NOBLE
WAREWASHING

# INSTALLATION, OPERATION, AND SERVICE MANUAL

## HT-180EC

ENERGY STAR

# REVISION HISTORY

| Revision | Date | Made by | Process | Details |
|---|---|---|---|---|
| A | 10-9-20 | JH | 8794 | Initial release of manual. |
| B | 5-25-21 | JH | N/A | Updated I/O Module P/N on pg. 24.<br>Added Fault Codes section. |
| C | 9-23-21 | JH | N/A | Added Setpoints section. |
| D | 5-26-22 | JH | N/A | Added Power Button Connector Wiring page. Updated schematic. |

NOBLE WAREWASHING

## HT-180EC1

**Door-type dishmachine; ENERGY STAR® qualified, electric-heated, high-temp, hot-water sanitizing, with booster heater, single-phase.**

## HT-180EC3

**Door-type dishmachine; ENERGY STAR® qualified, electric-heated, high-temp, hot-water sanitizing, with booster heater, three-phase.**

**The manufacturer provides technical support for all of the dishmachines detailed in this manual. We strongly recommend that you refer to this manual before making a call to our technical support staff. Please have this manual open when you call so that our staff can refer you, if necessary, to the proper page. Technical support is not available on holidays.**

**Contact technical support toll-free at 1-888-800-5672.**

**Technical support is available for service personnel only.**

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## SYMBOLS


- Risk of Injury to Personnel


- Risk of Damage to Equipment

- Risk of Electrical Shock

- Caustic Chemicals

- Reference Data Plate

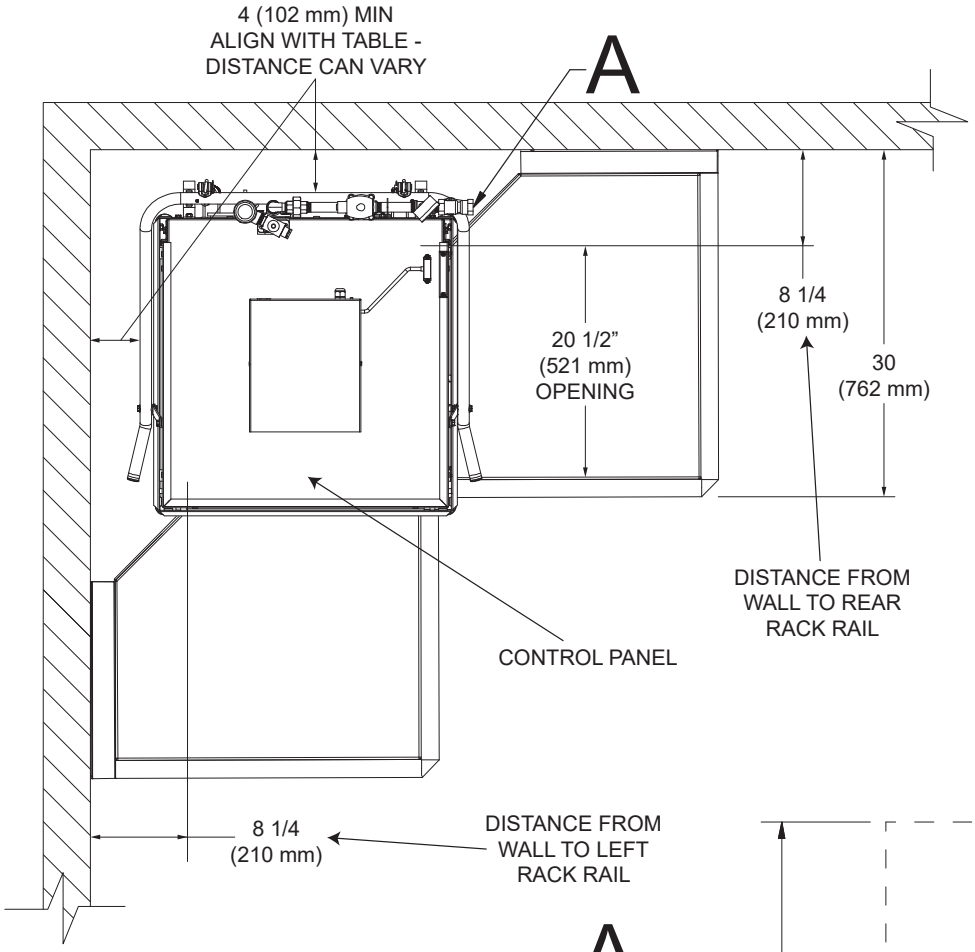
- Lockout Electrical Power

***NOTICE*** - Important Note

- Instructions Hyperlink

## ABBREVIATIONS & ACRONYMS

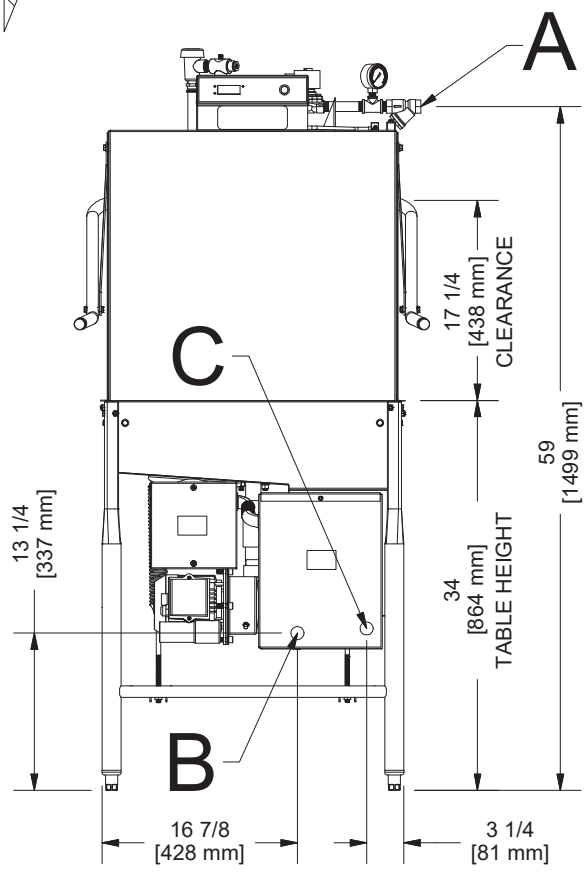
**ANSI** - American National Standards Institute
**GHT** - Garden Hose Thread
**GPG** - Grains per Gallon
**GPM** - Gallons per Minute
**HP** - Horse Power
**Hz** - Hertz
**ID** - Inside Diameter
**kW** - Kilowatts
**MCA** - Minimum Circuit Ampacity
**MOP** - Maximum Overcurrent Protection
**NFPA** - National Fire Protection Association
**NPT** - National Pipe Thread
**OD** - Outside Diameter
**PRV** - Pressure Regulating Valve
**PSI** - Pounds per Square Inch
**V** - Volts

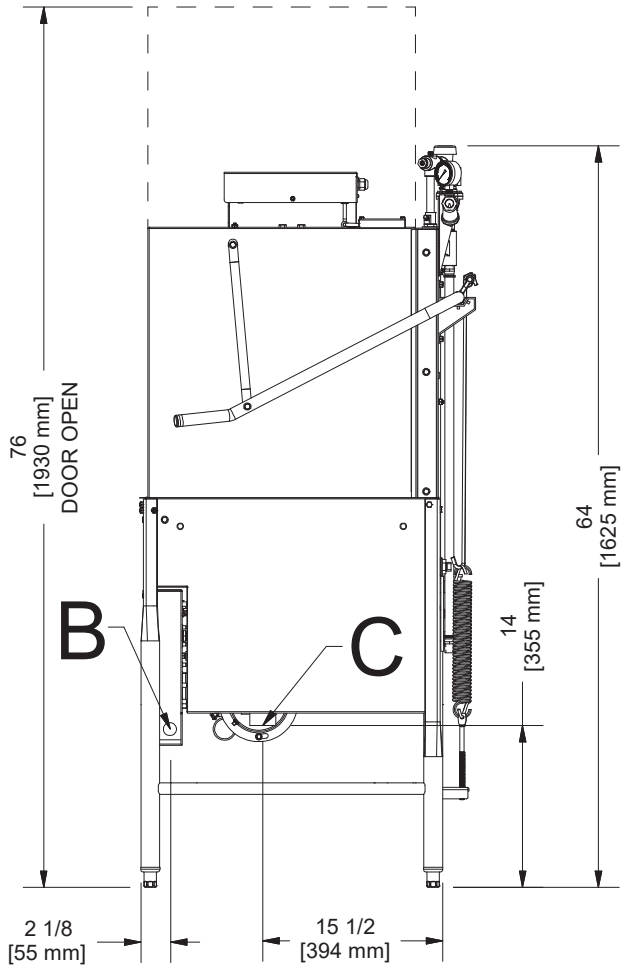



**LEGEND**

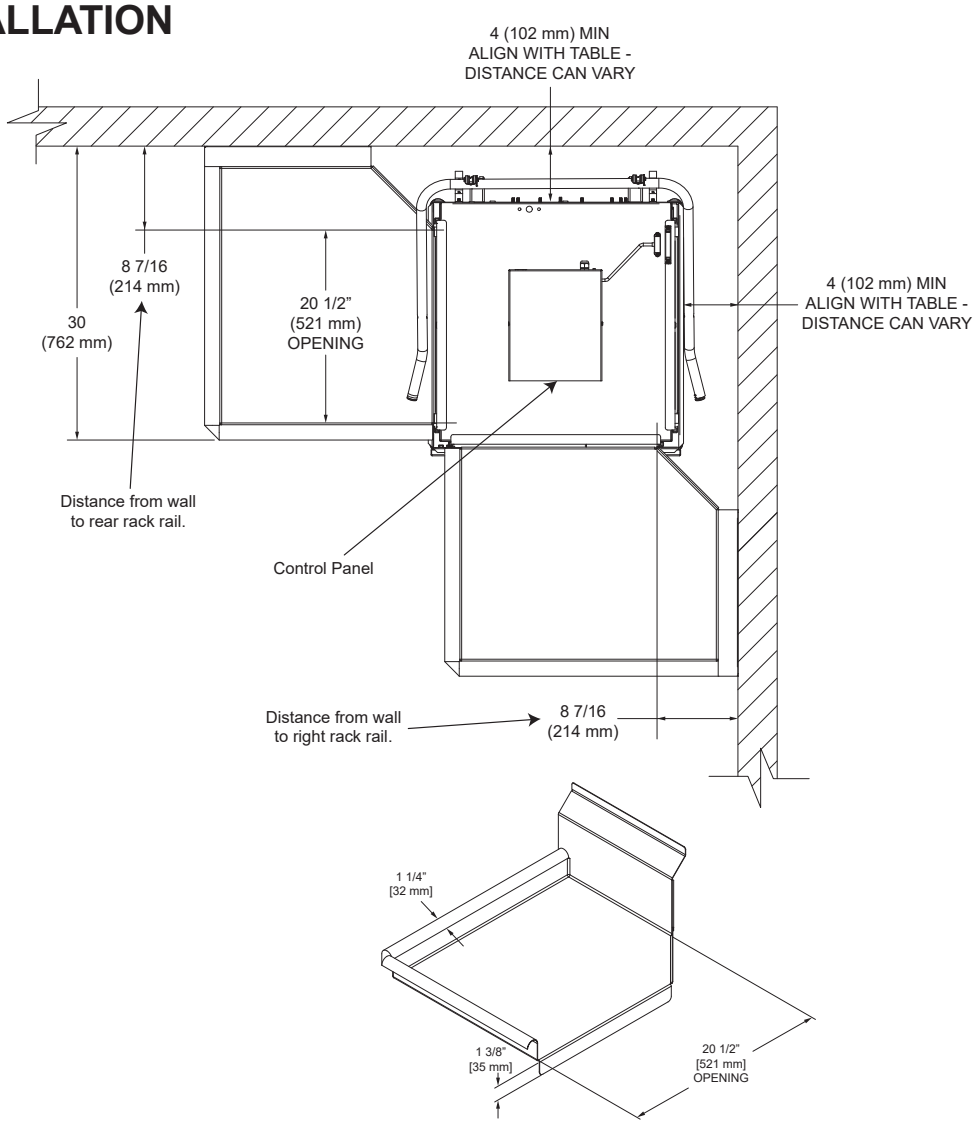
A - Water Inlet (1/2" NPT)
B - Electrical Connection Point
C - Drain (1 1/2" NPT)

*All dimensions from the floor can be increased 1 1/8" using the machine's adjustable feet.*



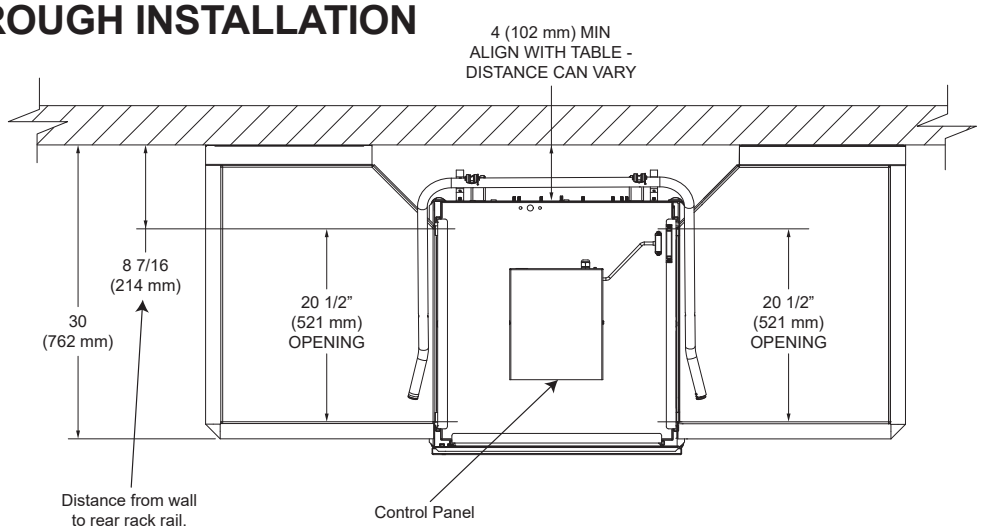
## CORNER INSTALLATION







## STRAIGHT-THROUGH INSTALLATION



## PERFORMANCE/CAPABILITIES

### Operating Capacity:

| | |
|---|---|
| Racks per Hour | 58 |
| Dishes per Hour | 1450 |
| Glasses per Hour | 2088 |

### Minimum Operating Cycle (Seconds):

| | |
|---|---|
| Wash Time | 40 |
| Rinse Time | 13 |
| Dwell Time | 4 |
| Total Cycle Time | 57 |

### Tank Capacity (Gallons/Liters):

| | |
|---|---|
| Wash Tank | 8.0/30.3 |
| Rinse Tank | 2.0/7.6 |

## WATER REQUIREMENTS

| | |
|---|---|
| Minimum Wash Temperature (°F/°C) | 150/66 |
| Minimum Rinse Temperature (°F/°C) | 180/83 |
| Inlet Water Temperature (°F/°C) | 110/44 |
| Flow Pressure (PSI) | 10 ± 2 |
| Water Line Size | 1/2” |
| Drain Line Size | 1 1/2” |

**NOTICE**

*Always refer to the machine data plate for specific electrical and water requirements. The material provided on this page is for reference only and is subject to change without notice.*

# ELECTRICAL REQUIREMENTS

*Local codes may require more stringent protection than what is displayed here and on the data plate. Always verify with your electrical service contractor that your circuit protection is adequate and meets all applicable national and local codes. Numbers in this manual are for reference and may change without notice.*

**NOTICE**

*On three-phase machines, imbalanced wild leg goes to L3.*
*Also see the Motor Rotation section.*

| Volts | Phase | Freq | Wash Motor | Wash Heater | Rinse Heater | Total Load | MCA | MOP |
|---|---|---|---|---|---|---|---|---|
| 208 | 1 | 60 Hz | 5.0 A | 19.7 A | 50.6 A | 75.3 A | 76.6 A | 80.0 A |
| 230 | 1 | 60 Hz | 5.0 A | 21.8 A | 55.9 A | 82.7 A | 84.0 A | 90.0 A |
| 208 | 3 | 60 Hz | 5.0 A | 11.4 A | 29.2 A | 45.6 A | 46.9 A | 50.0 A |
| 230 | 3 | 60 Hz | 5.0 A | 12.6 A | 32.3 A | 49.9 A | 51.2 A | 55.0 A |

## INSPECTION

***Do not throw away packaging if damage is evident!***

Before installing the machine, check the packaging and machine for damage. If the packaging is damaged, the machine might also be damaged. If there is damage to both packaging and machine, do not throw away the packaging. The machine has been inspected and packed at the factory and is expected to arrive to you in new, undamaged condition. However, rough handling by carriers or others might result in damage to the machine while in transit. If so, do not return the machine to the manufacturer. Instead, contact the carrier and ask them to send a representative to the site to inspect the damage and complete an inspection report. You must contact the carrier and the dealer that sold you the machine within 48 hours of receiving the machine.

## UNPACKING

While unpacking the machine, ensure there are no missing parts. If an item is missing, contact the manufacturer immediately.

## LEVELING

The machine must be level in its operating location to prevent damage to the machine during operation and to ensure the best results. The machine comes with four adjustable bullet feet, which can be turned using a pair of channel locks (or by hand if the machine can be raised safely). Ensure the machine is level from side-to-side and front-to-back before making any connections.

## PLUMBING

***Plumber MUST flush the incoming water line!***

Plumbing connections must comply with all applicable local, state, and national plumbing codes. The plumber is responsible for ensuring that the incoming water line is thoroughly flushed before connecting it to any component of the machine. It is very important to remove all foreign debris from the water line that might potentially get trapped in the valves or cause an obstruction. Any valves that are fouled as a result of foreign matter left in the water line—and any expenses resulting from this fouling—are not the responsibility of the manufacturer.

***A water hardness test MUST be performed.***

A water hardness test must be performed to determine if a water treatment system needs to be installed.

