



TECHNICAL MANUAL
For
DOOR TYPE DISHWASHING MACHINE

Commander 18-5
Commander 18-5C
Commander 18-5H
Commander 18-5CH

Installation, Operation, and Maintenance Instructions

Insinger Machine Company
6245 State Road
Philadelphia, PA 19135-2996

800.344.4802

Fax 215.624.6966

www.insingermachine.com



Thank you for purchasing this quality Insinger product.

On the space provided below please record the model, serial number and start-up date of this unit:

Model: _____

Serial Number: _____

Start-Up Date: _____

When referring to this equipment please have this information available.

Each piece of equipment at Insinger is carefully tested before shipment for proper operation. If the need for service should arise please contact your local Authorized Insinger Service Company.

A Service Network Listing is provided on our web site, www.insingermachine.com or call Insinger at 800-344-4802 for your local authorized servicer.

For proper activation of the *Insinger Limited Warranty* a SureFire™ Start-Up & Check-Out Service should be completed on your machine. Refer to the Introduction section in this manual for an explanation of Insinger SureFire™ Start-Up & Check-Out Program.

Please read the Insinger Limited Warranty and all installation and operation instructions carefully before attempting to install or operate your new Insinger product.

To register your machine for warranty by phone, fax or the internet or for answers to question concerning installation, operation, or service contact our Technical Services Department:

TECHNICAL SERVICE CONTACTS	
Toll-Free	800-344-4802
Fax	215-624-6966
E-mail	service@insingermachine.com
Web	www.insingermachine.com

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Item # _____

COMMANDER 18-5 AUTOMATIC SINGLE TANK DOOR TYPE DISHWASHER

CSI - 11400



DESIGN

Automatic door type, single tank dishwasher with timed wash and rinse cycle. Fully automatic operation with power on/off button. A selector switch allows you to start the wash cycle with a manual start button or by closing the door. Capacity is 60 - 20" X 20" racks per hour, or 1500 dishes per hour. Designed for straight through operation. Corner model available for right angle operation.

STANDARD EQUIPMENT

- Space saving compact design
- Door safety switch
- Detergent connection provision
- Fully automatic operation
- Single scrap screen design
- Non-proprietary commercially available pump motor
- Easily removable pump suction strainer
- Tank heat: 3KW electric immersion heater or steam injector
- SureFire™ Start-Up and Check-Out Service
- Vacuum breaker
- Capillary thermometer for wash
- In-line thermometer for final rinse
- Manual start button
- Selector switch
- Single point electrical connection: motor, controls, heater and built-in booster (only)
- Top-mounted NEMA 12 control panel
- "Easy Clean" front-mounted wash tank
- Manifold cleanout brush
- Inspection door
- S/S frame, legs and feet
- Automatic tank fill
- Low water protection
- Override switch for delimiting or extended wash cycle
- Vent fan connection provision

OPTIONAL ACCESSORY EQUIPMENT

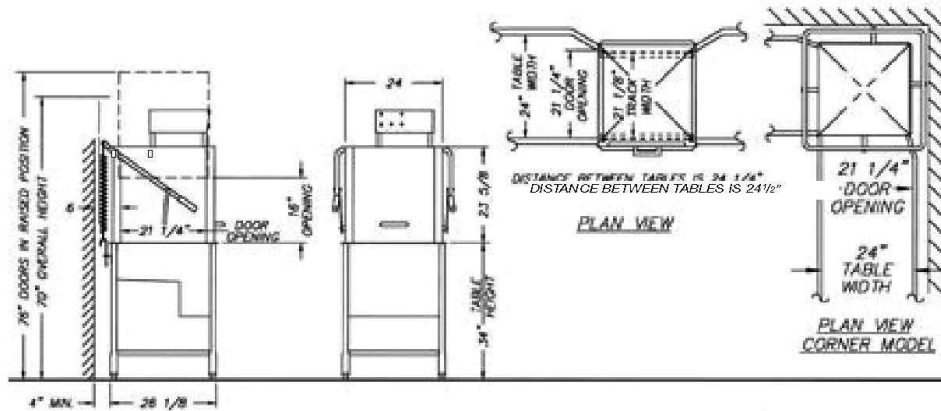
- Pressure reduction valve and line strainer
- Stainless steel steam coil tank heat
- Steam booster
- Built-in electric booster
- Remote electric booster
- Security package
- Totally enclosed motor
- Door activated drain closer
- Plastic 20" x 20" racks (plate or silver)
- S/S front panel
- 0.5, 2, 4, 6 minute wash timer



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CSI - 11400



Note: For all rough in connections see Installation and Layout Detail Drawing.

SPECIFICATIONS

CONSTRUCTION - Hood and tank constructed of 16 gauge type 304 S/S. Hood unit of all welded seamless construction. S/S frame, legs and feet. All internal castings are non-corrosive lead free nickel alloy or bronze.

DOORS - A front inspection/cleanout door and two simultaneously opening operating doors. Operating doors have fingertip control, balanced by externally mounted springs. (Corner model available with 2 doors at right angles.) Extra large die formed type 304 S/S doors ride in all S/S channels. A triple ply leading edge on the door channels made of S/S with no plastic or nylon sleeves or liners used.

PUMP - Centrifugal type "packless" pump with a brass petcock drain. Construction includes ceramic seal and a balanced cast impeller on a precision ground stainless steel shaft. All working parts mounted as an assembly and removable as a unit without disturbing pump housing. One 1 HP motor, standard horizontal C-face frame, drip proof, internally cooled with ball-bearing construction.

CONTROLS - Top-mounted control cabinet, NEMA 12 rated, housing motor controls and overload protection, transformer, contactors and all dishwasher integral controls.

SPRAY SYSTEM - Wash and rinse spray systems made of type 304 stainless steel pipe threaded into cast hub assemblies. Upper and lower wash and rinse spray assemblies are removable without the use of tools.

WASH - 2 power spinning wash arms above and 2 power spinning wash arms below. On top, each wash arm is designed with 8 nozzles (16 total). On the bottom, each wash arm is designed with 4 slots (8 total). The slots are precision milled for water control and produce a fan spray.

FINAL RINSE - 2 power spinning rinse arms above and 2 power spinning rinse arms below. On top, each rinse arm is designed with 2 nozzles (4 total). On the bottom, each rinse arm is designed with 4 nozzles (8 total). The nozzles produce a fan spray reducing water consumption, maximizing heat retention.

DRAIN - Drain valve externally controlled. Overflow assembly with skimmer cap is removable without use of tools for drain line inspection. Heater protected by low water level control.

Capacity per hour	Tank capacity	Motor size	Electric usage	Steam consumption at 20 psi min.	Final rinse peak flow at 20 psi min.																
60 racks 1500 dishes 75-150 meals	6.4 gals.	1 hp (wash)	3.0 kw wash tank 13.5 kw b.i.booster 40° or 70° rise 6.0 kw rem. booster 40° rise 12.0 kw rem. booster 70° rise	11 lbs./hr tank 24 lbs./hr booster 40° rise 42 lbs./hr booster 70° rise	3.0 gals./min.																
Final rinse consumption at 20 psi min.	Exhaust hood requirement	Peak rate drain flow	Shipping weight	Current draw amps	Steam/gas	Electric w/o booster	Electric w/ built-in booster														
60 gals./hr. 1.0 gal./rack	100 CFM	9 gals./min.	400 lbs.	208/1/60 9.3	208/3/60 5.1	240/1/60 8.1	240/3/60 4.2	380/3/50 2.8	480/3/60 2.3	23.7	13.4	20.6	11.8	7.4	5.9	81.7	50.9	76.9	44.3	27.9	22.1

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Item # _____

CSI - 11400

COMMANDER 18-5H AUTOMATIC SINGLE TANK DOOR TYPE WAREWASHER & TRAY/UTENSIL WASHER



DESIGN

Automatic door type, single tank dishwasher with timed wash and rinse cycle. Fully automatic operation with power on/off button. A selector switch allows you to start the wash cycle with a manual start button or by closing the door. Capacity is 60 - 20" X 20" racks per hour, or 1500 dishes per hour. The 18-5H can also handle mixer agitators, 18" X 26" sheet pans, utensils and mixing bowls up to 60 quarts! Designed for straight through operation. Corner model available for right angle operation.

STANDARD EQUIPMENT

- Space saving compact design
- Door safety switch
- Detergent connection provision
- Fully automatic operation
- Single scrap screen design
- Non-proprietary commercially available pump motor
- Easily removable pump suction strainer
- Tank heat: 5KW electric immersion heater or steam injector (6KW corner)
- SureFire™ Start-Up and Check-Out Service
- Vacuum breaker
- Capillary thermometer for wash
- In-line thermometer for final rinse
- Single point electrical connection: motor, controls, heater and built-in booster (only)
- Manual start button
- Selector switch
- Top-mounted NEMA 12 control panel
- "Easy Clean" front-mounted wash tank
- Manifold cleanout brush
- Inspection door
- S/S frame, legs and feet
- Automatic tank fill
- Low water protection
- Override switch for delimiting or extended wash cycle
- Vent fan connection provision

OPTIONAL ACCESSORY EQUIPMENT

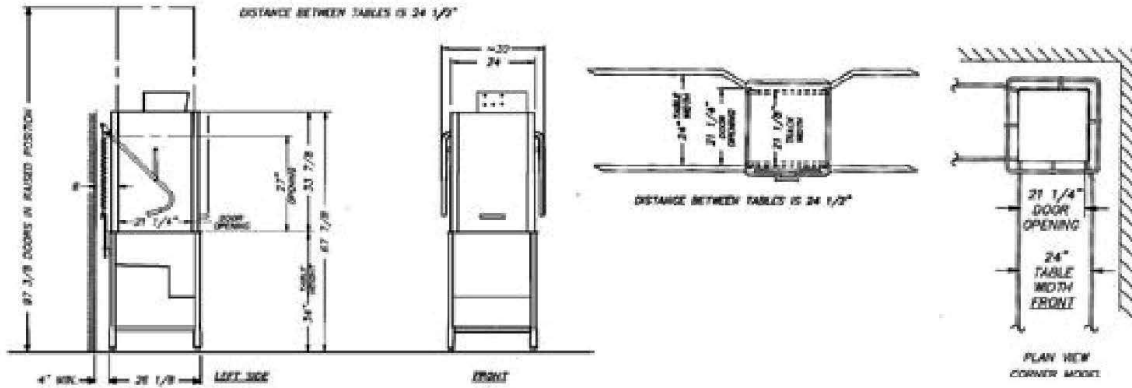
- Pressure reduction valve and line strainer
- Stainless steel steam coil tank heat
- Steam booster
- Built-in electric booster
- Remote electric booster
- Security package
- Totally enclosed motor
- Door activated drain closer
- Plastic 20" x 20" racks (plate or silver)
- S/S front panel
- 0.5, 2, 4, 6 minute wash timer



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Note: For all rough in connections see Installation and Layout Detail Drawing.

SPECIFICATIONS

CONSTRUCTION - Hood and tank constructed of 16 gauge type 304 S/S. Hood unit of all welded seamless construction. S/S frame, legs and feet. All internal castings are non-corrosive lead free nickel alloy or bronze.

DOORS - A front inspection/cleanout door and two simultaneously opening operating doors. Operating doors have fingertip control, balanced by externally mounted springs. (Corner model available with 2 doors at right angles.) Extra large die formed type 304 S/S doors ride in all S/S channels. A triple ply leading edge on the door channels made of S/S with no plastic or nylon sleeves or liners used.

PUMP - Centrifugal type "packless" pump with a brass petcock drain. Construction includes ceramic seal and a balanced cast impeller on a precision ground stainless steel shaft. All working parts mounted as an assembly and removable as a unit without disturbing pump housing. One 2 HP motor, standard horizontal C-face frame, drip proof, internally cooled with ball-bearing construction.

