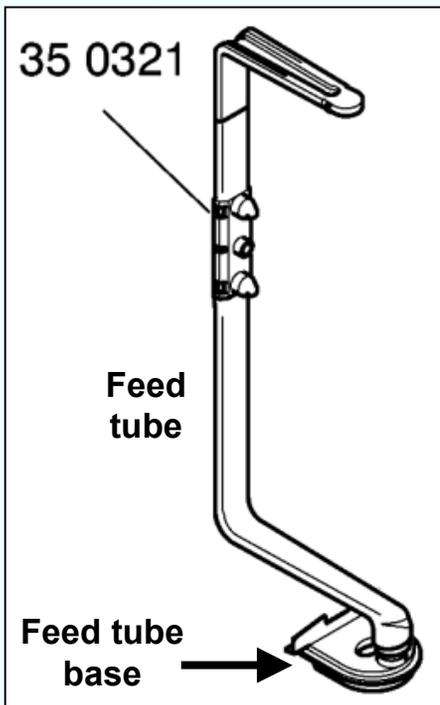
**NOTE:** When new 15mm hinge bushings (with latches) are opened, replace them instead of reusing them.

**TIP:** Unlike old hinge bushings, new hinge bushings are self-locking and don't need separate locks. To remove doors when new hinge bushings are used, spread latches apart until door pins clear latches.

**NOTE:** New and old hinge levers and bushings can't be mixed and matched since new hinge levers have 15mm holes to fit new hinge bushings and old hinge levers had 14mm holes for old hinge bushings (and locks).

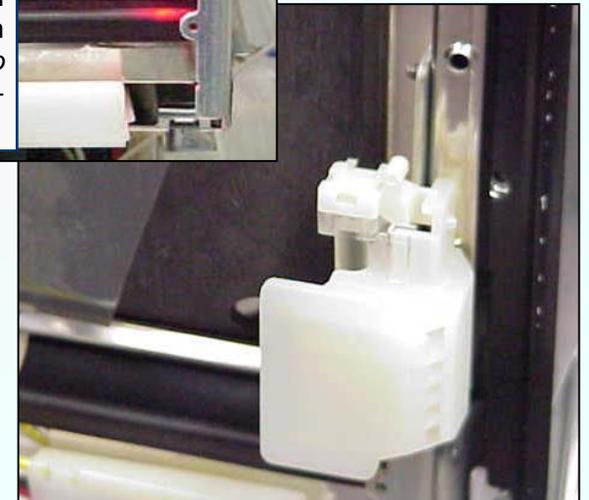
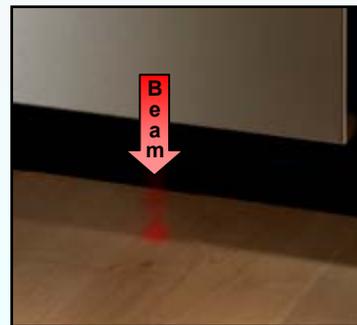
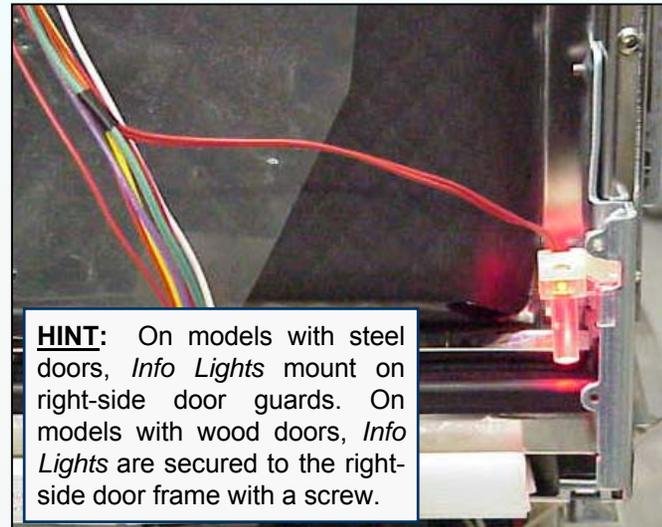
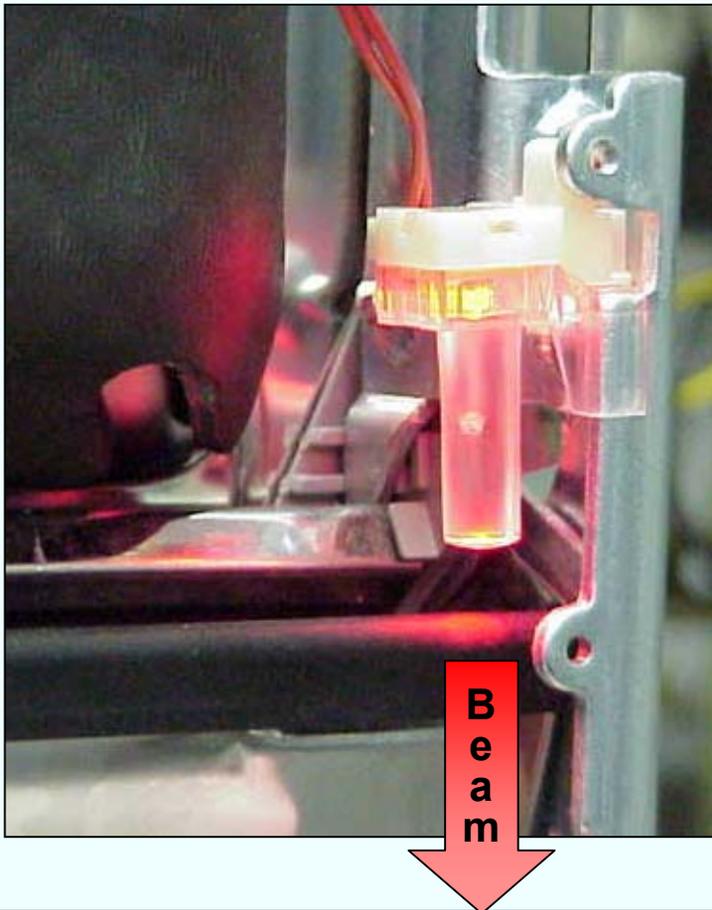
# Miscellaneous Service Tips – Spray Arm Feed Tubes

