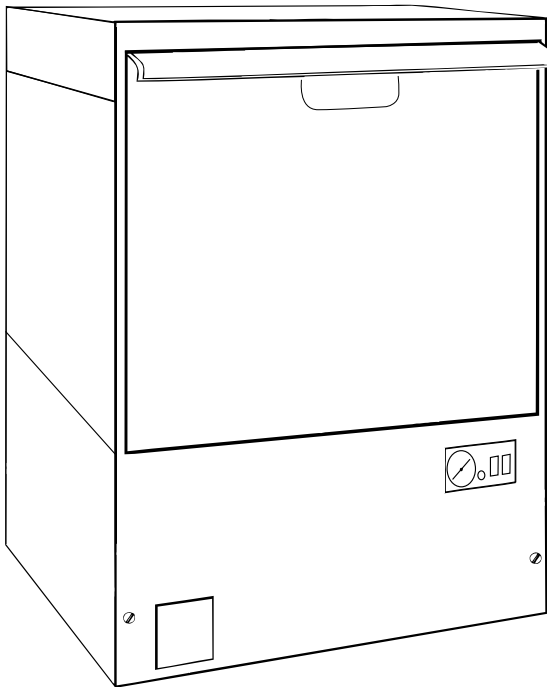




Simply Engineered Better

Technical Manual

Undercounter Dishwasher



Model

401-HT

401-HTN

401-LT

Machine Serial No.

February, 2003

Manual P/N 0509604 REV. G

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

U.S. For Export Customers

1-336-661-1992

1-800-228-8350

1-336-661-1660

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
02/28/97	All	7791	Issue of manual and replacement parts lists.
09/09/98	27	7791	Changed booster tank part number.
09/09/98	29	7791	Changed item 15 hose part number.
02/28/00	40, 41, 42, 43	7791	Revised electrical schematic.
07/21/00	17, 23, 37	7791	Revised part numbers.
08/22/01	21	—	Revised part numbers.
12/12/01	27	—	Revised fill hose part number.
11/04/02	17	—	Revised part number for front panel.
11/04/02	23	—	Revised part number for pump assembly.
11/04/02	37	—	Revised part number for control cabinet.
2/5/03	37	—	Revised part number 108391 to 113622 .

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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 401** 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 | -Wash/rinse arm |
| -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 | |
| -Pumped drain (to 3 ft/1m) (vertical) | |

This series of dishwashers is available in the following models:

Model Numbers

401-HT, 401-HTN, 401-LT

- The 401-HT model is a high temperature (82°C/180°F rinse) sanitizing model with booster.
- The 401-HTN model is a high temperature (82°C/180°F rinse) sanitizing model without booster.
- The 401-LT model is a low temperature (60°C/140°F rinse) sanitizing model for use with 5.25% or 8.4% sodium hypochlorite solution (chlorine bleach) as a sanitizing agent. The rinse aid pump is optional.

Options

- Kit 512 - Detergent pump (P/N [0709624](#))
- 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 508 - Rinse aid pump kit (P/N [0708754](#))
- 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)

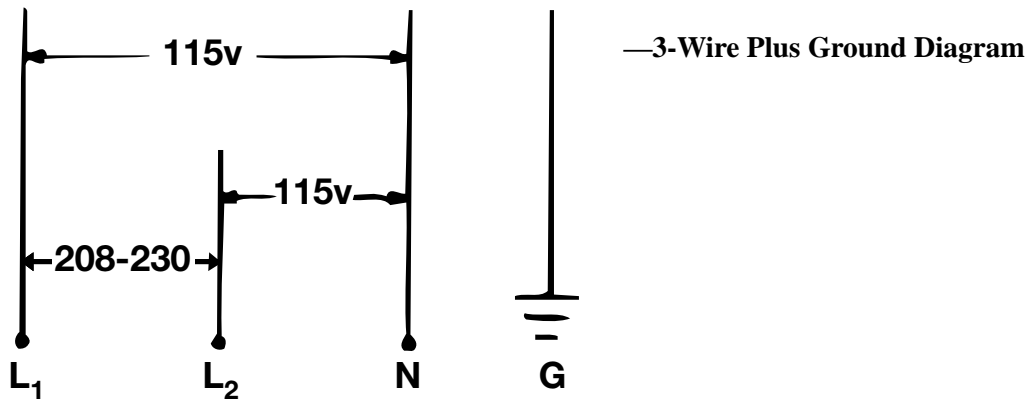
Electrical Power Requirements

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

Detergent/Chemicals

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

1. Your machine may be fitted with an optional 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. An optional rinse aid pump may be added for 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 is supplied with chemical sanitizer dispensing pump. Using a 5.25% or 8.4% sodium hypochlorite solution, 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

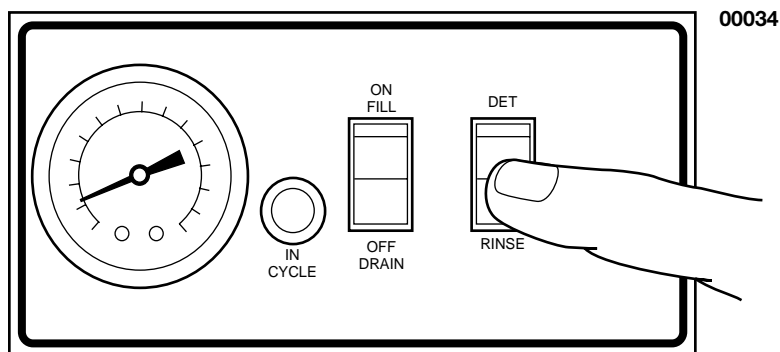
1. Remove any foreign material from inside the machine.
2. Center the scrap screen over the sump opening.
3. Prime the booster using the following procedure (if applicable).



CAUTION:

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

- a. Open the dishwasher door.
- b. Make sure the On-Fill/Off-Drain switch is in the Off-Drain position.
- c. Push the Detergent/Rinse prime switch “down” to the Rinse position.
- d. Hold the prime switch in the Rinse position until you observe water entering the wash tank. The water inlet port is on the lower right side of the tank interior.
- e. Release the switch. You have completed the booster priming process.



WARNING:

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

4. Check the machine for water leaks by depressing the ON/FILL switch on the front panel, then close and latch the door. This allows the tank to automatically fill by using the rinse cycle. Check for leaks.
5. Open the door and check the water level. The water level should be 1/2" over the scrap screen.
6. Depress the OFF/DRAIN switch, 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.
7. Replace the front panel. Installation is now complete.

OPERATION

Operation Summary (See Timer Chart in back of manual)

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.
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.
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. **The door must remain open for 5 seconds to allow the timer to reset before starting another cycle.**

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, 401-HTN - **66°C/150°F.**
 - 401-LT - **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 cycle 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 and 401-HTN and 60°C/140°F for model 401-LT.
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 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 **OFF/DRAIN** switch to **OFF** and close and latch the door to drain the tank.
2. Open the door and remove the lower spray arm 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 arm to remove any debris from spray openings. Do not strike the spray arm against solid objects.
6. Reinstall the scrap screen and spray arm.
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.

Deliming

Your dishwasher should be delimed regularly as required. This 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.

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



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.

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. For chemical sanitizing Model 401-LT, re-prime sanitizer chemical line and run an additional cycle to flush any excess sanitizer from machine.
7. Drain the dishwasher. Deliming is complete.

Maintenance Schedule

- **As Required**
 1. Check the temperature gauge reading.
 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 arm 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 (if equipped). 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/OFF 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. If 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.

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 arm is clean.
3. Scrap screen is properly positioned and clean.
4. Thermostat is at the correct setting.
5. Sanitizer, detergent, and rinse additive dispensers (if equipped) 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 arm 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-LT 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 arm 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 arm Check scraping procedures Use proper racks - do not overload racks Unclog wash arm 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

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REPLACEMENT PARTS

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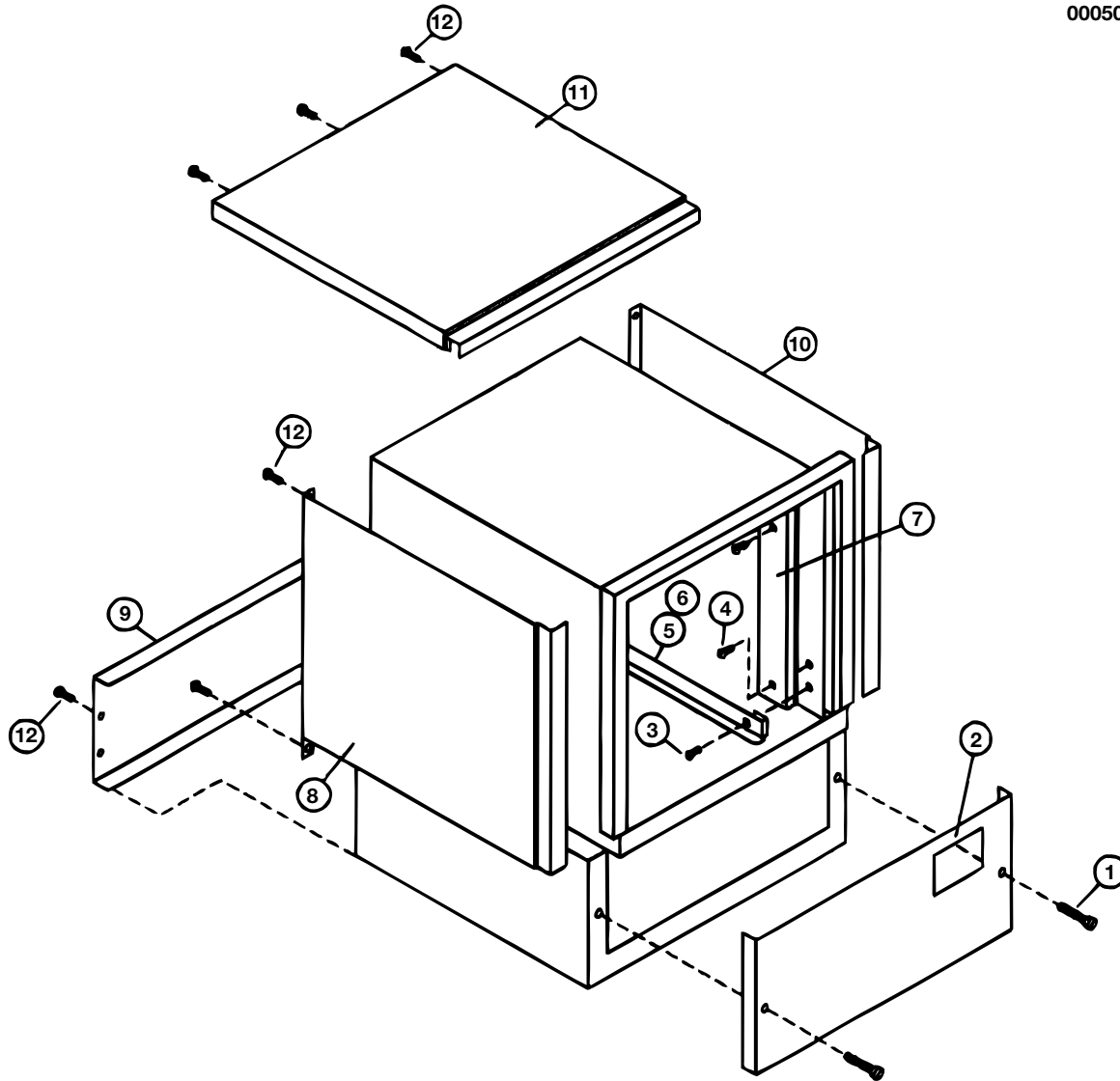