CONTROLS - Top-mounted control cabinet, NEMA 12 rated, housing motor controls and overload protection, transformer, contactors and all dishwasher integral controls. All controls safe low voltage 24 VAC.

SPRAY SYSTEM - Wash and rinse spray systems made of type 304 stainless steel pipe threaded into cast hub assemblies. Upper and lower wash and rinse spray assemblies are removable without the use of tools.

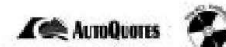
WASH - 2 power spinning wash arms above and 2 power spinning wash arms below. On top, each wash arm is designed with 8 nozzles (16 total). On the bottom, each wash arm is designed with 4 slots (8 total). The slots are precision milled for water control and produce a fan spray.

FINAL RINSE - 2 power spinning rinse arms above and 2 power spinning rinse arms below. On top, each rinse arm is designed with 2 nozzles (4 total). On the bottom, each rinse arm is designed with 4 nozzles (8 total). The nozzles produce a fan spray reducing water consumption, maximizing heat retention.

DRAIN - Drain valve externally controlled. Overflow assembly with skimmer cap is removable without use of tools for drain line inspection. Heater protected by low water level control.

Capacity per hour	Tank capacity	Motor size	Electric usage	Steam consumption at 20 psi min.	
60 racks 1500 dishes 75-150 meals	6.4 gals.	2 hp (wash)	5.0 kw wash tank (straight) 6.0 kw wash tank (corner) 13.5 kw b.i. booster 40° or 70° rise 6.0 kw rem. booster 40° rise 12.0 kw rem. booster 70° rise	18 lbs./hr tank 24 lbs./hr booster 40° rise 42 lbs./hr booster 70° rise	
Final rinse peak flow at 20 psi min.	Final rinse consumption at 20 psi min.	Exhaust hood requirement	Peak rate drain flow	Shipping weight	
3.0 gals./min.	60 gals./hr. 1.0 gal./rack	100 CFM	9 gals./min.	600 lbs.	
Current draw amps	Steam	Electric w/o booster	Electric w/ built-in booster	Electric w/o booster - corner	Electric w/ built-in booster - corner
208/1/60	13.7	37.7	95.7	42.5	100.5
208/3/60	8.0	21.9	59.4	24.6	62.1
240/1/60	11.9	32.7	89.0	36.9	93.2
240/3/60	7.2	19.2	51.7	21.6	54.1
380/3/50	4.4	12.0	32.5	13.6	34.1
480/3/60	3.6	9.6	25.8	10.8	27.0

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Commander 18-5 Series

INTRODUCTION

Purpose

The purpose of this technical manual is to provide installation, operation, cleaning and maintenance directions.

A section is provided for replacement parts.

Scope

This manual contains all pertinent information to assist in the proper installation, operation, cleaning, maintenance, and parts ordering for Commander 18-5 series dishwashers.

The **installation instructions** are intended for qualified equipment installers. The **operation and cleaning instructions** are intended for the daily users of the equipment. The **maintenance and parts sections** are intended for qualified service and/or maintenance technicians. Replacement parts may be ordered directly from our factory or from your local Insinger Authorized Service Agency. You can speak to the **Insinger Technical Services Department, 800/344-4802**, or e-mail us at **service@insingermachine.com**. When calling for warranty information or replacement parts please provide the model and serial number of your Insinger Equipment. These important numbers should be noted in this manual on the spaces provided on the opening page.

Surefire™ Start-up & Check-out Program
Insinger is proud to offer our exclusive Surefire™ Start-up & Check-out Program to our commercial customers. This service is included in the purchase price of your new Insinger dishwasher. We will provide an authorized factory service technician for the initial start-up of your new Insinger dishwasher to ensure it is running at optimum levels from the very first pass. Please call the factory or your local Insinger Sales Representative to schedule this service.

NSF 3-2003 requirements for detergent and chemical sanitizer dispensers.

This machine must be operated with an automatic detergent dispenser and, if applicable, an automatic chemical sanitizer feeder, including a visual means to verify that detergents and sanitizers are delivered or a visual or audible alarm to signal if detergents and sanitizers are not available for delivery to the respective washing and sanitizing systems. Please see instructions for electrical and plumbing connections located in this manual and in the feeder equipment manual.

Definitions

Throughout this guide you will find the following terms: WARNING, CAUTION, & NOTE.

WARNING indicates potential physical danger.
CAUTION indicates potential equipment damage.
NOTE indicates helpful operating hints or tips.

You will visually be able to identify each as shown below:



WARNING:
Indicates potential physical danger.



NOTE:
Indicates helpful operating hints or tips.

CAUTION:

Indicates potential equipment damage.

Door Type Dishwashing Machine

Safety Summary

The following are general safety precautions that are not related to any specific procedures. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

Keep Away From Live Circuits

Operating personnel must at all times observe all safety regulations. Do not replace components or make adjustments inside the equipment with the high voltage supply turned on. Under certain conditions, dangerous potentials may exist when the power control is in the off position. To avoid casualties, always remove power, red tag machine and ground a circuit before touching it.

Do Not Service or Adjust Alone

Under no circumstances should any person reach into or enter the enclosure for the purpose of servicing or adjusting the equipment except in the presence of someone who is capable of rendering aid.

Resuscitation

Personnel working with or near high voltages should be familiar with modern methods of resuscitation. Such information may be obtained from the Bureau of Medicine and Surgery.

INSINGER MACHINE COMPANY LIMITED WARRANTY

Insinger Machine Company, Inc. (Insinger) hereby warrants to the original retail purchaser of this Insinger Machine Company, Inc. product, that if it is assembled and operated in accordance with the printed instructions accompanying it, then for a period of either 15 months from the date of shipment from Insinger or 1 year (12 months) from the date of installation, that said Insinger product shall be free from defects in material and workmanship. Whichever one of the two aforesaid limited warranty time periods is the longest shall be the applicable limited warranty coverage time period.

Insinger may require reasonable proof of your date of purchase; therefore, you should retain your copy of invoice or shipping document.

This limited warranty shall be limited to the repair or replacement of parts which prove defective under normal use and service and which on examination shall indicate, to Insinger's satisfaction, they are defective. Any part that is claimed to be defective and covered by this limited warranty must be returned to Insinger, this may be done through an Authorized Service Agency. Furnish serial number of machine with shipment and send to:

*Insinger Machine Company
6245 State Road
Philadelphia, PA 19135-2996*

If Insinger's inspection confirms the defect and the claim, Insinger will repair or replace such part without charge and return it to you freight or postage prepaid.

This limited warranty does not cover any failure or accident, abuse, misuse, alteration, misapplication, improper installation, fire, flood, acts of God or improper maintenance or service, or failure to perform normal and routine maintenance as set out in

the instruction booklet (operating instructions) or for improper operation or failure to follow normal operating instructions (as set out in the instruction booklet). Insinger is not responsible nor liable for any conditions of erosion or corrosion caused by corrosive detergents, acids, lye or other chemicals used in the washing and or cleaning process.

Service must be done by either Insinger Appointed Service Agencies or agencies receiving prior authorization from Insinger.

All warranty work must be done during normal working hours, unless purchaser receives prior authorization from Insinger.

There are no other express warrants except as set forth herein and any applicable implied warranties of merchantability and fitness are limited in duration to the period of coverage of this express written limited warranty. This limited warranty supersedes all other express warranties, implied warranties of merchant-ability and fitness or limited warranties as of this date, January 1, 1998. Some states do not allow limitation on how long an implied warranty lasts so this limitation may not apply to you.

Insinger is not liable for any special, indirect or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so this limitation nor exclusion may not apply to you.

Insinger does not authorize any person or company to assume for it any other obligation or liability in connection with the sale, installation, use, removal, return or replacement of its equipment: and no such representations are binding on Insinger.

**INSINGER MACHINE COMPANY LIMITED WARRANTY
COMMERCIAL MARINE USE**

Insinger Machine Company, Inc. (Insinger) hereby warrants to the original retail purchaser of this Insinger Machine Company, Inc. product, that if it is assembled and operated in accordance with the printed instructions accompanying it (installation manual), then for a period of 18 months from the date of installation on board the vessel, that said Insinger product shall be free from defects in material and workmanship.

Insinger may require reasonable proof of your date of equipment install, therefore, you should retain your copy of invoice or shipping document.

This limited warranty shall be limited to the replacement of parts which prove defective under normal use and service and which on examination shall indicate, to Insinger's satisfaction, they are defective. Any part that is claimed to be defective and covered by this limited warranty must be returned to Insinger. Furnish serial number of machine with shipment and send to:

*Insinger Machine Company, Inc.
6245 State Road
Philadelphia, PA 19135-2996*

If Insinger's inspection confirms the defect and the claim, Insinger will repair or replace such part without charge and return it to you freight or postage prepaid. If part damages are not covered, Insinger will contact the customer and advise.

If a factory trained authorized technician is required to repair or replace defective parts or material during the 18 month warranty period, the cruise line will be responsible for the payment of travel expense and a minimum of four hours labor.

Labor will be billed to the customer at a reduced rate of \$40.00 per hour. If sailing with a vessel is required, then an eight hour per day minimum will apply.

This limited warranty does not cover accident, abuse, misuse, alteration, misapplication, improper installation, fire, flood, or improper maintenance or service, or failure to perform normal and routine maintenance as set out in the instruction booklet (operating instructions) or for improper operation or failure to follow normal operating instructions (as set out in the instruction booklet).

Insinger is not responsible nor liable for any conditions of erosion or corrosion caused by corrosive detergents, acids, lye or other chemicals used in the washing, caring and or cleaning process.

Warranty service must be done by either Insinger Appointed Service Agencies or agencies, customers galley engineers receiving prior authorization from Insinger.

There are no other express warrants except as set forth herein and any applicable implied warranties of merchantability and fitness are limited in duration to the period of coverage of this express written limited warranty. This limited warranty supersedes all other express warranties, implied warranties of merchantability and fitness or limited warranties as the above date.

Insinger does not authorize any person or company locally or overseas to assume for it any other obligation or liability in connection with the sale, installation, use, removal, return or replacement of its equipment; and no such representations are binding on Insinger.

INSTALLATION INSTRUCTIONS

Commander 18-5 Series & CS Series

Placement

Carefully uncrate machine. Take caution not to damage components which may be mounted on the top or sides of the machine. Set unit in place and adjust the feet to level the machine.

Fasten the tables to the load and unload side of the machine. Most installations require fastening the turn-down lip of the dish tables to the side of the machine with flathead countersunk screws. The table design should provide horizontal clearance of 30" for servicing.

Electrical Connections

Connect electrical lines sized for the correct voltage, current and phase of the machine. These should agree with the machine requirements indicated on the nameplate and labels on the control panel.

A single-point electrical connection is provided for the pumps, control circuit, and wash tank heater.

If an electric booster is provided, connect power directly to the booster.

If the Insinger Self-Contained booster is provided the machine comes standard with a Single-Point Connection (to include the booster).

CAUTION:

Connections must be made to a circuit breaker or fused disconnect as provided by the end-user and required by local codes.
A laminated wiring diagram is inside the control panel.

Fuse Sizing Chart

Model	208VAC/3È	230VAC/3È	380VAC/3È	460VAC/3È	220VAC/1È
18-5(C) steam heat	6A	6A	6A	6A	15A
18-5(C) electric heat	15A	15A	10A	10A	30A
18-5(C) electric heat Insinger SCB	60A	50A	35A	25A	100A
18-5H steam heat	15A	10A	6A	6A	25A
18-5H electric heat	25A	25A	15A	15A	45A
18-5H electric heat Insinger SCB	70A	60A	40A	30A	110A

CAUTION:

As with any 3 phase system, an electrician must check all motors for proper phasing, i.e., Pump motors must be running in direction indicated by arrow on housing.

Mechanical Connections

Connect 140° water lines for tank fill/booster as tagged and noted on the installation drawings. If machine is provided with steam heat connect the steam lines and steam condensate lines as tagged and noted on installation drawings. Connect the drain line.

