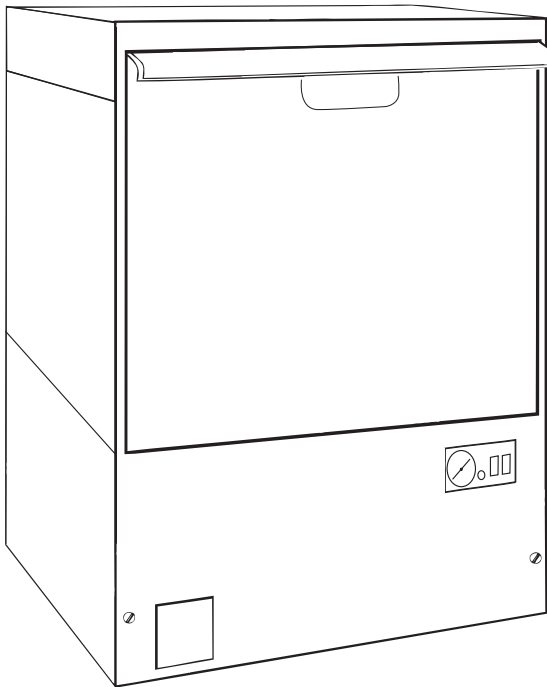




Simply Engineered Better

Technical Manual

Undercounter Dishwasher



Model

**401-HTM2 PLUS
401-HTNM2 PLUS
401-LTM2 PLUS**

Machine Serial No.

September, 2003

Manual P/N 0510645

2674 N. Service Road
Jordan Station, Ontario, Canada L0R 1S0

Moyer Diebel, Ltd.

905/562-4195

Fax: 905/562-4618

Complete the information below so it will be available for quick reference.

Model Number _____ Serial Number _____

Voltage and Phase _____

Moyer Diebel Parts Distributor _____ Phone _____
(if applicable)

Moyer Diebel Service Agency _____ Phone _____

Moyer Diebel Service:

Moyer Diebel Limited

Phone: 1-905-562-4195

1-800-263-5798

Fax: 1-905-562-4618

NOTE: When calling to order parts, be sure to have the model number, serial number, voltage, and phase of your machine, along with your customer account number.

Revision History

Revision Date	Revised Pages	Serial Number Effectivity	Comments
7/16/03	All		Issue of manual and replacement parts lists.

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INTRODUCTION

Welcome to **Moyer Diebel**.

Thank you for choosing **Moyer Diebel** and for allowing us to take care of your dishwashing needs.

This manual covers several models. Model numbers are shown on the front cover.

Your machine has been completely assembled, inspected, and thoroughly tested at our factory to eliminate problems at installation before it was shipped to your installation site. This manual provides:

- Warranty information
- Installation and operation procedures
- Maintenance instructions
- Troubleshooting guide
- Replacement parts lists.

Complete and return your warranty registration card as soon as possible.

Moyer Diebel constantly improves its products; therefore, specifications contained in this manual may have changed.

For your protection, factory authorized parts should always be used.

Replacement parts may be ordered from your **Moyer Diebel** authorized parts distributor or service agency. When ordering parts, supply the model number, serial number, voltage and phase of your machine, the part number, part description, and quantity.

LIMITED WARRANTY

Champion Industries/Moyer Diebel Limited, P.O. Box 4183, Winston-Salem, North Carolina 27115, and P. O. Box 301, 2674 North Service Road, Jordan Station, Ontario, Canada L0R 1S0 warrants machines, and parts, as set out below.

Warranty of Machines: Champion Industries/Moyer Diebel Limited warrants all new machines of its manufacture bearing the name "Champion" or "Moyer Diebel" and installed within the United States and Canada to be free from defects in material and workmanship for a period of one (1) year after the date of installation or fifteen (15) months after the date of shipment by Champion/Moyer Diebel, whichever occurs first. [See below for special provisions relating to Model Series DF and SW.] The warranty registration card must be returned to Champion/Moyer Diebel within ten (10) days after installation. If warranty card is not returned to Champion/Moyer Diebel within such period, the warranty will expire after one year from the date of shipment.

Champion/Moyer Diebel will not assume any responsibility for extra costs for installation in any area where there are jurisdictional problems with local trades or unions.

If a defect in workmanship or material is found to exist within the warranty period, Champion/Moyer Diebel, at its election, will either repair or replace the defective machine or accept return of the machine for full credit; provided, however, as to Model Series DF and SW, Champion/Moyer Diebel's obligation with respect to labor associated with any repairs shall end (a) 120 days after shipment, or (b) 90 days after installation, whichever occurs first. In the event that Champion/Moyer Diebel elects to repair, the labor and work to be performed in connection with the warranty shall be done during regular working hours by a Champion/Moyer Diebel authorized service technician. Defective parts become the property of Champion/Moyer Diebel. Use of replacement parts not authorized by Champion/Moyer Diebel will relieve Champion/Moyer Diebel of all further liability in connection with its warranty. In no event will Champion/Moyer Diebel's warranty obligation exceed Champion/Moyer Diebel's charge for the machine. The following are not covered by Champion/Moyer Diebel's warranty:

- a. Lighting of gas pilots or burners.
- b. Cleaning of gas lines.
- c. Replacement of fuses or resetting of overload breakers.
- d. Adjustment of thermostats.
- e. Adjustment of clutches.
- f. Opening or closing of utility supply valves or switching of electrical supply current.
- g. Adjustments to chemical dispensing equipment.
- h. Cleaning of valves, strainers, screens, nozzles, or spray pipes.
- i. Performance of regular maintenance and cleaning as outlined in operator's guide.
- j. Damages resulting from water conditions, accidents, alterations, improper use, abuse, tampering, improper installation, or failure to follow maintenance and operation procedures.

Examples of the defects not covered by warranty include, but are not limited to: (1) Damage to the exterior or interior finish as a result of the above, (2) Use with utility service other than that designated on the rating plate, (3) Improper connection to utility service, (4) Inadequate or excessive water pressure, (5) Corrosion from chemicals dispensed in excess of recommended concentrations, (6) Failure of electrical components due to connection of chemical dispensing equipment installed by others, (7) Leaks or damage resulting from such leaks caused by the installer, including those at machine table connections or by connection of chemical dispensing equipment installed by others, (8) Failure to comply with local building codes, (9) Damage caused by labor dispute.

Warranty of Parts: Champion/Moyer Diebel warrants all new machine parts produced or authorized by Champion/Moyer Diebel to be free from defects in material and workmanship for a period of 90 days from date of invoice. If any defect in material and workmanship is found to exist within the warranty period Champion/Moyer Diebel will replace the defective part without charge.

DISCLAIMER OF WARRANTIES AND LIMITATIONS OF LIABILITY. CHAMPION/MOYER DIEBEL'S WARRANTY IS ONLY TO THE EXTENT REFLECTED ABOVE. CHAMPION/MOYER DIEBEL MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY, OR FITNESS OF PURPOSE. CHAMPION/MOYER DIEBEL SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. THE REMEDIES SET OUT ABOVE ARE THE EXCLUSIVE REMEDIES FOR ANY DEFECTS FOUND TO EXIST IN CHAMPION/MOYER DIEBEL DISHWASHING MACHINES AND CHAMPION/MOYER DIEBEL PARTS, AND ALL OTHER REMEDIES ARE EXCLUDED, INCLUDING ANY LIABILITY FOR INCIDENTALS OR CONSEQUENTIAL DAMAGES.

Champion/Moyer Diebel does not authorize any other person, including persons who deal in Champion/Moyer Diebel dishwashing machines, to change this warranty or create any other obligation in connection with Champion/Moyer Diebel Dishwashing Machines.

GENERAL

This manual covers the **Moyer Diebel 401PLUS** undercounter dishwashing machine. This machine is fully automatic and is equipped with a 1/2 H.P. pump motor. All models are available for mounting directly to the floor or on optional stands (see accessories listed on page 4).

Standard equipment includes:

- | | |
|---|--|
| -Automatic tank fill | -Upper and lower spray arms |
| -Common utility connections | -Two dish racks (peg and flat) |
| -120 Volt control circuit | -Exclusive vent design for venting of condensation |
| -Convenient, easy to use controls | -Stainless steel heavy-gauge construction |
| -Door latch activated start switch | -Detergent and rinse aid pumps |
| -Pumped drain (to 3 ft/1m) (vertical) | |
| -Final rinse sentry feature (high temp models only) | |

This series of dishwashers is available in the following models:

Model Numbers

401-HT PLUS, 401-HTN PLUS, 401-LTPLUS

- The 401-HT PLUS model is a high temperature (82°C/180°F rinse) sanitizing model with booster and the final rinse sentry feature.
- The 401-HTN PLUS model is a high temperature (customer supplied 82°C/180°F rinse water) sanitizing model without booster.
- The 401-LT PLUS model is a low temperature (60°C/140°F rinse) sanitizing model.

Options

- Kit 504 - Top and side panels (P/N 0708756)
- Kit 505 - Top panel only (P/N 0708744)
- Kit 506 - Left side panel only (P/N 0708745)
- Kit 507 - Right side panel only (P/N 0708746)
- Kit 510 - Extended reach pumped drain kit (P/N 0708766)
- Kit 511 - 30°C/70°F temperature rise booster (P/N 0708753)
(for 49°C/110°F supply water).

Accessories

- 17RS - 17" rack stand (raises working height and adds rack storage)
- 17T - 17" cabinet (raises working height and adds storage)
- CST - Combination sink/table (scraping and sorting station)
- 101285 - Dish Rack (Peg Rack)
- 101273 - Silverware Rack (Flat Bottom Rack)

Electrical Power Requirements

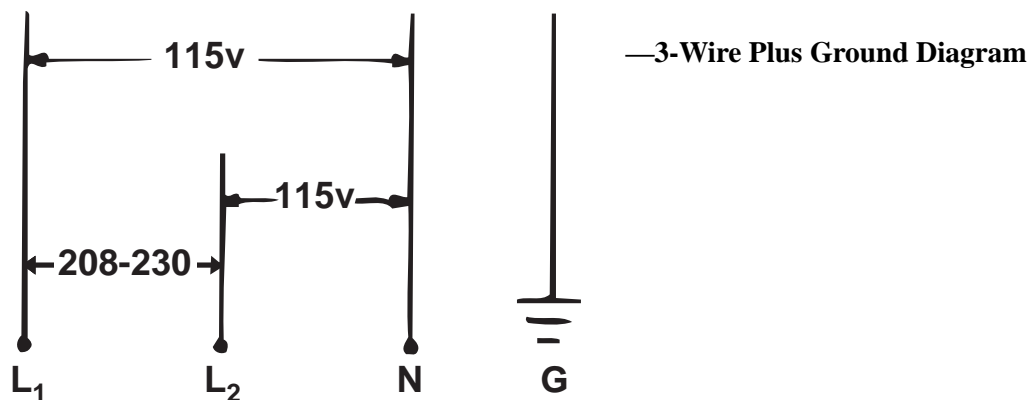
Model	Voltage	Booster Rise	Machine Full Load Amp	Power Requirement (125% Service Factor)
401-LT PLUS	115/60/1	N/A	9	15
401-HTN PLUS	115/60/1	N/A	9	15
401-HT PLUS	208/60/1	40	33	42
401-HT PLUS	240/60/1	40	37	47
401-HT PLUS	208/60/1	70	45	57
401-HT PLUS	240/60/1	70	51	64



NOTE:

208-230V/60Hz/1PH electrical supply service must be a 3-wire plus ground for connection as shown.

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INSTALLATION

Unpacking

**WARNING:**

Care should be taken when lifting the machine to prevent damage.

1. Immediately after unpacking your machine, inspect for any shipping damage. If damage is found, save the packing material and contact the carrier immediately.
2. Remove the dishwasher from the skid. Adjust the feet if required, then move the machine to its permanent location.
3. Level the machine (if required) by placing a level on the top of the machine and adjusting the feet. Level the machine front-to-back and side-to-side.

**CAUTION:**

After locating your machine, the installation must meet local health codes. An example may be to seal your machine to the floor using a good grade of silicone sealant.

Electrical Connections

**WARNING:**

Electrical and grounding connections must comply with the National Electrical Code and/or Local Electrical Codes.

**WARNING:**

When working on the dishwasher, disconnect the electric service and tag it to indicate work is being done on that circuit.

1. The electrician should compare the electrical specifications on the machine electrical rating label (located on the lower left front panel) to the electrical power supply before connecting the machine to the incoming service at a fused disconnect switch.

**NOTE:**

The 208-240V/60Hz/1PH electrical supply service for this machine must be a 3-wire plus ground service.

2. On the 208V-240V models, a terminal block is provided on the left front side of the machine (located behind the front panel) for electrical service connections. A fused disconnect switch or circuit breaker (supplied by user) is required to protect each power supply circuit.
3. On 115V models, your machine is already equipped with a 4-foot power cord and plug suitable for 115V-15A service.