Figure 1 — Track and Panel Assembly

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	1
10	0308737	Panel, RH Side	1
11	0308735	Panel, Top	1
12	0501412	Screw, 10-32 x 3/8" Lg. Truss Head	10

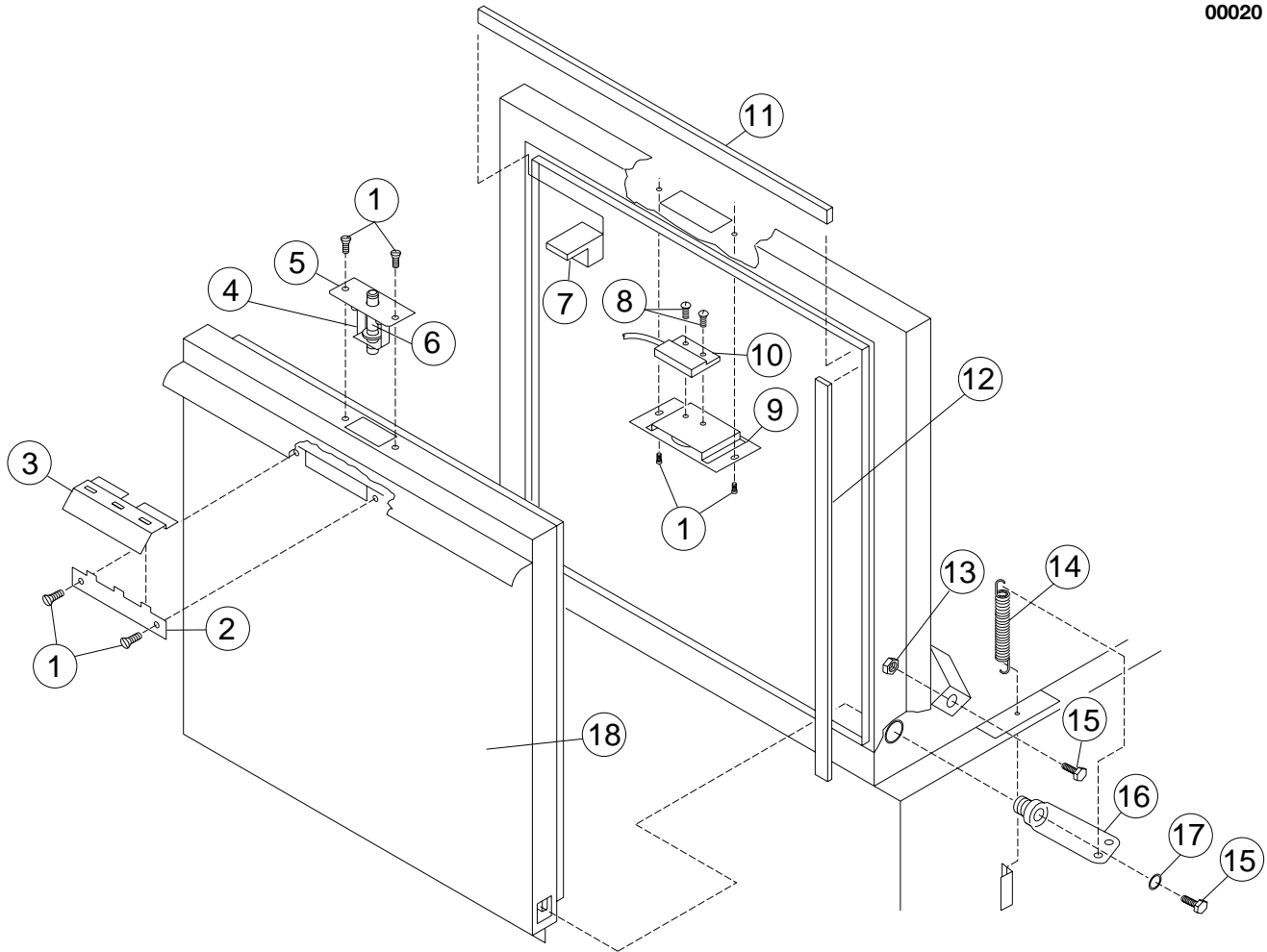


Figure 2 — Door and Switch Assembly

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)	

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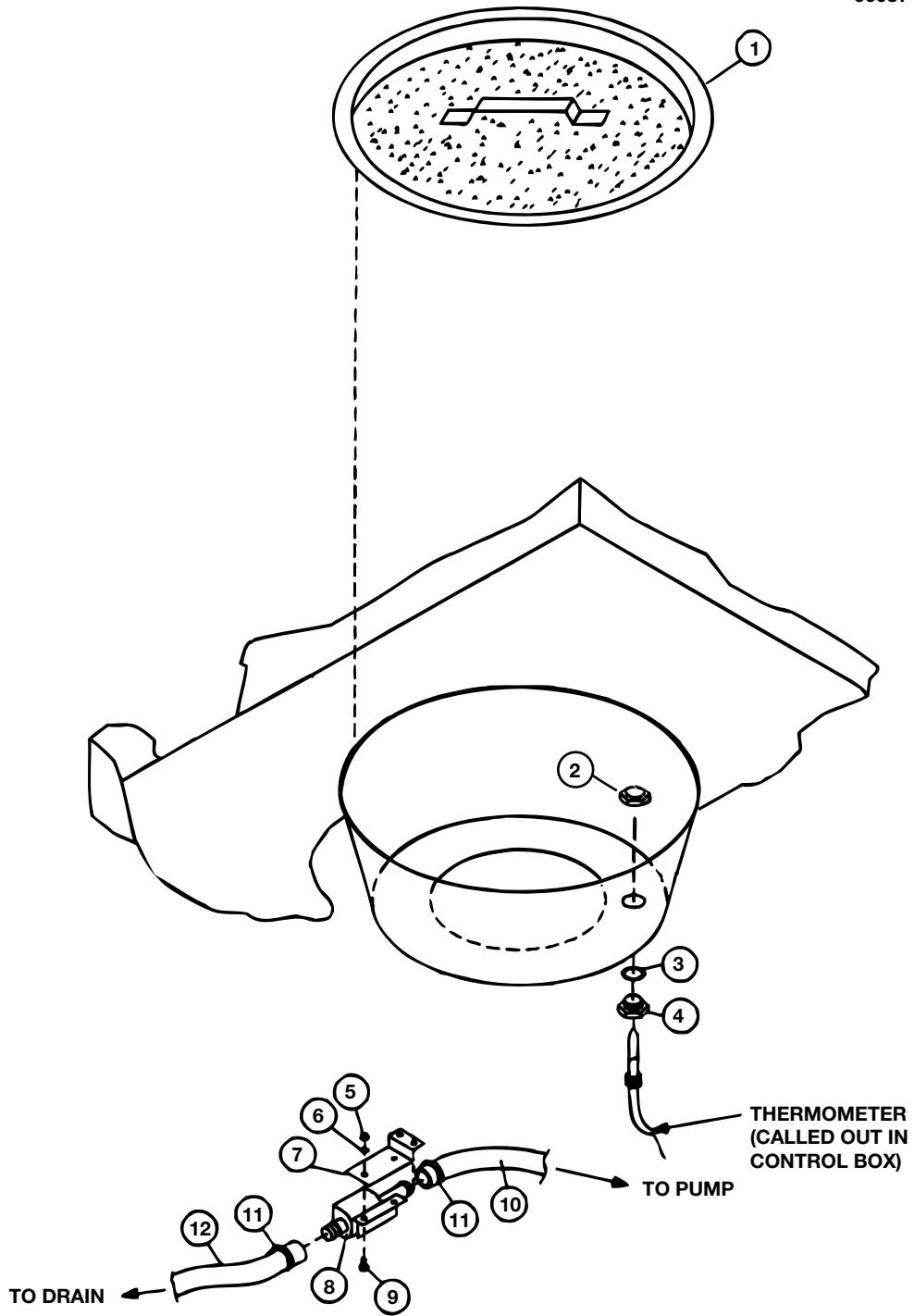


Figure 3 — Tank/Drain Assembly

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	0501539	Nut, Plain 1/4-20	2
6	0501501	Washer, Lock, 1/4" Split.....	2
7	0308611	Support, Drain Valve	1
8	0306618	Valve, Drain.....	1
9	0501418	Screw, 1/4-20 x 1/2" Lg. Round Head	2
10	0507265	Hose, 5/8" ID x 7/8" OD PVC Braided (3 ft.)	2
11	0510082	Clamp, hose	2
12	0509302	Hose 5/8" ID x 1" OD Braided PVC	1