CAUTION:

Drain lines must be as specified on installation drawings.

Drain line should be properly vented and should have fall of not less than 1/4" to the foot of proper flow.
Some area plumbing codes require drains to flow into an open gap with an opening twice the diameter of the pipe.

Check with your local plumbing codes for the type of drain connection required.

CAUTION:

All lines must be flushed prior to use to remove debris.

CAUTION:

Do not reduce the size of lines as specified in installation drawings. All Lines are sized to facilitate necessary flows, pressures, etc.

HVAC

Ventilation system must be sized to provide adequate ventilation per machine specs. Refer to spec sheet.

Chemicals

Upon the completed installation of the dishwasher, contact a local detergent/chemical supplier for the correct chemicals for your soil load and geographical area.

Electrical connection points for the detergent dispenser and rinse injector are located inside the control panel. Refer to the wiring diagram for this machine for the proper connection points.

Dispensers may be connected on either the primary voltage side of the machine or the 24VAC control voltage side.

CAUTION:

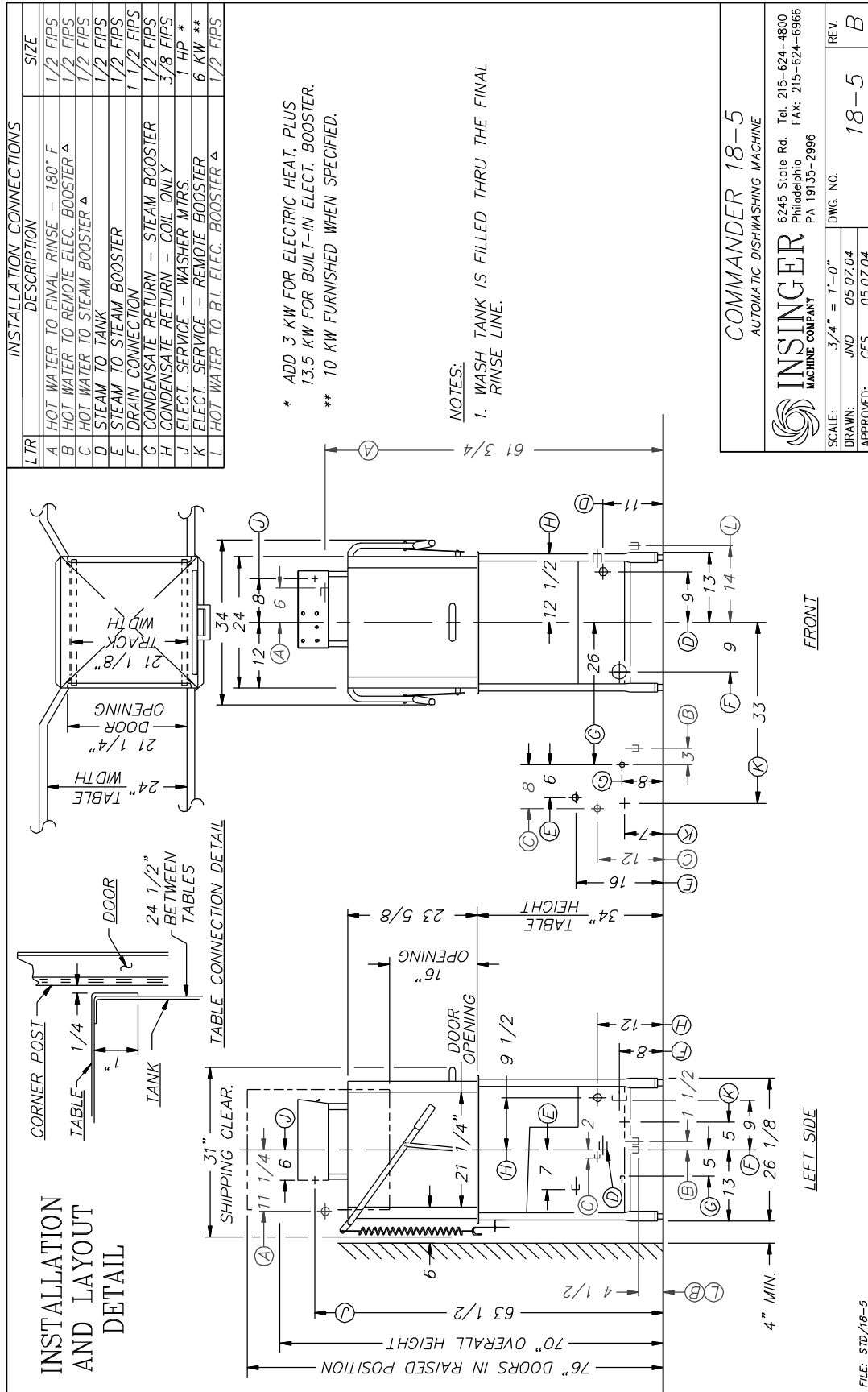
When connecting on the 24VAC control voltage side of the transformer, total VA must not exceed 50VA.

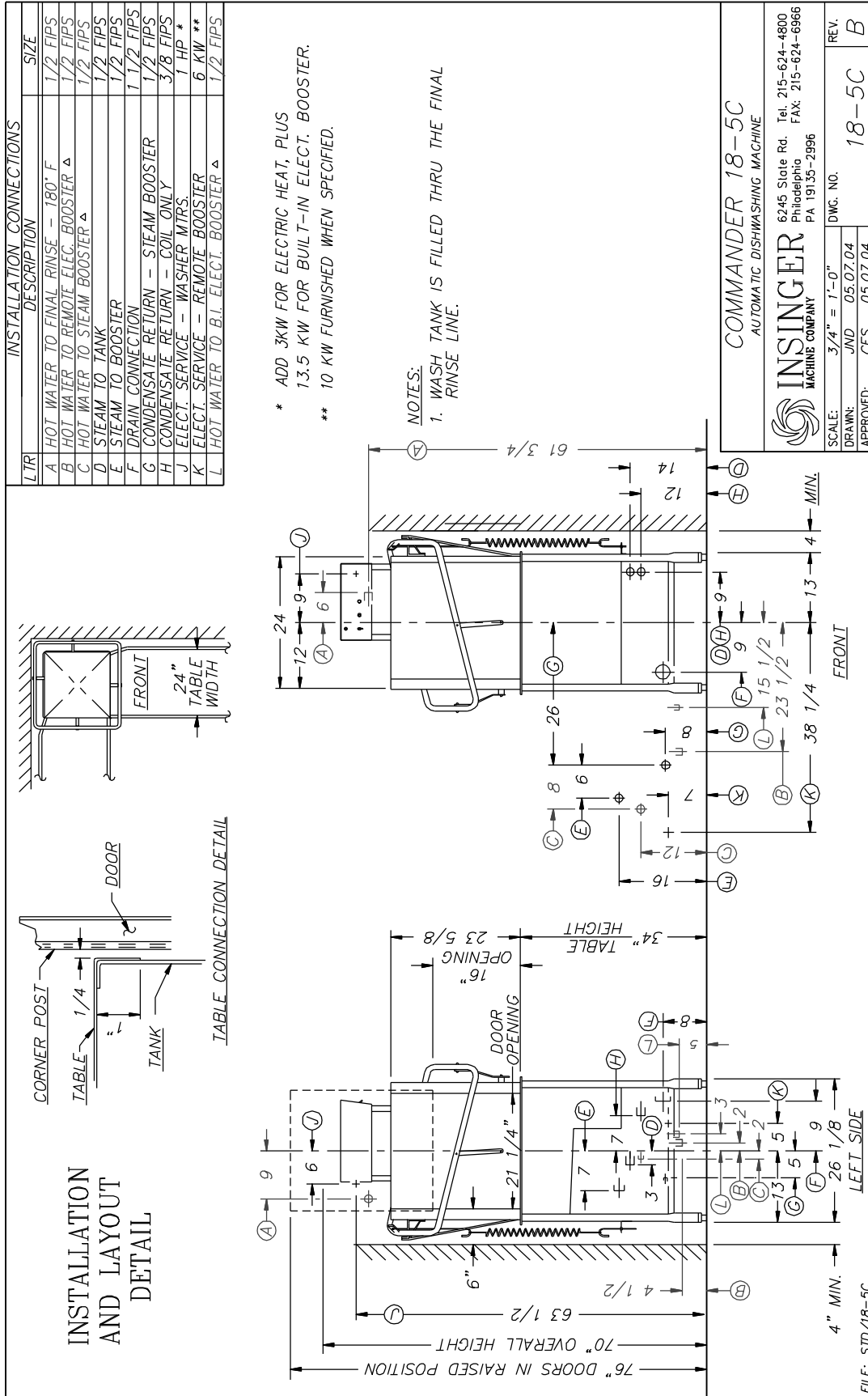
The detergent density probe should be installed in the hole provided & labeled in the wash tank. A switch on the control panel labeled "Wash Cycle" is provided for de-liming the machine. When activated, this switch will keep the machine in an indefinite wash cycle. This feature can also be used to wash heavily soiled ware on an extended wash cycle.