Plumbing Connections



CAUTION:

Plumbing connections must comply with local sanitary and plumbing codes.

Water Connections

1. Connect the hot water supply (60°C/ 140°F Min) to the 1/2" I.D. fill hose provided. The **fill solenoid valve is equipped with a flow control** that will accept water pressures from 172 kPa/25 psi to 665 kPa/95 psi.
2. Install a manual shut-off valve with 3/4" garden hose connection in the water supply line close to the machine to accommodate installation and servicing the machine. The shut-off valve should be the same size or larger than the supply line.
3. **The fill solenoid valve is equipped with a built-in strainer** to protect from particles in the water supply.

Drain Connections

1. All Models are supplied with a flexible 5/8" I.D. drain hose, which must be connected to a 1-1/2" drain using a wye (Y) fitting close to the machine.
2. Drain connections height should be a maximum of 3 feet from the floor.

Detergent/Chemicals

Use a qualified detergent/chemical supplier for your detergent, rinse aid, and chemical sanitizer needs.

1. Your machine has a liquid detergent dispensing pump. Insert the labeled detergent pickup tube into the detergent container. The pickup tube has a strainer on the end to prevent crystallized chemical from clogging the supply lines.
2. The cycle timer located in the main control cabinet is equipped with adjustable cams for the chemical dispensing pump(s). The cams control the length of time that the pumps operate. A qualified person may adjust the cam settings if necessary. Refer to the timer chart diagram(s) at the end of the manual for timer cam locations. Factory time settings are only approximate. Have your chemical supplier check the concentration and make the necessary adjustments.



NOTE:

A nonchlorinated detergent is recommended for your dishwasher.

Rinse Aid

1. A rinse aid pump is included on all models. Insert the labeled *Rinse Aid* pickup tube into the rinse aid container. Contact your chemical supplier for adjustment to ensure proper dosage.

Chemical Sanitizer

1. Model 401-LT PLUS is supplied with chemical sanitizer dispensing pump. Insert the labeled Chemical Sanitizer pickup tube into the chemical sanitizer container. Have your chemical supplier set chemical dosage according to local code.
2. Contact your chemical supplier for adjustment of the chemical sanitizer to ensure proper dosage.

Completing Installation

1. Remove any foreign material from inside the machine.
2. Center the scrap screen over the sump opening.
3. Prime the booster using the following procedure (if applicable).



CAUTION:

To prime the booster, the following procedure must be followed AFTER the electrical and plumbing connections have been made.

- a. Remove the front panel.
- b. Locate the Installation and Service toggle switch on the extreme left side of the control box.
- c. Press the toggle switch to the Booster Fill position and hold it approximately 1 minute (or until water enters wash tank).
- d. Release the toggle switch to stop the water flow.
- e. You have complete the booster priming process.



NOTE:

*Push the Installation and Service toggle switch to the ON position.
Electrical power is now supplied to the machine.*



WARNING:

Failure to prime the booster may cause damage to the booster elements and other electrical components and will void the warranty,

4. After plumbing and electrical connections are completed, check the machine for water leaks by depressing the **ON/FILL/OFF/DRAIN** to the **ON/FILL** position, then close and latch the door. This allows the tank to fill and complete the rinse cycle. Check for leaks.
4. Open the door and check the water level. The water level should be 1/2" over the scrap screen.
5. Depress the **ON/FILL/OFF/DRAIN** switch to the **OFF/DRAIN** position, close and latch the door to drain the machine. This allows the machine to complete the 105-second wash and drain cycle. Check the drain plumbing for leaks or kinks in drain hose.
6. Replace the front panel. Installation is now complete.

OPERATION

Operation Summary

The following is a summary of your Undercounter Dishwashing Machine operating cycle:

1. The cycle begins when you close and latch the door.
2. The green cycle lamp lights and the wash pump starts.
3. The pump runs during the wash cycle for approximately 80 seconds. **The wash cycle duration is extended if the booster is not up to temperature.**
4. The wash pump stops, and the drain valve is opened.
5. After a 2-3 second pause, the pump drain cycle begins and continues for approximately 30 seconds. Just before this cycle ends the fill valve will come on for 2-3 seconds to flush the wash tank of any remaining detergent.
6. After a 2-3 second pause, the fill valve opens, and the pump starts for the rinse cycle.
7. Within approximately 25 seconds, the rinse cycle is complete. The pump stops, the green cycle lamp turns off, and the cycle is complete.
8. Open the door and remove the rack of clean ware.

Daily Operation Procedures

The operation of your dishwasher will be more efficient when these procedures are followed:

1. Check that the spray arm and scrap screen are in place.
2. Close and latch the door. Push the ON/FILL switch to the ON position. The tank will begin filling with water. This procedure is followed only when the tank is empty.
3. When the tank is full, check the wash tank temperature gauge. Minimum wash temperatures are:
 - 401-HT PLUS, 401-HTN PLUS - **66°C/150°F.**
 - 401-LT PLUS - **60°C/140°F.**

**CAUTION:**

If the wash water temperature falls below the minimums listed above, you must run an empty cycle to refill with fresh hot water.

4. Scrap and preflush all items to be washed, and load the items into the rack. **DO NOT OVERLOAD** the rack. Wash only one layer of silverware in a rack.
5. Open the door and insert the rack into the machine.
6. Close and latch the door. This will start the wash cycle. The green cycle lamp located on the front control panel will light. This lamp will remain on until the entire wash and rinse cycles are completed.

 **NOTE:**

The machine may be stopped at any time by opening the door. When restarted, the cycle does not start over. It will continue from the point at which it was interrupted.

7. Check the rinse temperature during the final rinse (120 seconds into cycle). The rinse temperature must be 82°C/180°F minimum for models 401-HT PLUS, 401-HTN PLUS and 60°C/140°F for model 401-LT PLUS.
8. The pump will automatically stop and the green cycle light will turn off indicating the cycle is completed.
9. Open the door and remove the rack.
10. Repeat steps 4-9 for additional cycles. Machine operation is automatic.
11. CLEAN the scrap screen after every meal period. During heavy usage, the scrap screen should be cleaned more frequently.

**CAUTION:**

Poor machine performance and/or damage to the machine can occur if the scrap screen becomes clogged with soil or waste particles.

12. To drain water out of the tank at the end of each day. Flip ON/FILL/OFF/DRAIN switch to DRAIN position. Close and latch door. Machine will drain completely in approximately 105 seconds.

**CAUTION:**

DO NOT LEAVE WATER IN THE TANK OVERNIGHT. Water left in the tank overnight will allow harmful chemicals to deteriorate the tank.

MAINTENANCE

The efficiency and life of your machine is increased by regularly scheduled preventive maintenance. A well maintained machine gives better results and service. An investment of a few minutes of daily maintenance will be worthwhile.

The best maintenance you can provide is to keep your machine clean. Components that are not regularly cleaned and flushed will clog and become inoperative.

Intervals shown in the following schedules represent an average length of time between necessary maintenance. Maintenance intervals should be shortened whenever your machine is faced with abnormal working conditions, hard water, or multiple shift operations.

Cleaning Schedule

- **Daily-Every 8 Hours**

1. Depress the **ON/FILL/OFF/DRAIN** switch to **OFF/DRAIN** position and close and latch the door to drain the tank.
2. Open the door and remove the upper and lower spray arms by unscrewing the knurled fastener.
3. Remove the scrap screen carefully to keep soil or waste particles from falling into the sump. Remove any material caught in pump intake.
4. Clean inside the tank with clean water. Backflush the scrap screen until it is clean. Do not strike the screen against solid objects.
5. Clean the wash arms to remove any debris from spray openings. Do not strike the spray arms against solid objects.
6. Reinstall the scrap screen and spray arms.
7. Leave the door open overnight to allow drying.
8. Report any unusual conditions to your supervisor.

- **Meal Periods**

1. Clean the scrap screen after every meal period and more frequently during heavy usage. Do not allow the scrap screen to become clogged with soil or waste particles.

Maintenance Schedule

- **As Required**
 1. Check the temperature gauge reading to make sure that it is accurate.
 2. Check the chemical supplies and refill as necessary.
- **Weekly**
 1. Inspect all water lines for leaks and tighten them at joints if required.
 2. Clean all detergent residue from the exterior of the machine.
 3. Check the drain for leaks.
 4. Remove and closely inspect the spray arms for blockage.
 5. Check for damage to the scrap screen. Ineffective screening can cause wash system failures, or poor washing results.
 6. Clean the detergent, sanitizer, and rinse aid supply tubes. Complete the following procedure:
 - a. Remove the detergent, sanitizer, and rinse aid pick-up tube(s) from the container(s). Place the tube(s) into a container of hot water.
 - b. Ensure ON/FILL/OFF/DRAIN switch is in the ON position depress and hold the **DET** prime switch (located on the front panel) until clear water enters the tank through the fill air gap (located on the right side of the tank).
 - c. Your machine is equipped with a sanitizer and/or rinse aid pump, follow the same procedure by pressing the **SANITIZER** and/or the **RINSE AID** prime switch until clear water enters the tank through the fill air gap.
 - d. When completed, remove the pickup tubes from the hot water and reinsert them into the correct chemical containers. Repeat the priming procedures to ensure that chemicals have filled the tubes for the next operating period.
 - e. Run a complete cycle to flush chemicals from the tank.

Deliming

Your dishwasher should be delimed regularly. The frequency will depend on the mineral content of your water.

Inspect your machine interior for lime deposits. If deliming is required, a deliming agent should be used for best results.



DANGER:

Deliming solution or other acids must not come in contact with household bleach (sodium hypochlorite) or any chemicals containing chlorine, iodine, bromine, or fluorine. Mixing will cause hazardous gases to form. Skin contact with deliming solutions can cause severe irritation and possible chemical burns. Consult your chemical supplier for specific safety precautions.

If you have the chemical sanitizing model (401-LT PLUS), carefully follow the following procedure before deliming:

1. Remove the sanitizer tube from the container. Place the tube into a container of hot water.
2. Depress and hold the **SANITIZER** prime switch (located on the front panel) until all sanitizer has been purged from the hoses.
3. Close the door and depress the door latch. Complete two operating cycles to purge the machine of all sanitizer.

Deliming Procedure

Complete the following procedure to delime your machine:

1. Add the delime chemical to wash the tank (per chemical supplier specifications).
2. Close and latch the door.
3. The dishwasher will complete a regular cycle.
4. Check the deliming results and repeat if necessary per the chemical supplier's specifications.
5. Operate the dishwasher for at least four complete cycles to purge the machine of any deliming chemicals.
6. Drain the dishwasher. Deliming is complete.

TROUBLESHOOTING

Before determining any specific cause of a breakdown or abnormal operation of your dishwasher, check that:

1. Power supply is turned on. All switches are ON.
2. Wash arms are clean.
3. Scrap screen is properly positioned and clean.
4. Thermostat is at the correct setting.
5. Sanitizer, detergent, and rinse additive dispensers are adequately filled.
6. All plumbing valves are open and drain hose is not kinked.

If a problem still exists, use the following table for troubleshooting.

CONDITION	CAUSE	SOLUTION
Machine will not start	Door not closed and latched Main switch off, or unit unplugged . .	Make sure door is fully latched Check disconnect or plug into outlet
Low or no water	Main water supply is turned off Water level setting low	Turn on house water supply Adjust water level
Chemical not feeding	No chemical in container Feed tubes to/from chemical pump clogged Screen on feed tube clogged Tubing kinked or split	Replace or fill container Clear obstruction and flush with hot water Clean and replace Straighten or replace tubing
Water temperature is low when in use	Incoming water temperature at machine too low	Raise house supply temperature to 60°C/140°F for all machines
Insufficient pumped spray pressure	Clogged spray arms Scrap screen full	Clean Must be kept clean and in place
Low final rinse temperature	Low incoming water temperature	Check the booster - be sure the thermostat is set to maintain 66°C/180°F temperature (401-L PLUS is 60°C/140°F) (Check all valves to be sure they are clean and operating)
Poor washing results	Detergent dispenser not operating properly Insufficient detergents Detergent setting too low Wash water temperature too low Wash arms clogged Improperly scraped dishes Ware being improperly placed in rack Improperly cleaned equipment	Contact service agent Check dosage Check and fill Contact detergent supplier Contact detergent supplier See above booster temperatures, run cycle Clean wash arms Check scraping procedures Use proper racks - do not overload racks Unclog wash arms to maintain proper pressure and flow conditions
No water in wash well	Opening door prior to cycle completion Water supply is turned off	Close and latch door. Wait for green light to go out before opening door. Turn on supply
No water in wash tank after activating the ON/FILL switch	Door not latched	Latch door Wait for wash tank to fill
Cycle time increases with each cycle	Incoming water temperature is too low	Raise temperature to 60°C/140°F for all machines.