## WATER SUPPLY CONNECTION: WATER HARDNESS GREATER THAN 3 GPG

If water hardness tests at greater than 3 GPG, install the Scaltrol Water Treatment system (see Plumbing Options page) into the water line before the machine's incoming water connection point. A water shut-off valve should be installed to allow access for service.

## WATER SUPPLY CONNECTION: WATER HARDNESS LOWER THAN 3 GPG

If water hardness tests at lower than 3 GPG, install the water supply line directly to the machine's incoming water connection point. A water shut-off valve should be installed to allow access for service.

## PRESSURE REGULATOR

The manufacturer recommends the installation of a pressure regulating valve (PRV) in the incoming water line to ensure proper flowrate at all times and offers these devices as options (see Plumbing Options page).

Do not confuse static pressure with flow pressure. Static pressure is the line pressure in a “no flow” condition (all valves and services are closed). Flow pressure is the pressure in the fill line when the fill valve is opened during the cycle.

## SHOCK ABSORBER

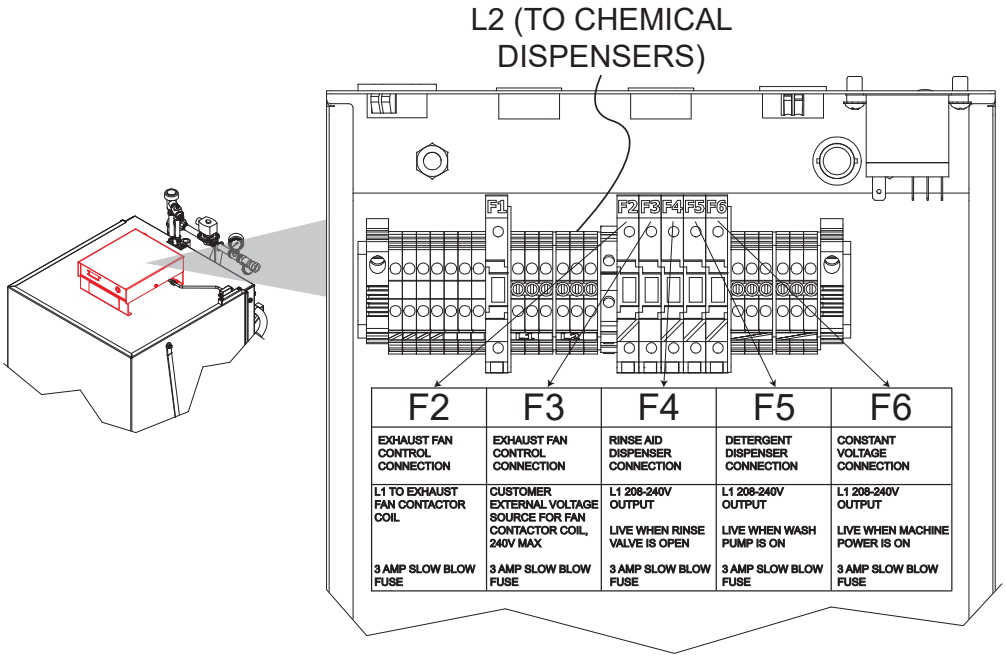
The manufacturer recommends the installation of a shock absorber in the incoming water line and offers these devices as options (see Plumbing Options page). This prevents line hammer/hydraulic shock—induced by the solenoid valve as it operates—from causing damage to the equipment.

## CONNECTING THE DRAIN LINE

The machine's drain is a gravity-discharge drain. All piping from the 1 1/2” NPT connection on the wash tank must be pitched (1/4” per foot) to the floor or sink drain. All piping from the machine to the drain must be a minimum 1 1/2” NPT and must not be reduced. There must also be an air-gap between the machine drain line and the floor sink or drain. If a grease trap is required by code, it should have a flow capacity of 5 GPM.

## CHEMICAL & EXHAUST FAN ELECTRICAL CONNECTIONS

Remove control box lid and make chemical and exhaust fan connections at the points shown below:




| F2 | F3 | F4 | F5 | F6 |
|---|---|---|---|---|
| EXHAUST FAN CONTROL CONNECTION | EXHAUST FAN CONTROL CONNECTION | RINSE AID DISPENSER CONNECTION | DETERGENT DISPENSER CONNECTION | CONSTANT VOLTAGE CONNECTION |
| L1 TO EXHAUST FAN CONTACTOR COIL<br>3 AMP SLOW BLOW FUSE | CUSTOMER EXTERNAL VOLTAGE SOURCE FOR FAN CONTACTOR COIL, 240V MAX<br>3 AMP SLOW BLOW FUSE | L1 208-240V OUTPUT<br>LIVE WHEN RINSE VALVE IS OPEN<br>3 AMP SLOW BLOW FUSE | L1 208-240V OUTPUT<br>LIVE WHEN WASH PUMP IS ON<br>3 AMP SLOW BLOW FUSE | L1 208-240V OUTPUT<br>LIVE WHEN MACHINE POWER IS ON<br>3 AMP SLOW BLOW FUSE |

## CHEMICAL CONNECTIONS

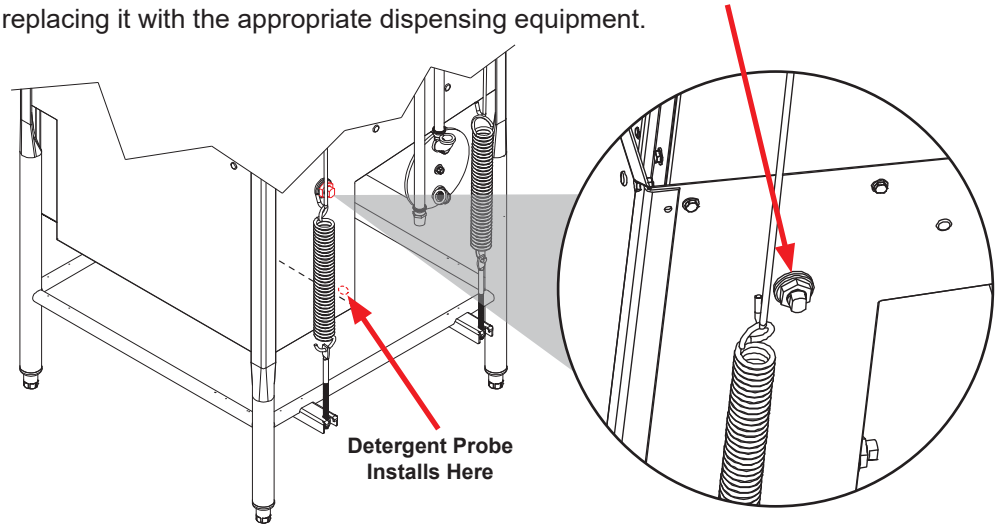
***Chemical connections should be made by the chemical supplier.***

***Using deionized water or other aggressive fluids will result in corrosion and failure of components and will void the warranty.***


**WARNING!** ***Some of the chemicals used in dishwashing can cause chemical burns if they come in contact with skin. Wear protective gear when handling these chemicals. If any skin comes in contact with these chemicals, immediately follow the instructions provided with the chemicals for treatment.***

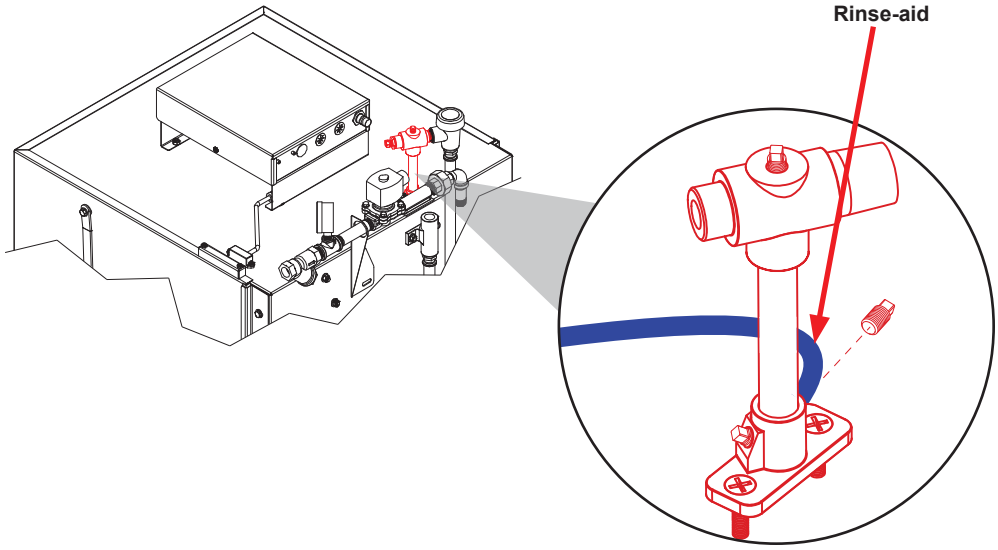
**Detergent**

Connect detergent by removing the bulkhead fitting on back of the machine and replacing it with the appropriate dispensing equipment.




**Rinse-aid**

Connect rinse-aid by removing the brass plug at the base of the rinse injector and replacing it with the appropriate dispensing equipment.




## PLUMBING CHECK

Slowly turn on water supply to the machine after incoming fill line and drain line have been installed. Check for any leaks and repair as required. All leaks must be repaired before operating the machine.

## ELECTRICAL POWER CONNECTIONS

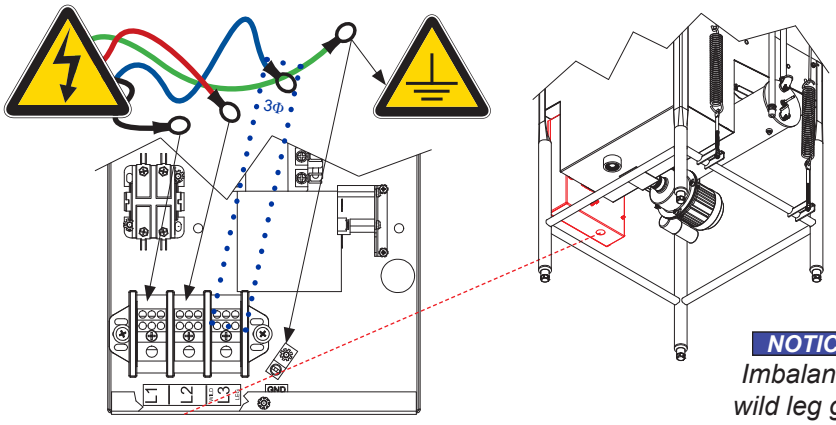
Electrical and grounding conductors must comply with the applicable portions of the National Electric Code ANSI/NFPA 70 (latest edition) and/or other electrical codes.

Data plate is located on the right side of the machine. Refer to data plate for machine operating requirements, machine voltage, total amperage, and serial number.

***Disconnect electrical power supplies and lockout/tagout in accordance with appropriate procedures and codes at the disconnect switch.***

***If necessary, see Heaters page for phase conversion kit.***

1. Open electrical box at bottom-front of machine by using a phillips screwdriver to remove the two screws.
2. Install 3/4" conduit into the pre-punched hole in bottom of electrical box.
3. Route power wires and connect to power block and grounding lug.
4. Install service wires (L3 for 3-Phase only) to the appropriate terminal.




**NOTICE** *Imbalanced wild leg goes to L3.*

5. Install grounding wire into the lug provided.
6. Tighten connections.

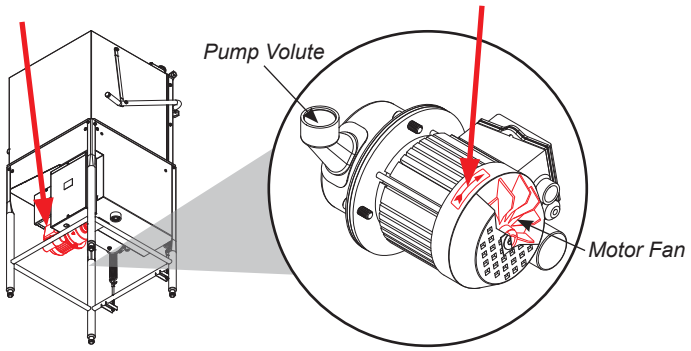
**NOTICE** *"DE-OX" or similar anti-oxidation agent should be used on all power connections.*

## MOTOR ROTATION

On 460 V 3-Phase machines only, correct pump motor rotation must be verified before the machine is operated. Failure to do so can result in damage to the machine and components.

**CAUTION! *On 460 V 3-Phase machines only, correct pump motor rotation must be verified before operation!***

1. Follow Filling the Wash Tub section.
2. Locate wash pump motor and identify the arrow decal which shows the correct motor rotation (if no decal is present, correct rotation is away from the pump volute).




3. Start the machine.
4. Observe rotation of motor fan and quickly stop the machine.
5. If rotation is incorrect, disconnect electrical power and reverse the L1 and L2 connections at terminal block shown in the section above.

## VOLTAGE CHECK

Apply power to the machine. Check incoming power at terminal block and ensure it corresponds with the voltage listed on the data plate. If not, contact a qualified service agency to examine the problem. Do not run the machine if voltage is too high or too low. Shut off service breaker and advise all proper personnel of the location of the breaker and any problems. Replace control box cover and tighten-down screws.

## SURROUNDING AREA

This is a commercial dishmachine and reaches temperatures that can exceed those generated by a residential machine. Surrounding countertops, cabinets, flooring material, and subflooring material must be designed and/or selected with these higher temperatures in mind.

**NOTICE** *Any damage to surrounding area caused by heat/moisture to materials that are not recommended for higher temperatures will not be covered under warranty or by the manufacturer.*

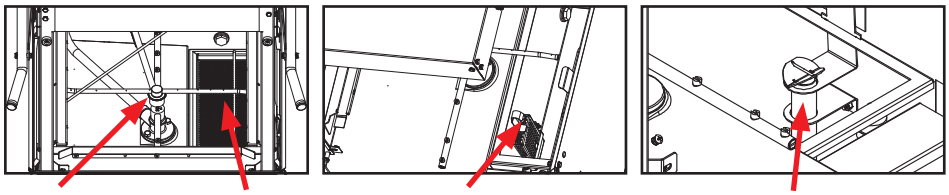
## TEMPERATURE SETPOINTS

The temperature setpoints on this machine have been set at the factory. They should only be adjusted by an authorized service agent.

## PREPARATION

Before operating the machine, verify the following:

1. Tank is clean and free of debris.
2. Wash arms, rinse arms, and scrap screen are installed correctly.
3. Sump strainer and standpipe (located under scrap screen) are installed correctly and standpipe is down.



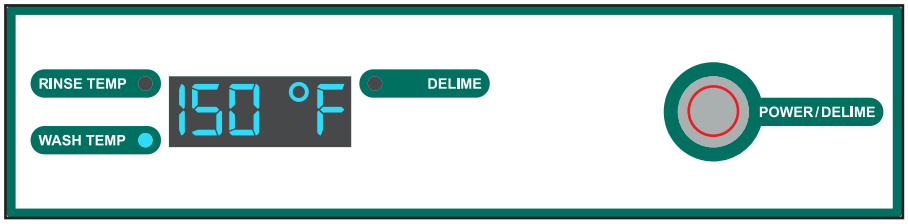
Wash & Rinse Arms, Scrap Screen | Sump Strainer | Standpipe

## POWER UP

To energize the machine, turn on the power at the service breaker. The voltage should have been previously verified as correct. If not, the voltage must be verified.

## FILLING THE WASH TUB

1. Close door.
2. Press power button.
3. LED ring on power button will turn red.




4. Machine will start filling automatically.
5. Wait until wash temperature on display reaches a minimum of 150 °F.

## WARE PREPARATION

Proper ware preparation will help ensure good results and fewer re-washes. If not prepared properly, ware might not come out clean and the efficiency of the machine will be reduced. Putting unscraped dishes into the machine affects its performance, so scraps should always be removed from ware before being loaded into a rack. Pre-rinsing and pre-soaking are good ideas, especially for silverware and casserole dishes.

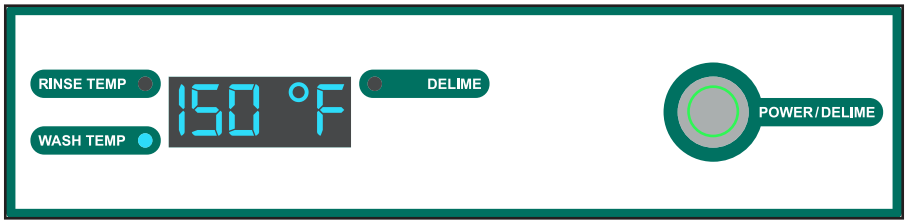
## DAILY MACHINE PREPARATION

Place cups and glasses upside-down in racks so they don't hold water during the cycle. The machine sanitizes as well as cleans. To do this, ware must be properly prepared before being placed in the machine.

Refer to the Preparation section and follow the instructions there. Afterward, ensure that chemicals are supplied to the machine. If not, contact your chemical supplier.

## WASHING A RACK OF WARE

1. Ensure wash temperature has reached a minimum of 150 °F.
2. Open door completely.
3. Slide rack of ware into the machine.
4. Close door and cycle starts automatically. LED ring on power button will turn green.



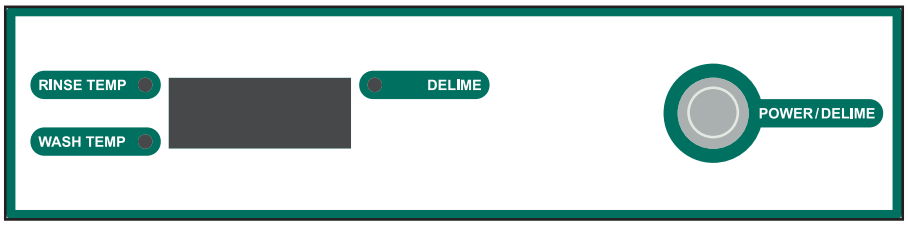

5. When LED ring on power button turns red, cycle is complete.
6. Open door and remove rack of clean ware.
7. Replace with a rack of soiled ware and close door. Repeat this process.