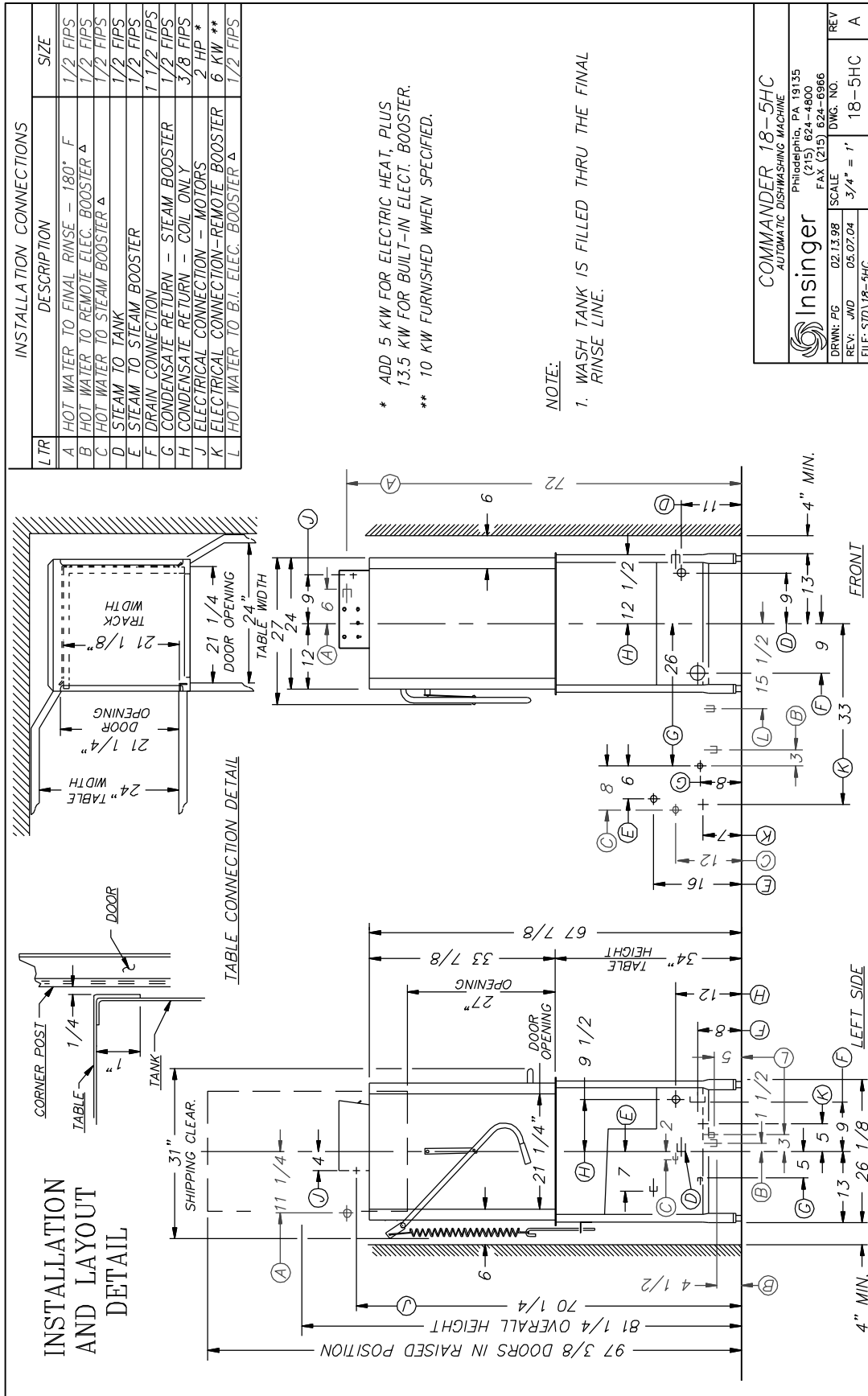
Tabling

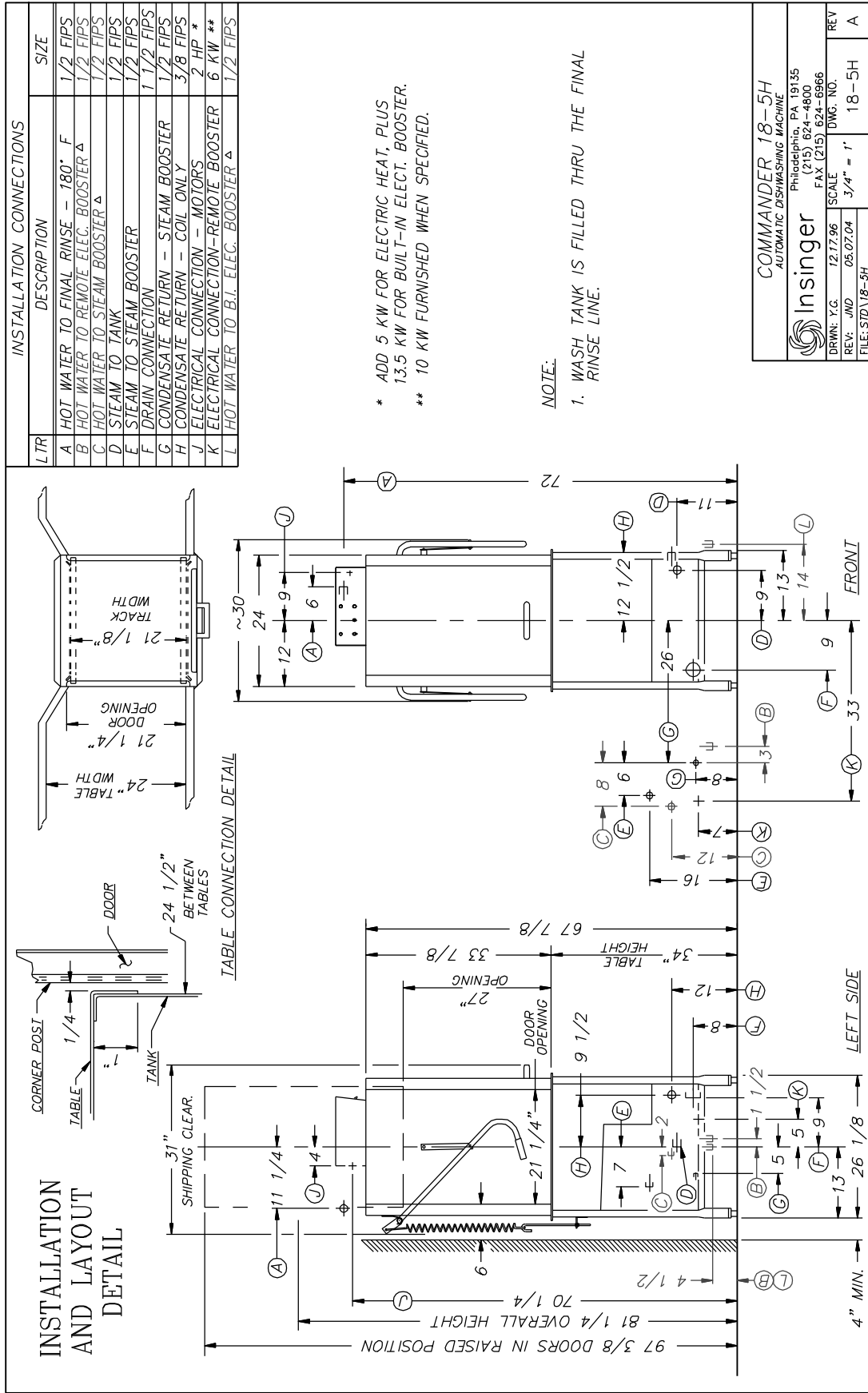
Load and unload tables should be pitched towards the machine to return excess water into the machine.

Insinger dishmachines are user-friendly, making them easy to operate and maintain. By following the operation procedure and general cleaning procedures your Insinger dishwasher will give you years of trouble free service.









Insinger dishmachines are user-friendly, making them the easiest dishmachines on the market to operate and maintain.

By following these operating procedures your Insinger dishwasher will give you years of trouble free service.

OPERATION INSTRUCTIONS

1. Ensure drain overflow tube is in place. Close all tank drain valves. One drain is provided for each tank of the dishmachine.
2. Check for proper installation and cleanliness of all internal, removable components such as suction strainers, scrap screens, and spray manifolds.
3. Ensure all water & steam lines are open. Ensure electrical circuits are on.
4. Close machine doors.
5. Move the power toggle switch to the ON position. The machine will fill the tank, run through a complete wash/rinse cycle and shut-off.
6. When the tanks are full the tank heat will operate automatically. Proper wash tank temperature is 156°F minimum. Proper final rinse temperature is 180°F minimum at 20 PSI, while in the final rinse cycle.

CAUTION:

To ensure proper operation of the auto tank fill feature and the tank heaters, the tank level floats **MUST** be cleaned daily.

7. Open doors.
8. Insert a rack of soiled dishware in machine and lower doors. Depress the cycle start button, machine will wash and rinse automatically. When the rinse indicator light goes off the machine cycle is complete

CAUTION:

Overloading racks will minimize the proper cleaning of ware.

WARNING:



Do not open the doors during the wash/rinse cycle as hot water is being sprayed. An interlock is provided to stop the wash/rinse cycle if the doors are opened but hot water may spray out if doors are opened too quickly.

9. Open doors and remove rack of clean ware. For continuous operation repeat steps 2B19 & 2B10
10. Upon completion of ware cleaning move the power toggle switch to the "OFF" position.
11. Refer to the cleaning procedures for proper clean-up of the dishmachine.
12. A switch on the control panel labeled "Wash Cycle" is provided for use when de-liming the machine. When activated, this switch will keep the machine in an indefinite wash cycle. This feature can also be used to wash heavily soiled ware on an extended wash cycle.
13. Report any unusual occurrences to qualified service personnel.

The following cleaning procedures should be done daily, at the end of the shift.

Cleaning Procedures, Daily

1. Remove all internal removable parts including spray manifolds, scrap screens, drain overflow tube and suction strainer.
2. Remove the end caps from the spray manifolds and clean with the brush provided. Flush the manifolds.
3. Flush scrap screens
4. Clean drain overflow tube.

NOTE:



V-cup seal on the drain overflow tube may become gummed not allowing the overflow tube to seal. This will cause the drain to leak water. Remove any build-up on the V-cup seal. When the seal becomes worn, replace with part # D2-557.

CLEANING PROCEDURES (CONTINUED)

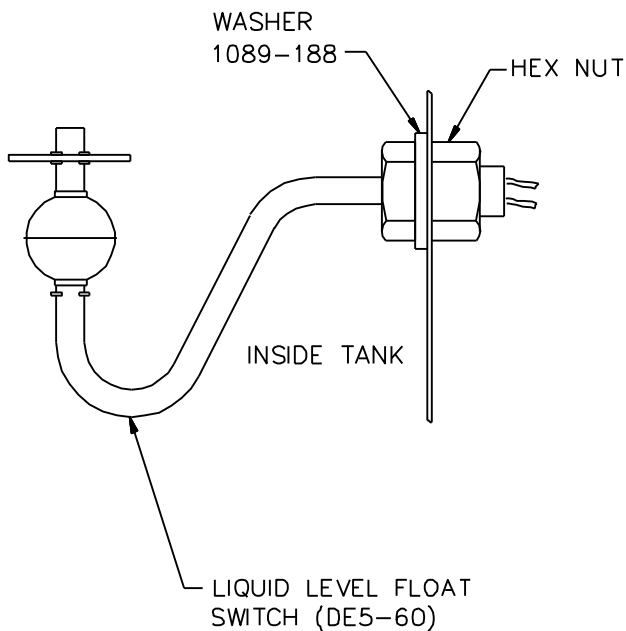
5. Clean suction strainers of build-up.

p

NOTE:

Improper cleaning of the suction strainers will cause the pumps to cavitate. This will cause poor washing results.

6. Clean the tank level float with a plastic abrasive pad (do not use steel wool).


CAUTION:

Level floats must be cleaned daily. Build-up of grease and dirt will cause faulty operation of the tank fill heating system.

p

NOTE:

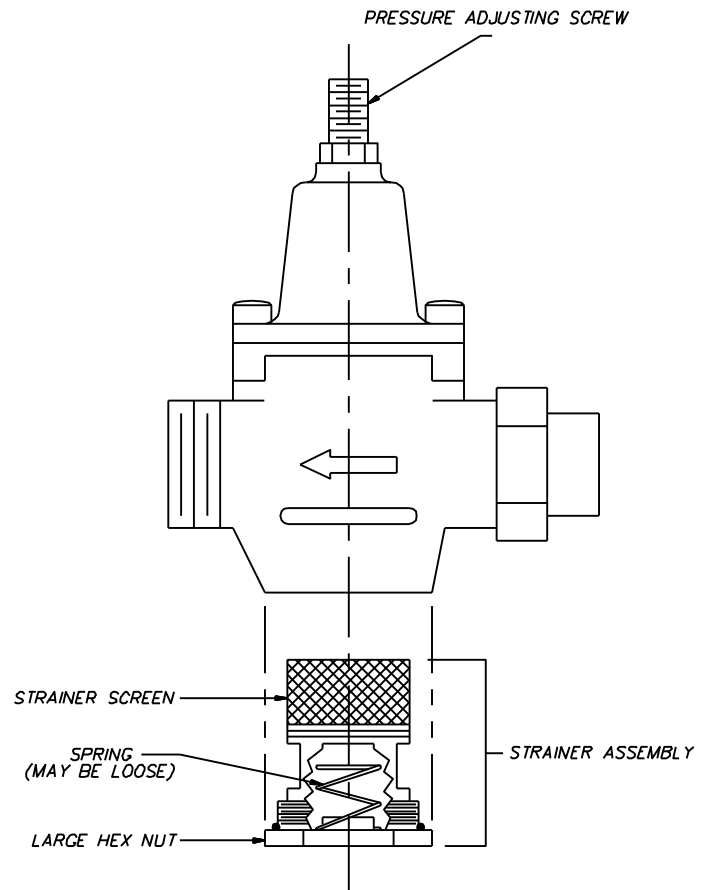
Upper & lower wash & rinse pipes are not the same.

7. Final rinse nozzles should be cleaned of matter clogging the jet spray.

8. A door should be left open to allow drying of interior surfaces.

PRESSURE ADJUSTMENT

Pressure in the final rinse must be maintained at 20 ± 2 psi. Adjustment of the pressure is made with the adjusting screw on the pressure reducing valve.



SKETCHA\SK-4689 PRESSURE REDUCING VALVE

If there are flow or pressure problems with the pressure reducing valve, **CAREFULLY** remove the strainer assembly and clean the strainer screen. Be careful not to damage the Hex nut o-ring

The following is a basic guide for the repair and replacement of common dishwasher parts. Refer to the Basic Services Guide for troubleshooting tips.