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REPLACEMENT PARTS

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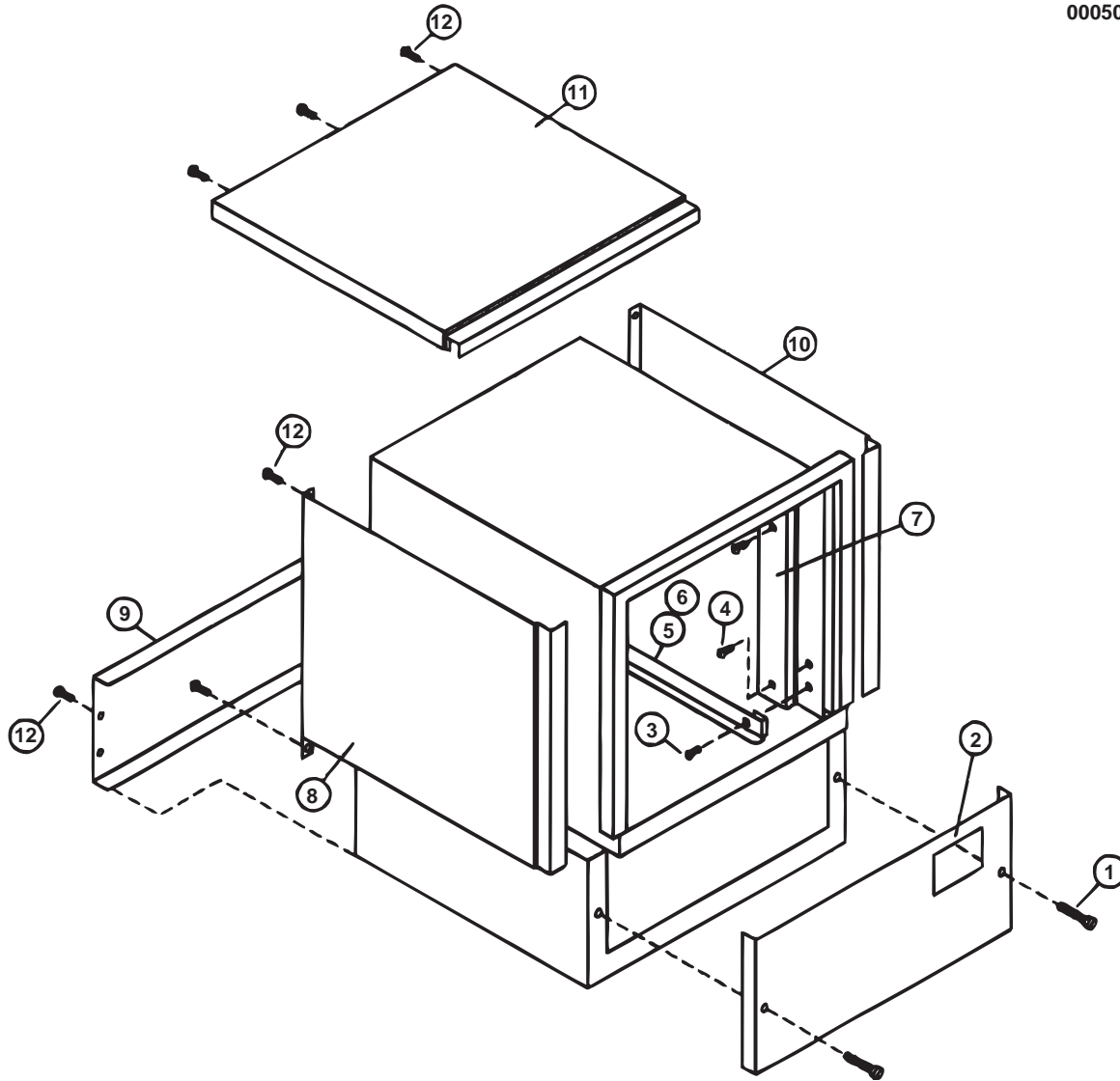


Figure 1 — Track and Panel Assembly

TRACK AND PANEL ASSEMBLY

Fig. 1 Item No.	Part No.	Description	Qty
1	0508751	Screw, 10-32 x 1-1/2" Lg. Truss Head	2
2	0309572	Front Panel	1
3	0501413	Screw, 10-32 x 3/8" Lg. Round Head.....	2
4	0501415	Screw, 10-32 x 5/8" Lg. Round Head.....	4
5	0308632	Track, RH	1
6	0308631	Track, LH	1
7	0708647	Cover, Vent	2
8	0308736	Panel, LH Side	1
9	0308734	Panel, Rear (HT PLUS)	1
9	0309573	Panel, Rear (LT PLUS, HTN PLUS).....	1
10	0308737	Panel, RH Side	1
11	0308735	Panel, Top	1
12	0501412	Screw, 10-32 x 3/8" Lg. Truss Head.....	10

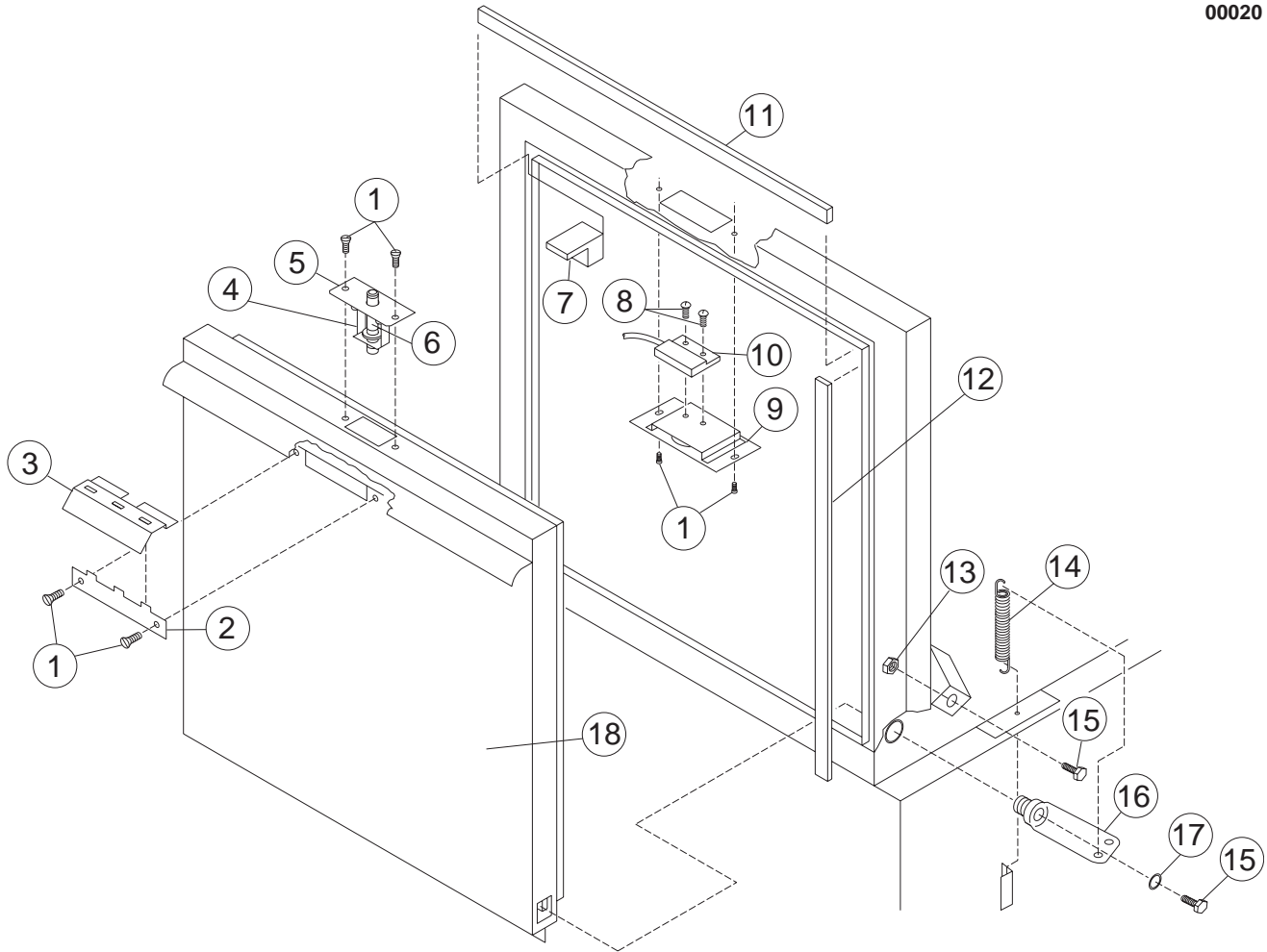


Figure 2 — Door and Switch Assembly

DOOR AND SWITCH ASSEMBLY

Fig. 2 Item No.	Part No.	Description	Qty
1	0501412	Screw, 10-32 x 3/8" Truss Head	6
2	0308596	Plate, Door Latch.....	1
3	0308597	Handle, Door Latch	1
4	0508721	Retaining Ring, Plunger	1
5	0709462	Assembly, Door Catch (Includes items 4, 6).....	1
6	0509436	Plunger, Door Catch	1
7	0508545	Gasket, Steam.....	2
8	104883	Screw, Round Head (6-32 x 3/8")	2
9	0709431	Plate, Door Switch.....	1
10	111090	Switch, Door Magnetic Reed	1
11	0508544	Gasket, Upper Door.....	1
12	0508543	Gasket, Side Door	2
13	0501539	Nut, Plain 1/4-20	2
14	0503715	Spring, Door Hinge	2
15	0501421	Bolt, 1/4-20 x 1-1/4" Hex Head	4
16	0708564	Arm, Door Hinge.....	2
17	0501501	Washer, Lock 1/4" Split	2
18	0708527	Door.....	1
-	0508555	Wiring, Harness, Door Switch	1
-	0708526	Door Assy. (includes items 1-6, 18)	

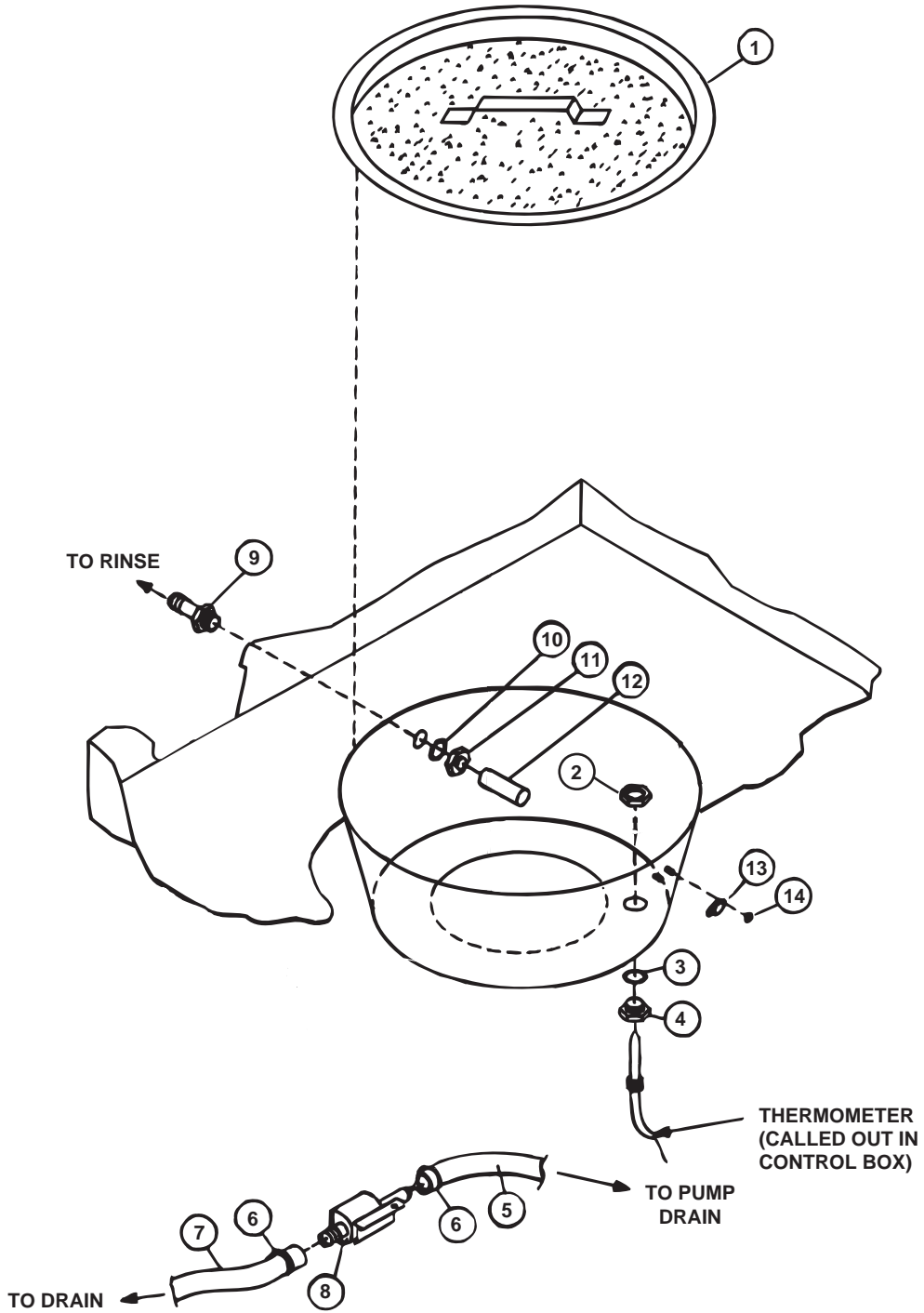


Figure 3 — Tank/Drain Assembly

TANK/DRAIN ASSEMBLY

Fig. 3 Item No.	Part No.	Description	Qty
1	0508628	Scrap Screen	1
2	201029	Locknut, 1/2 NPT Nickel-Plated	1
3	0501836	O-Ring, Thermometer	2
4	0508872	Adapter, Thermometer	1
5	0507265	Hose, 5/8" ID x 7/8" OD PVC Braided (3 ft.)	2
6	0510082	Clamp, hose	2
7	0509302	Hose 5/8" ID x 1" OD Braided PVC	1
8	0306618	Valve, Drain.....	1
9	0508578	Adapter, Pump Tube.....	1
10	104414	O-ring	1
11	0508579	Nut, Jam 1"-8	1
12	0308655	Tube, Pump Outlet	1
13	110562	Thermostar, High Limit.....	1
14	108954	Nut, Grip 6-32 w/Nylon Insert	2