## OPERATIONAL INSPECTION

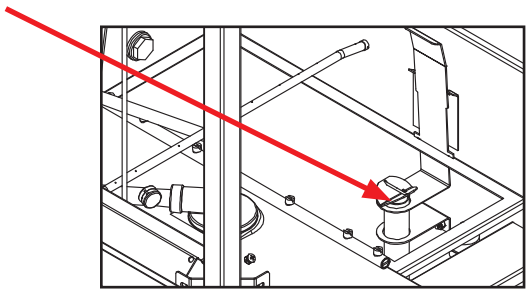
Based on use, the scrap screen might become clogged with soil and debris as the workday progresses. Operators should regularly inspect the scrap screen to ensure it has not become clogged. If clogged, it will reduce the washing capability of the machine. Instruct operators to clean-out the scrap screen at regular intervals or as required by workload. Do NOT beat strainers to remove debris.

## SHUTDOWN & CLEANING

1. Turn machine off by pushing power button. Display and LED will turn off.



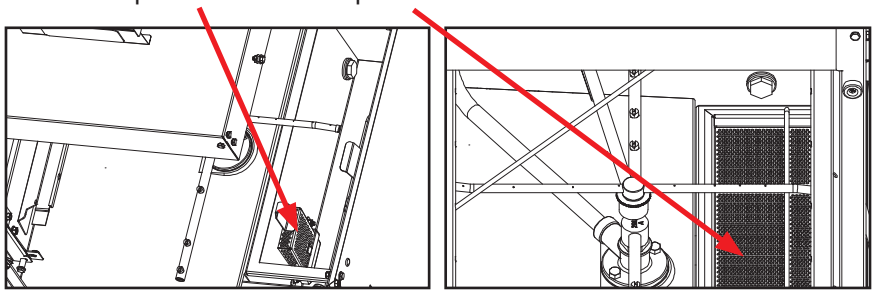

2. Open door and allow steam/heat to escape.
3. Raise standpipe and allow tub to drain.



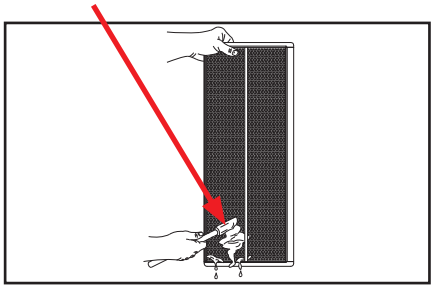

**WARNING! *Wash tank water will be hot!***

## SHUTDOWN & CLEANING

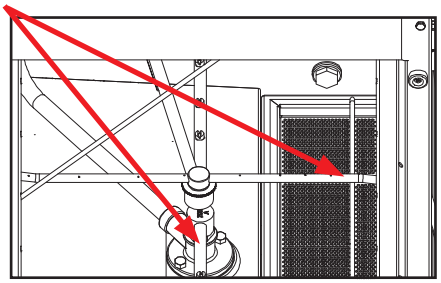
4. Remove sump strainer and scrap screen.



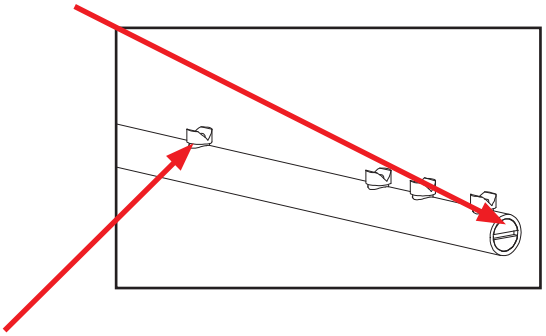
5. Use a hand-scraper to scrape foodsoil into a trash basket.



6. Rinse with pre-rinse hose and replace.
7. Remove all wash and rinse arms.



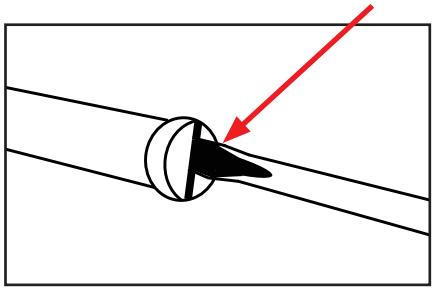
8. Remove end-caps from the arms.



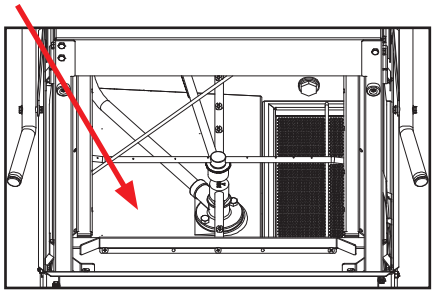
9. Clean nozzles with a brush.
10. Use a small wire or toothpick to remove remaining debris or lime deposits from the nozzles.
11. Flush the arms with water.

## SHUTDOWN & CLEANING

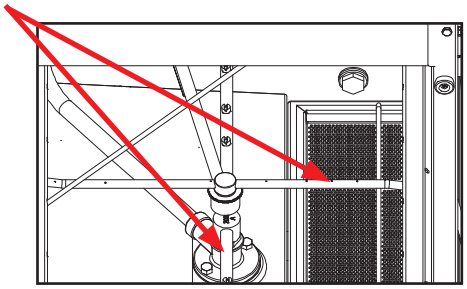
12. Replace end-caps and ensure they have been tightened.



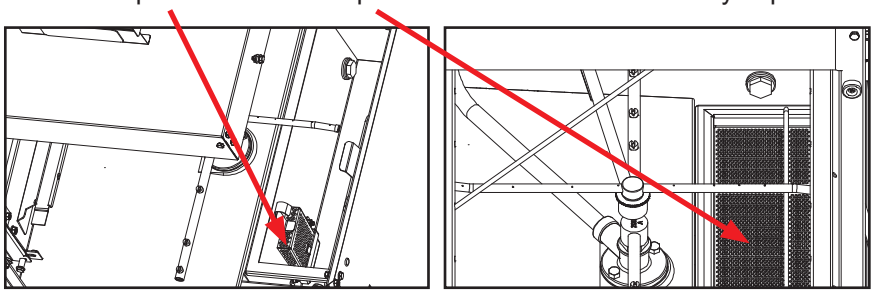
13. Spray or wipe out interior of the machine.



14. Replace wash and rinse arms.



15. Ensure sump strainer and scrap screen are clean and securely in place.



16. Use stainless steel polish to clean and protect outside of the machine.

## DETERGENT CONTROL

Detergent usage and water hardness are two factors that contribute greatly to how efficiently this machine will operate. Using detergent in the proper amount can become a source of substantial savings. A qualified water treatment specialist can determine what is needed for maximum efficiency from the detergent.

***See Water Supply Connection section for more information on water treatment.***

1. Hard water greatly affects the performance of the machine, causing the amount of detergent required for washing to increase. If the machine is installed in an area with hard water, the manufacturer recommends the installation of water treatment equipment.

2. Deposited solids from hard water can cause spotting that will not be removed with a drying agent. Treated water will reduce this occurence.

3. Treated water might not be suitable for use in other areas of operation and it might be necessary to install a water treatment system for the water going to the machine only. Discuss this option with a qualified water treatment specialist.

4. Machine operators should be properly trained on how much detergent is to be used per cycle. Meet with a water treatment specialist and detergent vendor to discuss a complete training program for operators.

5. These machines require that chemicals be provided for proper operation and sanitization and require the installation of third-party chemical feeders to introduce these chemicals to the machine. Contact a chemical supplier with any questions.

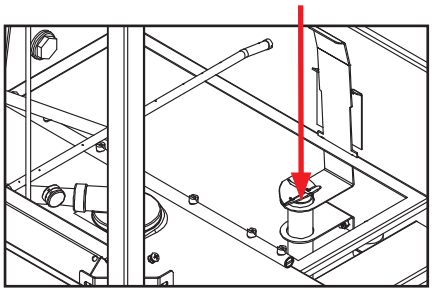
6. Water temperature is an important factor in ensuring that the machine functions properly. The machine's data plate details what the minimum temperatures must be for the incoming water supply, the wash tank, and the rinse tank. If minimum requirements are not met, there is a possibility that dishes will not be clean or sanitized.

7. Instruct machine operators to observe the required temperatures and to report when they fall below the minimum allowed. A loss of temperature can indicate a larger problem.

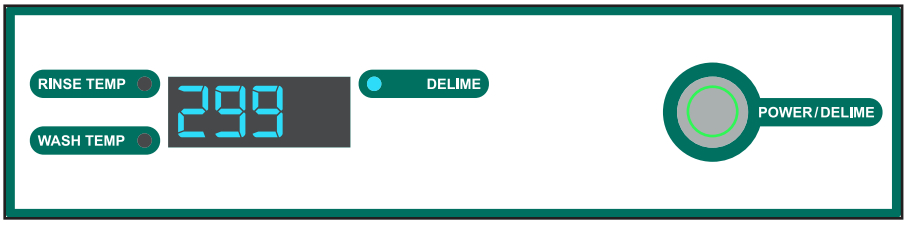
## DELIMING

Tank capacities of the machine are listed on the Operating Parameters page.

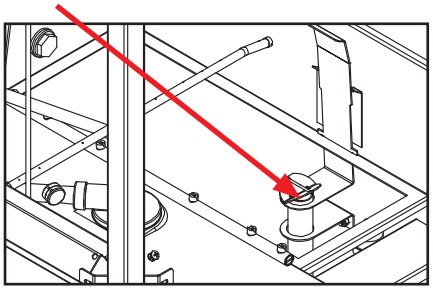
1. With power button on, raise door and lift standpipe to drain the machine.



2. Allow machine to completely drain.
3. Add deliming solution to tub per chemical supplier's instructions.
4. Close door. The machine will fill and turn on heaters.
5. Once filling has stopped, press and hold power button until blue delime button turns on (about three seconds). Release button and machine will start delime cycle.




6. Display will count down the delime cycle and shut off once complete. If the machine is not delimed, run delime cycle again.
7. Raise door and lift standpipe to drain the machine.



8. Once drained, put standpipe back in place and close door to refill the machine.
9. The machine is ready to wash ware once minimum wash temperature is reached.


**CAUTION!** *This equipment is not recommended for use with deionized water or other aggressive fluids. Using deionized water or other aggressive fluids will result in corrosion and failure of components and will void the warranty.*

## PREVENTATIVE MAINTENANCE



**CAUTION!**
***Do NOT beat strainers to remove debris!***

The manufacturer highly recommends that any maintenance and repairs not specifically discussed in this manual be performed only by qualified service personnel.

**WARNING!** *Unqualified personnel performing maintenance on the machine may void the warranty, lead to larger problems, or cause harm to the operator.*

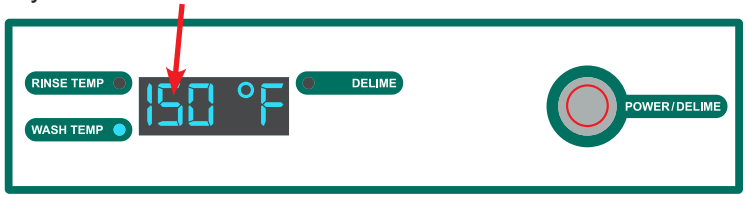
Following the operating and cleaning instructions in this manual will result in the most efficient results from the machine. As a reminder, here are some steps to take to ensure the machine is being used the way it was designed to work:

1. Ensure water temperatures match those listed on the machine data plate. A loss of temperature can indicate a larger problem.
2. Ensure all strainers are clean and securely in place before operating the machine. When cleaning out strainers, do NOT beat them on waste cans. Wipe out strainers with a rag and rinse with water if necessary. Use a toothpick to dislodge any stubborn debris.
3. Ensure all wash and rinse arms are secure in the machine before operating.
4. Ensure standpipe is in position before operating.
5. Remove as much soil from dishes by hand as possible before loading into racks.
6. Do not overfill racks.
7. Ensure glasses are placed upside-down in the rack.
8. Ensure all chemicals being injected into the machine are at correct concentrations.
9. Clean the machine at the end of every day/shift per the Shutdown and Cleaning section of this manual.
10. Follow all safety procedures, whether listed in this manual or put forth by local, state, or national codes/regulations.

## ADJUSTING WASH TEMP SETPOINT

*To access setpoints, the machine should be on and not in cycle.*

1. Push and hold button for a minimum of six seconds. Wash temperature shows on display and will flash on and off.



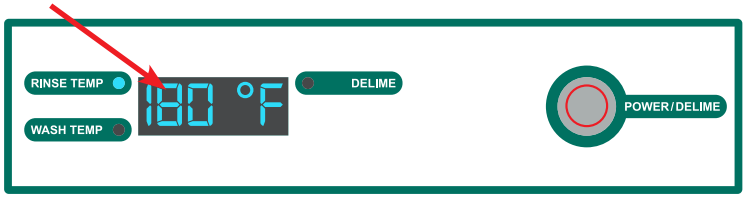

2. Once button is released, each press and release of button fewer than three seconds will advance wash temperature one degree at a time to a maximum of 170 °F, and will then roll over to 150 °F and advance up again.

***If there is no activity (button presses) for 30 seconds, display will exit setpoints mode without saving changes.***


3. Once desired temperature is selected, press and hold button for a minimum of three seconds and no more than six seconds (after three seconds wash temperature will stop flashing). Release button to accept and move to next setting (rinse temperature).


## ADJUSTING RINSE TEMP SETPOINT

1. Once setting changes to rinse temperature, rinse temperature shows on display and will flash on and off.




2. Each press and release of button fewer than three seconds will advance wash temperature one degree at a time to a maximum of 192 °F, and will then roll over to 180 °F and advance up again.

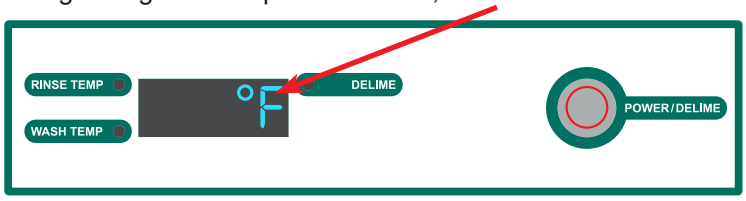
***If there is no activity (button presses) for 30 seconds, display will exit setpoints mode without saving changes.***

## ADJUSTING RINSE TEMP SETPOINT

1. Once desired temperature is selected, press and hold button for a minimum of three seconds and no more than six seconds (after three seconds rinse temperature will stop flashing). Release button to accept and move to next setting (temperature scale).

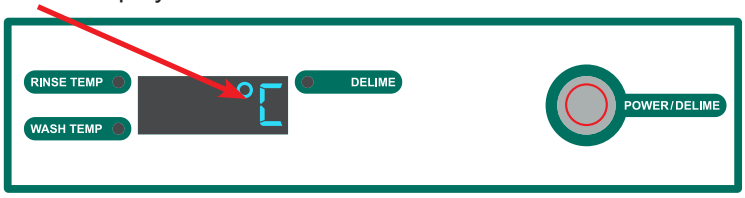

## CHANGING TEMPERATURE SCALE

1. Once setting changes to temperature scale, °F or °C will flash on and off.




***If there is no activity (button presses) for 30 seconds, display will exit setpoints mode without saving changes.***

2. Each press and release of button fewer than three seconds wil toggle between °F and °C on display.




3. Once desired temperature scale is selected, press and hold button for a minimum of three seconds and no more than six seconds (after three seconds temperature scale will stop flashing). Release button to accept and move to next setting (back to wash temperature).