MAINTENANCE REQUIREMENTS

Daily

1. Refer to the operations and cleaning instructions provided in this manual for daily cleaning procedures.

Weekly

1. The entire machine should be wiped down using an industrial grade stainless steel cleaner.
2. Under the supervision of your detergent supplier the machine interior must be properly de-limed.

p

NOTE:

The water quality in some areas requires de-liming to be done more frequently. Contact your detergent supplier for recommended de-liming frequency.

Quarterly

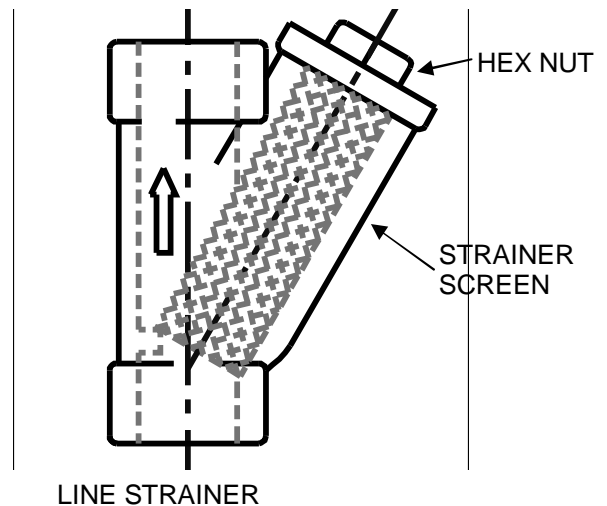
1. Remove and clean the strainer screens on the water and steam lines. If the screens cannot be cleaned, replace.
2. Inspect the condition of the solenoid valve seats, and diaphragms. Replace where necessary.
3. Inspect drain O-Rings for leakage. Replace where necessary.
4. Check door spring tension and adjust where necessary.
5. Check wash and rinse hub bushing/bearing and replace where necessary.

MAINTENANCE PROCEDURES

Solenoid Valve Disassembly (See dwg. SK-4692)

1. Disconnect the power supply to the machine. Turn off the water supply.

2. Remove cap on top of the coil. Remove the coil.
3. Remove the 4 hex bolts and lift bonnet from valve body. Note positioning of spring and plunger.
4. Remove main piston.
5. Inspect for dirt, wear or lime build-up. Clean or replace as required.
6. Reassemble in reverse of disassembly.



Line Strainer Disassembly

1. Shut off water or steam supply.
2. Remove large hex nut on bottom of strainer body.
3. Remove strainer screen. Inspect and clean or replace as necessary.
4. Reassemble in reverse of disassembly. Water flow must be same direction as arrow on line strainer body. Use new gaskets to insure a tight seal.

Pump Disassembly

1. Before disassembling pump ensure there are no obstructions in the pump intake. Remove and clean the suction strainer (inside tank). See dwg. SK-2456 & SK-2923

p

NOTE:

It is not necessary to remove the pump housing from the machine to disassemble

Pump Disassembly (Continued)

2. Remove the pump motor and impeller by removing the 4 hex bolts attaching them to the pump housing.
3. Repair or replace the pump parts as required.
4. Reassemble in reverse of disassembly.

Immersion Heater Replacement

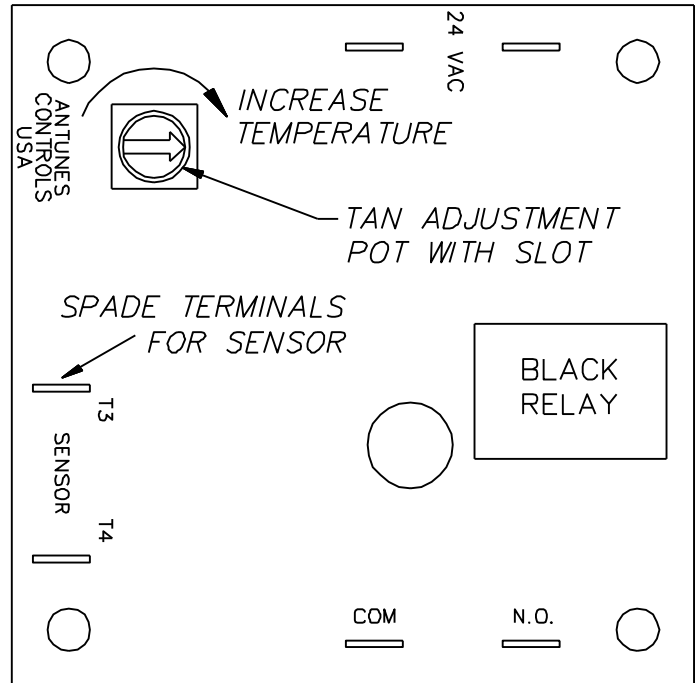
See dwg. #SK-4703

1. The immersion heater **MUST** be completely submerged at all times. If this is not the case contact a qualified service technician. The heated surface should never be in contact with sludge. See dwg. SK-4703.
2. Remove the housing covering the wiring terminations. Disconnect the immersion heater wires.
3. Remove the immersion heater by loosening and removing the large hex nut.

p NOTE:
Use plumbers putty as gasketing around the immersion heater to minimize leaks.

Tank Heat Temperature Adjustment

1. A temperature control board is provided in the control panel for easy adjustment of tank temperature. Though tank temperature is adjusted during the machines factory test it is sometimes necessary to re-adjust the temperature at start-up.
2. Locate the temperature control board. Use the control panel layout drawing located in Section 4, Electrical Schematic and Replacement Parts.
3. Adjust the tank temperature to the desired temperature by turning the potentiometer located on the temperature control board. An arrow on the potentiometer indicates increase.
4. If the temperature does not change refer to Troubleshooting Tank Temperatures in the next section.



TANK TEMPERATURE CONTROL BOARD
(DE9-251)

Troubleshooting Tank Temperatures

Electric Heat

1. If temperature does not change check the temperature control board (P/N DE9-251) proper operation. If the temperature control board is faulty, replace.
2. Verify tank heat contactor is working correctly. If not, replace.
3. Verify all immersion heaters are working properly and not limed. If not, replace.

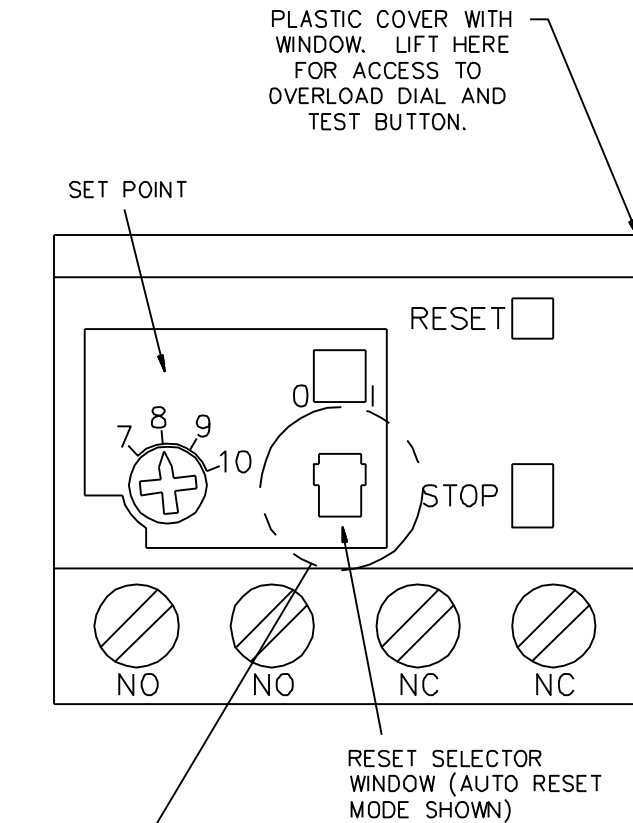
Steam Heat

1. If temperature does not change check the temperature control board (P/N DE9-251) proper operation. If the temperature control board is faulty, replace.
2. Verify steam pressure per machine specifications.
3. Verify steam trap is not clogged. If so, replace.

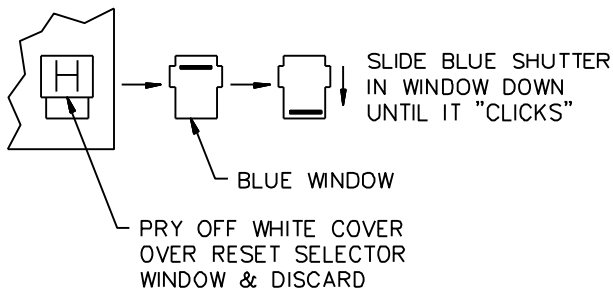
Motor Overloads

All motors used on Insinger Machines are provided with motor overloads. Motor overloads are adjusted when the machines are factory tested. Should it be necessary to adjust the motor overloads in the field first verify the motor current draw for the voltage the machine is using.

Using the Control Panel Component Layout Dwg. located in Section 3 to identify the overload adjust by turning the dial to the appropriate AMP draw.



TO CHANGE FROM MANUAL TO AUTO RESET:

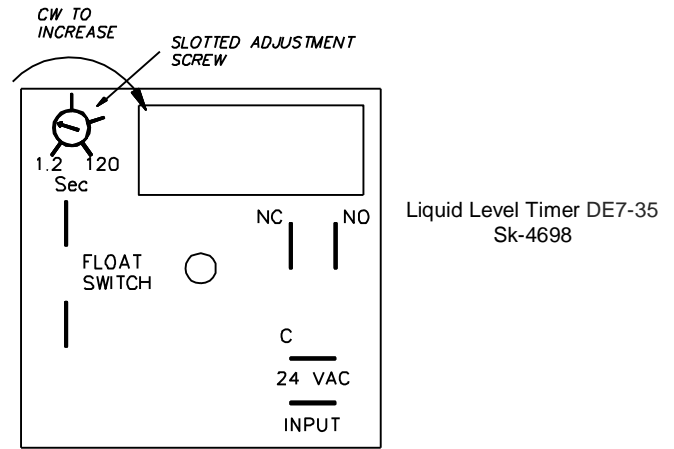


Level System

The level control system consists of one overflow timer (P/N DE7-35) and one level float (P/N DEF-60) per tank.

When the system is powered-up, the tank(s) will begin to fill (assuming no water is in the tanks).

When the level float is actuated, the overflow timer begins to time-out and continues the filling process until the tank(s) is full.



NOTE:
The overflow timer **MUST** be adjusted during initial start-up. Adjustment depends on water fill pressure. The water level **MUST** be 1/4" below the lip of the overflow tube. Adjust by increasing or decreasing the potentiometer on the level timer.