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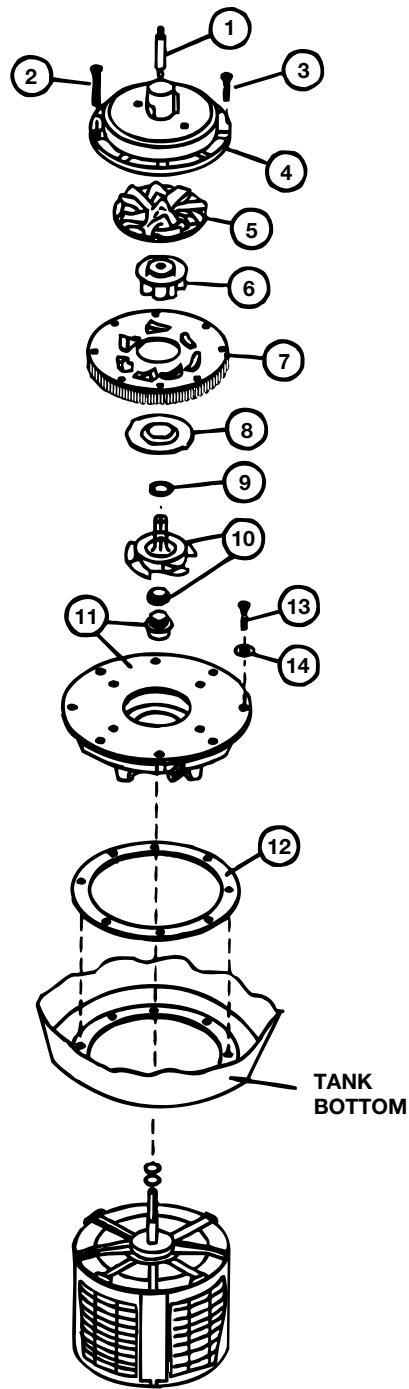


Figure 4 — Pump Assembly

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	0502742	Housing, Top (No Hole).....	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
*-	0508973	Pump/Motor Assembly (50/60 Hz, 220V) (Export machines) ..	1
*-	0710072	Pump/Motor Assembly (50/60 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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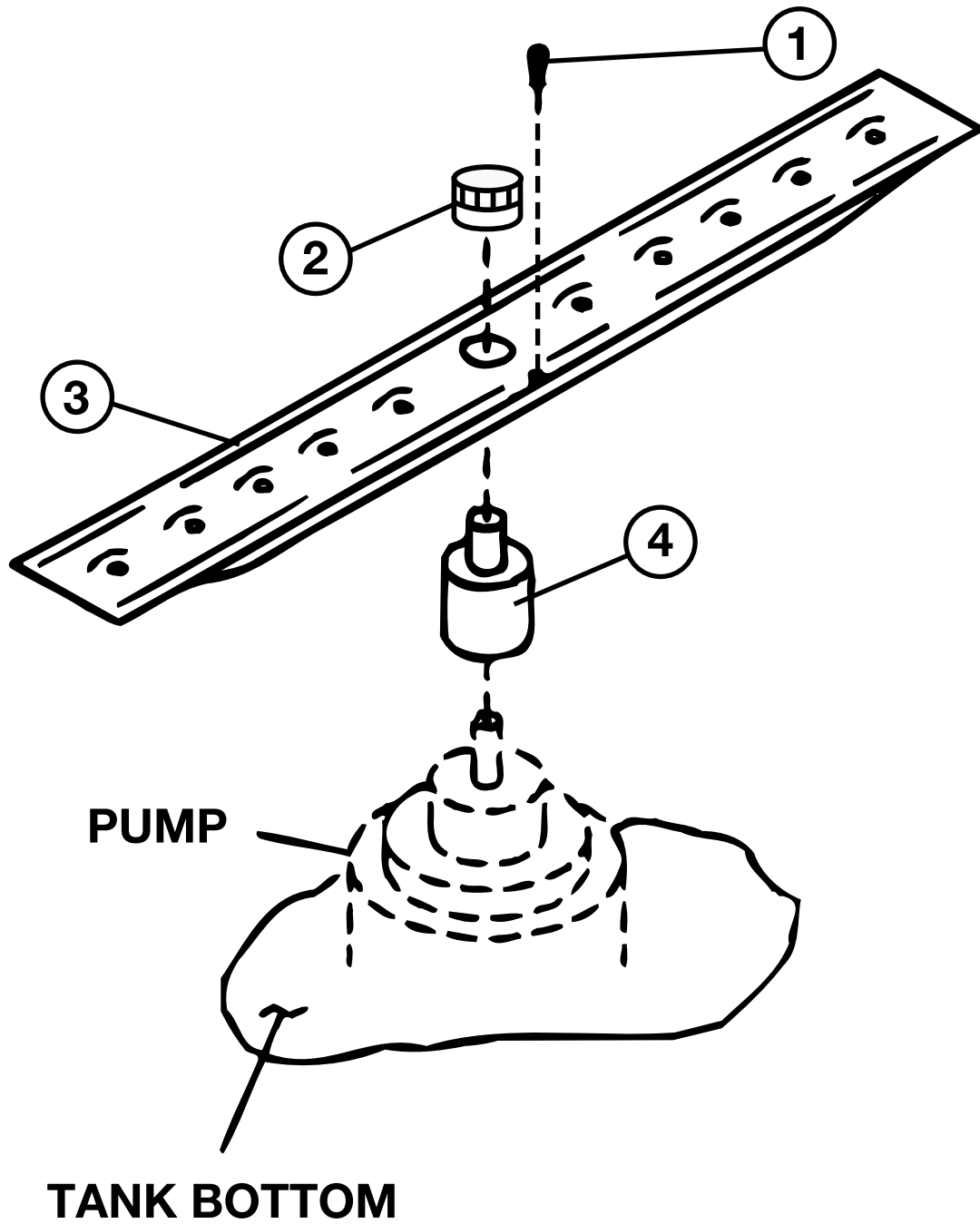


Figure 5 — Wash System Assembly

WASH SYSTEM ASSEMBLY

Fig. 5 Item No.	Part No.	Description	Qty
1	0501563	Screw, #8 x 3/8" (Sheet Metal) Truss Head	4
2	0501684	Nut, Spray Arm Lock	1
3	0705049	Wash Arm, Lower	1
4	0508540	Bushing, Lower Wash Arm	1

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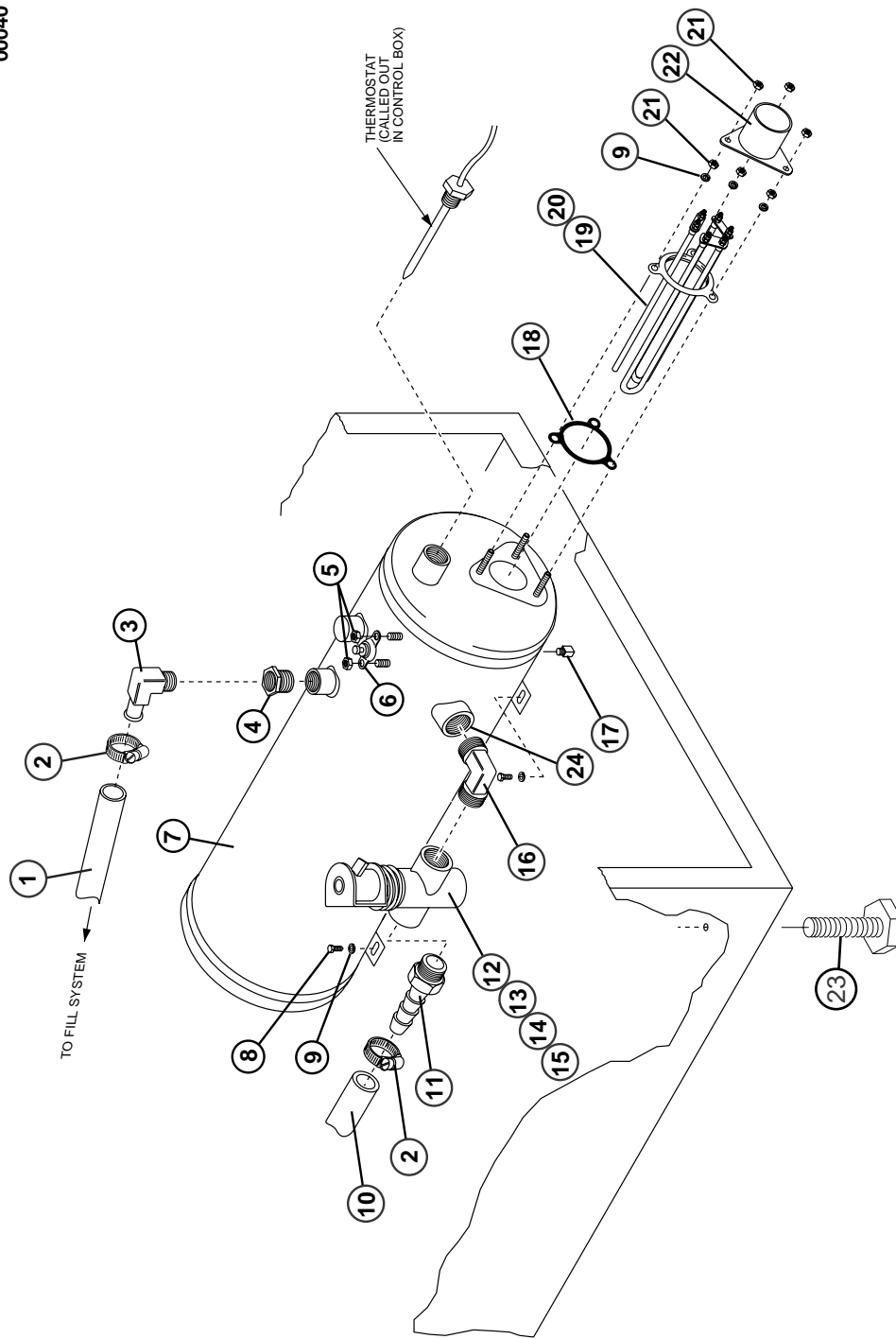