4. To exit setpoints at any time, hold button for a minimum of six seconds. Display wash temperature will stop flashing. The machine is ready to operate.

| DISPLAY SHOWS | POSSIBLE CAUSE | REMEDY |
|---|---|---|
| "F1 Service needed," "No water in Booster" | 1. Low or no water pressure.<br>2. Faulty pressure switch.<br>3. Faulty inlet valve or fill relay.<br>4. Contactor to booster heater not turning off.<br>5. Faulty temperature input (P12) on IO module.<br>6. Faulty temperature probe (T3).<br>7. Faulty float switch allows heaters to operate with no water in tank. | 1. Perform PSI check (see Preventative Maintenance page).<br>2. Replace pressure switch.<br>3. Verify that fill relay is supplying voltage to fill solenoid. Replace faulty component.<br>4. Check for welded contacts. Verify that output from IO module turns off when above the set temperature.<br>5. Substitute a 1.2 kΩ resistor for T3, and verify that booster heater turns off. If not, replace IO module.<br>6. Verify that the booster-probe resistance is correct with respect to temperature (see table on pg. 23). If not, replace T3.<br>7. Replace float switch. |
| "F2 Service needed," "Check booster thermostat" | 1. Contactor to booster heater not turning off.<br>2. Faulty temperature input (P12) on IO module.<br>3. Faulty temperature probe (T3). | 1. Check for welded contacts. Verify that output from IO module turns off when above the set temperature.<br>2. Substitute a 1.2 kΩ resistor for T3, and verify that booster heater turns off. If not, replace IO module.<br>3. Verify that the booster probe resistance is correct with respect to temperature (see table on pg. 23). If not, replace T3. |
| "F3 No water in wash tank," "Check inlet water and door" | 1. Malfunction of fill solenoid or fill relay.<br>2. Door is open, which inhibits fill mode.<br>3. Faulty door switch. | 1. Replace faulty component.<br>2. Close door to activate door switch.<br>3. Replace or adjust door switch. |
| "F4 Service needed," "Check incoming power" | 1. Incoming power not properly connected.<br>2. L3 is missing (3-phase machines only). | 1. Check connections to heater.<br>2. Verify that L3 is present and connected properly. |
| "F5 Service needed," "Check booster thermostat and high limit" | 1. Faulty temperature input (P12) on IO module.<br>2. Faulty temperature probe (T3).<br>3. Faulty high-limit switch.<br>4. Faulty booster heater.<br>5. Booster-heater contactor not energizing. | 1. Substitute a 1.8 kΩ resistor for T3, and verify that booster heater turns on. If not, replace IO module.<br>2. Verify that T3 resistance is consistent with the table on pg. 23. If not, replace T3.<br>3. Replace high-limit switch.<br>4. Check booster heater for proper resistance. Replace if incorrect.<br>5. Verify that drive voltage to contactor coil is present during a call for heat and that contactor closes. If voltage is present, replace contactor. If voltage is not present, check wiring. |

| DISPLAY SHOWS | POSSIBLE CAUSE | REMEDY |
|---|---|---|
| "F6 Service needed," "No water in wash tank" | 1. Low or no water pressure.<br>2. Faulty inlet valve or fill relay.<br>3. Contactor to wash heater not turning off.<br>4. Faulty temperature input (T1) on IO module.<br>5. Faulty temperature probe (T1).<br>6. Faulty float switch allows heaters to operate with no water in tub. | 1. Perform PSI check (see Preventative Maintenance page).<br>2. Verify that fill relay is supplying voltage to fill solenoid. Replace faulty component.<br>3. Check for welded contacts. Verify that output from IO module turns off when above the set temperature.<br>4. Substitute a 1.2 kΩ resistor for T1, and verify that wash heater turns off. If not, replace IO module.<br>5. Verify that T1 resistance is correct with respect to temperature (see table on pg. 23). If not, replace T1.<br>6. Replace float switch. |
| "F7 Service needed," "Check wash tank thermostat" | 1. Contactor to wash heater not turning off.<br>2. Faulty temperature input (P10) on IO module.<br>3. Faulty temperature probe (T1). | 1. Check for welded contacts. Verify that output from IO module turns off when above the set temperature.<br>2. Substitute a 1.2 kΩ resistor for T1, and verify that wash heater turns off. If not, replace IO module.<br>3. Verify that T1 resistance is correct with respect to temperature (see table on pg. 23). If not, replace T1. |
| "F8 No water in wash tank," "Check inlet water and door" | 1. Malfunction of fill solenoid or fill relay.<br>2. Door is open, which inhibits fill mode.<br>3. Faulty door switch. | 1. Replace faulty solenoid or fill relay.<br>2. Close door to activate door switch.<br>3. Replace or adjust door switch. |
| "F9 Service needed," "Check incoming power" | 1. Incoming power not properly connected.<br>2. L3 is missing (3-phase machines only). | 1. Check connections to heater.<br>2. Verify that L3 is present and connected properly. |
| "F10 Service needed," "Check wash tank thermostat and high limit" | 1. Faulty temperature input (T1) on I/O module.<br>2. Faulty temperature probe (T1).<br>3. Faulty high-limit switch.<br>4. Faulty wash heater.<br>5. Wash-heater contactor not energizing. | 1. Substitute a 1.8 kΩ resistor for T1, and verify that wash heater turns on. If not, replace I/O module.<br>2. Verify that T1 resistance is correct with respect to temperature (see table on pg. 23). If not, replace T1.<br>3. Replace high-limit switch.<br>4. Check wash heater for proper resistance. Replace if incorrect.<br>5. Verify that drive voltage to contactor coil is present during a call for heat and that contactor closes. If voltage present, replace contactor. If voltage not present, check wiring. |
| "F11 Service needed," "Check wash tank thermostat" | Faulty temperature probe (T1). | Replace probe that connects to P10. |

| DISPLAY SHOWS | POSSIBLE CAUSE | REMEDY |
|---|---|---|
| "F12 Service needed," "Check booster thermostat" | Faulty temperature probe (T3). | Replace probe that connects to P13. |
| "F13 Communication error," "Check 6-pin cable" | 1. Loose connection in 6-pin cable between display board and I/O module.<br>2. Faulty 6-pin cable between display board and I/O module.<br>3. Faulty communication port on I/O module or display board. | 1. Fully disconnect 6-pin cable at each end, and reconnect each end until a click is heard.<br>2. Inspect for broken wire or unseated terminal by gently pulling on each wire at each end of the cable. Reseat any loose terminals by inserting it fully into the housing using long-nosed pliers. Replace cable if broken wire is found.<br>3. Temporarily substitute a verified good display board, and check if F13 message recurs. If so, repeat substitution with a good I/O module. |
| "F14 Service needed," "Check incoming water pressure or pressure switch" | 1. Low or no water pressure.<br>2. Faulty pressure switch.<br>3. Faulty fill valve or fill valve not receiving power. | 1. Perform PSI check (see Preventative Maintenance page).<br>2. Replace pressure switch.<br>3. Check continuity and replace if faulty. |
| "F15 Sanisure violation" | 1. Faulty booster heater.<br>2. Faulty heater contactor. | 1. Check amperage on heater.<br>2. Check voltage on contactor coil and L1 and L2 legs. |
| "F16 LLC violation" | Faulty or corroded probe. | Clean or replace probe. |
| "F17 Excessive inlet temp" | Inlet water supply too hot. | Ensure inlet water supply is at required temperature. |

## RESISTANCE-TO-TEMPERATURE VALUES

| R (kΩ) | °F |
|---|---|
| 11.58 | 69.8 |
| 10.37 | 75.2 |
| 9.30 | 80.6 |
| 7.78 | 89.6 |
| 3.05 | 140.0 |
| 2.54 | 150.8 |
| 2.18 | 159.8 |
| 1.58 | 179.6 |
| 1.45 | 185.0 |
| 1.33 | 190.4 |
| 1.16 | 199.4 |
| 0.96 | 212.0 |

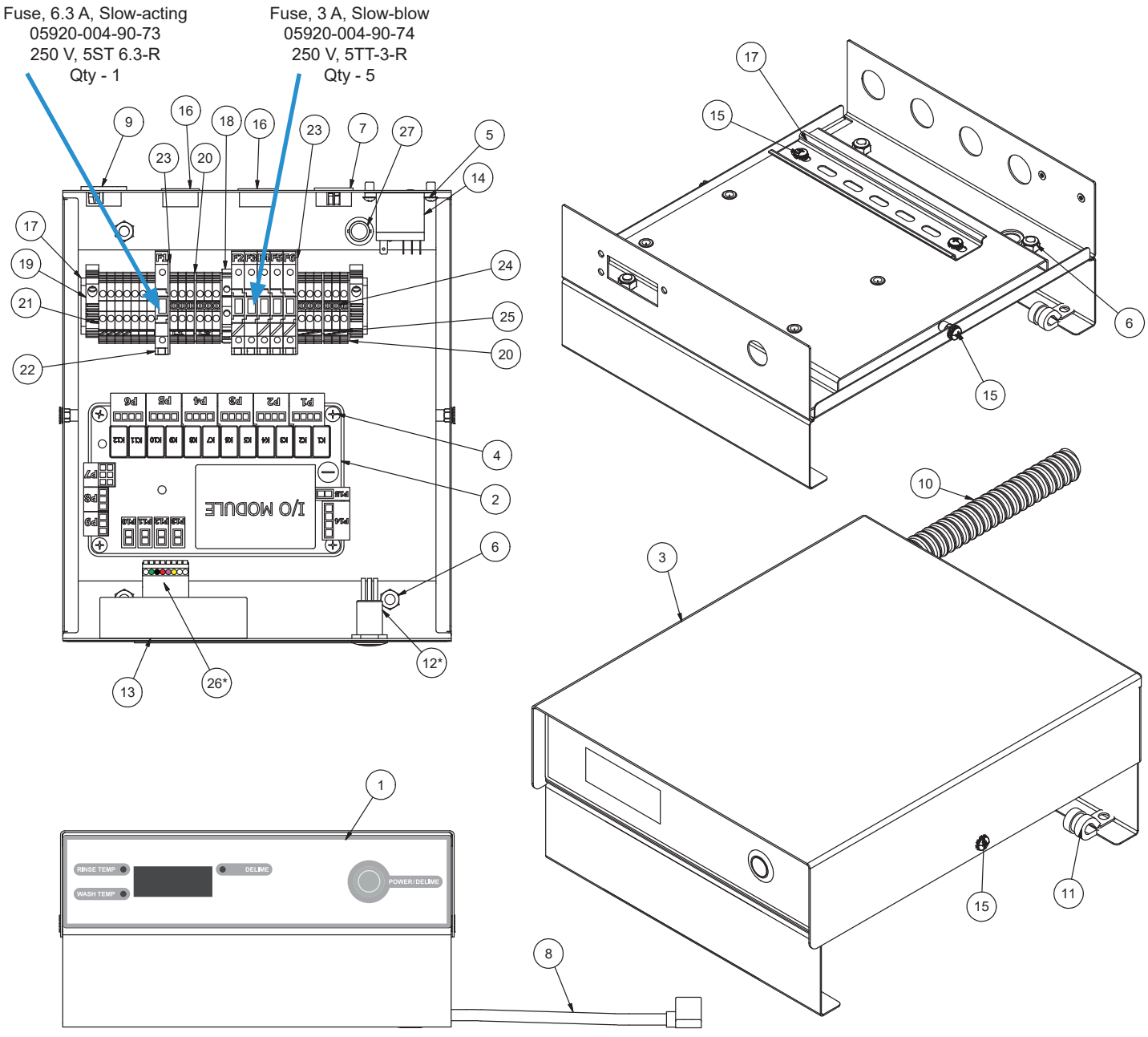
# TROUBLESHOOTING


**WARNING!** *Inspection, testing, and repair of electrical equipment should only be performed by a qualified service technician. Many of the tests require that the machine have power to it and live electrical components be exposed. USE EXTREME CAUTION WHEN TESTING THE MACHINE.*

| OBSERVATION | POSSIBLE CAUSE | REMEDY |
|---|---|---|
| Machine will not fill after the door is closed. Power "ON" light is illuminated. | 1. Faulty rinse solenoid valve.<br>2. Faulty door switch.<br>3. Fouled/faulty float switch. | 1. Repair or replace valve as required.<br>2. Verify the wiring of the switch; if correct, replace the switch.<br>3. Clean float switch if fouled. If clean and still not working, replace. |
| Machine will not fill after the door is closed. Power "ON" light is NOT illuminated. | 1. Service breaker tripped.<br>2. Machine not connected to power source.<br>3. Faulty power source. | 1. Reset. If the breaker trips again, contact an electrician to verify the amp draw of the machine.<br>2. Verify the machine has been properly connected to the power source.<br>3. Verify the wiring of the switch; if correct, replace switch. |
| Machine will not run after the door is closed. Power "ON" light is illuminated and the machine is filling. | 1. Wash motor faulty/damaged.<br>2. Wash motor contactor faulty. | 1. Verify the wash motor is getting power. If so, replace the motor.<br>2. Check for continuity; if contacts are open, replace the contactor. |
| Machine runs continuously in the wash cycle. | 1. Machine is in Delime mode.<br>2. Timer faulty.<br>3. Wash motor contactor faulty. | 1. Exit Delime cycle.<br>2. Replace timer module.<br>3. Check for continuity; if contacts are open, replace the contactor. |
| Wash or rinse heater does not work. | 1. Faulty heater element.<br>2. Faulty heater contactor.<br>3. Misadjusted thermostat.<br>4. Faulty heater probe. | 1. Check element for continuity; if open, replace the heater.<br>2. Replace the contactor.<br>3. Verify operation and setting of thermostats.<br>4. Replace probe. |
| Machine fills slowly and/or the rinse is weak. | 1. Clogged or obstructed rinse arms.<br>2. Low incoming water pressure.<br>3. Y-strainer is clogged. | 1. Remove and clean the rinse arms.<br>2. Adjust the water pressure regulator to ensure there is 10 ± 2 PSI flow.<br>3. Clean out the Y-strainer. |
| Rinse water not reaching required temperature. | 1. Faulty rinse heater.<br>2. Misadjusted thermostat.<br>3. Rinse thermometer is defective.<br>4. Faulty rinse tank probe. | 1. Check element for continuity; if open, replace heater.<br>2. Verify operation and setting of thermostats.<br>3. Replace thermometer.<br>4. Replace probe. |


**WARNING!** *Inspection, testing, and repair of electrical equipment should only be performed by a qualified service technician. Many of the tests require that the machine have power to it and live electrical components be exposed. USE EXTREME CAUTION WHEN TESTING THE MACHINE.*

| OBSERVATION | POSSIBLE CAUSE | REMEDY |
|---|---|---|
| Machine doesn't drain. | 1. Drain clogged.<br>2. Standpipe not removed before draining. | 1. Remove obstruction.<br>2. Remove standpipe. |
| Incorrect water pressure displayed during Fill or Rinse modes. | 1. Water turned off. | 1. Turn water on. |
| Wash water is not reaching required temperature. | 1. Faulty wash heater.<br>2. Misadjusted thermostat.<br>3. Wash probe is defective. | 1. Check element for continuity; if open, replace the heater.<br>2. Verify operation and setting of thermostats.<br>3. Replace probe. |
| Door will not close completely. | 1. Improper spring tension.<br>2. Obstruction in door channel.<br>3. Door panels are not square with frame. | 1. Adjust spring tension as required by loosening (not removing) spring bolt nuts and adjusting the tension. Tighten nuts back when done.<br>2. Remove the obstruction.<br>3. Adjust the frame to accommodate the door panels. |
| Water leaks at the wash pump. | 1. Wash pump seal defective.<br>2. Plug not shut/tight.<br>3. Loose hoses (hose clamps) on the wash pump. | 1. Replace the seal.<br>2. Close or tighten.<br>3. Tighten the hose clamps. |
| Will not rinse during autocycle. | 1. Defective rinse solenoid.<br>2. No water to the machine. | 1. Repair or replace the rinse solenoid as required.<br>2. Verify there is water at 10 ± 2 PSI connected to the machine. |
| Dishes are not coming clean. | 1. Machine temperatures are not up to the minimum requirements.<br>2. No detergent/too much detergent. | 1. Verify incoming water, rinse water, and wash water match the required temperatures as listed on the machine data plate.<br>2. Adjust detergent concentration as required for the amount of water held by the machine. |

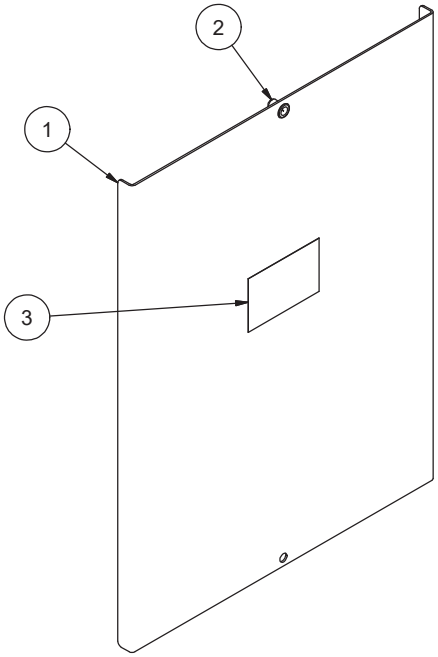


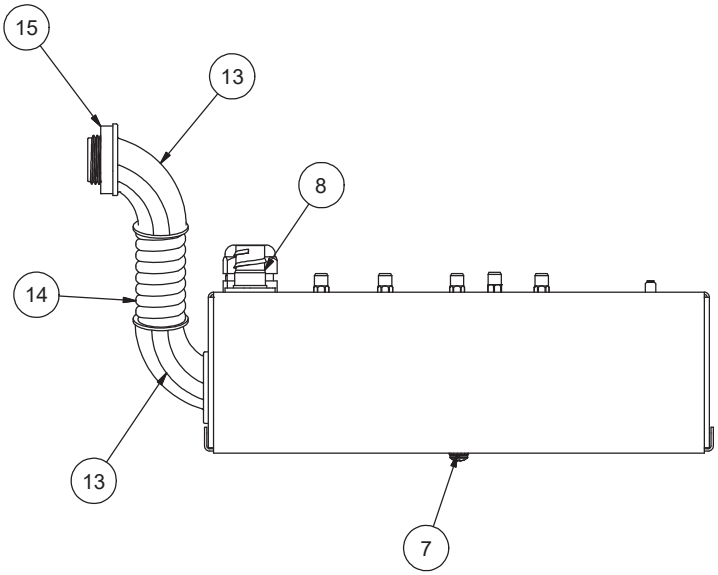

**See Power Button Connector Wiring page for wiring diagram.*

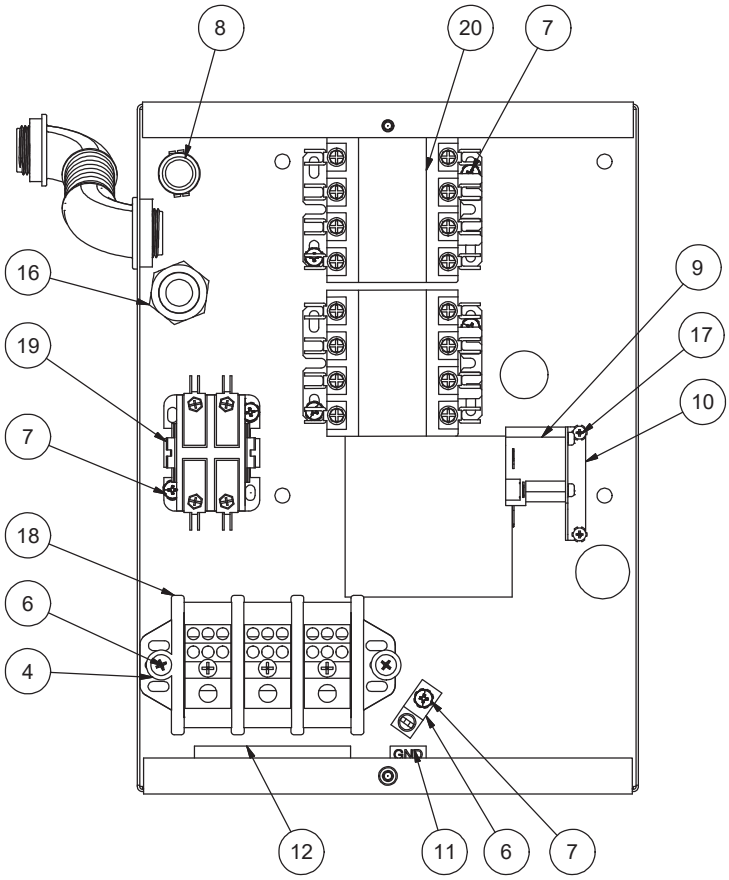
| ITEM | QTY | DESCRIPTION | PART NUMBER |
|---|---|---|---|
| 1 | 1 | Decal, Control Box | 09905-004-85-62 |
| 2 | 1 | I/O Module | 05945-004-98-57 |
| 3 | 1 | Cover, Control Box | 05700-004-85-14 |
| 4 | 4 | Screw, 10-32 x 1" | 05305-002-19-42 |
| 5 | 2 | Screw, 6-32 x 3/8" | 05305-002-25-91 |
| 6 | 4 | Locknut, 1/4-20 Hex with Nylon Insert | 05310-374-01-00 |
| 7 | 1 | Plug | 05975-011-47-81 |
| 8 | 1 | Door, Cycle Switch | 05930-002-36-80 |
| 9 | 1 | Fitting, 1/2" Straight | 05975-003-33-27 |
| 10 | 1 | Conduit, 1/2" PVC Flex | 05975-003-33-36 |
| 11 | 1 | Clamp, Tubing with Rubber Cushion | 04730-002-83-21 |
| 12* | 1 | Power Button | 05930-004-85-60 |
| 13 | 1 | Display, LED Temp | 05945-004-85-61 |
| 14 | 1 | Relay, 10 A, 220 V, AC Coil | 05945-004-84-93 |
| 15 | 4 | Screw, 10-32 x 1/2" | 05306-004-42-04 |
| 16 | 2 | Grommet, 7/8" Split | 05975-200-40-00 |
| 17 | 1 | Din-rail, 7" | 05700-003-71-06 |
| 18 | 1 | Terminal Block, Ground | 05999-004-90-65 |
| 19 | 2 | End Bracket, Terminal | 05999-004-90-66 |
| 20 | 4 | Separator, Terminal Block | 05999-004-90-67 |
| 21 | 19 | Terminal Block, Single Level | 05999-004-90-68 |
| 22 | 6 | Holder, Terminal Block Fuse | 05999-004-90-69 |
| 23 | 2 | End Bracket, Fuse Block | 05999-004-90-70 |
| 24 | 4 | Jumper Bars, 3-pole | 05999-004-90-71 |
| 25 | 19 | Tag, Marking 5 mm x 5 mm | 05999-004-90-72 |
| 26* | 1 | Female Plug Pin | 05935-004-91-16 |
| 27 | 1 | Bushing, 1/2" Snap | 05975-210-05-00 |