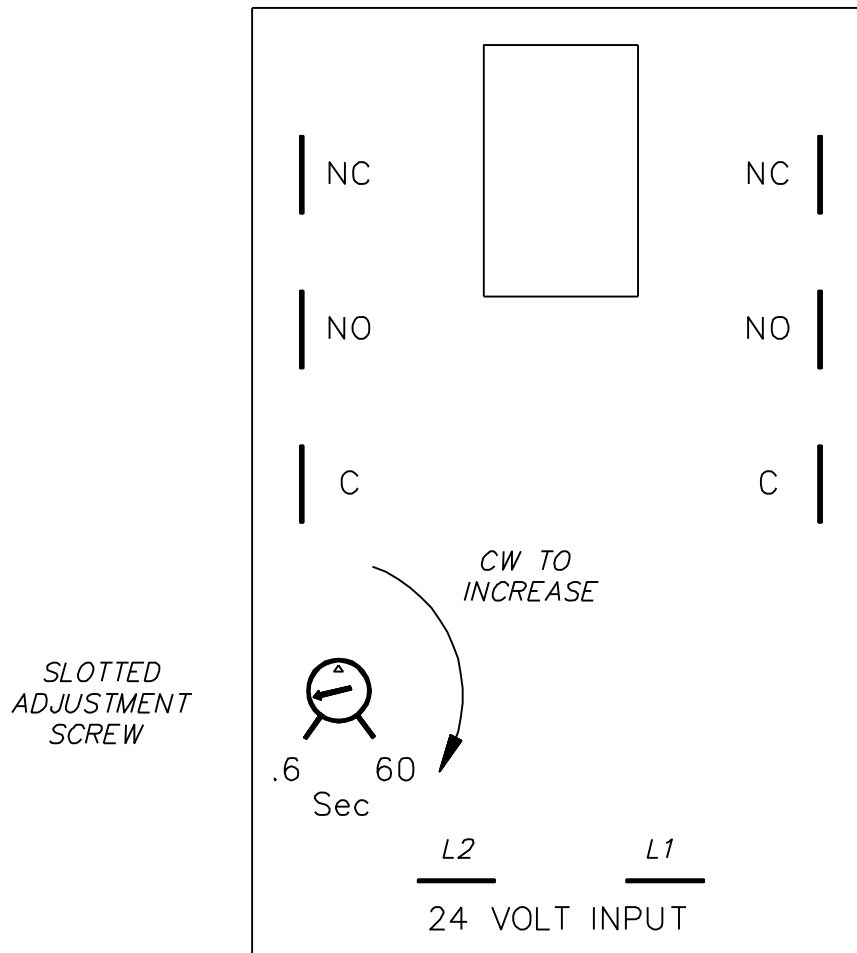
NOTE:
Dirty level floats will cause the tank heat to energize with no water in the tanks. **LEVEL FLOATS MUST BE CLEANED DAILY.**

Cycle Timers

If your machine is controlled by timing boards instead of a PLC, timing boards are used to determine wash time, rinse time and dwell time.

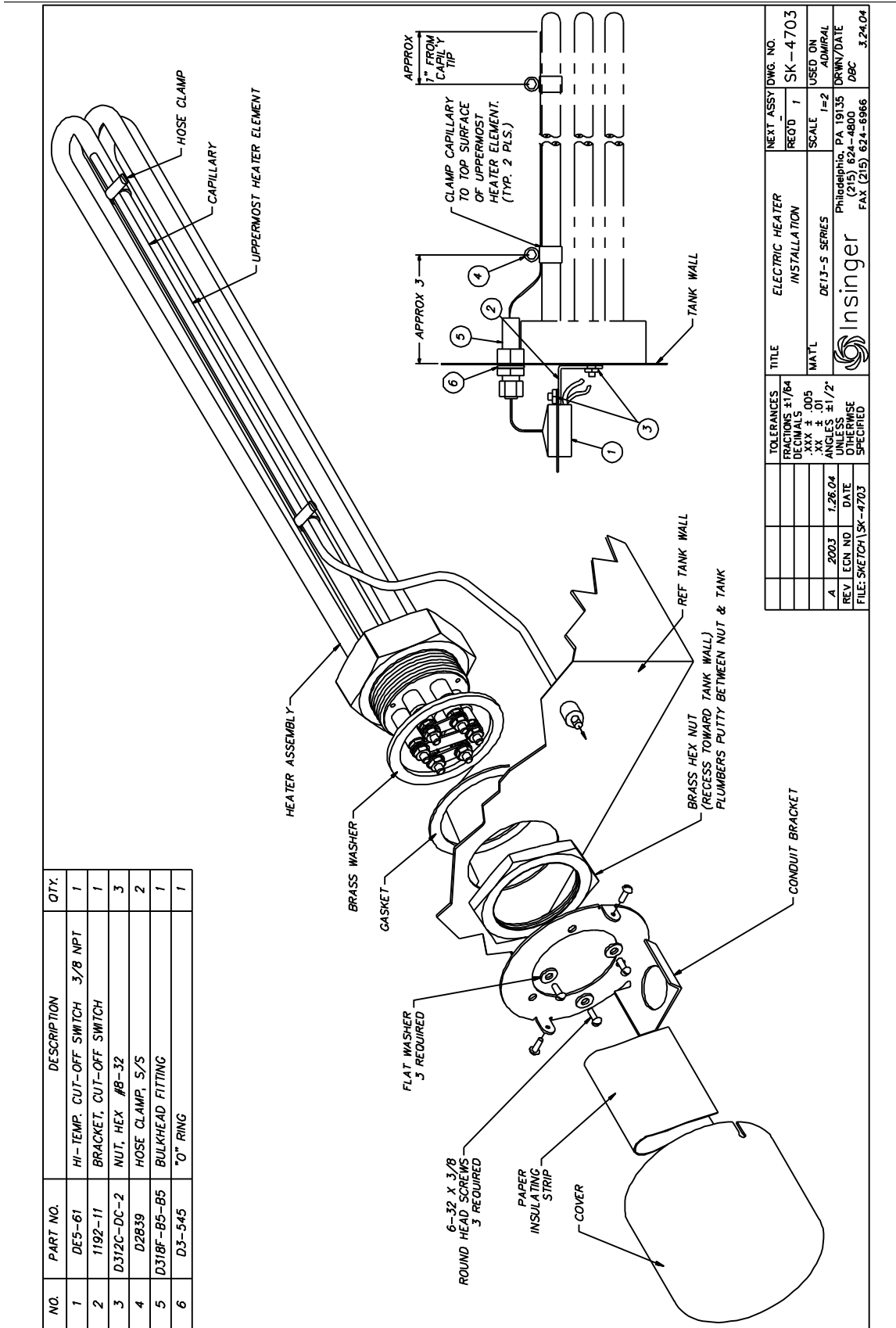
See drawing SK-3490, item no. 8. The potentiometer control – see below – increases or decreases the sequence time. Turn the potentiometer with a small slotted screwdriver clockwise to increase time and counterclockwise to decrease time.

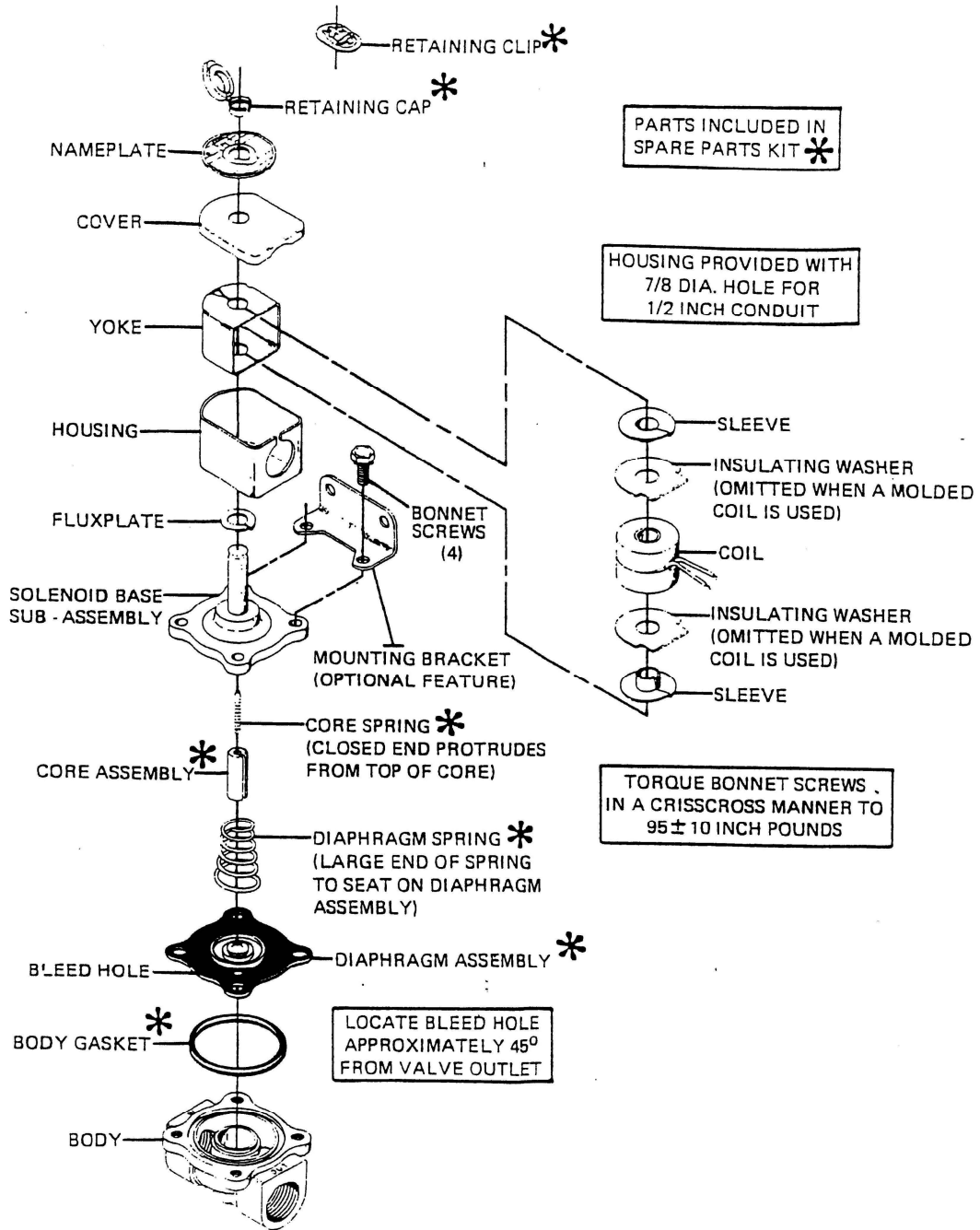
The board labeled with a 'W' is for the wash cycle, the 'R' represents the rinse cycle, and the 'L' stands for the dwell cycle – the time at the end of the wash cycle where the amber light is on for a few seconds to ensure the dishes are sanitized and to prevent dishmachine operators from getting splashed with water still flinging off the wash and rinse arms at the end of the cycle. Do not open the machine before the light goes out.