Figure 6 — Booster Assembly and Water Inlet Piping (HT Only)

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

Fig. 6 Item No.	Part No.	Description	Qty.
1	0509214	Hose, 1/2" I.D.....	3 ft.
2	0503679	Clamp, hose.....	2
3	0502653	Elbow, 3/8 MPT X1/2 Hose x 90°.....	1
4	0508840	Bushing, reducing 3/4 NPT x 3/8 NPT Brass	1
5	108954	Nut, grip 6-32 w/nylon insert	2
6	110562	Thermostat, high limit	1
7	0509607	Tank, booster (tank only)	1
8	0501419	Bolt (1/4-20 x 1/2" Hex Hd).....	2
9	0501501	Washer, lock 1/4 split	2
10	0509526	Hose 1/2" x 7'	1
11	0502618	Coupler, 3/8 MPT x 1/2.....	1
12	0504952	Valve, solenoid (3/8 NPT).....	1
13	0502811	Repair kit, 3/8" valve.....	1
14	0505235	Coil, 115V 3/8" valve.....	1
15	0504958	Flow washer, 3/8" valve	1
16	0509606	Elbow, reducing 1/2 MPT x 3/8 MPT 90°	1
17	0508817	Plug, pipe 1/8"	1
18	109985	O ring, gasket	1
*19	111233	Heater element, 9KW (70° rise) 208/230V 1PH (existing 70° rise)	1
*19	0708753	Conversion Kit 410° to 70° Rise.....	AR
20	111235	Heater element, 6KW (40° rise) 208/230V 1PH.....	1
21	0501539	Nut, plain 1/4-20	6
22	107908	Cover, heater element.....	1
23	0503718	Foot, adjustable	4
24	100171	Bushing, reducing face 3/4" to 1/2" Brass (not shown)	1

* When converting machine contact factory with serial number. Kit is supplied with new data plate for machine. Factory will supply jumper settings for element at time of installation.

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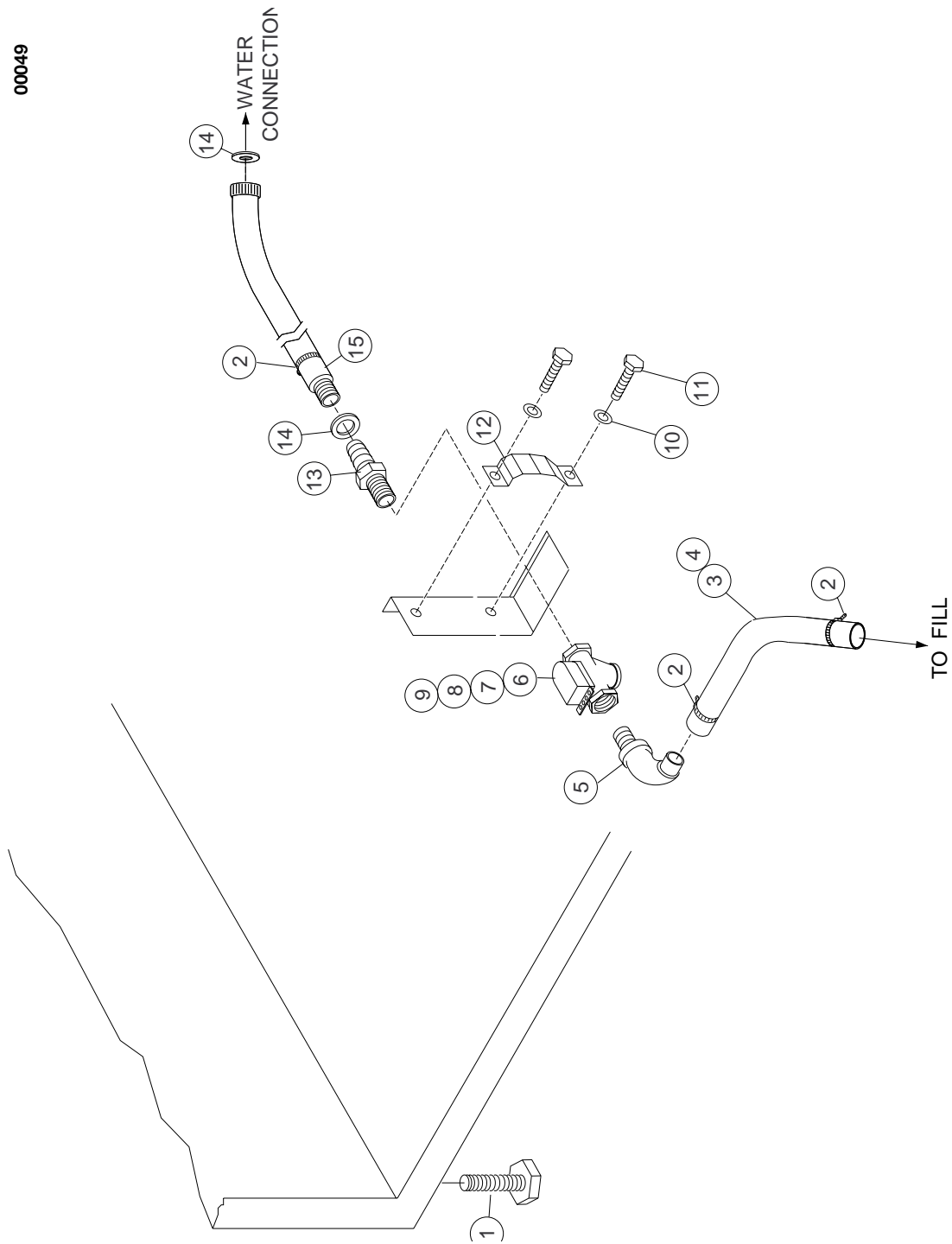


Figure 7 — Water Inlet Piping
(HTN, LT Only)

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

Fig. 7 Item No.	Part No.	Description	Qty
1	0503718	Foot, adjustable	4
2	0503679	Clamp, hose	3
3	0502665	Hose, 1/2" I.D. clear braided (LT Only).....	3 ft.
4	0509214	Hose, 1/2" I.D. white (HTN 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 x 1/2" 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	2
15	0509526	Hose, coupled	1

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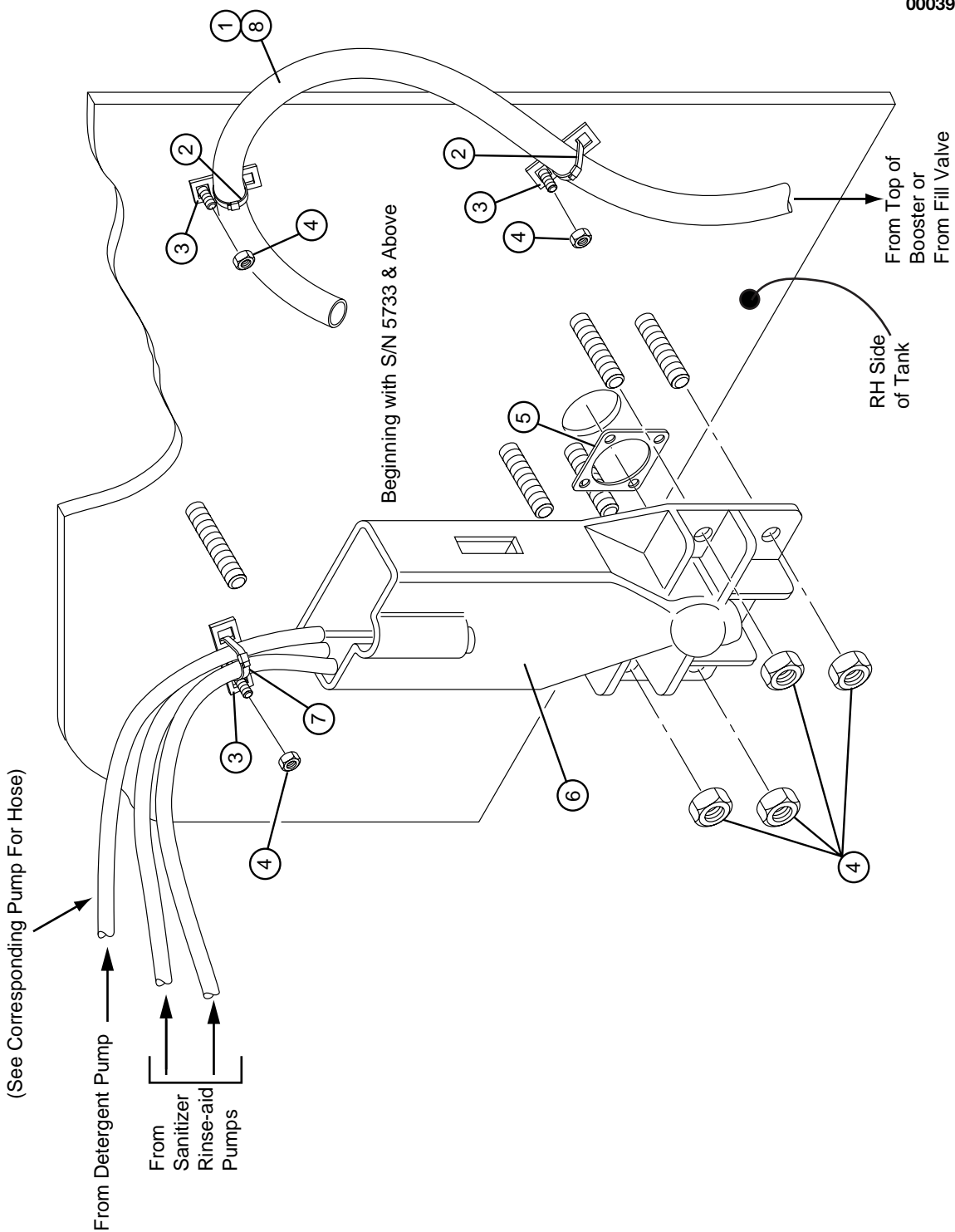


Figure 8 — Fill System

FILL SYSTEM

Fig. 8 Item No.	Part No.	Description	Qty
1	0502665	Hose, 1/2" I.D. Clear Braided (HTN, LT)	A/R
2	0501518	Tie Wrap, Hose.....	2
3	106090	Bracket, Tie Wrap.....	2
4	107966	Nut, Grip, 10-32 w/Nylon Insert	8
5	0509048	Gasket, Inlet Chute	1
6	0508867	Inlet Chute	1
7	0501519	Tie Wrap, Chemical Hose	3
8	0509214	Hose, Fill 1/2" I.D. (White).....	3 ft.