**See Power Button Connector Wiring page for wiring diagram.*

# ELECTRICAL BOX

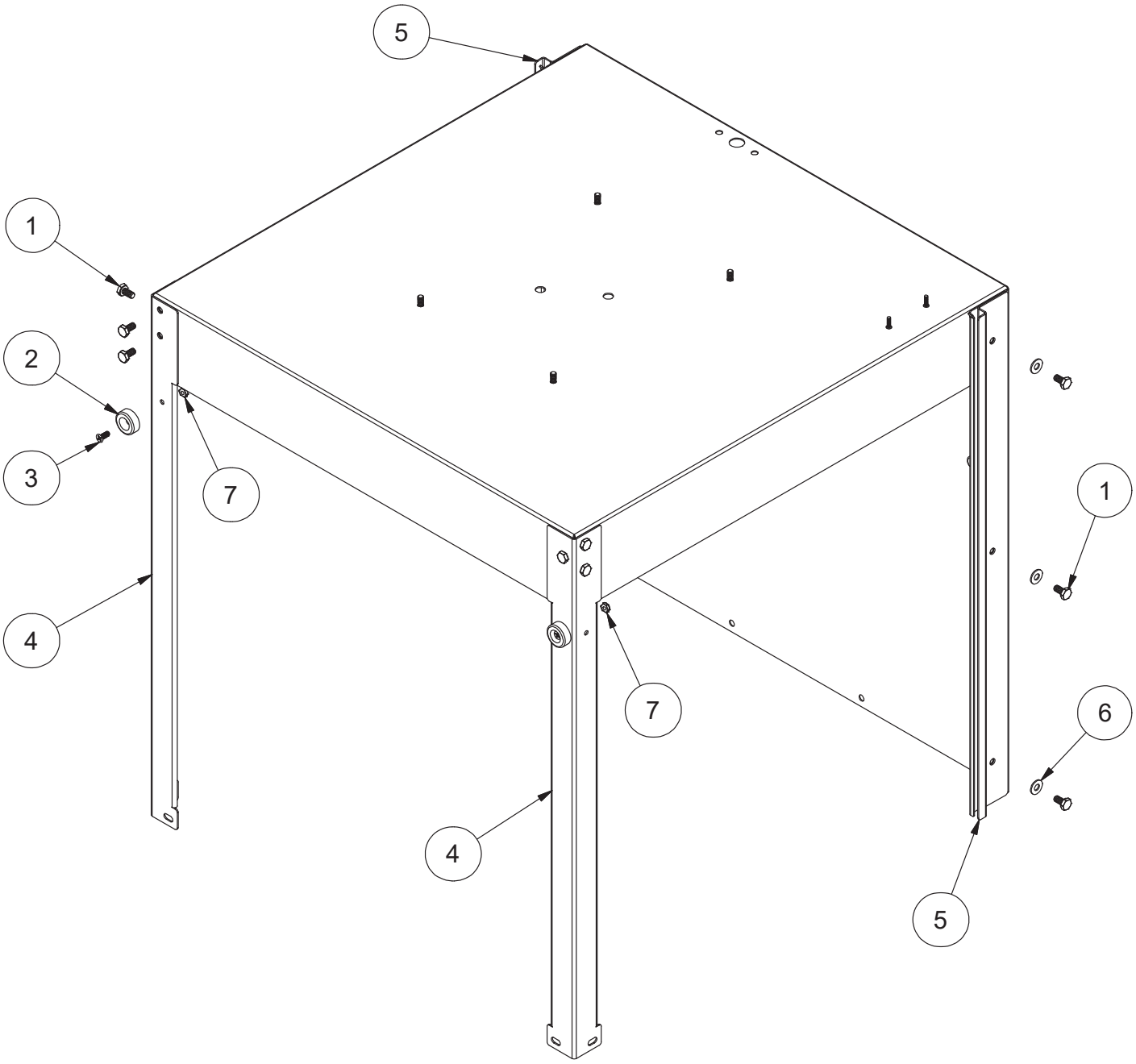


# ELECTRICAL BOX

| ITEM | QTY | DESCRIPTION | PART NUMBER |
|---|---|---|---|
| 1 | 1 | Cover, Electrical Box | 05700-004-85-07 |
| 2 | 11 | Nut, 10-32 Hex | 05310-004-40-48 |
| 3 | 1 | Decal, Warning-Disconnect Power | 09905-100-75-93 |
| 4 | 2 | Washer, Flat | 05311-173-01-00 |
| 5 | 2 | Screw, 10-32 x 3/4" | 05305-011-62-17 |
| 6 | 1 | Ground Lug | 05940-200-76-00 |
| 7 | 9 | Screw, 10-32 x 1/2" | 05306-004-42-04 |
| 8 | 1 | Fitting, 1/2" Straight | 05975-003-33-27 |
| 9 | 1 | Thermostat, High-limit | 05930-004-33-12 |
| 10 | 1 | Bracket, High-limit | 05700-004-36-37 |
| 11 | 1 | Decal, Ground | 09905-011-86-86 |
| 12 | 1 | Decal, L1 L2 L3 | 09905-004-37-05 |
| 13 | 2 | Fitting, 90-degree, 3/4" | 05975-004-19-42 |
| 14 | 1 | Conduit, 1/2" PVC Flex | 05975-003-77-47 |
| 15 | 2 | Nut, Conduit Black Nylon, 3/4" | 05975-003-81-29 |
| 16 | 1 | Fitting | 05975-011-65-51 |
| 17 | 2 | Screw, 6-32 x 3/8” | 05305-002-25-91 |
| 18 | 1 | Terminal Block, 3-pole | 05940-011-48-27 |
| 19 | 1 | Contactor, 30 A, 240 VAC | 05945-002-74-20 |
| 20 | 2 | Contactor, Heater, 4-pole, 35 A, 208-240 VAC | 05945-109-01-69 |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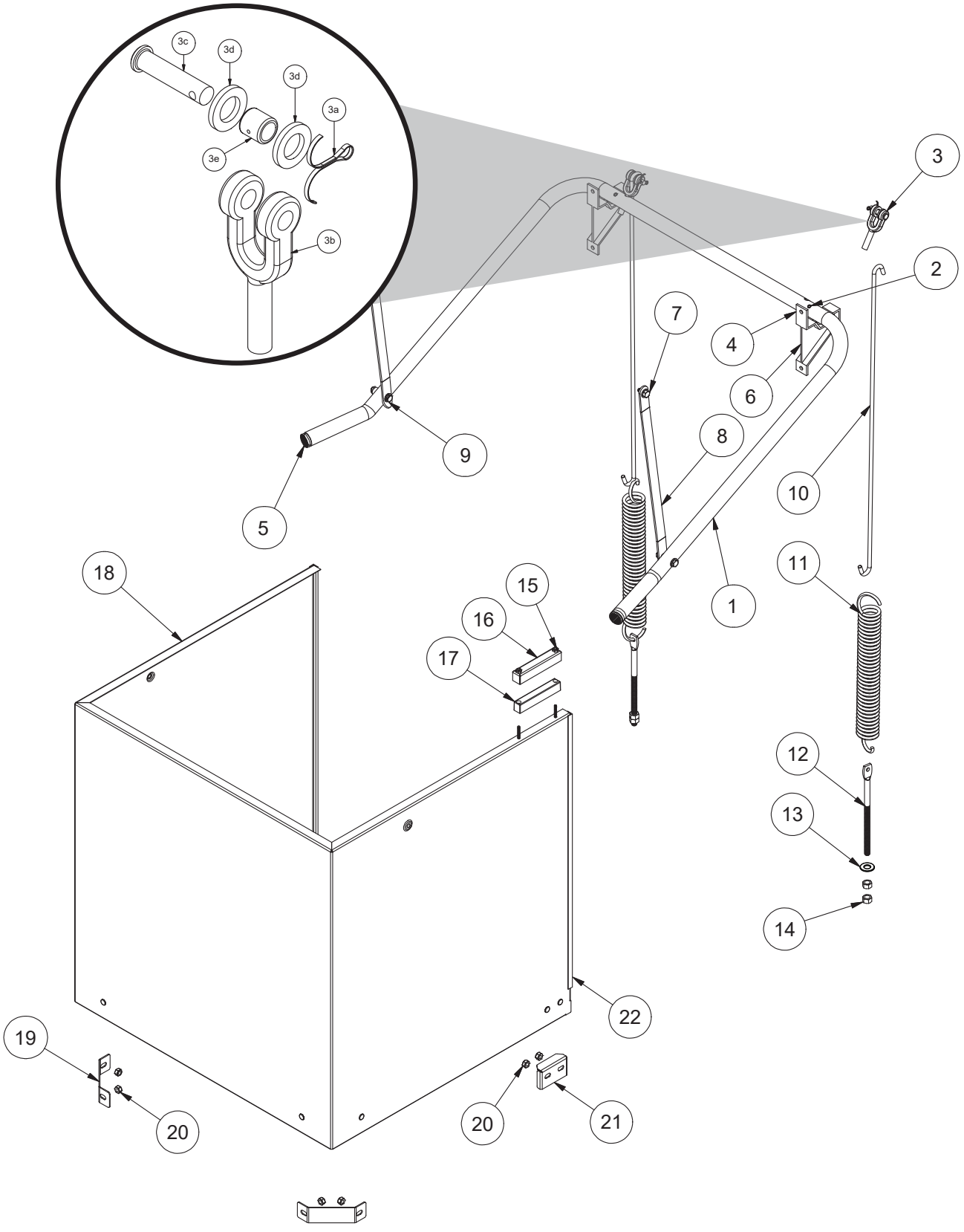
| ITEM | QTY | DESCRIPTION | PART NUMBER |
|---|---|---|---|
| 1 | 12 | Bolt, 1/4-20 x 1/2" | 05305-274-02-00 |
| 2 | 2 | Guide, Hood | 05700-004-90-99 |
| 3 | 2 | Screw, 10-32 x 1/2” | 05305-011-44-51 |
| 4 | 2 | Support, Hood | 05700-004-84-99 |
| 5 | 2 | Guide, Hood, Rear | 05700-004-87-24 |
| 6 | 6 | Washer, 1/4-20 | 05311-174-01-00 |
| 7 | 2 | Locknut, Low-profile, 10-32 | 05310-004-28-70 |