WASH & RINSE TIMER DE7-27

SKETCHA\SK-4708

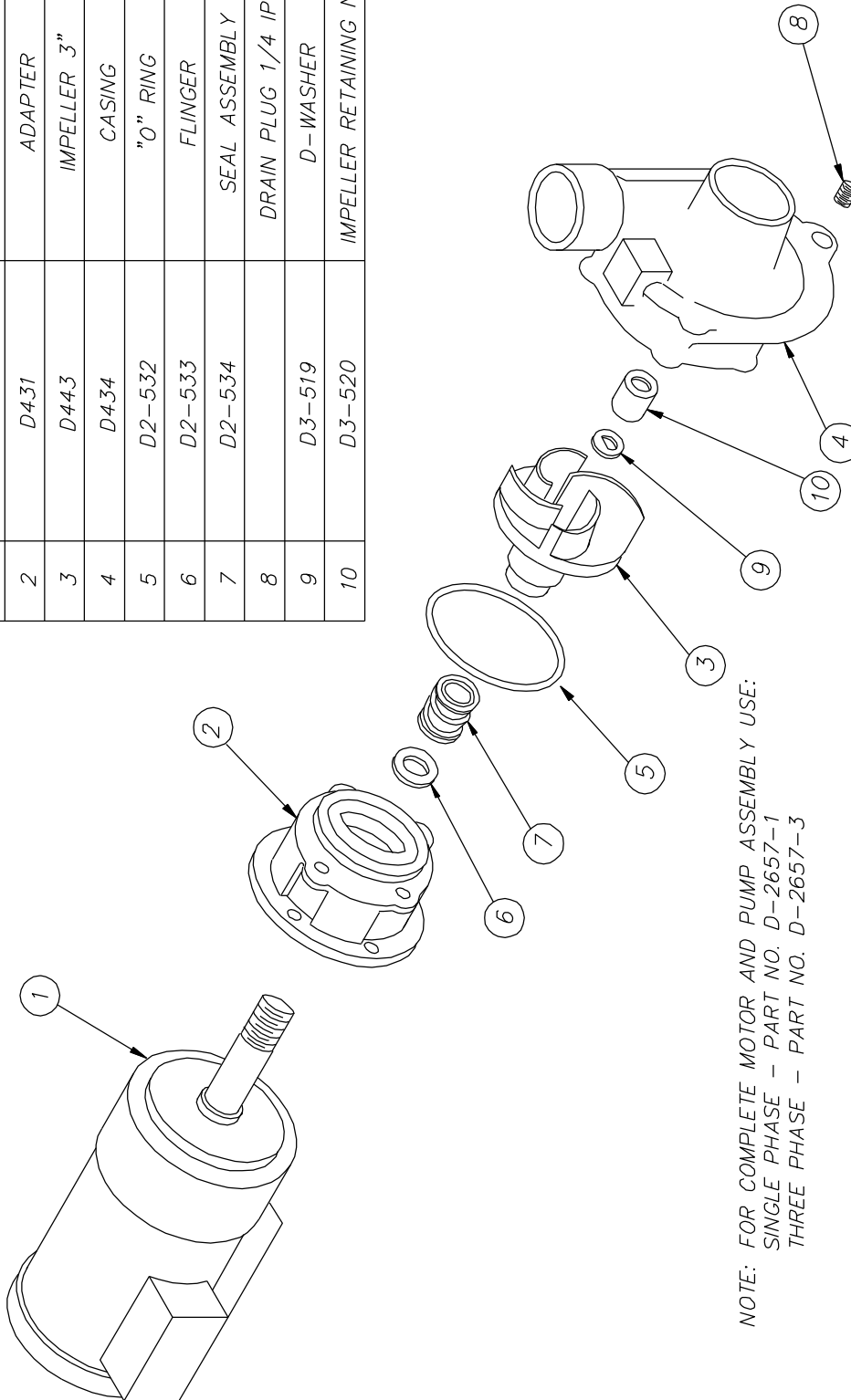





SOLENOID VALVE
 FINAL RINSE
 6-17

SKETCHA\SK-4692

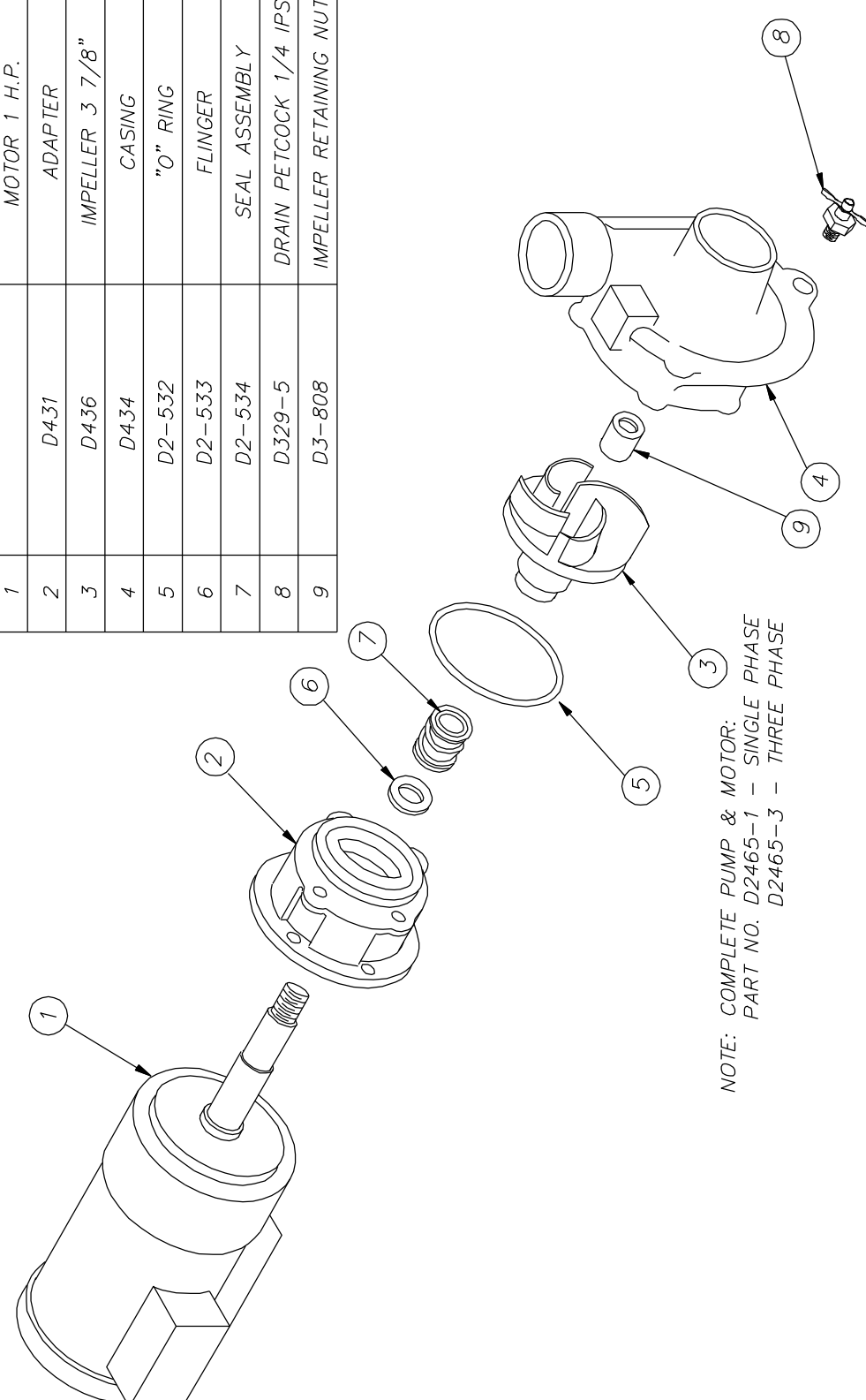
ITEM	PART NO.	DESCRIPTION	QTY.
1		MOTOR 2 H.P.	1
2	D431	ADAPTER	1
3	D443	IMPELLER 3"	1
4	D434	CASING	1
5	D2-532	"O" RING	1
6	D2-533	FLINGER	1
7	D2-534	SEAL ASSEMBLY	1
8		DRAIN PLUG 1/4 IPS	1
9	D3-519	D-WASHER	1
10	D3-520	IMPELLER RETAINING NUT	1



NOTE: FOR COMPLETE MOTOR AND PUMP ASSEMBLY USE:
 SINGLE PHASE - PART NO. D-2657-1
 THREE PHASE - PART NO. D-2657-3

TOLERANCES		TITLE	PARTS LIST	NEXT ASSY	DWG. NO.
FRACTIONS	±1/64				
DECIMALS	.XXX ± .005		2 H.P. PUMP	REQ'D -	SK-2923
	.XX ± .01			SCALE -	USED ON
ANGLES	±1/2°				VARIOUS
UNLESS OTHERWISE SPECIFIED					
REV	ECN NO	DATE			
A	966	10.29.93			
FILE: SKETCHA \ SK-2923					
 Insinger Machine Company			Philadelphia, PA 19135 (215) 624-4800 FAX (215) 624-6966		
			DRWN/DATE MAM 11.11.93		


ITEM	PART NO.	DESCRIPTION	QTY.
1		MOTOR 1 H.P.	1
2	D431	ADAPTER	1
3	D436	IMPELLER 3 7/8"	1
4	D434	CASING	1
5	D2-532	"O" RING	1
6	D2-533	FLINGER	1
7	D2-534	SEAL ASSEMBLY	1
8	D329-5	DRAIN PETCOCK 1/4 IPS	1
9	D3-808	IMPELLER RETAINING NUT	1