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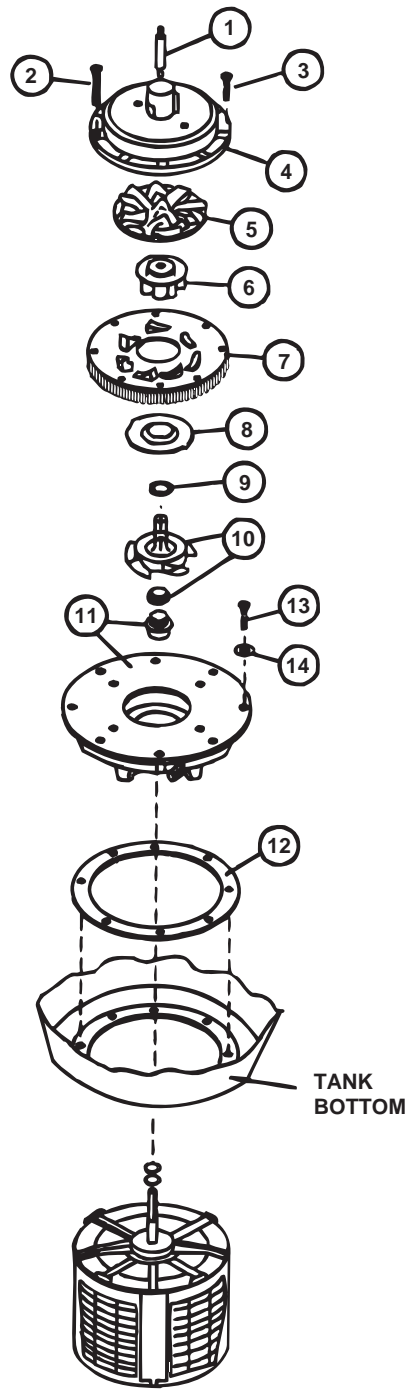


Figure 4 — Pump Assembly

PUMP ASSEMBLY

Fig. 4 Item No.	Part No.	Description	Qty
1	0508542	Spindle, Lower Wash Arm	1
2	0501431	Screw, 8-32 x 1-1/8" Round Head.....	4
3	0501425	Screw, 8-32 x 5/8" Round Head	4
4	0508793	Housing, Top	1
5	0502741	Diffuser.....	1
6	0502704	Impeller	1
7	0502746	Adapter Plate, Suction.....	1
8	0502745	Plate, Drain Inlet.....	1
9	0502703	O-ring	1
10	0502744	Propeller/Rotating Seal Assembly	1
11	0502743	Mounting Plate/Seal Assembly (Includes Item 10).....	1
12	0501881	Gasket, Pump	1
13	0508665	Screw, 10-32 x 5/8" Hex Washer Head	8
14	0508570	Washer, Sealing Teflon.....	8
*-	0710071	Pump/Motor Assembly (60 Hz) (115V).....	1
-	107966	Nut, Grip 10-32, SST (Not Shown) (For mounting Item 1).....	1

* Motor not available as a separate repair part

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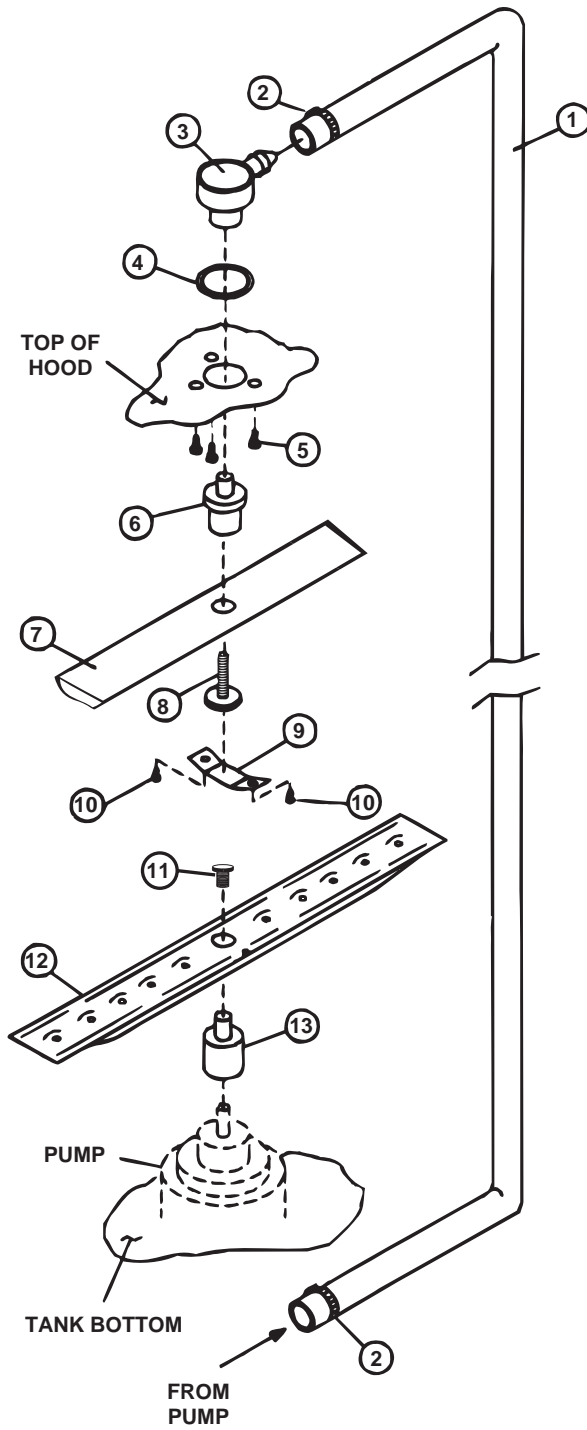
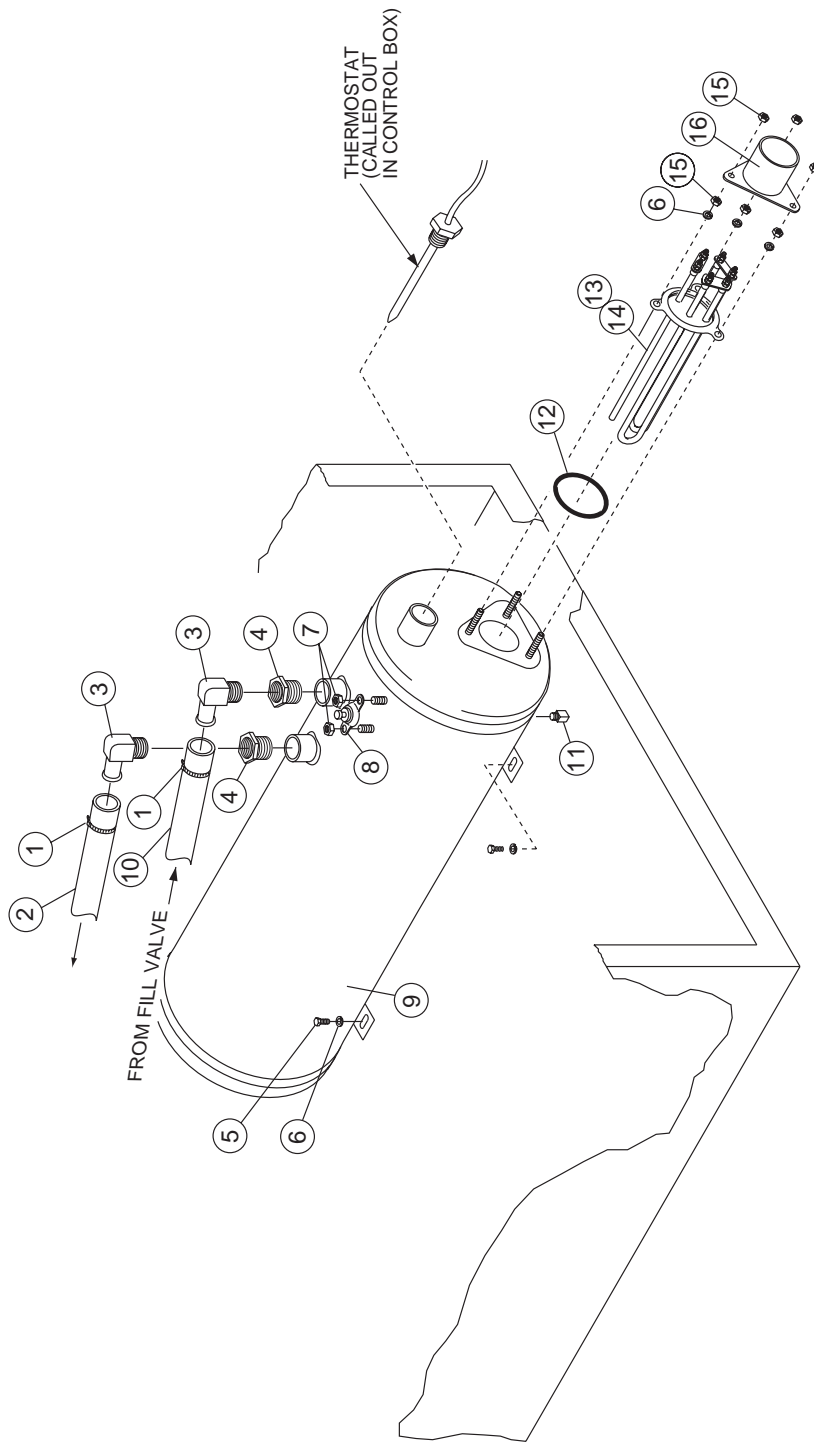


Figure 5 — Wash System Assembly

WASH SYSTEM ASSEMBLY

Fig. 5 Item No.	Part No.	Description	Qty
1	0508549	Hose, Upper Wash.....	1
2	0502563	Clamp, Hose 1"	2
3	0708650	Spindle, Upper Wash Arm.....	1
4	0503588	O-ring, 1-1/8" x 1-3/8"	1
5	0501412	Screw 10-32 x 3/8 Truss Head	3
6	0508541	Bushing, Upper Wash Arm	1
7	0710593	Wash Arm, Upper.....	1
8	0505042	Pivot, Upper Wash Arm	1
9	0308783	Retainer, Upper Pivot	1
10	0501563	Screw, #8 x 3/8 Truss Head.....	2
11	0501684	Nut, Spray Arm Lock.....	1
12	0705049	Wash Arm, Lower	1
13	0508540	Bushing, Lower Wash Arm	1