3c
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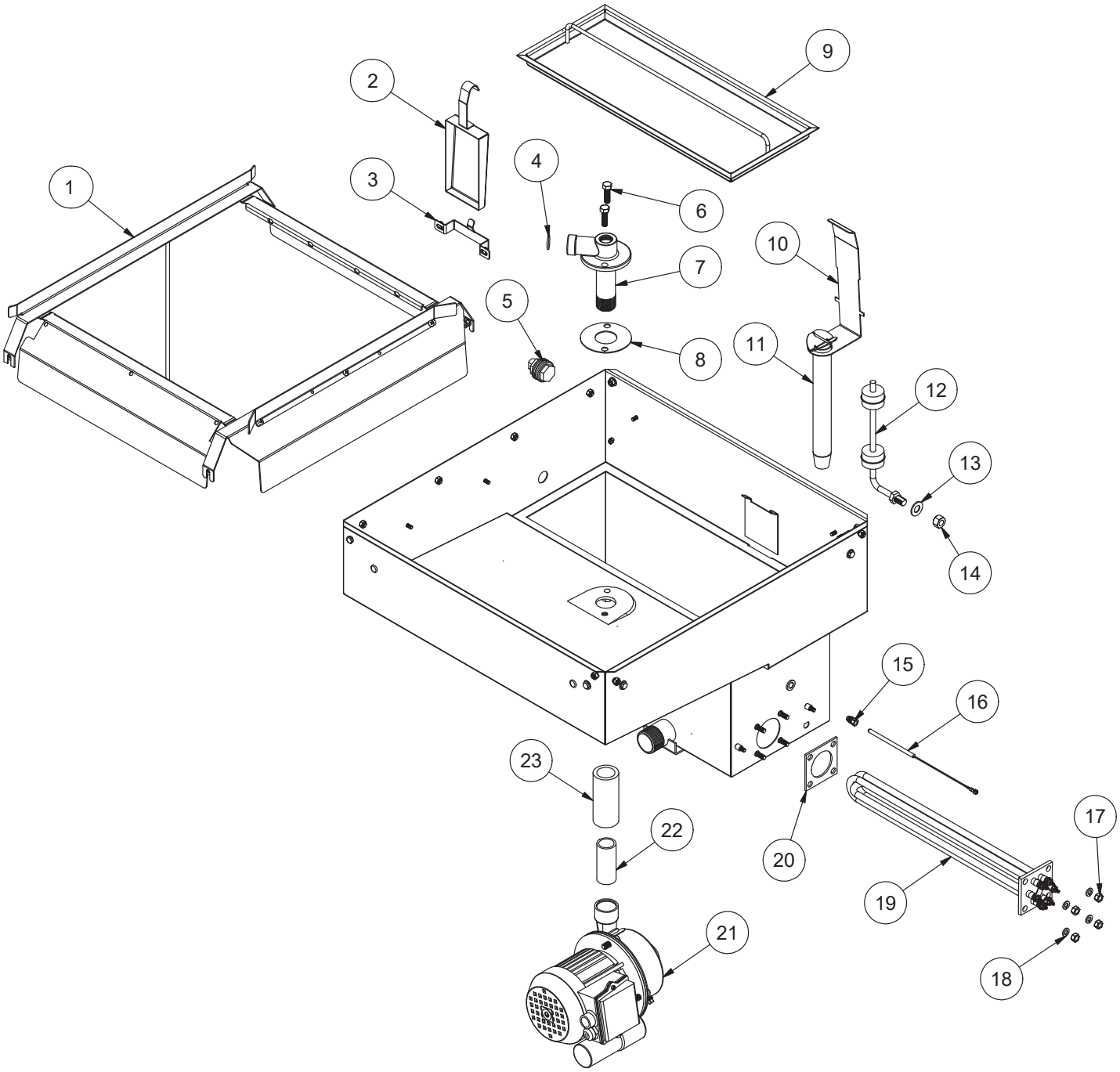
| ITEM | QTY | DESCRIPTION | PART NUMBER |
|---|---|---|---|
| 1 | 1 | Complete Cantilever Arm Assembly (items 1–5)<br>Cantilever Arm Only | 05700-004-85-10<br>05700-001-21-00 |
| 2 | 2 | Spring Pin, 1/4" x 1 1/8" | 05315-407-06-00 |
| 3 | 2 | Yoke Assembly | 05700-000-75-77 |
| 3a | 1 | Cotter Pin | 05315-207-01-00 |
| 3b | 1 | Yoke | 05700-000-75-78 |
| 3c | 1 | Clevis Pin, 5/16” x 1 3/8” | 05315-700-01-00 |
| 3d | 2 | Nylon Washer | 05311-369-03-00 |
| 3e | 1 | Bushing | 03120-100-03-00 |
| 4 | 2 | Nut, Center Locknut 3/8-16 | 05310-256-04-00 |
| 5 | 2 | Plug, Cantilever Arm | 05340-011-35-00 |
| 6 | 2 | Bracket, Cantilever Arm | 05700-003-88-91 |
| 7 | 2 | Screw, 1/4-20 x 5/8" Hex | 05305-274-24-00 |
| 8 | 2 | Connector, Door | 05700-004-85-11 |
| 9 | 2 | Screw, 1/4-20 x 1 1/2" | 05305-274-23-00 |
| 10 | 2 | Rod, Spring | 05700-003-67-39 |
| 11 | 2 | Spring | 05340-109-02-00 |
| 12 | 2 | Bolt, Cantilever Hanger Eye 3/8-16 | 05306-956-05-00 |
| 13 | 2 | Washer, 3/8" ID x 7/8" OD | 05311-176-02-00 |
| 14 | 4 | Nut, 3/8-16 Hex | 05310-276-01-00 |
| 15 | 2 | Locknut, 8-32 Hex with Nylon Insert | 05310-272-02-00 |
| 16 | 1 | Cover, Door Magnet | 05700-004-07-39 |
| 17 | 1 | Magnet, Reed Switch | 05930-111-51-68 |
| 18 | 1 | Door | 05700-004-84-98 |
| 19 | 2 | Door Stop, Front | 05700-004-85-74 |
| 20 | 4 | Locknut, 1/4-20 Hex with Nylon Insert | 05310-374-01-00 |
| 21 | 2 | Door Stop, Rear | 05700-004-86-86 |
| 22 | 2 | Door Guide | 05330-600-01-00 |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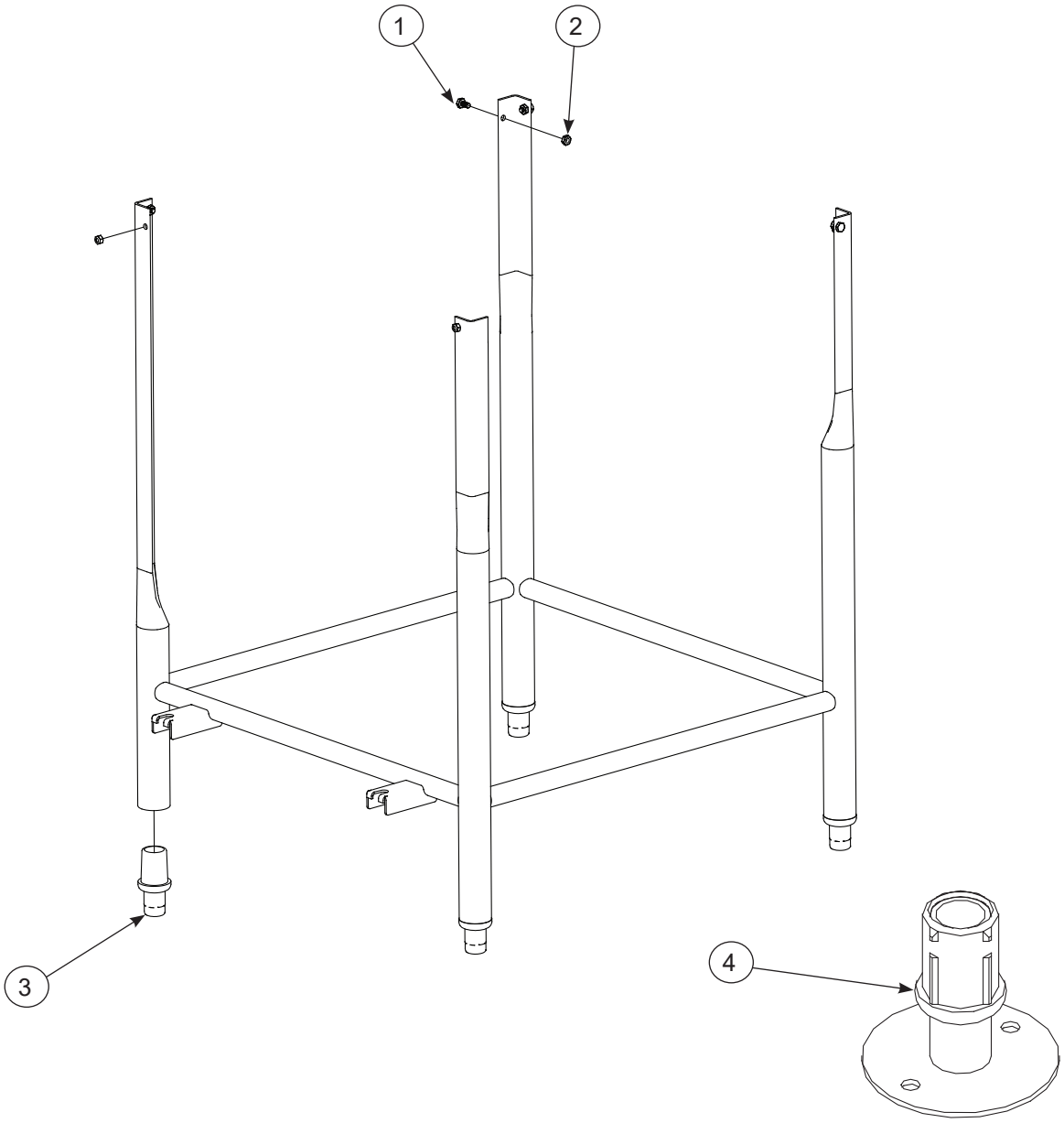
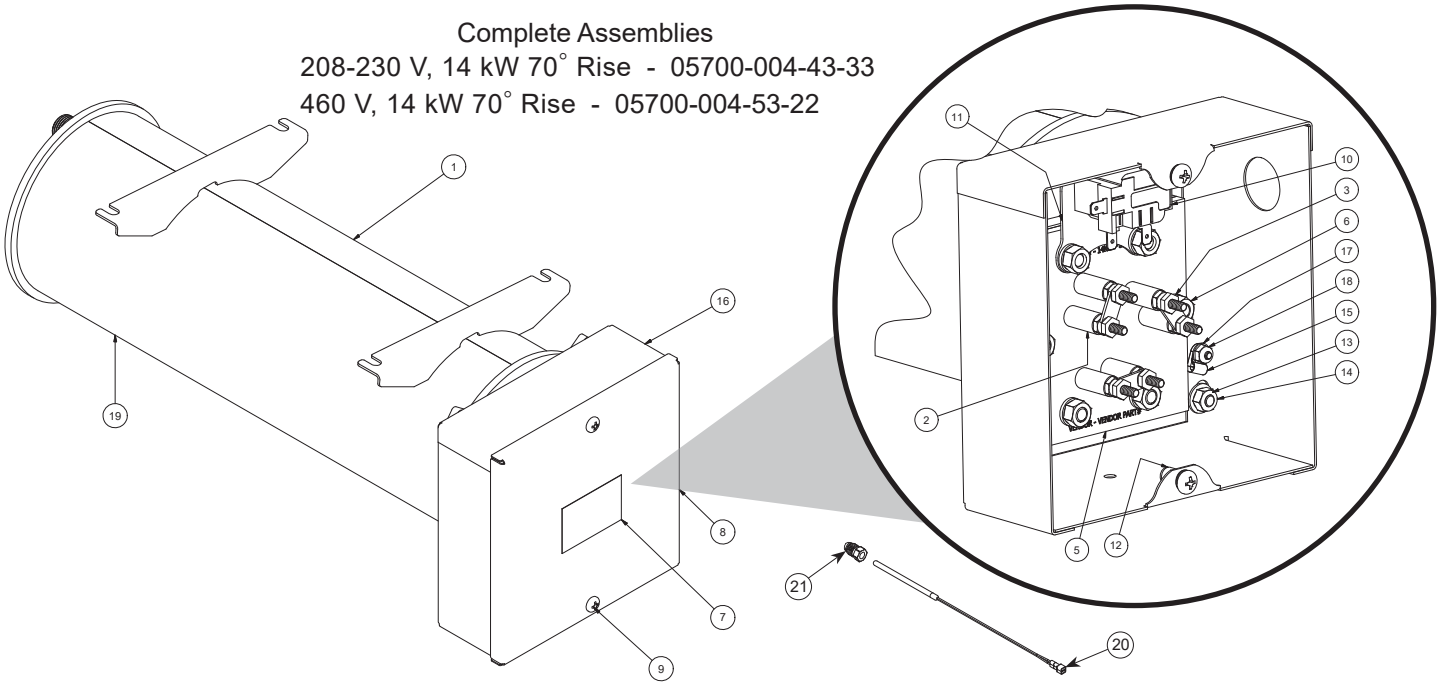
| ITEM | QTY | DESCRIPTION | PART NUMBER |
|---|---|---|---|
| 1 | 1 | Track Assembly | 05700-002-01-00 |
| 2 | 1 | Sump Strainer | 05700-001-22-23 |
| 3 | 1 | Bracket, Sump Strainer | 05700-001-22-24 |
| 4 | 1 | O-ring | 05330-002-60-69 |
| 5 | 1 | Bulk Head Plug | 04730-609-05-00 |
| 6 | 2 | Bolt, Hex 3/8-16 x 1 1/4" Long | 05305-276-10-00 |
| 7 | 1 | Lower Wash Manifold | 05700-031-46-00 |
| 8 | 1 | Gasket | 05700-111-35-03 |
| 9 | 1 | Scrap Screen | 05700-003-07-76 |
| 10 | 1 | Standpipe Lift<br>Standpipe Lift Support (Not Shown) | 05700-002-91-54<br>05700-002-91-55 |
| 11 | 1 | Standpipe | 05700-001-25-69 |
| 12 | 1 | Switch, Dual Float | 06680-121-70-71 |
| 13 | 1 | Washer, Flat, 1/2" | 05311-011-71-93 |
| 14 | 1 | Nut, 1/2-13 | 05310-011-72-58 |
| 15 | 1 | Fitting, 1/4" | 05310-924-02-05 |
| 16 | 1 | Probe, Thermistor 4" | 06685-004-17-26 |
| 17 | 1 | Nut, Hex, 5/16-18 | 05310-275-01-00 |
| 18 | 1 | Lockwasher, 5/16", Split | 05311-275-01-00 |
| 19 | 1 | Heater | See Heaters page. |
| 20 | 1 | Wash Heater Gasket | 05330-011-47-79 |
| 21 | 1 | Wash Motor | See Motors page. |
| 22 | 1 | Nipple | 05700-021-34-84 |
| 23 | 1 | Discharge Hose | 05700-011-88-24 |




| ITEM | QTY | DESCRIPTION | PART NUMBER |
|---|---|---|---|
| 1 | 4 | Bolt, 1/4-20 x 1/2” | 05305-274-02-00 |
| 2 | 4 | Locknut, 1/4-20 Hex with Nylon Insert | 05310-374-02-00 |
| 3 | 4 | Bullet Foot | 05340-108-01-03 |
| 4 | 4 | Flanged Bullet Foot (Optional) | 05340-002-34-86 |

# RINSE TANK

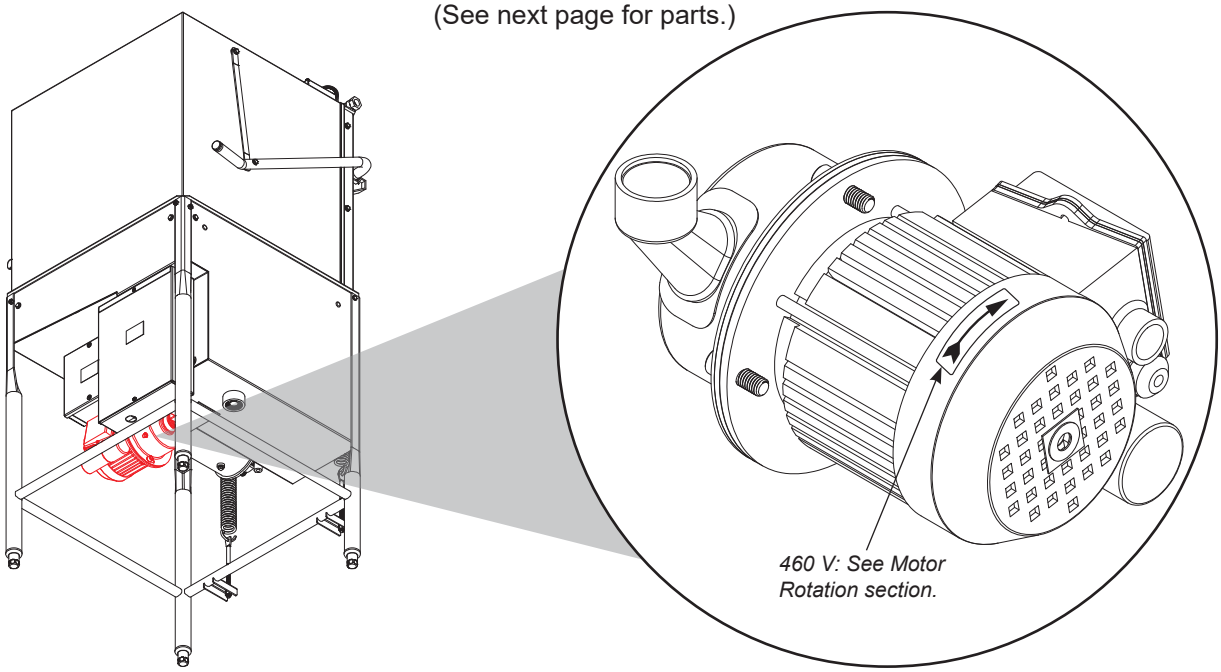
Complete Assemblies
208-230 V, 14 kW 70˚ Rise - 05700-004-43-33
460 V, 14 kW 70˚ Rise - 05700-004-53-22




| ITEM | QTY | DESCRIPTION | PART NUMBER |
|---|---|---|---|
| 1 | 1 | Tank, Rinse | 05700-004-50-86 |
| 2 | 1 | Heater, Rinse | See Heaters page. |
| 3 | 6 | Lockwasher, Split 5/16” | 05311-275-01-00 |
| 4 | 1 | Fitting, 1/4”, Brass Nut/Sleeve | 05310-924-02-05 |
| 5 | 1 | Gasket, Rinse Heater | 05330-200-02-70 |
| 6 | 6 | Nut, Hex 5/16-18 | 05310-275-01-00 |
| 7 | 1 | Decal, Warning-Disconnect Power | 09905-100-75-93 |
| 8 | 1 | Cover, Heater | 05700-004-51-34 |
| 9 | 2 | Screw | 05305-004-27-82 |
| 10 | 1 | Thermostat, High-limit | 05930-004-33-12 |
| 11 | 1 | Bracket, High-limit Thermostat | 05700-004-36-84 |
| 12 | 2 | Nut, 1/4-20 | 05310-004-23-96 |
| 13 | 4 | Washer, 1/4-20 | 05311-174-01-00 |
| 14 | 4 | Locknut, 1/4-20 Hex with Nylon Insert | 05310-374-01-00 |
| 15 | 1 | Clamp, Wire 1/8", P-clip | 05975-601-10-15 |
| 16 | 1 | Cover Door, New Rinse Tank | 05700-004-52-21 |
| 17 | 1 | Washer, Flat | 05311-173-02-00 |
| 18 | 1 | Locknut, Hex 8-32 | 05310-272-02-00 |
| 19 | 1 | Plug, 1/4", Brass (Not Shown) | 04730-209-01-00 |
| 20 | 1 | Probe, Thermistor 4" | 06685-004-17-26 |
| 21 | 1 | Fitting, 1/4" | 05310-924-02-05 |

## Complete Assemblies

(See next page for parts.)




The models covered in this manual come supplied with various wash motor assemblies (a wash motor assembly includes the wash motor and the pump end), depending on the characteristics of the machine. To ensure you order the correct wash motor assembly for the model you are servicing, please refer to the following table:

| MODEL | VOLTS | Hz | PHASE | WASH MOTOR ASSEMBLY |
|---|---|---|---|---|
| All | 208 | 60 | 1 | 06105-004-24-80[1] |
| All | 208 | 60 | 3 | 06105-004-24-80[1] |
| All | 230 | 60 | 1 | 06105-004-24-80[1] |
| All | 230 | 60 | 3 | 06105-004-24-80[1] |
| All | 460 | 60 | 3 | 06105-121-64-21[2] |

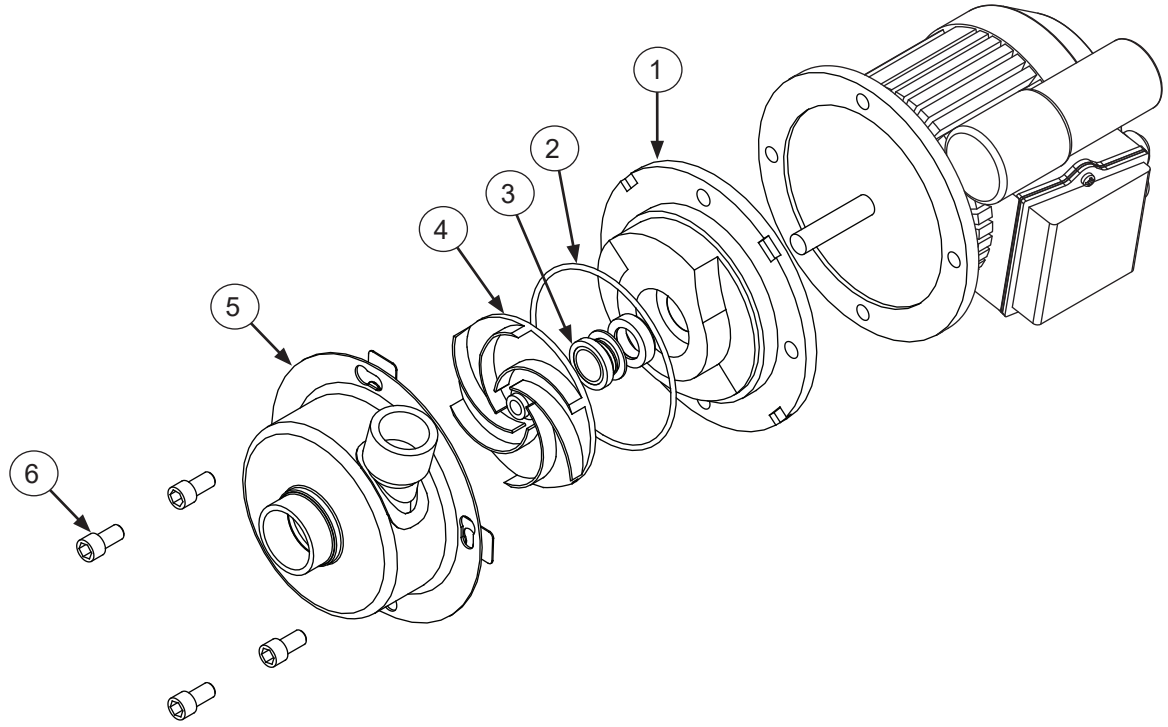
*[1]Use P/N 06105-004-32-04 to order the motor only.*
*[2]Use P/N 06105-002-62-71 to order the motor only.*

**NOTICE**

*When servicing a wash motor, it is important to refer to the wiring schematic found on the motor to ensure the motor is wired correctly. Different manufacturers of motors might not use the same wire color codes and your new motor might not connect using the same wires. Always refer to the wiring diagrams on the motor you are installing. If the motor you are installing has had the schematic removed, contact the manufacturer immediately for technical support.*

## Parts

(See previous page for complete assemblies.)