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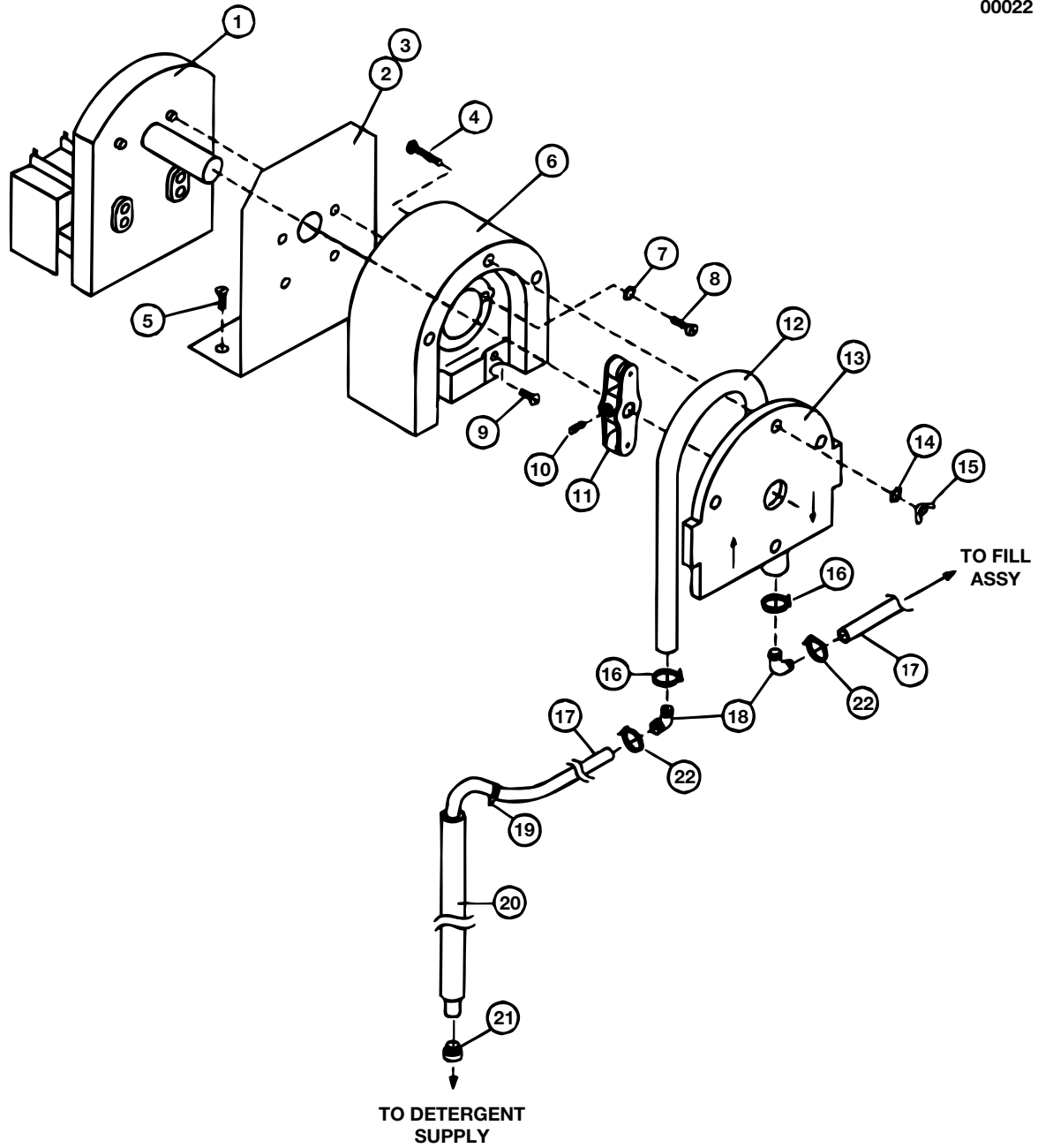


Figure 9 — Detergent Pump Assembly (optional)

DETERGENT PUMP ASSEMBLY (OPTIONAL)

Fig. 9 Item No.	Part No.	Description	Qty
1	0503757	Motor, Pump.....	1
2	0308637	Bracket, Detergent Pump (except LT).....	1
3	0308610	Bracket, Detergent/Sanitizer Pumps (LT)	1
4	N/A	Screw, M4 x 35mm Hex Head	4
5	0501412	Screw, 10-32 x 3/8" Lg. Truss Head	2
6	N/A	Housing, Pump	1
7	0501497	Washer, Lock #8 Split	2
8	0504822	Screw, 8-32 x 1/2" Lg. Pan Head	2
9	0501425	Screw, 8-32 x 5/8" Round Head.....	2
10	N/A	Screw, Set M6 x 8mm	1
11	N/A	Rotor Assembly.....	1
12	108194	Hose, Pump	1
13	N/A	Cover, Pump Housing	1
14	N/A	Washer, Flat M4	4
15	N/A	Nut, Wing M4.....	4
16	0501519	Tie Wrap, Hose.....	2
17	0502667	Hose, Detergent, 1/4" I.D. PVC (Clear).....	A/R
18	0502644	Elbow, 1/4" O.D. x 90° Barbed.....	2
19	0503695	Label, Detergent.....	1
20	0306363	Tube, Pick-Up	1
21	0501869	Strainer, Pick-Up Tube	1
22	0501519	Tie Wrap, Hose.....	2
-	109829	Pump Head Assy. (includes items 4, 6, 10-15)	
-	0708559	Pump/Motor Assy. (includes items 1, 2, 4, 6-16, 18)	

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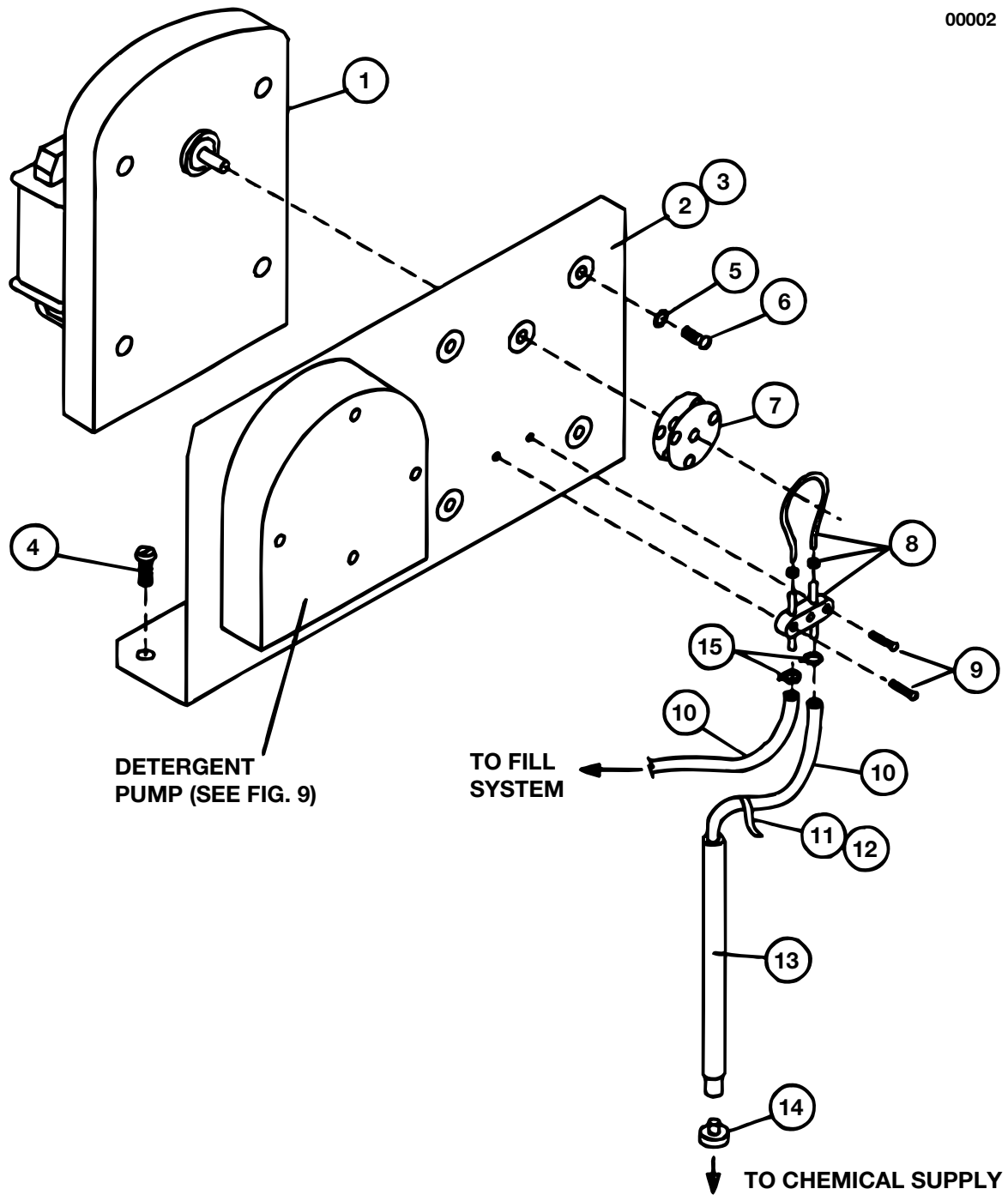