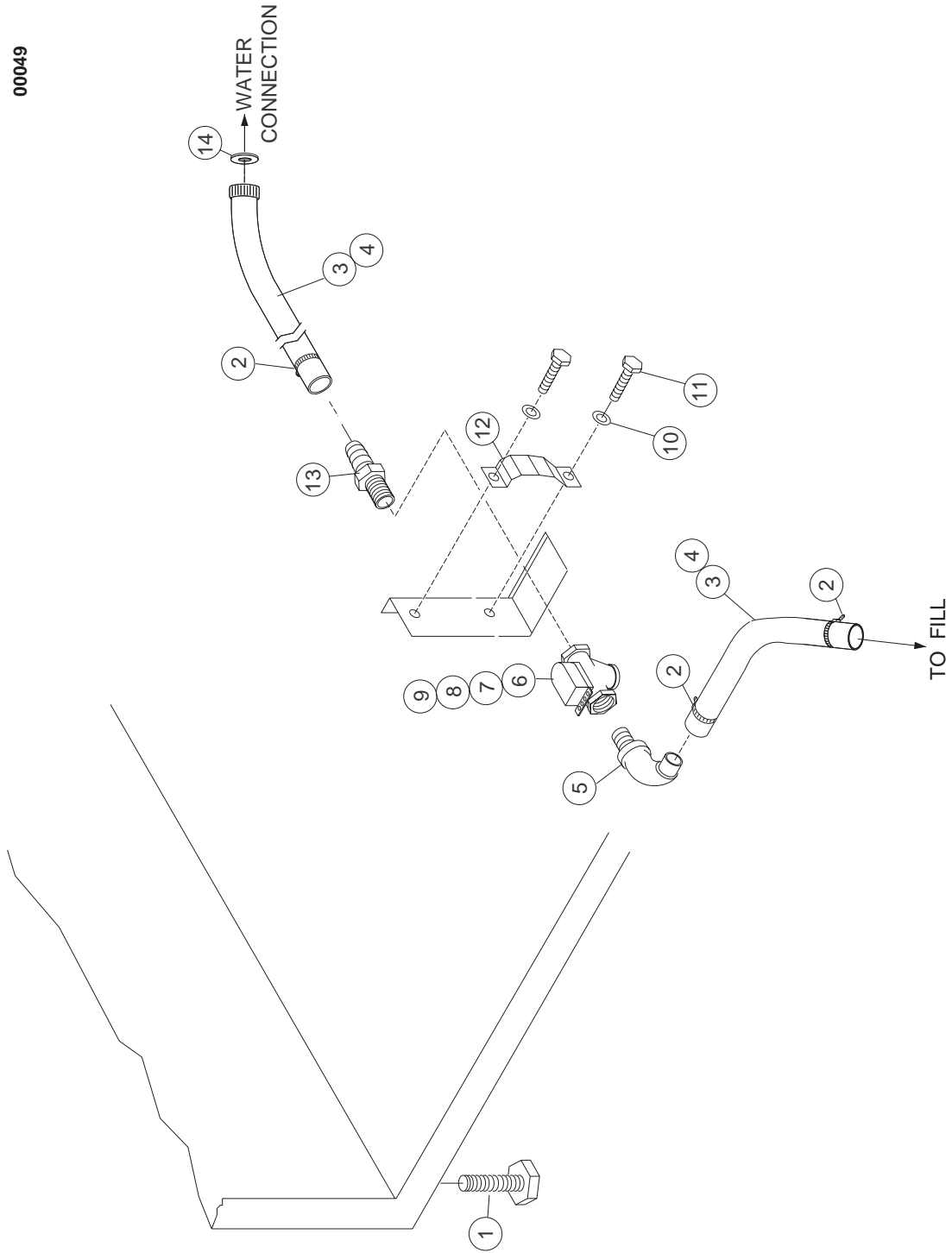


**Figure 6 — Booster Assembly and Water Inlet Piping
(HT PLUS Only)**

**BOOSTER ASSEMBLY AND WATER INLET PIPING
(HT PLUS ONLY)**

Fig. 6 Item No.	Part No.	Description	Qty.
1	0503679	Clamp, hose	2
2	0509214	Hose, 1/2" I.D.	3 ft.
3	0502653	Elbow, 3/8 MPT X 1/2 Hose x 90°	1
4	0508840	Bushing, reducing 3/4 NPT x 3/8 NPT Brass	2
5	0501419	Bolt., 1/4-20 x 1/2" Hex Head	2
6	0501501	Washer, Lock 1/4" Split	5
7	108954	Nut, Grip 6-32 w/Nylon Insert	2
8	110562	Thermostat, high limit	1
9	0509042	Tank, booster (tank only)	1
10	107417	Hose 1/2" I.D. (28")	A/R
11	0508817	Plug, pipe 1/8"	1
12	109985	O ring, gasket	1
13	111235	Heater element, 6KW (40° rise) 208/230V 1PH	1
14	111233	Heater element, 9KW (70° rise) 208/230V 1PH	1
15	0501539	Nut, plain 1/4-20	1
16	107908	Cover, heater element	1
---	110997	Wire, Jumper Heater Element (Not Shown)	1
---	0307356	Insulation, Heater Terminal (Not Shown)	1
---	0508937	Label, Cover Warning (Not Shown)	1

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**Figure 7 — Water Inlet Piping
(HTN PLUS, LT PLUS Only)**

**WATER INLET PIPING
(HTN PLUS, LT PLUS ONLY)**

Fig. 7 Item No.	Part No.	Description	Qty
1	0503718	Foot, adjustable	4
2	0503679	Clamp, hose	3
3	107417	Hose, 1/2" ID (LT PLUS Only).....	3 ft.
4	107417	Hose, 1/2" I.D (HTN PLUS Only)	3 ft.
5	0502653	Elbow, 3/8 MPT x 1/2" Hose x 90° Brass	1
6	0504952	Valve, solenoid (3/8NPT).....	1
7	0502811	Repair kit, 3/8" valve.....	1
8	0505235	Coil, 115V 3/8" valve.....	1
9	0504958	Flow washer, 3/8" valve	1
10	0501501	Washer, lock 1/4" split.....	2
11	0501419	Bolt, 1/4-20 x1/2" Hex Hd	2
12	0300203	Clamp, valve support.....	1
13	0502618	Coupling, 3/8 MPT x 3/4" hose barb	1
14	0505320	Washer, hose.....	1

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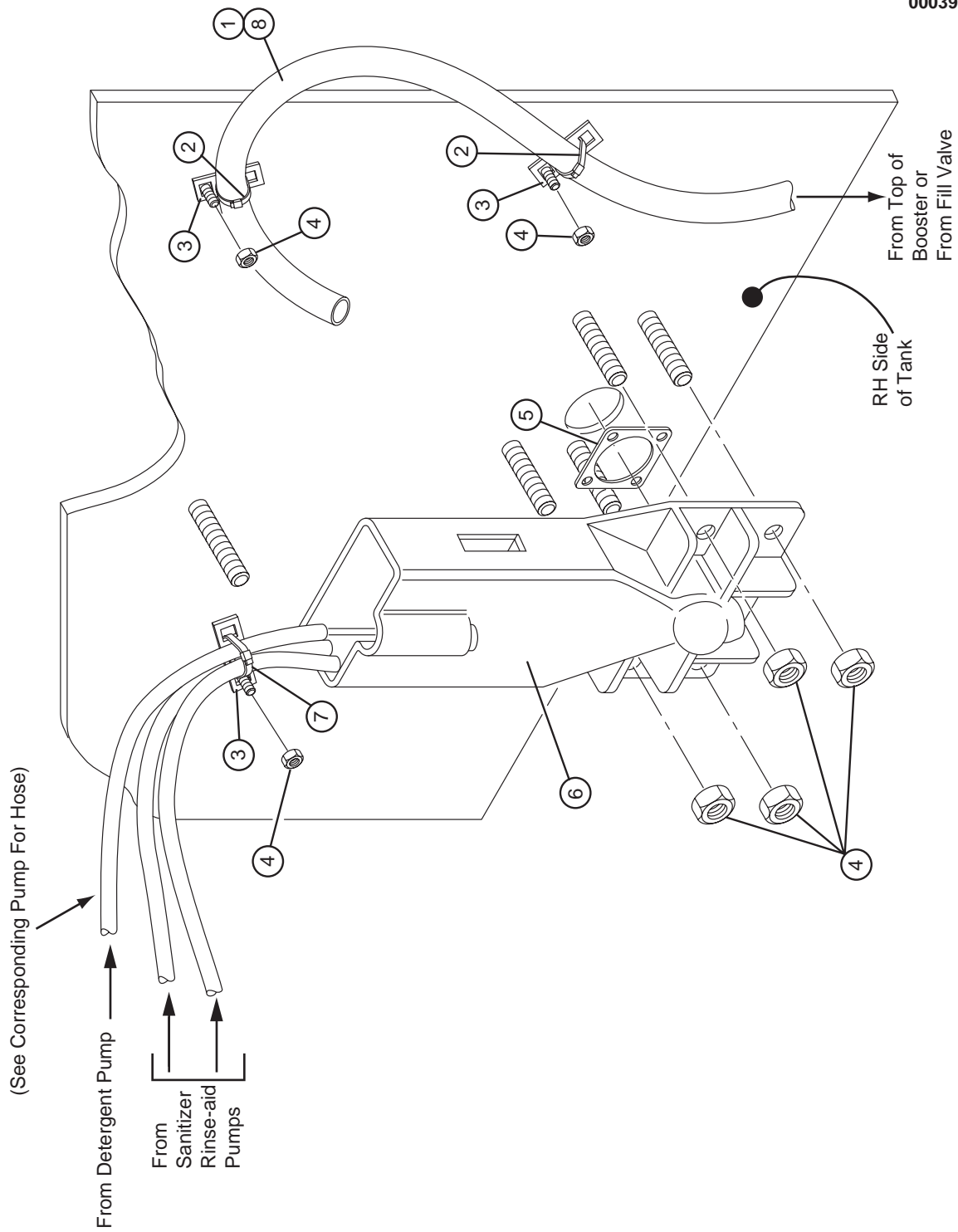
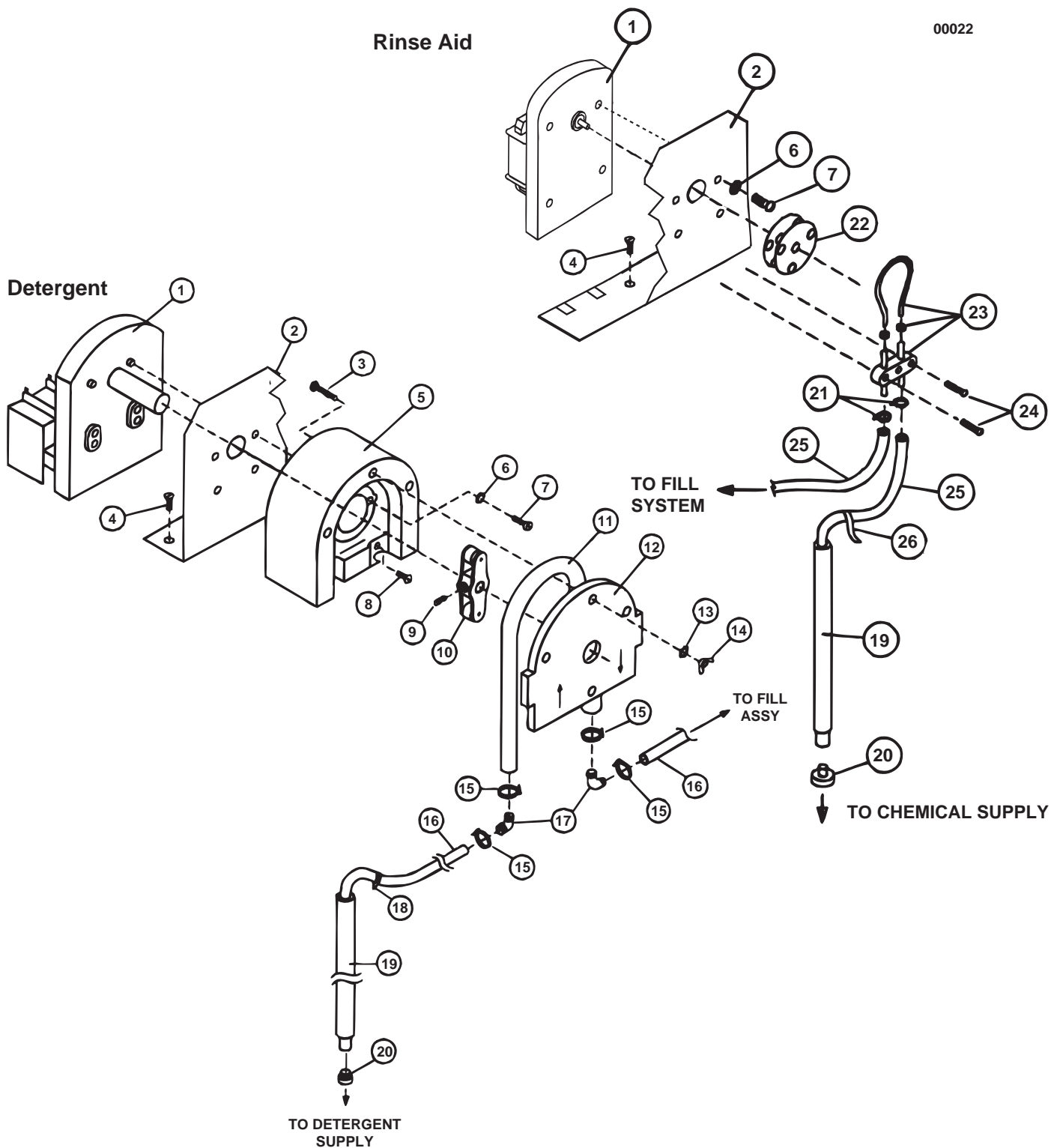


Figure 8 — Fill System

FILL SYSTEM

Fig. 8 Item No.	Part No.	Description	Qty
1	107417	Hose, 1/2" I.D. (HTN PLUS, LT PLUS).....	A/R
2	0501518	Tie Wrap, Hose.....	2
3	106090	Bracket, Tie Wrap	3
4	107966	Nut, Grip, 10-32 w/Nylon Insert	8
5	0509048	Gasket, Inlet Chute	1
6	0508867	Inlet Chute	1
7	0501519	Tie, Nylon 4"	3
8	107417	Hose, Fill 1/2" I.D.	3 ft.