The models covered in this manual come supplied with various wash motors (see previous page), depending on the characteristics of the machine. To ensure you order the correct parts for the model you are servicing, please refer to the following table:

| ITEM | QTY | DESCRIPTION | PART NUMBER |
|---|---|---|---|
| 1 | 1 | Seal Plate, 208/230 V | 05700-002-81-87 |
| | 1 | Seal Plate, 460 V | 05700-002-06-22 |
| 2 | 1 | Case O-ring, 208/230 V | 05330-002-81-83 |
| | 1 | Case O-ring, 460 V | 05330-002-87-02 |
| 3 | 1 | Mechanical Seal, 208/230 V | 05330-002-34-22 |
| | 1 | Mechanical Seal, 460 V | 05330-002-87-16 |
| 4 | 1 | Impeller Assembly, 208/230 V | 05700-002-81-86 |
| | 1 | Impeller Assembly, 460 V | 05700-002-06-19 |
| 5 | 1 | Pump Casing 208/230 V | 05700-002-85-01 |
| | 1 | Pump Casing 460 V | 05700-002-06-20 |
| 6 | 1 | Case Capscrew, 208/230 V | 05305-002-81-88 |

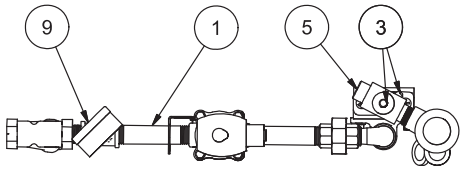
| Volts | Hz | Phase | Wash Heater | Rinse Heater (14 kW) |
|---|---|---|---|---|
| 208 | 50 | 1 | 04540-121-47-39 | 04540-121-63-38 |
| 208 | 50 | 3 | 04540-121-47-39 | 04540-121-63-38 |
| 208 | 60 | 1 | 04540-121-47-39 | 04540-121-63-38 |
| 208 | 60 | 3 | 04540-121-47-39 | 04540-121-63-38 |
| 230 | 50 | 1 | 04540-121-47-39 | 04540-121-63-38 |
| 230 | 50 | 3 | 04540-121-47-39 | 04540-121-63-38 |
| 230 | 60 | 1 | 04540-121-47-39 | 04540-121-63-38 |
| 230 | 60 | 3 | 04540-121-47-39 | 04540-121-63-38 |
| 380 | 50 | 3 | 04540-002-44-31 | 04540-121-63-38 |
| 415 | 50 | 3 | 04540-002-43-09 | N/A |
| 440 | 50 | 3 | 04540-121-65-99 | 04540-121-63-39 |
| 460 | 60 | 3 | 04540-121-65-99 | 04540-121-63-39 |

**Heater Phase Conversion Kit**

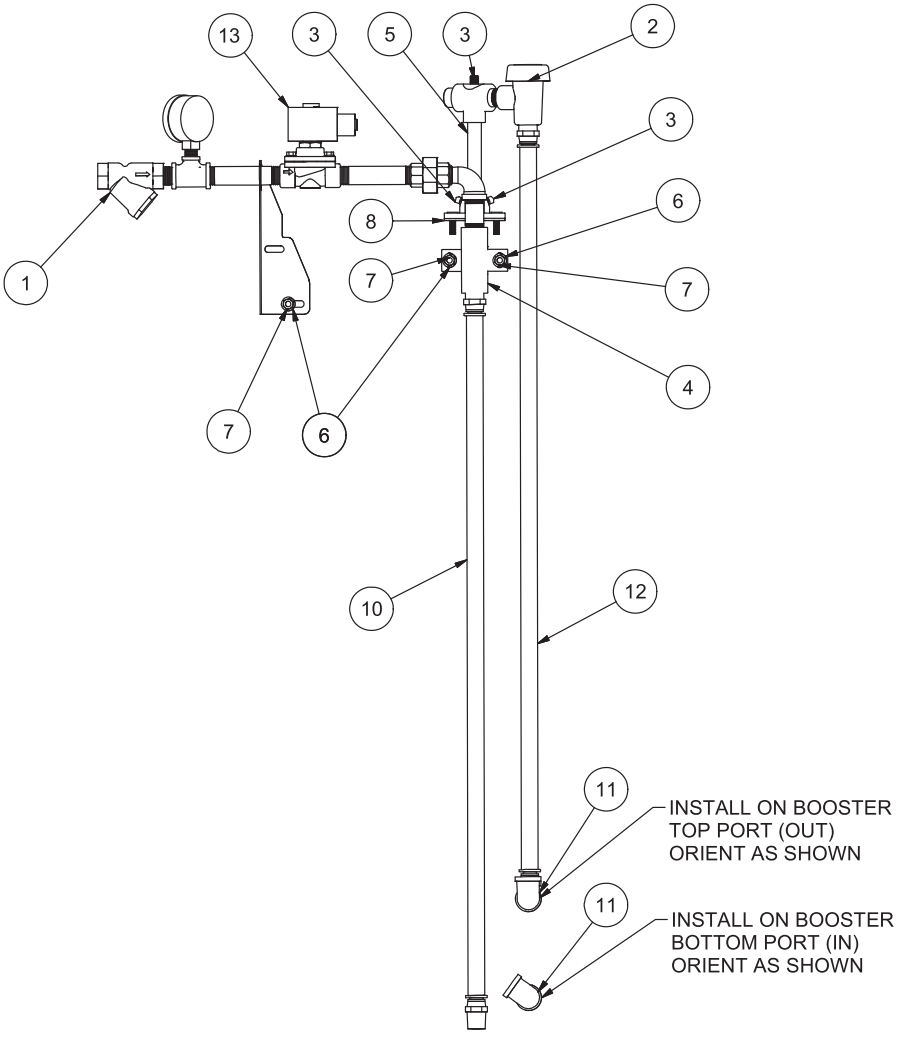
06401-004-00-22

Complete Plumbing Assembly
05700-004-54-52

**Top View**




**Back View**

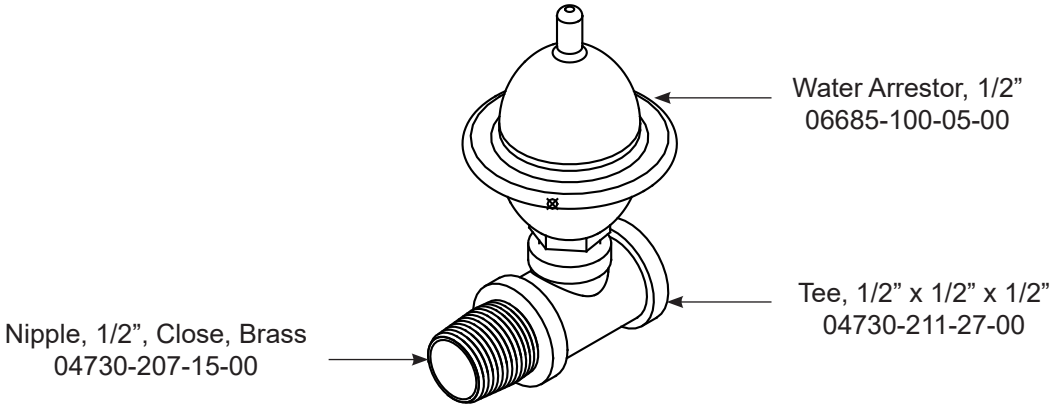



***NOTICE***

*When servicing plumbing components, take care not to damage the threads of each individual item. Damaged threads can cause leaks and loss of pressure, which could adversely affect the performance of the machine. It is strongly recommended that thread tape—used in conservative amounts—be applied to threads when joining components together. Do not use thread-sealing compounds, sometimes referred to as "pipe dope." Compounds can be ejected from the threads during the tightening process and become lodged in key components, rendering them useless, including solenoid valves and pressure gauge ball valves.*

| ITEM | QTY | DESCRIPTION | PART NUMBER |
|---|---|---|---|
| | 1 | Plumbing, Complete Assembly | 05700-004-54-52 |
| 1 | 1 | Plumbing, Inlet | 05700-004-47-98 |
| 2 | 1 | Vacuum Breaker, 1/2" Brass | 04820-003-06-13 |
| 3 | 3 | Plug, Rinse Injector, 1/8” Brass | 04730-209-07-37 |
| 4 | 1 | Casting, 1/2" Flanged Coupling | 05700-004-47-97 |
| 5 | 1<br>1 | Rinse Injector<br>Gasket, Rinse Injector (Not Shown) | 05700-002-56-75<br>05330-111-42-81 |
| 6 | 3 | Washer, 1/4-20 Hex with Nylon Insert | 05311-174-01-00 |
| 7 | 3 | Locknut, 1/4-20 Hex with Nylon Insert | 05310-374-01-00 |
| 8 | 1 | Gasket, Rinse Manifold | 05330-003-75-91 |
| 9 | 1 | Decal, 10 PSI | 09905-004-50-73 |
| 10 | 1 | Hose, 1/2" x 31" Blue | 05700-004-54-56 |
| 11 | 2 | Elbow, 1/2" 90-degree Brass | 04730-011-42-96 |
| 12 | 1 | Hose, 1/2" x 33" Red | 05700-004-51-62 |
| 13 | 1 | Solenoid Valve, 1/2" | 04810-003-71-56 |