Figure 10 — Sanitizer/(Optional) Rinse-Aid Pump Assembly

**SANITIZER/(OPTIONAL) RINSE-AID PUMP ASSEMBLY
LT**

Fig. 10 Item No.	Part No.	Description	Qty
1	0503756	Motor, Pump.....	1
2	0308610	Bracket, Detergent/Rinse Pump (Optional).....	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 (Optional).....	1
13	0306363	Tube, Pick-Up	1
14	0501869	Strainer, Pick-up Tube.....	1
15	0501519	Tie Wrap, Hose.....	2
-	0708561	Detergent Pump Assy. (HT & LT) (Optional)..... (Includes Detergent Pump and Items 2, 5-9)	1
-	0708754	Rinse-Aid Pump Assy. (Optional) (Includes Items 1,3, 5-10, 12-15)	

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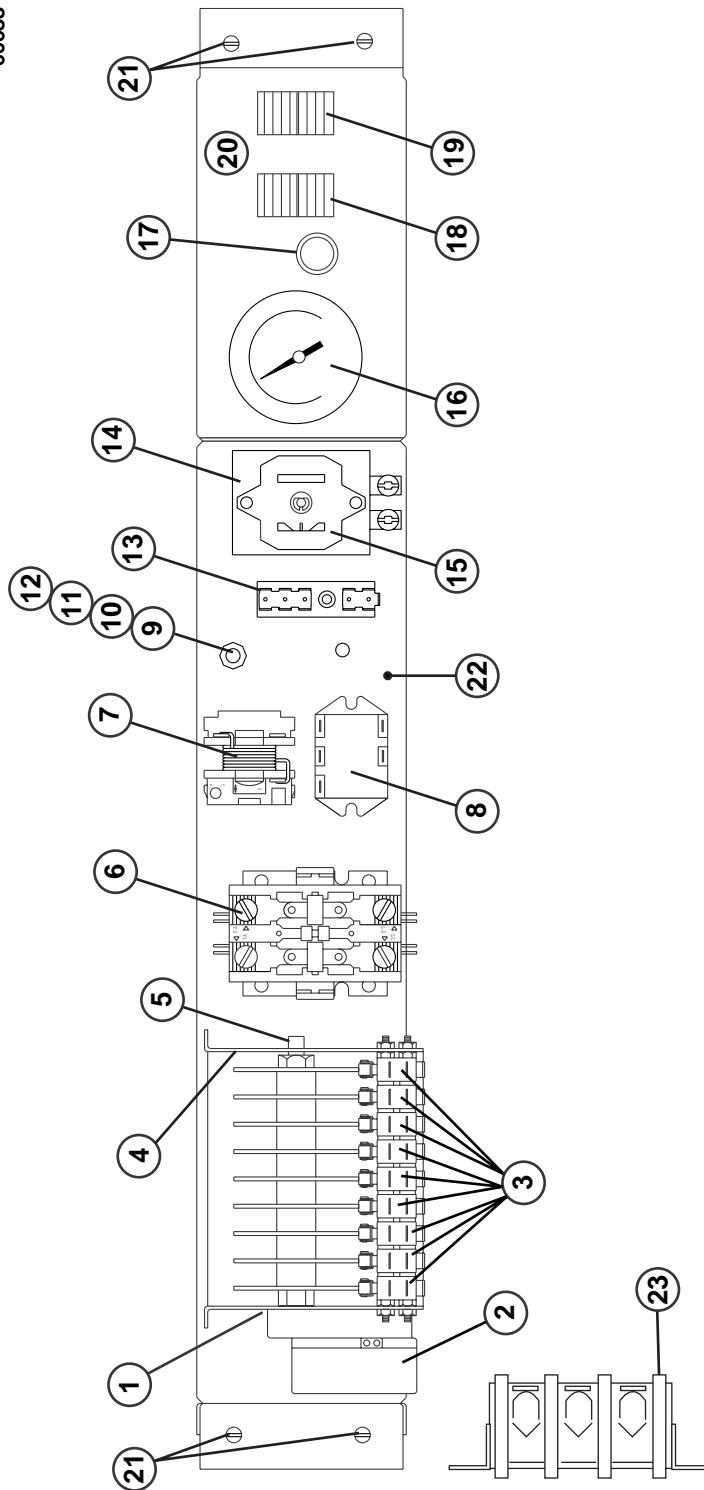


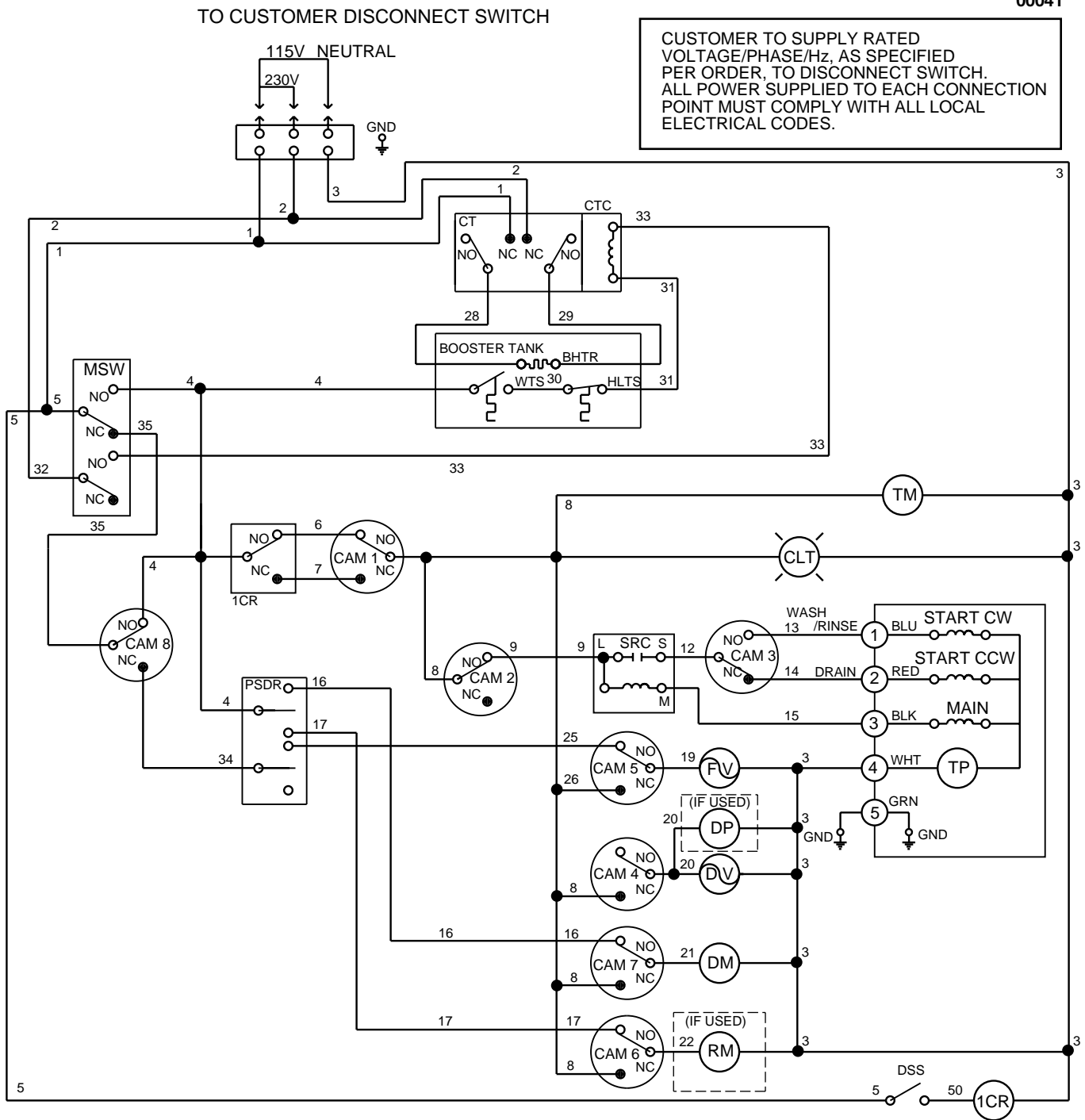
Figure 11 — Control Panel Assembly

CONTROL PANEL ASSEMBLY

Fig. 11 Item No.	Part No.	Description	Qty.
*1	0708538	Timer assy (HT, HTN) (Includes items 2-5)	1
*1	0708590	Timer assy (LT only) (Includes items 2-5).....	1
2	0504956	Motor, timer.....	1
3	0501379	Switch, timer	A/R
4	0308644	Bracket, timer support	1
5	0503701	Bearing, timer	1
6	111703	Contact, 2 pole 50A, 240V (401 HT only) (Booster)	1
7	0508974	Relay, motor start (220V, 50Hz)	1
-	0509642	Relay, motor start (220V, 60Hz)	1
-	0501358	Relay, motor start (115V, 50/60Hz).....	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	0501472	Washer, flat (#10 Brass)	2
12	0501533	Nut, plain (10-32 Brass).....	2
13	0503749	Board, terminal.....	1
14	0310330	Bracket, thermostat (401 HT only)	1
15	109069	Thermostat, booster (401 HT only).....	1
16	113622	Thermometer, 4 ft. Gas Filled (Replaces 108391)	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 (3pole) (220V/50Hz).....	1
-	109064	Transformer (Not Shown) (220V/50Hz)	1
-	106402	Block, fuse 600V, 30A (Not Shown) (220V/50Hz).....	1
-	107289	Fuse, 2.5 Amp, 250VAC (Not Shown) (220V/50Hz).....	2
-	0308967	Box, transformer (220V/50Hz).....	1
-	0509645	Harness, Control Panel (2 2 0 V / 5 0 H z)	1
-	107369	Contact, 25 FLA 2p 120V (Not Shown)(220V/50Hz).....	1