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Figure 9 — Detergent/Rinse Aid Pump Assemblies
(HT PLUS, HTN PLUS)

**DETERGENT/RINSE AID PUMP ASSEMBLIES
(HT PLUS, HTN PLUS)**

Fig. 9 Item No.	Part No.	Description	Qty
1	0503757	Motor, Pump (Detergent)	1
1	0503756	Motor, Pump Injector (Rinse Aid)	1
2	0308610	Bracket, Detergent/Sanitizer Pumps (Rinse Aid).....	1
3	N/A	Screw, M4 x 35mm Hex Head	4
4	0501412	Screw, 10-32 x 3/8" Lg. Truss Head.....	2
5	N/A	Housing, Pump	1
6	0501497	Washer, Lock #8 Split	2
7	0504822	Screw, 8-32 x 1/2" Lg. Pan Head	2
8	0501425	Screw, 8-32 x 5/8" Round Head	2
9	N/A	Screw, Set M6 x 8mm	1
10	N/A	Rotor Assembly.....	1
11	108194	Hose, Pump	1
12	N/A	Cover, Pump Housing	1
13	N/A	Washer, Flat M4	4
14	N/A	Nut, Wing M4.....	4
15	0501519	Tie Wrap, Hose.....	2
16	0502667	Hose, Detergent, 1/4" I.D. PVC (Clear).....	A/R
17	0502644	Elbow, 1/4" O.D. x 90° Barbed	2
18	0503695	Label, Detergent.....	1
19	0306363	Tube, Pick-Up	1
20	0501869	Strainer, Pick-Up Tube	1
21	0501519	Tie Wrap, Hose.....	2
22	0707142	Rotor Assembly.....	1
23	0706634	Element Tube Assy (45CC/Min).....	1
24	0506589	Screw, 6-32 x 7/8 Pan Head	2
25	0502666	Hose, 1/8" ID PVC (Clear).....	A/R
26	0505483	Label, Rinse Aid.....	1
-	109829	Detergent Pump Head Assy. (includes items 4, 6, 10-15)	
-	0709624	Detergent Pump/Motor Assy. (includes items 1, 4, 6-20)	
-	0708754	Rinse Aid Pump Assy (includes items 1, 6, 7, 19-26)	

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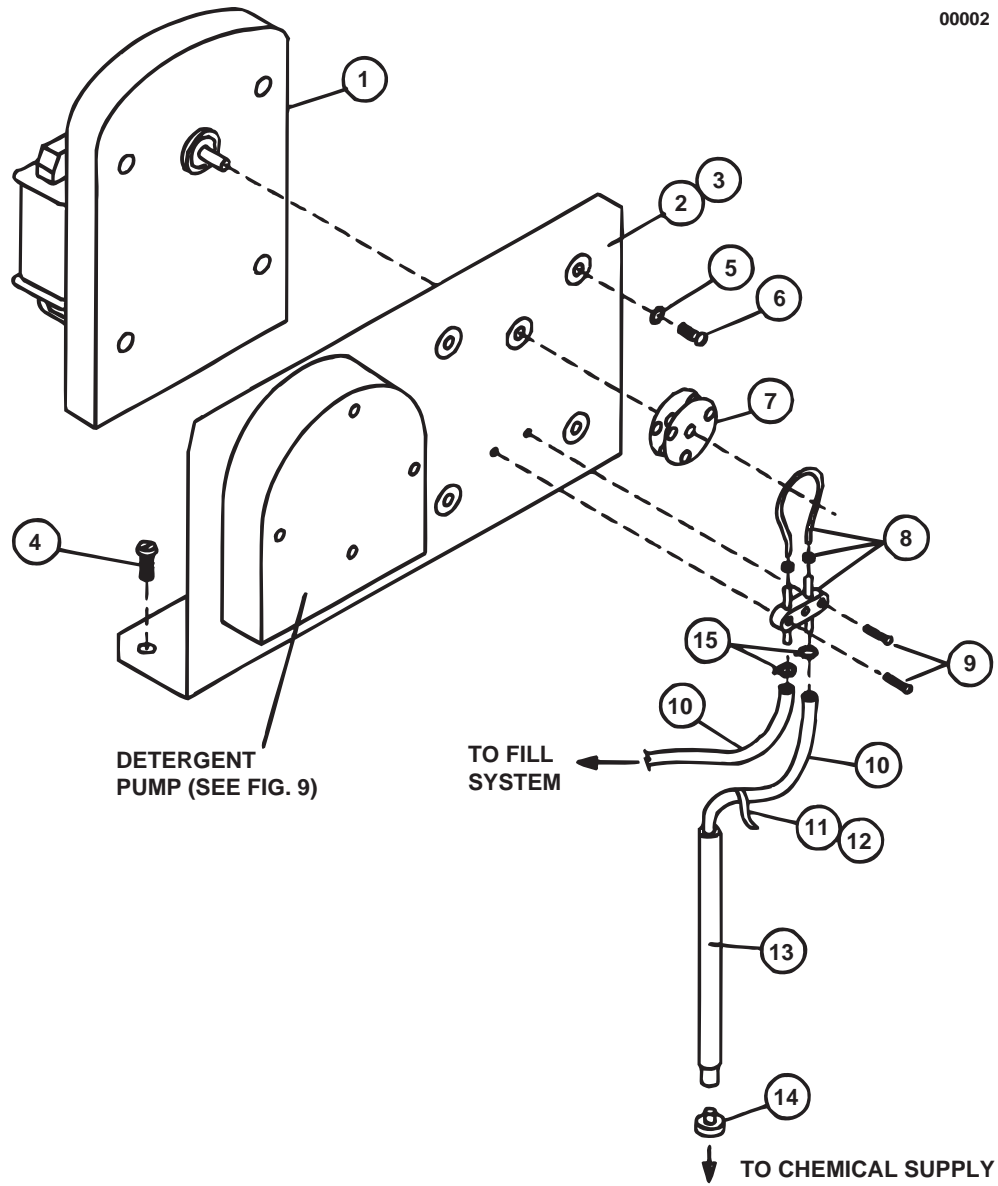


Figure 10 — Detergent/Sanitizer/Rinse-Aid Pump Assembly
(LT PLUS Only)

**DETERGENT/SANITIZER/RINSE-AID PUMP ASSEMBLIES
LT PLUS ONLY**

Fig. 10 Item No.	Part No.	Description	Qty
1	0503756	Motor, Pump.....	1
2	0308610	Bracket, Detergent/Rinse Pump	1
3	0308697	Bracket, Sanitizer Pump	1
4	0501412	Screw, 10-32 x 3/8" Lg. Truss Head.....	2
5	0501497	Washer, Lock #8 Split	4
6	0504822	Screw, 8-32 x 1/2" Lg. Pan Head	4
7	0707142	Rotor Assy.....	1
8	0706635	Element Tube Assy (45cc/min).....	1
9	0506589	Screw, 6-32 x 7/8" Lg. Pan Head	2
10	0502666	Hose, 1/8" I.D. PVC (Clear).....	A/R
11	0503694	Label, Sanitizer.....	1
12	0505483	Label, Rinse-Aid	1
13	0306363	Tube, Pick-Up	1
14	0501869	Strainer, Pick-up Tube	1
15	0501519	Tie Wrap, Hose.....	2
-	0709624	Detergent Pump Assy. (Includes Detergent Pump and Items 2, 5-9)	1
-	0708754	Rinse-Aid Pump Assy (Includes Items 1,3, 5-10, 12-15)	

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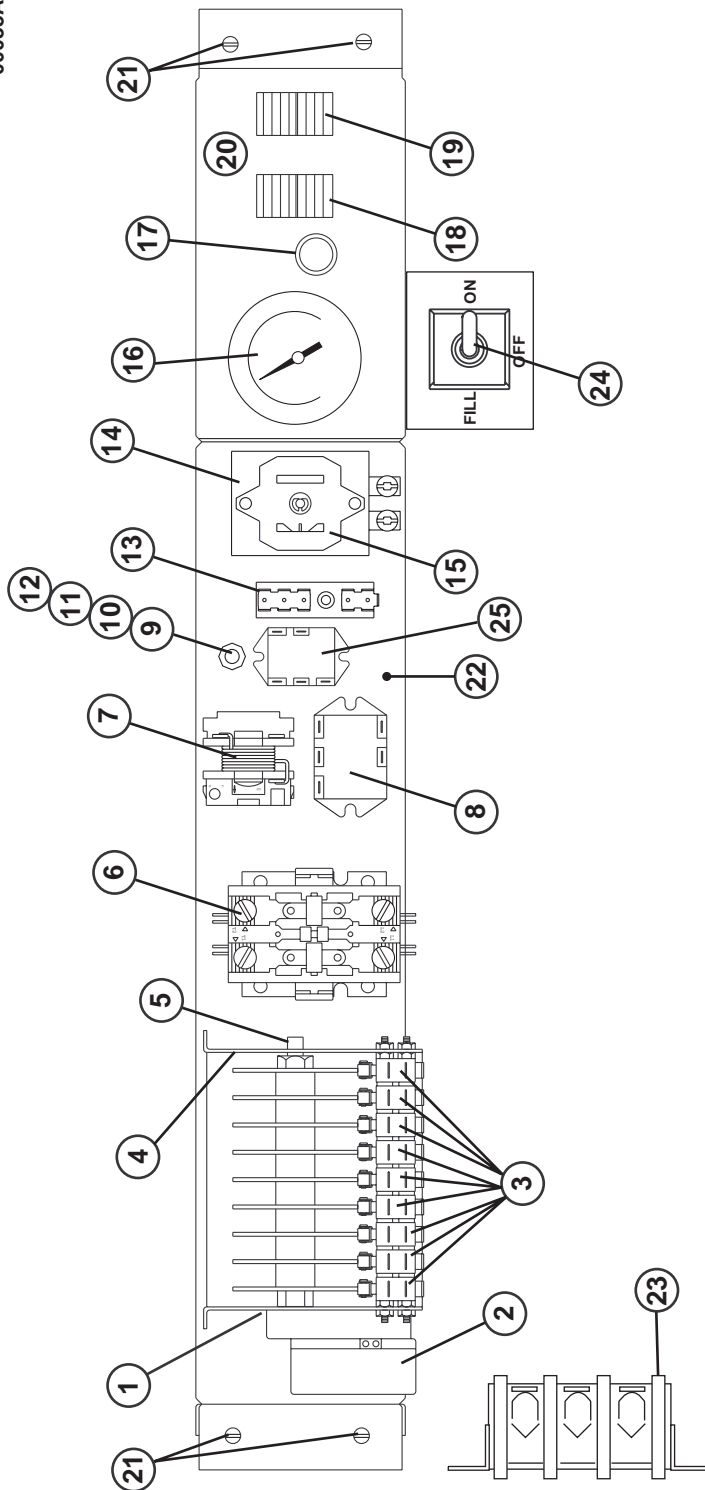