## SHOCK ABSORBER (WATER ARRESTOR) OPTION

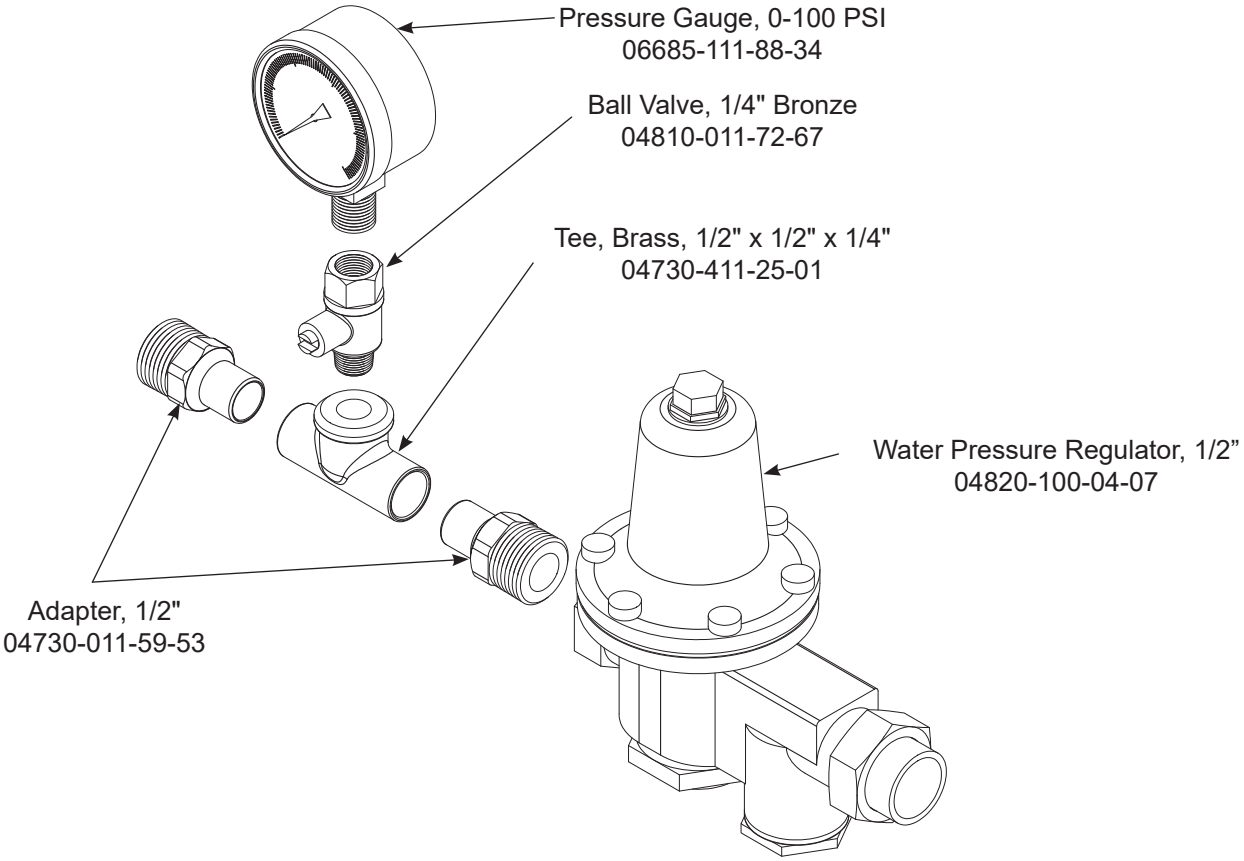



## WATER TREATMENT OPTION

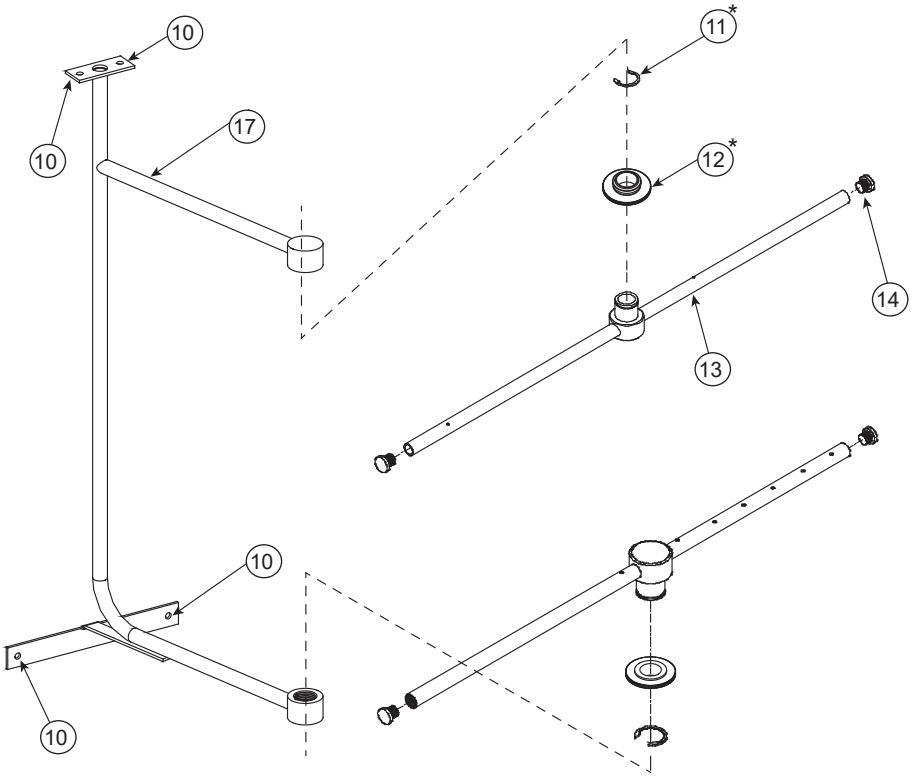
Scaltrol System
04730-003-05-76

Replacement Cartridge
(inspect at least every 6 months)
RSC-100

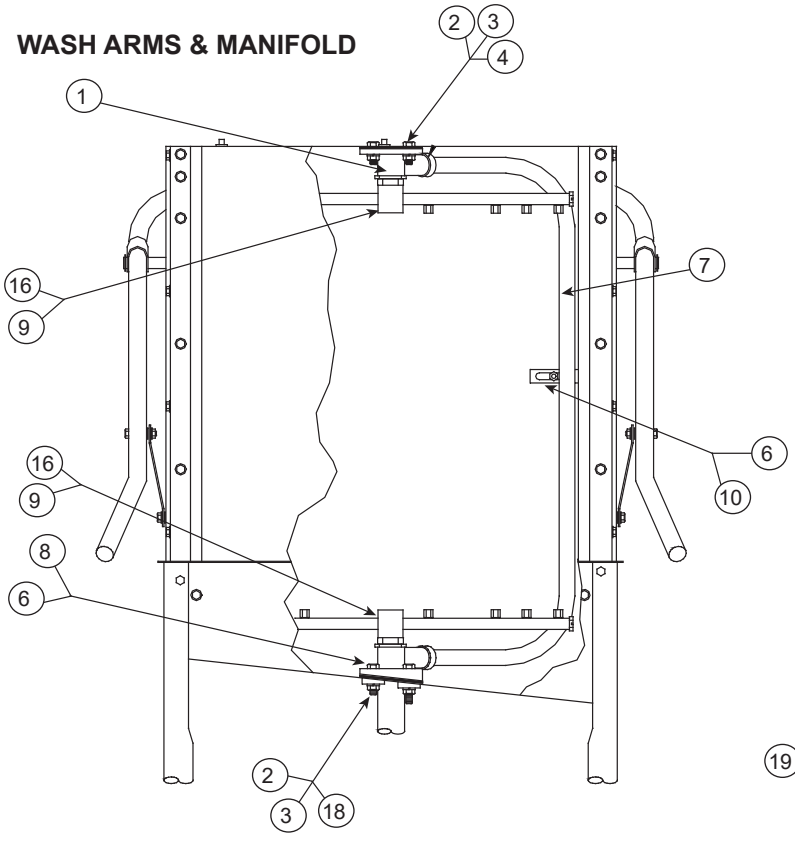
## PRESSURE REGULATING VALVE OPTION

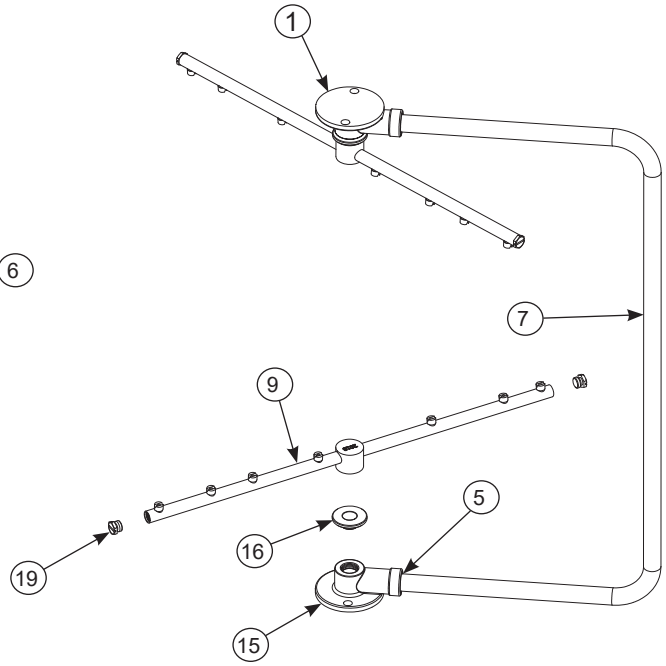


## FINAL RINSE ARMS & MANIFOLD




## WASH ARMS & MANIFOLD



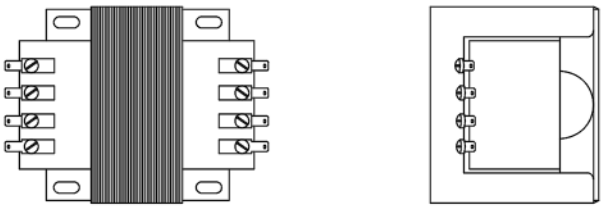



# WASH & RINSE ASSEMBLIES

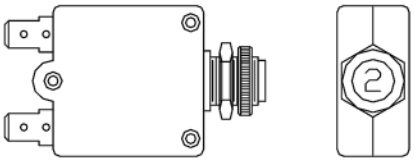
| ITEM | QTY | DESCRIPTION | PART NUMBER |
|---|---|---|---|
| 1 | 1 | Upper Manifold | 05700-031-34-82 |
| 2 | 4 | Nut, 3/8-16 Hex | 05310-276-01-00 |
| 3 | 4 | Lockwasher, 3/8" | 05311-276-01-00 |
| 4 | 2 | Bolt, Hex 3/8-16 x 7/8" | 05306-011-36-95 |
| 5 | 2 | O-ring | 05330-111-35-15 |
| 6 | 1 | Positioning Bracket, Manifold Tube | 05700-011-34-63 |
| 7 | 1 | Tube, Wash Manifold | 05700-131-15-07 |
| 8 | 2 | Gasket, Manifold | 05700-111-35-03 |
| 9 | 1 | Wash Arm | 05700-004-13-13 |
| 10 | 5 | Locknut, 1/4-20 Hex with Nylon Insert | 05310-374-01-00 |
| 11* | 2 | Clip, Retaining, Rinse Head Bushing | 05340-112-01-11 |
| 12* | 2 | Bearing Assembly, Rinse Arm | 05700-004-54-71 |
| 13 | 2 | Rinse Arm | 05700-003-58-94 |
| 14 | 4 | Rinse Arm End-cap | 04730-111-60-41 |
| 15 | 1 | Lower Wash Manifold | 05700-031-46-00 |
| 16 | 2 | Bearing Assembly | 05700-021-35-97 |
| 17 | 1 | Rinse Manifold Assembly | 05700-021-47-61 |
| 18 | 2 | Bolt, Hex 3/8-16 x 1 1/4" | 05305-276-10-00 |
| 19 | 4 | Wash Arm End-cap | 05700-003-31-59 |

*Rinse Arm Bearing Kit
(Includes items 11 and 12)
06401-004-57-50

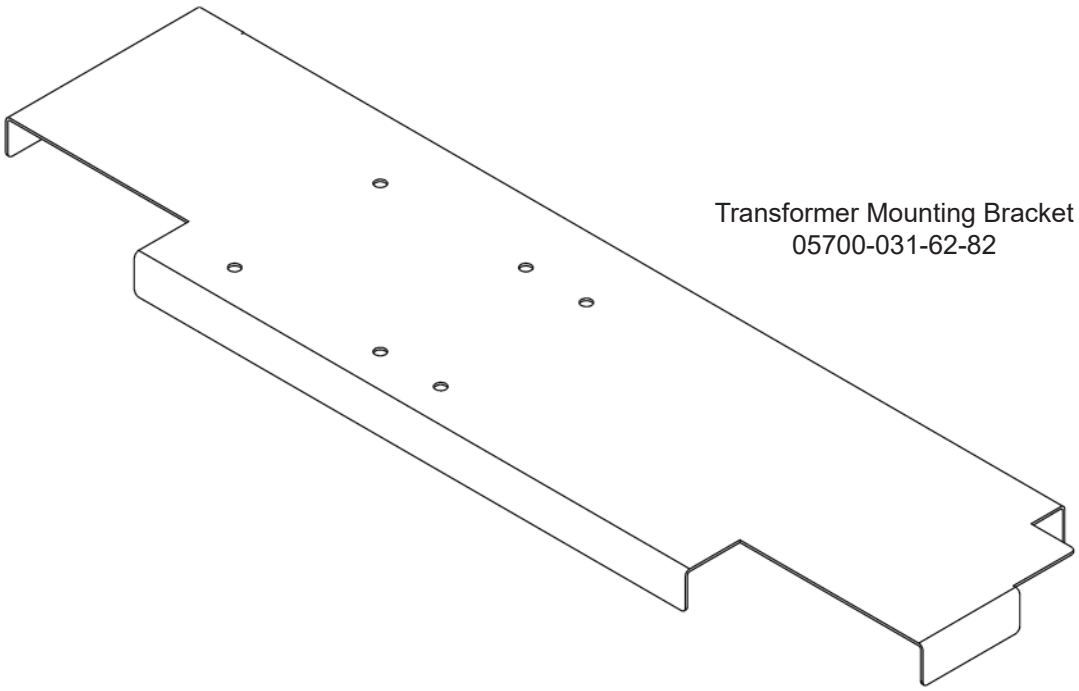
# 460 V MACHINE TRANSFORMER MOUNTING BOX



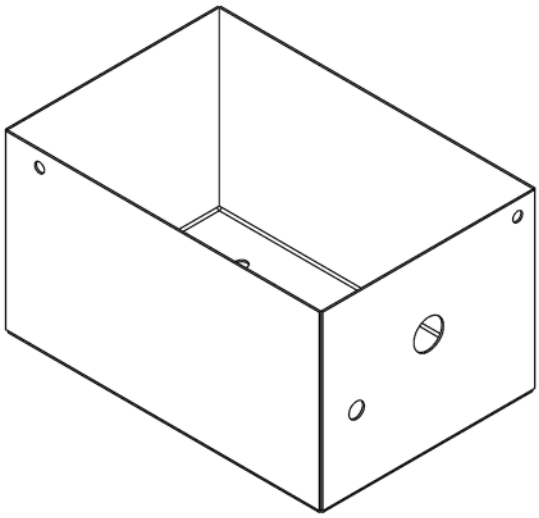
460 V Transformer
05950-111-65-93



2 A Circuit Breaker
05925-111-64-18



Transformer Mounting Bracket
05700-031-62-82



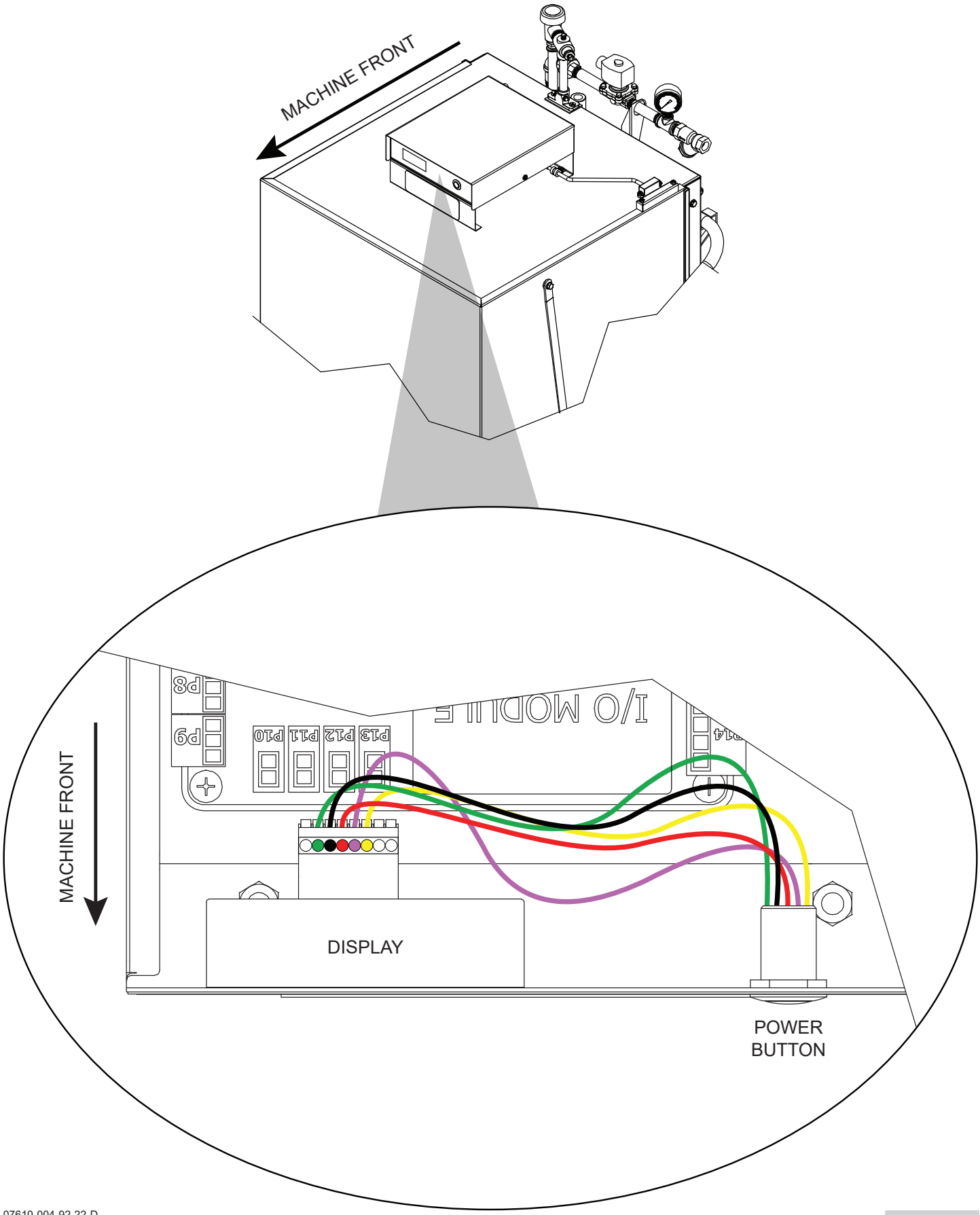
Transformer Mounting Box
05700-002-10-01

Transformer Mounting Box Top
(Not Shown)
05700-000-78-53

Call 1-880-800-5672 to order kits and use the part numbers below:

| DESCRIPTION | PART NUMBER |
|---|---|
| Door Magnet Cover Kit | 06401-004-07-73 |
| Drain Water Tempering Kit | 06401-004-85-80 |
| Exhaust Fan Contactor Kit | 05700-004-35-35 |
| False Panel Kit | 05700-002-75-59 |
| Phase Conversion Kit | 06401-004-00-22 |

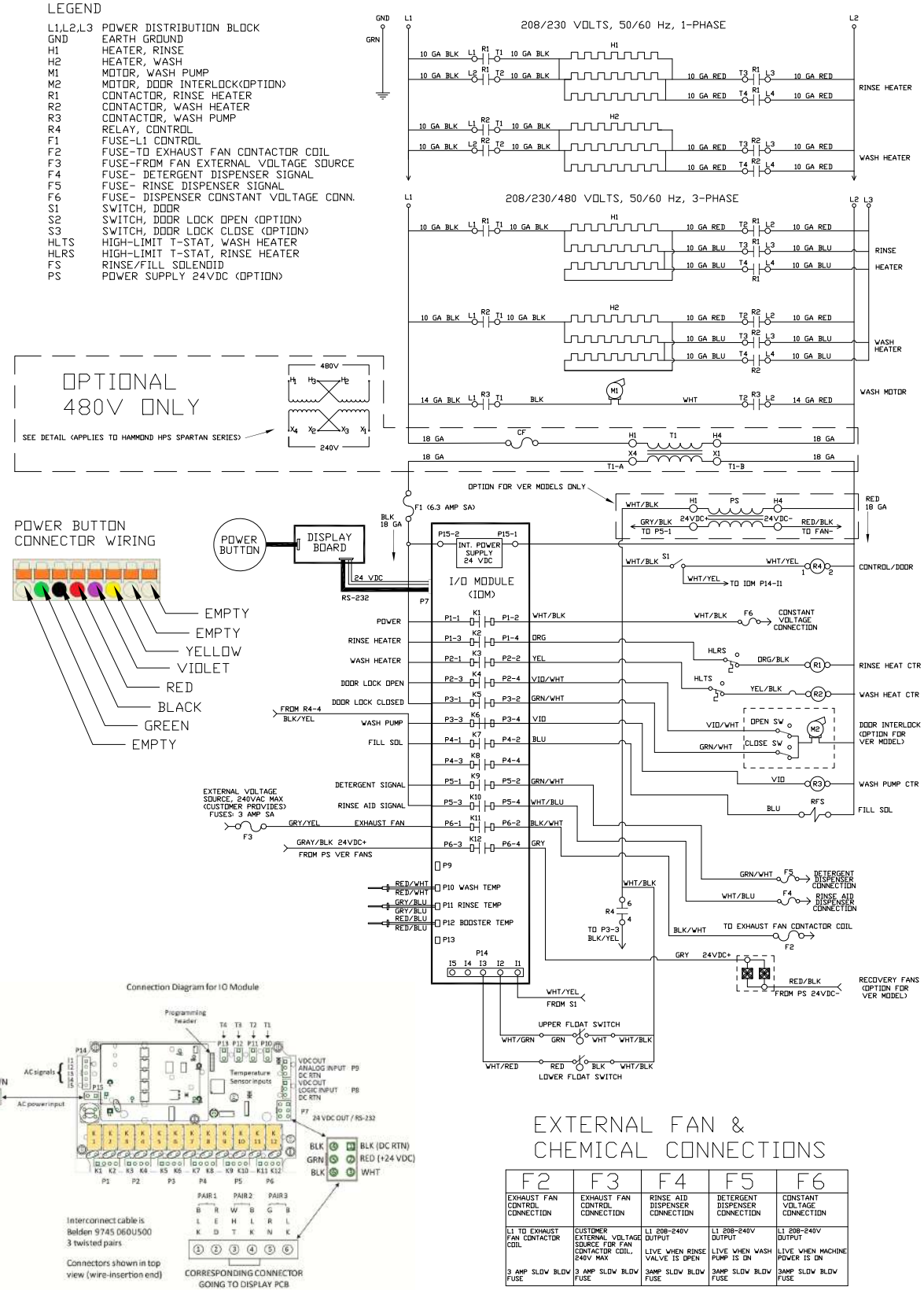
# POWER BUTTON CONNECTOR WIRING



# HT-180EC
## STD/VER

LEGEND

| | |
|---|---|
| L1,L2,L3 | POWER DISTRIBUTION BLOCK |
| GND | EARTH GROUND |
| H1 | HEATER, RINSE |
| H2 | HEATER, WASH |
| M1 | MOTOR, WASH PUMP |
| M2 | MOTOR, DOOR INTERLOCK(OPTION) |
| R1 | CONTACTOR, RINSE HEATER |
| R2 | CONTACTOR, WASH HEATER |
| R3 | CONTACTOR, WASH PUMP |
| R4 | RELAY, CONTROL |
| F1 | FUSE-L1 CONTROL |
| F2 | FUSE-TO EXHAUST FAN CONTACTOR COIL |
| F3 | FUSE-FROM FAN EXTERNAL VOLTAGE SOURCE |
| F4 | FUSE- DETERGENT DISPENSER SIGNAL |
| F5 | FUSE- RINSE DISPENSER SIGNAL |
| F6 | FUSE- DISPENSER CONSTANT VOLTAGE CONN. |
| S1 | SWITCH, DOOR |
| S2 | SWITCH, DOOR LOCK OPEN (OPTION) |
| S3 | SWITCH, DOOR LOCK CLOSE (OPTION) |
| HLTS | HIGH-LIMIT T-STAT, WASH HEATER |
| HLRS | HIGH-LIMIT T-STAT, RINSE HEATER |
| FS | RINSE/FILL SOLENOID |
| PS | POWER SUPPLY 24VDC (OPTION) |







## EXTERNAL FAN & CHEMICAL CONNECTIONS

| F2 | F3 | F4 | F5 | F6 |
|---|---|---|---|---|
| EXHAUST FAN CONTROL CONNECTION | EXHAUST FAN CONTROL CONNECTION | RINSE AID DISPENSER CONNECTION | DETERGENT DISPENSER CONNECTION | CONSTANT VOLTAGE CONNECTION |
| L1 TO EXHAUST FAN CONTACTOR COIL<br>3 AMP SLOW BLOW FUSE | CUSTOMER EXTERNAL VOLTAGE SOURCE FOR FAN CONTACTOR COIL, 240V MAX<br>3 AMP SLOW BLOW FUSE | L1 208-240V OUTPUT<br>LIVE WHEN RINSE VALVE IS OPEN<br>3AMP SLOW BLOW FUSE | L1 208-240V OUTPUT<br>LIVE WHEN WASH PUMP IS ON<br>3AMP SLOW BLOW FUSE | L1 208-240V OUTPUT<br>LIVE WHEN MACHINE POWER IS ON<br>3AMP SLOW BLOW FUSE |

Noble Warewashing • Lancaster, Pennsylvania
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