When water doesn't spray from upper spray arms, check feed tube (350321) where it enters the sump. Occasionally, the joint between the feed tube and its base can loosen -- the entire feed tube must be replaced.



# Miscellaneous Service Tips – Info Lights

**SHV99A13, SHX99A15 & DWHD94** models have *Info Lights*, which shine a **red** light onto floors, letting customers know their quiet dishwashers are running. When dishwashers finish wash cycles, *Info Lights* shut off.



## Miscellaneous Service Tips – Ratings

- **Dishwasher ratings** – Dishwashers are rated 120VAC, 60 Hz, 15A, 1450W (max.). Maximum amp draw when heaters running ~ 11A.
- **Heater ratings** – 120VAC, 1200W, flow-through, heats water ~ 2°F / minute.
- **Noise level** – Dependent on model, from 44 db – 56 dB.
- **Circulation pump ratings (two-winding motor)** – 120VAC, 60 Hz, 160W (~ .21 HP), insulation class A, with auto-reset thermal protector, 10 $\mu$ F capacitor.
- **Drain pump ratings** – 110 - 127 VAC, 60 Hz, 35W, .84A, 17 $\Omega$ , 6-vane (4-vane pump has same ratings).
- **Water inlet pressure range** – From 5 – 120 psi (.3 – 8.27 bar).
- **Circulation pump flow rate** – Approximately 60 liters/minute (~ 15.85 gallons/minute) at a pressure of 420 mbar (6.1 psi).
- **Drain pump flow rate** – Approximately 10 liters/minute (~ 2.64 gallons/minute) at a delivery height (head) of .9m (2.95’).
- **Water inlet valve flow rate** – Approximately 2 liters/minute (~ .5 gallons/minute).

## Miscellaneous Service Tips – FAQ's (1)

- **Dimensions** – 33-7/8” H x 23-9/16” W x 22-7/16” D (86.0 cm x 59.8 cm x 57.0 cm). Depth dependent on model (greater depth with door handle).
- **Cutout dimensions** – 23-5/8” - 24-1/8” (600 - 613 mm) H x minimum 33-15/16” (862 mm) W x 22-7/16” (570 mm) D.
- **Cabinet fitting** – Fits European cabinets (as is) and American cabinets (with trim strips provided with every unit).
- **Drain hose** – Extends 6’ beyond dishwasher (7’ long total). Can add up to 4’ extension (total hose length up to 10’ beyond dishwasher).
- **Drain hose diameter** – Better to match customer connections to drain hose adapter, which has 19.5mm (.77”) I.D. – compare to O.D. of customer connection. Nominal I.D. of adapter = 14.5mm (.57” or ~ 9/16”) – compare to nominal plumbing sizes.
- **Top Rack Only water usage** – 30% less than when both spray arms are running (take rated usage x .7).
- **OptiMiser timing** – Runs 30% less time than standard wash cycles.
- **Stainless steel alloy used** – 304 (“S30400”)

## Miscellaneous Service Tips – FAQ's (2)

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- **Door spring ratings** – Dependent on model, see below:
    - **Yellow** (dot) spring # 173696 – Used with SHU steel doors with inner doors with 2mm bitumen.
    - **Blue** (dot) spring # 168576 – Used with SHU/SHX/SHY steel doors with inner doors with 4mm bitumen.
    - **White** (dot) spring – Used with SHU steel doors with SGZ door kits with differently colored steel panel. Not available separately.
    - **Violet** (dot) spring # 168568 – Used with SHI wooden doors weighing 4.85 – 20.94 lbs. (2.2 – 9.5 kg).
    - **Orange** (dot) spring # 182640 – Used with SHV wooden doors weighing 7.0 – 24-1/4 lbs. (3.2 – 11 kg).
  - **Toe kick heights** – Can be adjusted from 3-1/2” to 7”. Cannot be adjusted below 3-1/2”.
  - **Water connection** – 3/8” NPT female.
  - **Recommended water inlet temperature** – 120°F (49°C).
  - **Net weight** – Dependent on model, typically 123 lbs. (56 kg).