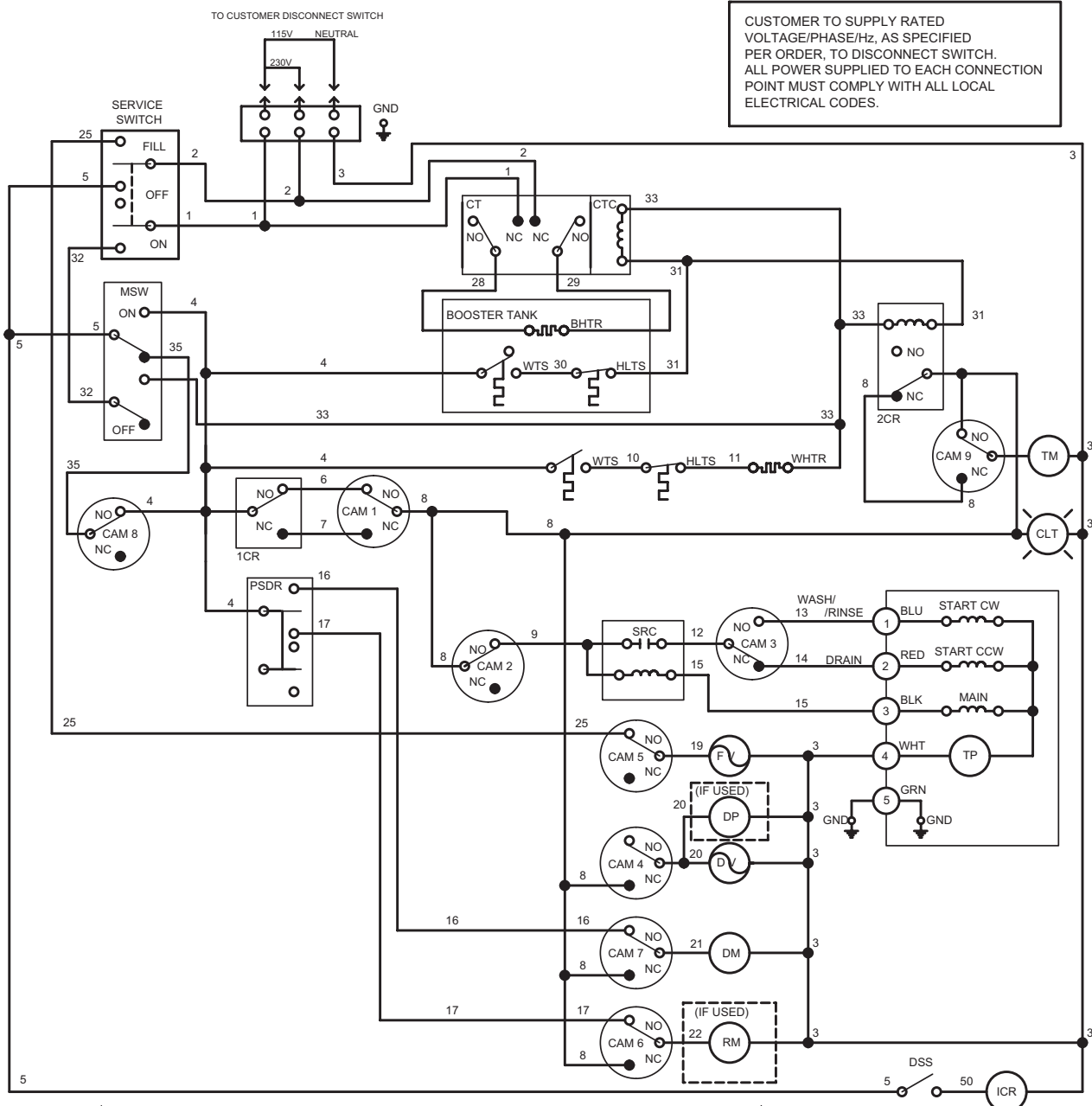
Figure 11 — Control Panel Assembly

CONTROL PANEL ASSEMBLY

Fig. 11 Item No.	Part No.	Description	Qty.
*1	0710583	Timer assy (HT PLUS Only) (Includes items 2-5)	1
*1	0708538	Timer assy (HTN PLUS Only) (Includes items 2-5)	1
*1	0708590	Timer assy (LT PLUS Only) (Includes Items 2-5)	1
2	0504956	Motor, timer.....	1
3	0501379	Switch, timer	A/R
4	0308644	Bracket, timer support (HTN PLUS)	1
4	0308645	Bracket, timer support (HT PLUS, LT PLUS)	1
5	0503701	Bearing, timer	1
6	111703	Contacto, 2 pole 50A, 240V (401 HT PLUS only) (Booster)...	1
7	0501358	Relay, motor start (115V, 50Hz).....	1
8	0509428	Relay, door safety switch (15A, 120VAC coil)	1
9	0501403	Screw (10-32 x 3/4 Rd Hd)	1
10	0501493	Washer, lock (#10 ext. tooth).....	1
11	0507709	Washer, flat (#10 ss)	2
12	0501533	Nut, plain (10-32 Brass)	2
13	0503749	Board, terminal.....	1
14	0310330	Bracket, thermostat (401 HT PLUS only).....	1
15	109069	Thermostat, booster (401 HT PLUS only)	1
16	113622	Thermometer, 4 ft. Gas Filled	1
17	0508551	Lamp, green.....	1
18	0501361	Switch, rocker (DPDT)	1
19	0501369	Switch, rocker (Spring return).....	1
20	0509568	Label, switch, overlay	1
20	0509626	French label, switch overlay	1
21	0501412	Screw (10-32 x 3/8" Truss Hd).....	4
22	0309579	Panel (sheet metal only)	1
23	0504951	Block, terminal (HT PLUS)	1
24	0501373	Switch, 3 position toggle	1
25	111069	Relay 2PDT 10A 240V	1
—	0510582	Harness, Control Box (HT PLUS) (Not Shown).....	1
—	0509608	Harness, Control Box (HTN PLUS) (Not Shown).....	1
—	0509611	Harness, Control Box (LT PLUS) (Not Shown)	1

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ELECTRICAL SCHEMATICS



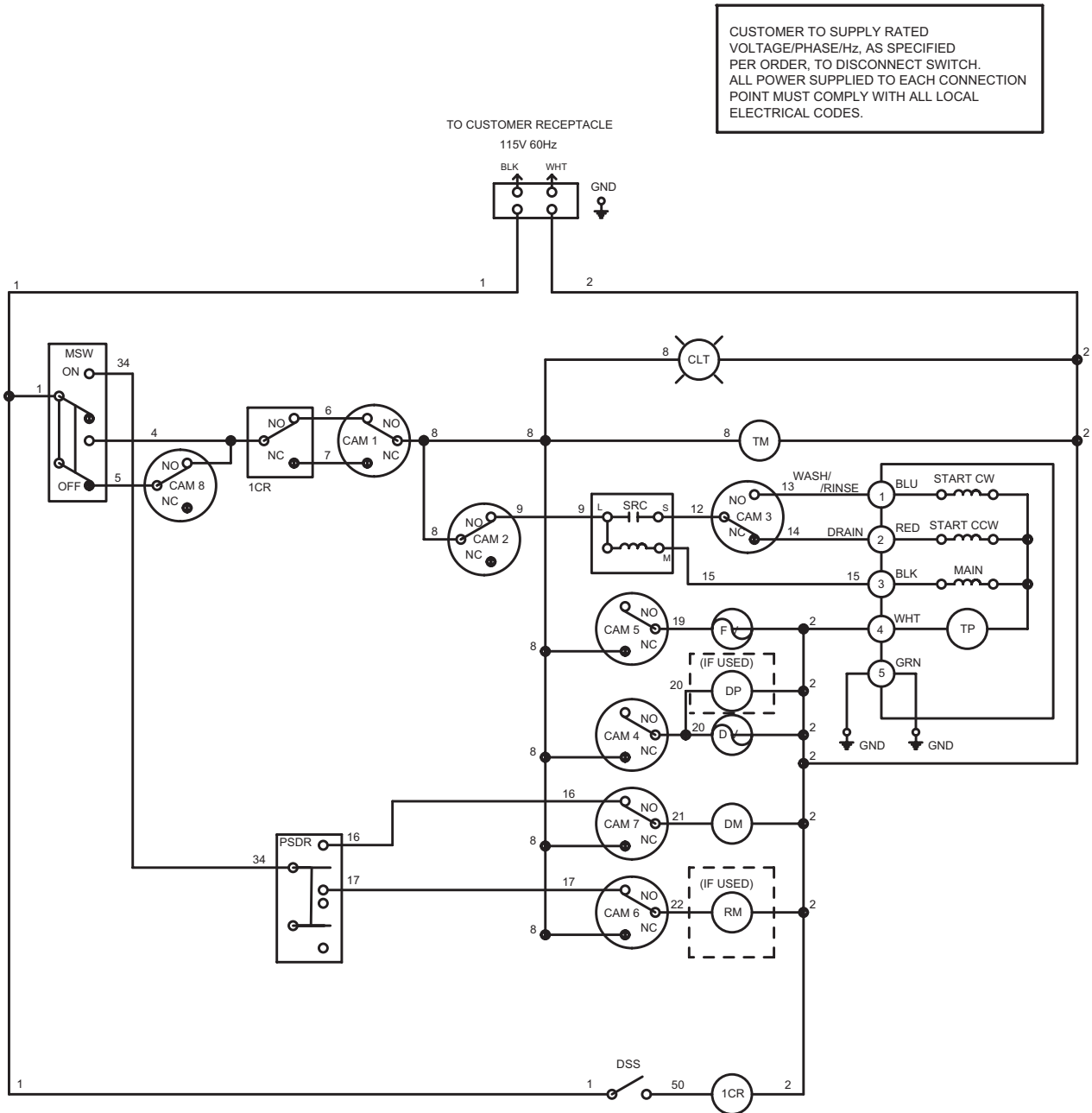
CUSTOMER TO SUPPLY RATED VOLTAGE/PHASE/Hz, AS SPECIFIED PER ORDER, TO DISCONNECT SWITCH. ALL POWER SUPPLIED TO EACH CONNECTION POINT MUST COMPLY WITH ALL LOCAL ELECTRICAL CODES.

BHTR	BOOSTER HEATER	CLT	CYCLE ON LIGHT	MSW	MAIN SWITCH ON/FILL/OFF/DRAIN	WTS	WATER THERMOSTAT
BLK	BLACK	CT	CONTACTOR	PSDR	PRIME SWITCH DETERGENT, RINSE		
BLU	BLUE	CTC	CONTACTOR COIL	1CR	RELAY		
CAM 1	HOMING	DM	DETERGENT MOTOR	2CR	RINSE SENTINEL RELAY		
CAM 2	PUMP MOTOR	DP	DRAIN PUMP (IF USED)	DSS	DOOR SAFETY SWITCH		
CAM 3	PUMP MOTOR REVERSING	DS	DOOR SWITCH	RM	RINSE MOTOR (IF USED)		
CAM 4	DRAIN	DV	DRAIN VALVE	SRC	CURRENT OPERATED START RELAY COIL		
CAM 5	FILL	EC/D	EXTENDED CYCLE/DELIME	SS	SERVICE SWITCH		
CAM 6	RINSE	FV	FILL VALVE	TM	TIMER MOTOR		
CAM 7	DETERGENT	GND	GROUND	TP	THERMAL PROTECTOR		
CAM 8	CYCLE	GRN	GREEN	WHT	WHITE		
CAM 9	RINSE SENTINEL	HLTS	HIGH LIMIT THERMOSTAT	WHTR	WATER HEATER		

A	REV	ECN	RELEASED TO PRODUCTION	SKH	JUL 28-03
			DESCRIPTION	BY	DATE

TOLERANCE	HOLE DIMENSIONS				ISSUED	SCHEMATIC 401+ SERIES HIGH TEMP		DRAWING NO. 0510652
DECIMAL	A		F		DR. CH. RTG.			
ANGLE	B		G					
SCALE 1:1	C		H					
FORMING DIMENSIONS ARE FROM BRAKELINE TO BRAKELINE UNLESS OTHERWISE NOTED	D		J					