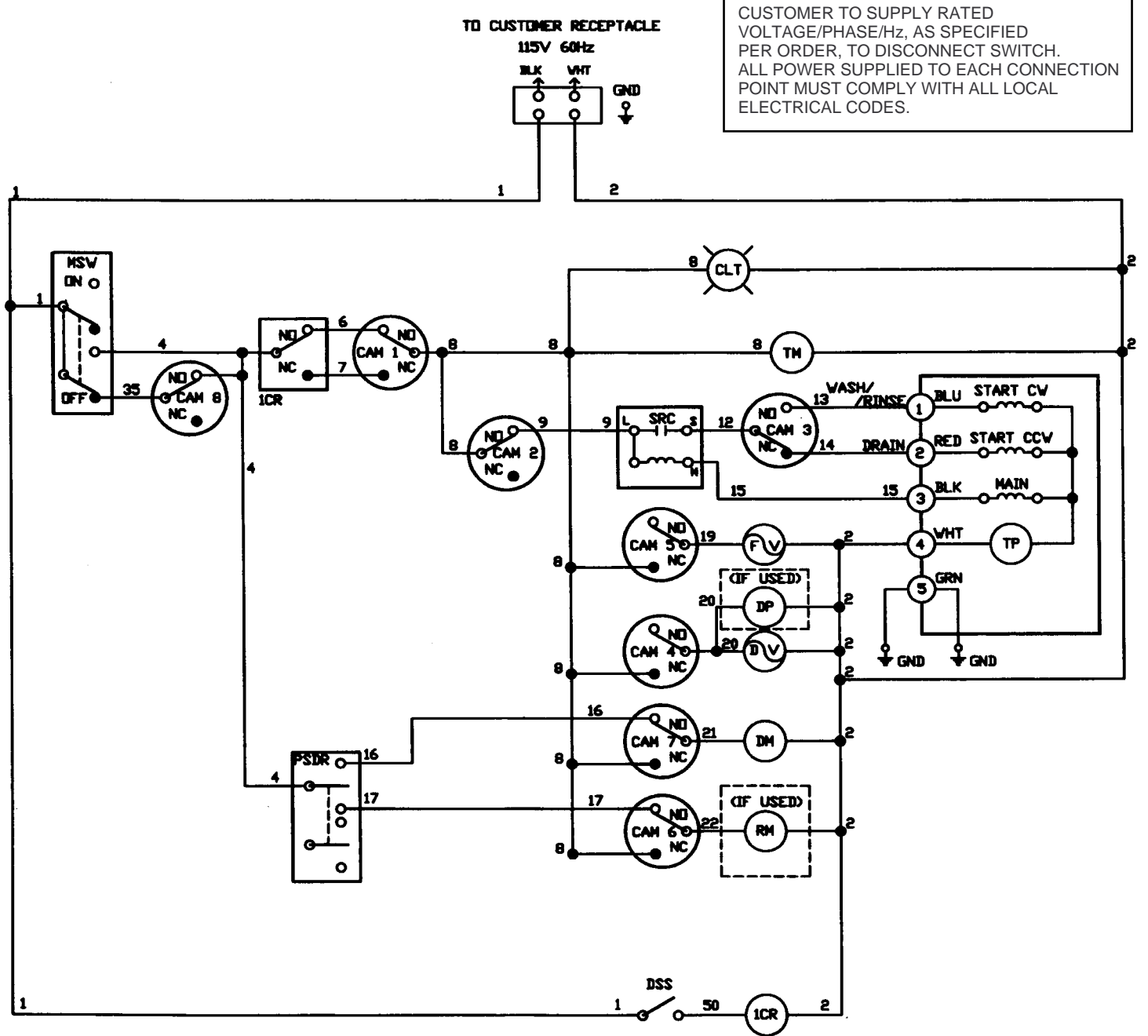
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ELECTRICAL SCHEMATICS



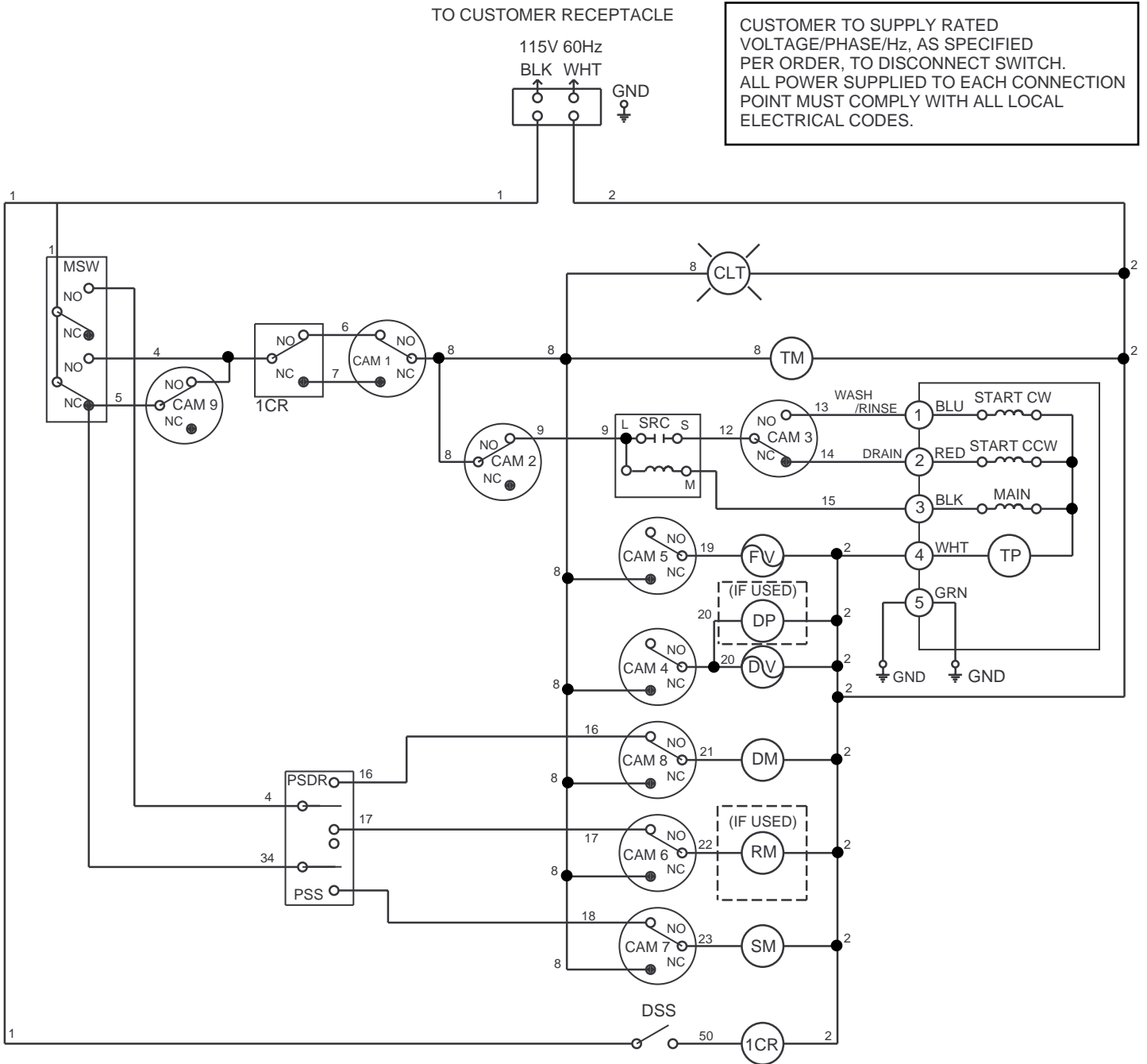
BHTR	BOOSTER HEATER	CT	CONTACTOR	PSDR	PRIME SWITCH DETERGENT, RINSE
BLK	BLACK	CTC	CONTACTOR COIL	ICR	RELAY
BLU	BLUE	DM	DETERGENT MOTOR	DDS	DOOR SAFETY SWITCH
CAM 1	HOMING	DP	DRAIN PUMP (IF USED)	RM	RINSE MOTOR (IF USED)
CAM 2	PUMP MOTOR	DS	DOOR SWITCH	SS	CURRENT OPERATED START RELAY COIL
CAM 3	PUMP MOTOR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

Figure 12 — Electrical Diagram, 401-HT



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	GRN	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	MSDR	PRIME SWITCH DETERGENT, RINSE	WTS	WATER THERMOSTAT