Figure 12 — Electrical Diagram, 401-HT PLUS



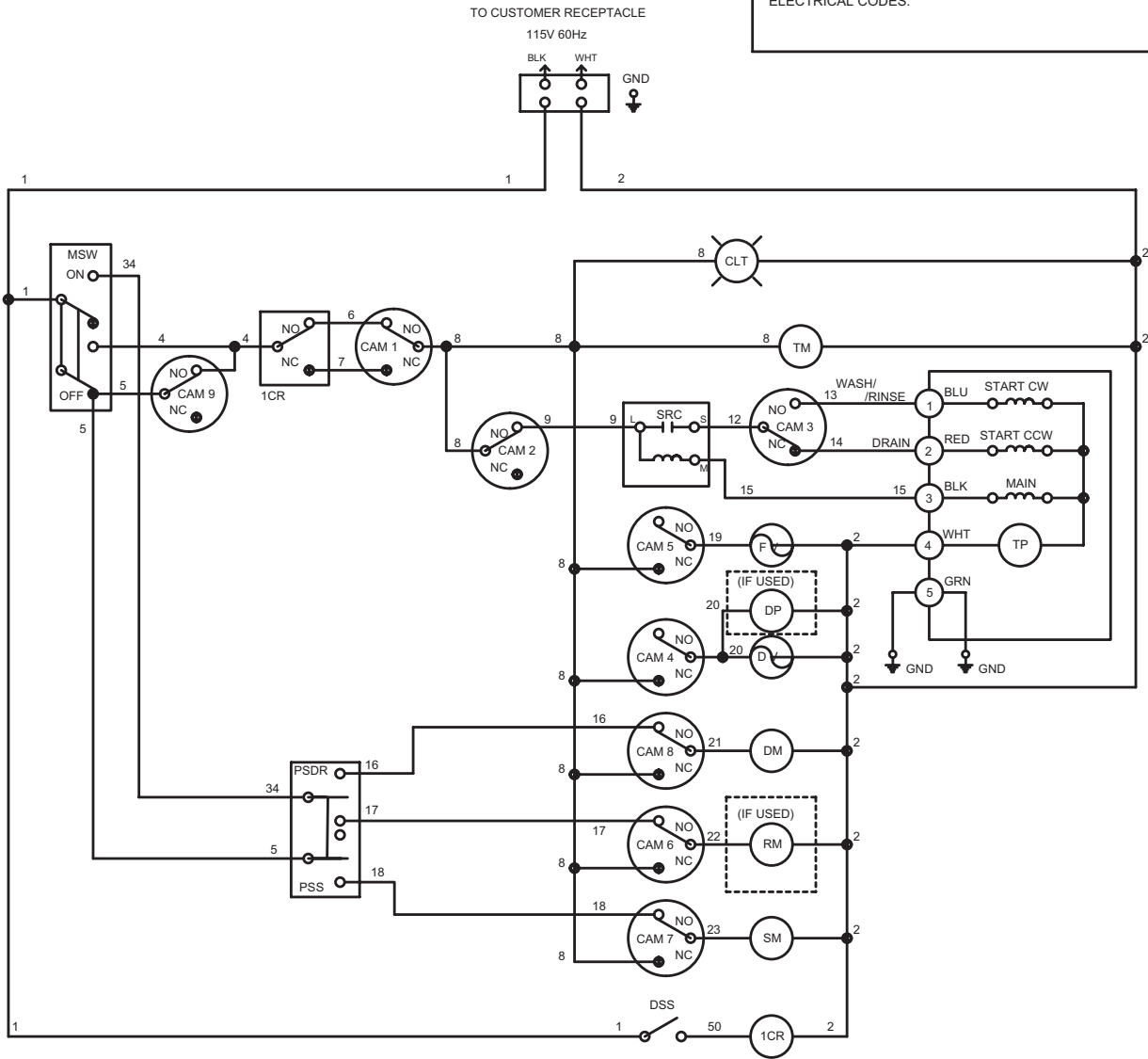
BLK	BLACK	CLT	CYCLE ON LIGHT	PSS	PRIME SWITCH SANITIZER
BLU	BLUE	DM	DETERGENT MOTOR	ICR	RELAY
CAM 1	HOMING	DP	DRAIN PUMP (IF USED)	DSS	REED SWITCH
CAM 2	PUMP MOTOR	RL	RELAY	RM	RINSE MOTOR (IF USED)
CAM 3	PUMP MOTOR REVERSING	DV	DRAIN VALVE	SRC	CURRENT OPERATED START RELAY COIL
CAM 4	DRAIN	FV	FILL VALVE	SM	SANITIZER MOTOR
CAM 5	FILL	GND	GROUND	TM	TIMER MOTOR
CAM 6	RINSE	GRN	GREEN	TP	THERMAL PROTECTOR
CAM 7	DETERGENT	HTLS	HIGH LIMIT THERMOSTAT	WHT	WHITE
CAM 8	CYCLE	MSW	MAIN SWITCH ON/FILL/OFF/DRAIN	WHTR	WATER HEATER
		PSDR	PRIME SWITCH DETERGENT, RINSE	WTS	WATER THERMOSTAT

A	RELEASED TO PRODUCTION	SKH	AUG 01/03
	DESCRIPTION	BY: CH	DATE

TOLERANCE		HOLE DIMENSIONS		ISSUED	SCHEMATIC 401+ SERIES HTN	
DECIMAL	A	F				
ANGLE	B	G		DR. CH. RTG.		
SCALE	C	H				
FORMING DIMENSIONS ARE FROM BRACKLINE TO BRACKLINE UNLESS OTHERWISE NOTED						

Figure 13 — Electrical Diagram, 401-HTN PLUS

CUSTOMER TO SUPPLY RATED VOLTAGE/PHASE/HZ, AS SPECIFIED PER ORDER, TO DISCONNECT SWITCH. ALL POWER SUPPLIED TO EACH CONNECTION POINT MUST COMPLY WITH ALL LOCAL ELECTRICAL CODES.



BLK	BLACK	CLT	CYCLE ON LIGHT	PSS	PRIME SWITCH SANITIZER
BLU	BLUE	DM	DETERGENT MOTOR	ICR	RELAY
CAM 1	HOMING	DP	DRAIN PUMP (IF USED)	DSS	REED SWITCH
CAM 2	PUMP MOTOR	RL	RELAY	RM	RINSE MOTOR (IF USED)
CAM 3	PUMP MOTOR REVERSING	DV	DRAIN VALVE	SRC	CURRENT OPERATED START RELAY COIL
CAM 4	DRAIN	FV	FILL VALVE	SM	SANITIZER MOTOR
CAM 5	FILL	GND	GROUND	TM	TIMER MOTOR
CAM 6	RINSE	GRN	GREEN	TP	THERMAL PROTECTOR
CAM 7	SANITIZER	HTLS	HIGH LIMIT THERMOSTAT	WHT	WHITE
CAM 8	DETERGENT	MSW	MAIN SWITCH ON/FILL OFF/DRAIN	WHTR	WATER HEATER
CAM 9	CYCLE	PSDR	PRIME SWITCH DETERGENT, RINSE	WTS	WATER THERMOSTAT

A	REV	ECN	RELEASED TO PRODUCTION	SKH	AUG 01-03
	REV	ECN	DESCRIPTION	BY CH	DATE

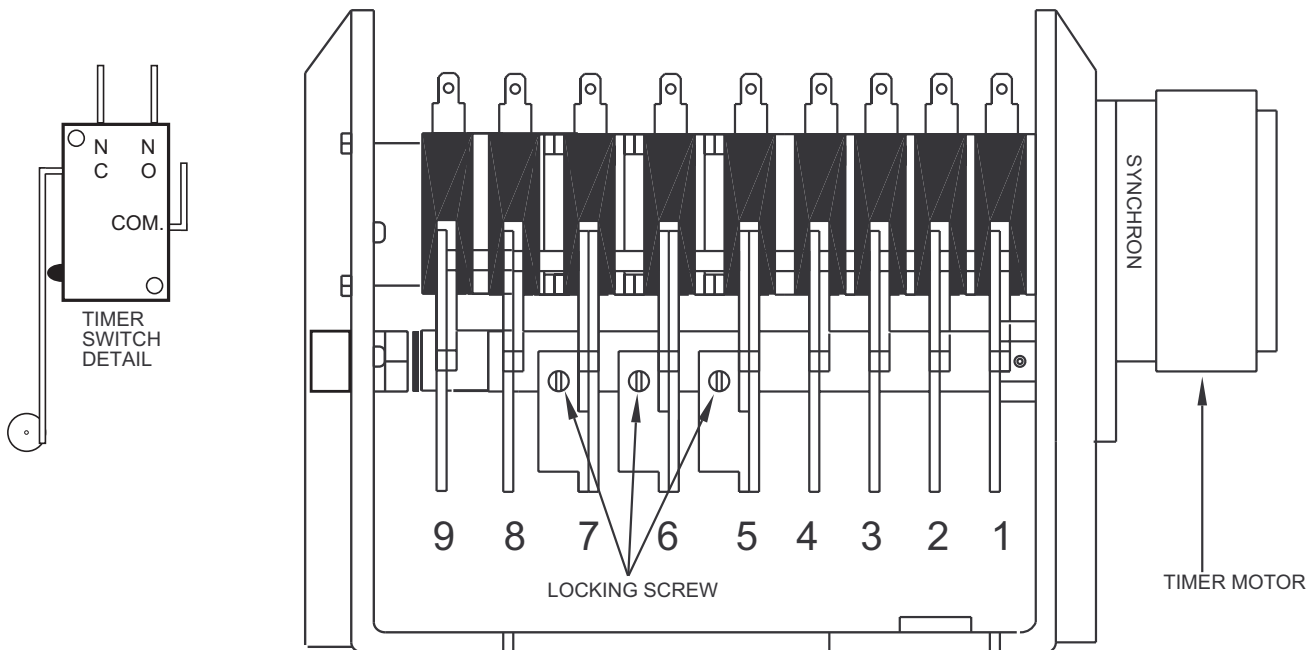
TOLERANCE		HOLE DIMENSIONS		ISSUED	SCHEMATIC 401+ SERIES LOW TEMP	
DECIMAL	A	F			DR. CH. RTG.	
ANGLE	B	G				
SCALE 1:1	C	H				
FORMING DIMENSIONS ARE FROM BRACKLELINE TO BRACKLELINE UNLESS OTHERWISE NOTED						
	D	J				

Figure 14 — Electrical Diagram, 401-LT PLUS

TIMING CHART 401-HTM2

CAM	TIME IN SECS	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	
1	HOMING CAM																	145-150
2	WASH PUMP FORWARD=WASH	0-80													120-140			
2	WASH PUMP REVERSE=DRAIN									80-110								
3	WASH PUMP REVERSING CAM								70-105									
4	DRAIN VALVE DRAIN PUMP OPTIONAL									80-110								
5	FILL VALVE											100-105		120-140				
6	RINSE PUMP OPTIONAL													115-120				
7	DETERGENT PUMP	0-5																
8	AUTO-FILL DRAIN													120-140				
9	RINSE SENTRY								70-75									

If booster thermostat is calling for heat, cam 9 will pause wash cycle until it reaches 82 C/180 F.

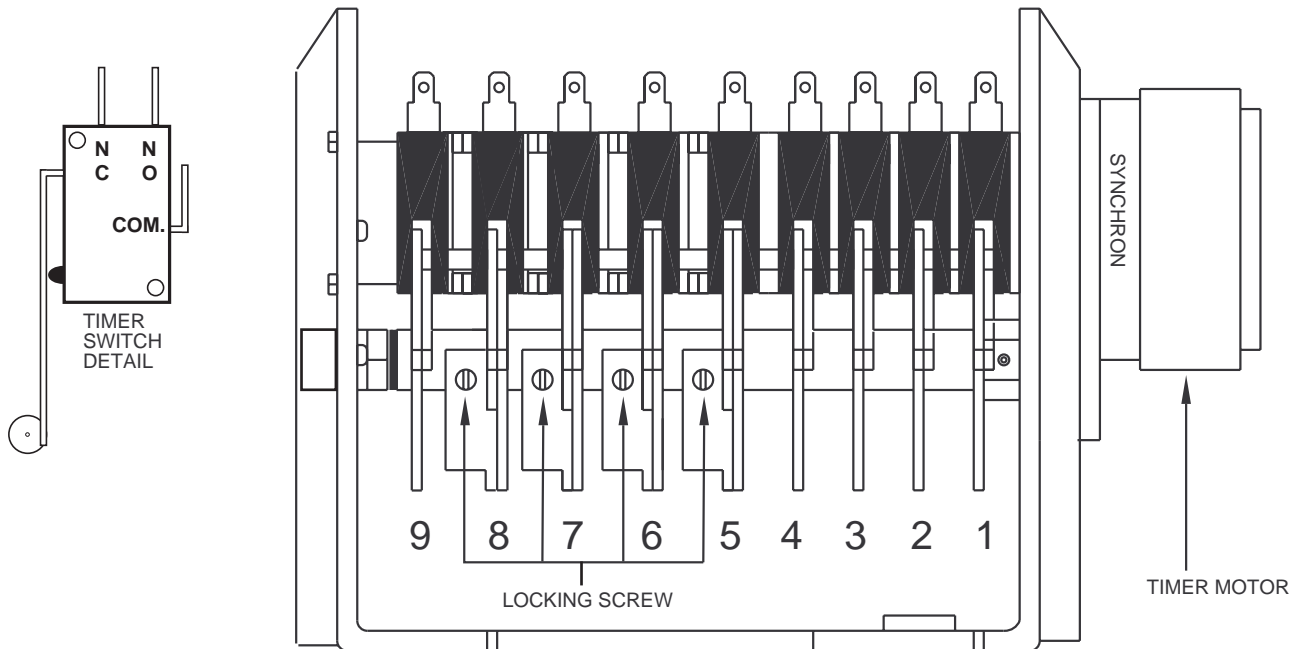


TIMER ASSEMBLY 401-HTM2

Figure 15 — Timer Chart and Diagram, 401-HT PLUS, 401-HTN PLUS

TIMING CHART 401-LTM2

CAM	TIME IN SECS	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	
1	HOMING CAM																	
2	WASH PUMP FORWARD=WASH																	
2	WASH PUMP REVERSE=DRAIN																	
3	WASH PUMP REVERSING CAM																	
4	DRAIN VALVE DRAIN PUMP																	
5	FILL VALVE																	
6	RINSE PUMP																	
7	SANITIZER PUMP																	
8	DETERGENT PUMP																	
9	AUTO-FILL DRAIN																	



TIMER ASSEMBLY 401-LTM2

Figure 16 — Timer Chart and Diagram, 401-LT PLUS