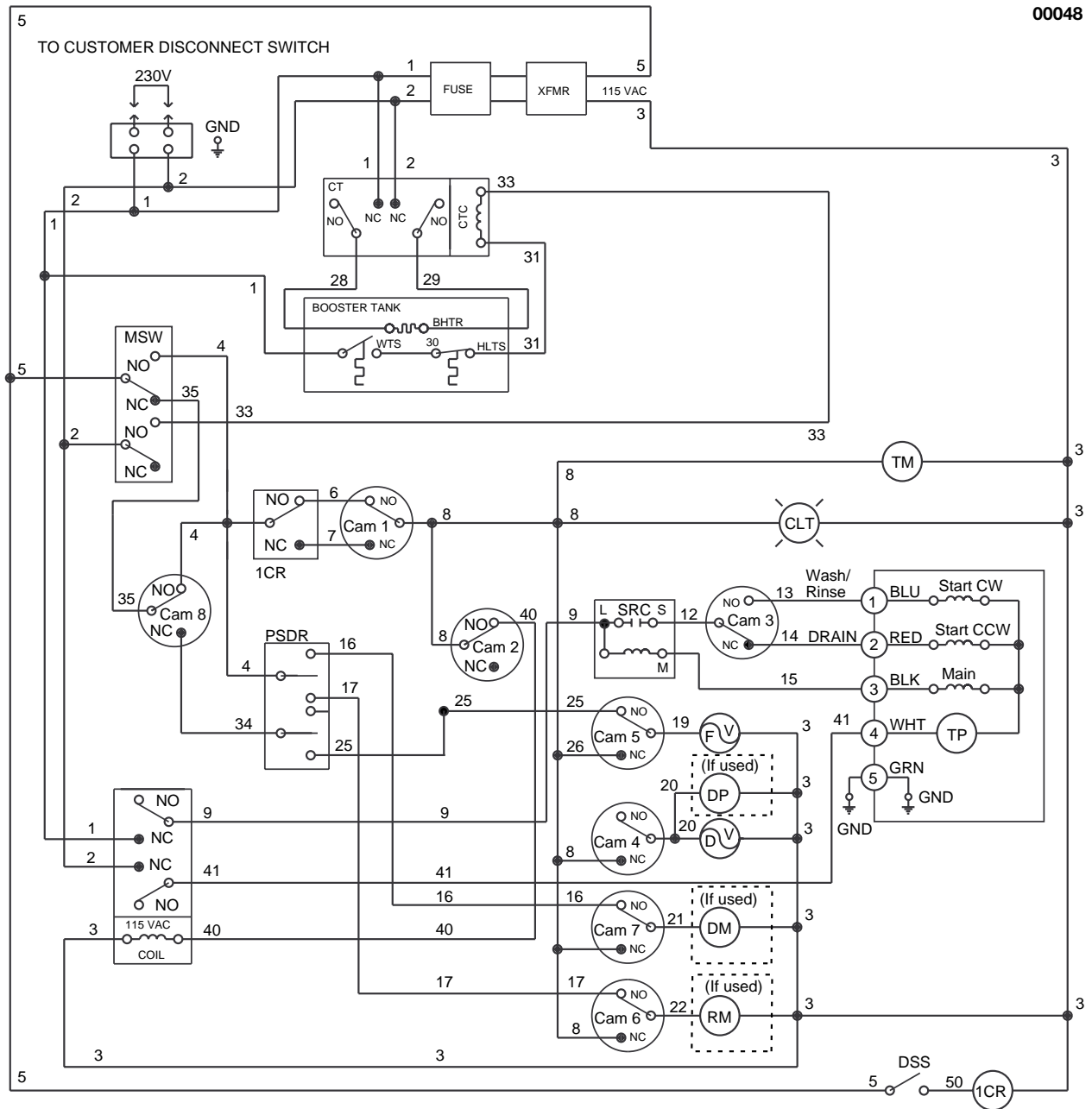
Figure 13 — Electrical Diagram, 401-HTN



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	1CR	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

Figure 14 — Electrical Diagram, 401-LT



BHTR	BOOSTER HEATER	CT	CONTACTOR	1CR	RELAY
BLK	BLACK	CTC	CONTACTOR COIL	DDS	DOOR SAFETY SWITCH
BLU	BLUE	DM	DETERGENT MOTOR	RM	RINSE MOTOR (IF USED)
CAM 1	HOMING	DP	DRAIN PUMP (IF USED)	SS	Current Operated Start Relay
CAM 2	PUMP MOTOR	DS	DOOR SWITCH	SS	SERVICE SWITCH
CAM 3	PUMP MOTOR REVERSING	DV	DRAIN VALVE	TM	TIMER MOTOR
CAM 4	DRAIN	FV	FILL VALVE	TP	THERMAL PROTECTOR
CAM 5	FILL	GND	GROUND	WHT	WHITE
CAM 6	RINSE	GRN	GREEN	WHTR	WATER HEATER
CAM 7	DETERGENT	HTLS	HIGH LIMIT THERMOSTAT	WTS	WATER THERMOSTAT
CAM 8	CYCLE	MSW	MAIN SWITCH On/Fill- Off/Drain		
CLT	CYCLE ON LIGHT	PSDR	Prime Switch, Detergent/Rinse		

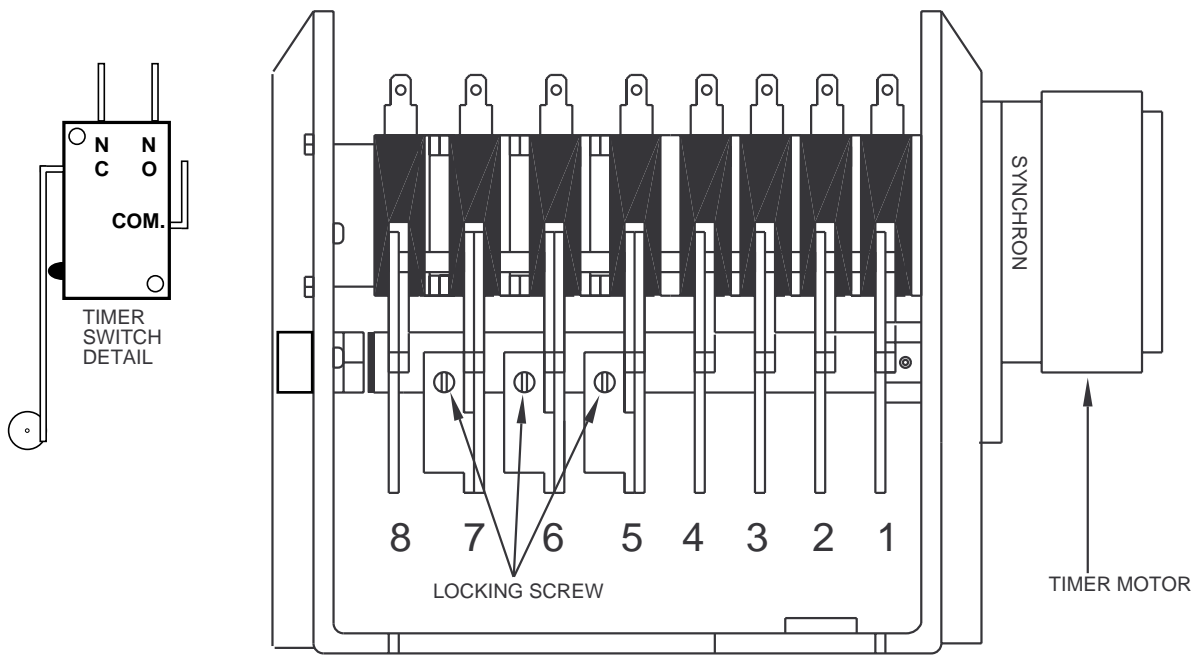
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CUSTOMER TO SUPPLY RATED VOLTAGE/
PHASE/HZ, AS SPECIFIED PER ORDER, TO
DISCONNECT SWITCH. ALL POWER SUPPLIED
TO EACH CONNECTION POINT MUST
COMPLY WITH ALL LOCAL ELECTRICAL CODES.

Figure 15 — Electrical Diagram, 401-HT (50 Hz)

TIMING CHART 401-HT

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 OPTIONAL													■	■	■	■	■
7	DETERGENT PUMP	■																
8	AUTO-FILL DRAIN													■	■	■	■	■

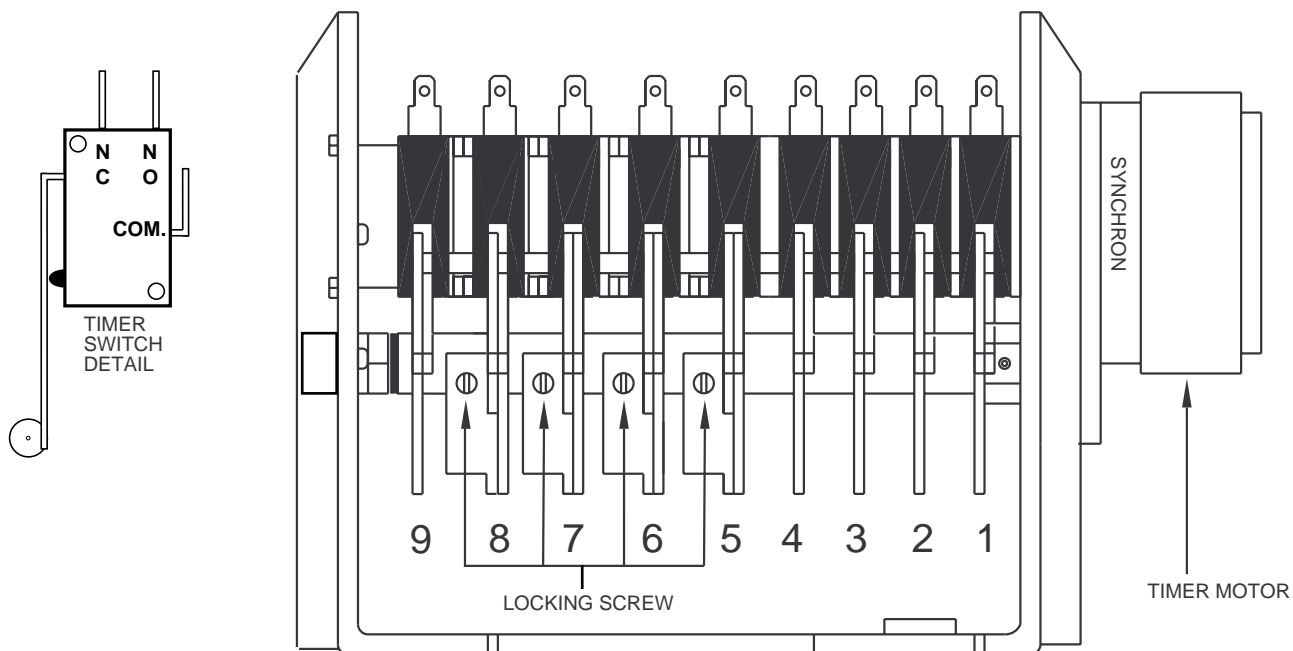


TIMER ASSEMBLY 401-HT

Figure 16 — Electrical Diagram, 401-HT, HTN

TIMING CHART 401-LT

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-LT

Figure 17 —Timer Chart and Diagram, 401-LT