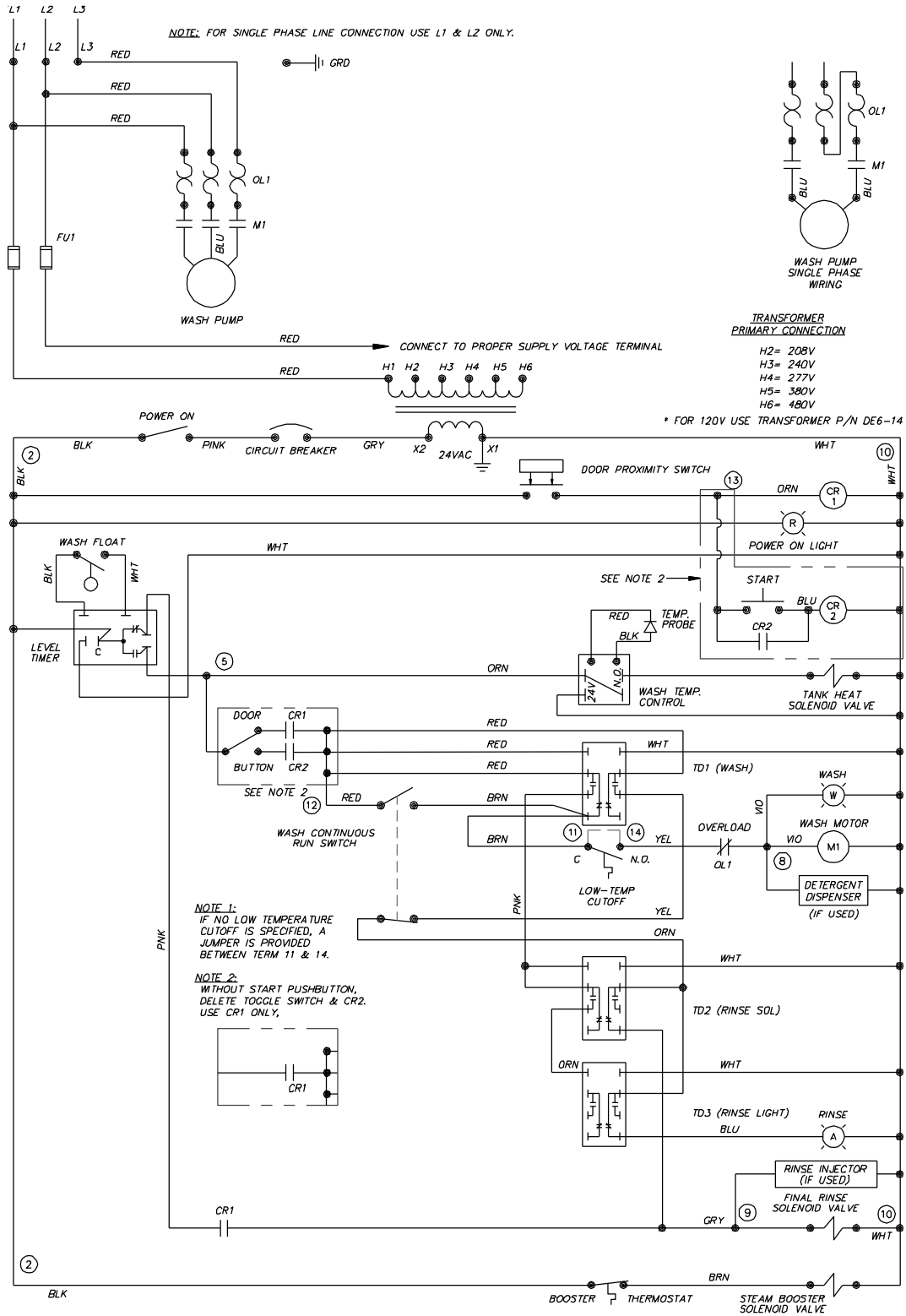


NOTE: COMPLETE PUMP & MOTOR:
 PART NO. D2465-1 - SINGLE PHASE
 D2465-3 - THREE PHASE

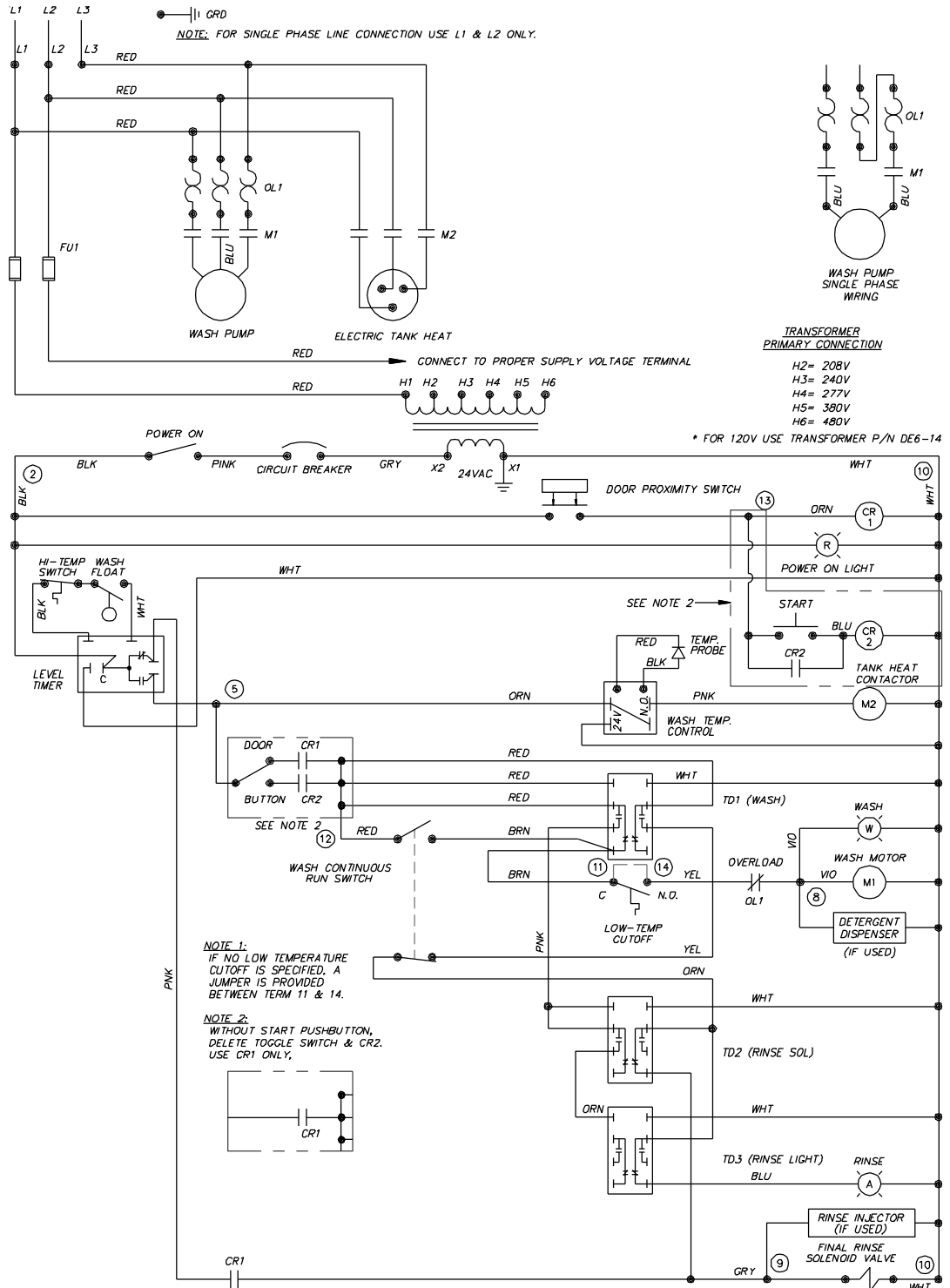
TOLERANCES	FILE: SKETCHA \SK-2462	
FRACTIONS ±1/64		
DECIMALS		
.XXX ± .005		
.XX ± .01		
ANGLES ±1/2°		
UNLESS OTHERWISE SPECIFIED		
REV	ECN NO	DATE
C	2007	3.25.04
B	1761	5.5.00
A	1005	4.26.94

TITLE	PARTS LIST	NEXT ASSY DWG. NO.
1 HP PUMP		SK-2462
MAT'L		SCALE - USED ON VARIOUS

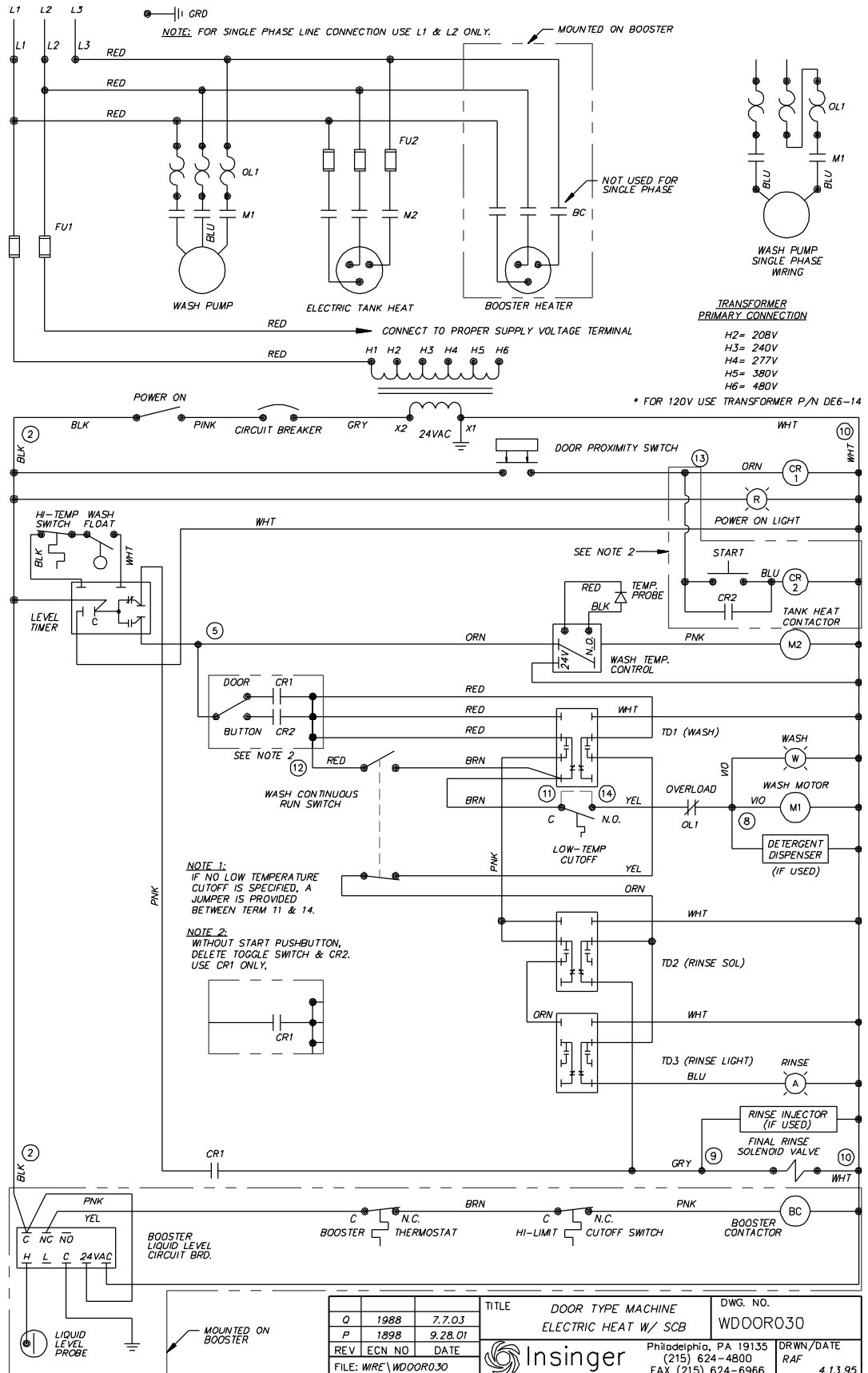

 Philadelphia, PA 19135
 (215) 624-4800
 FAX (215) 624-6966
 DRWN/DATE
 MAM 11.11.93

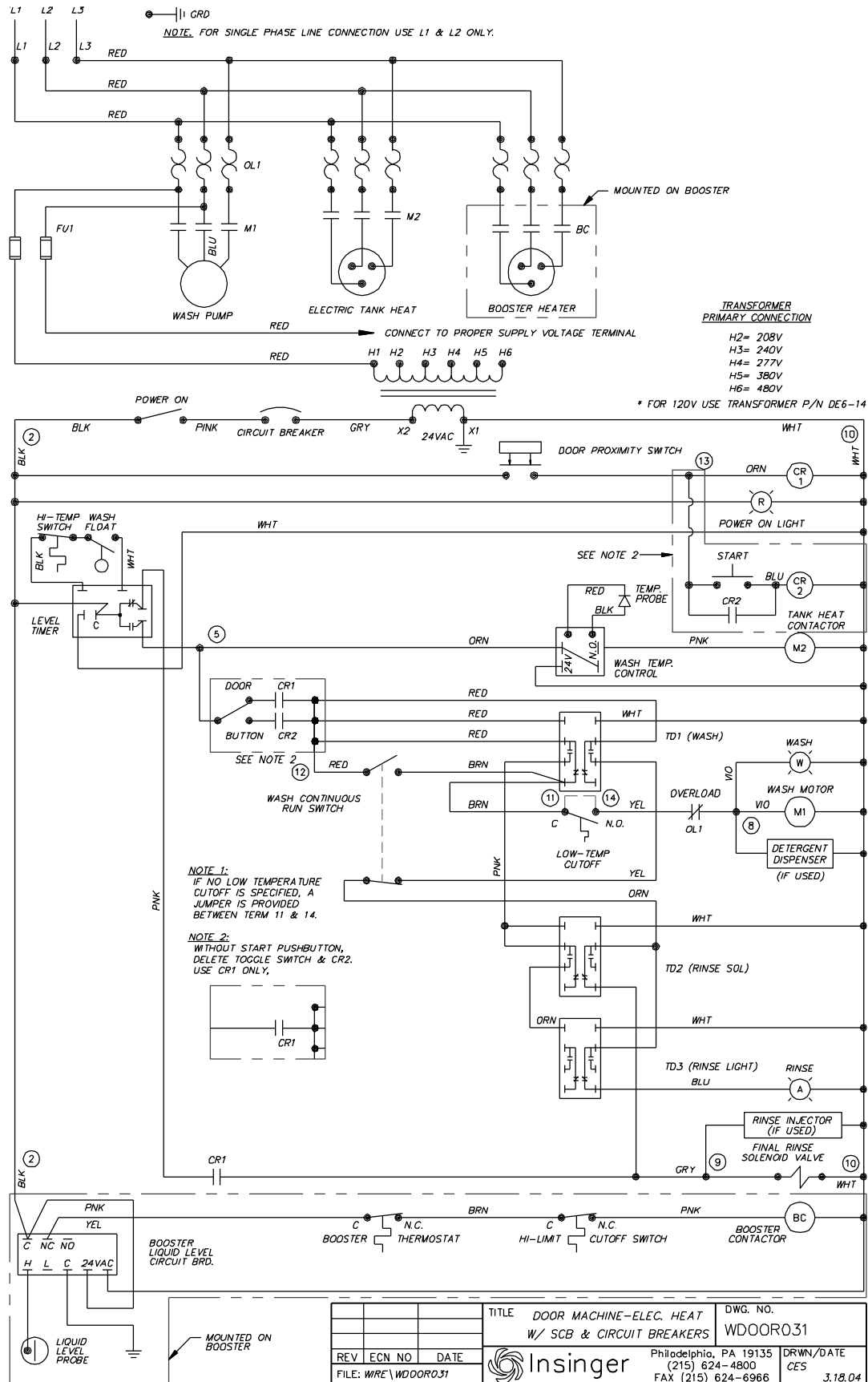


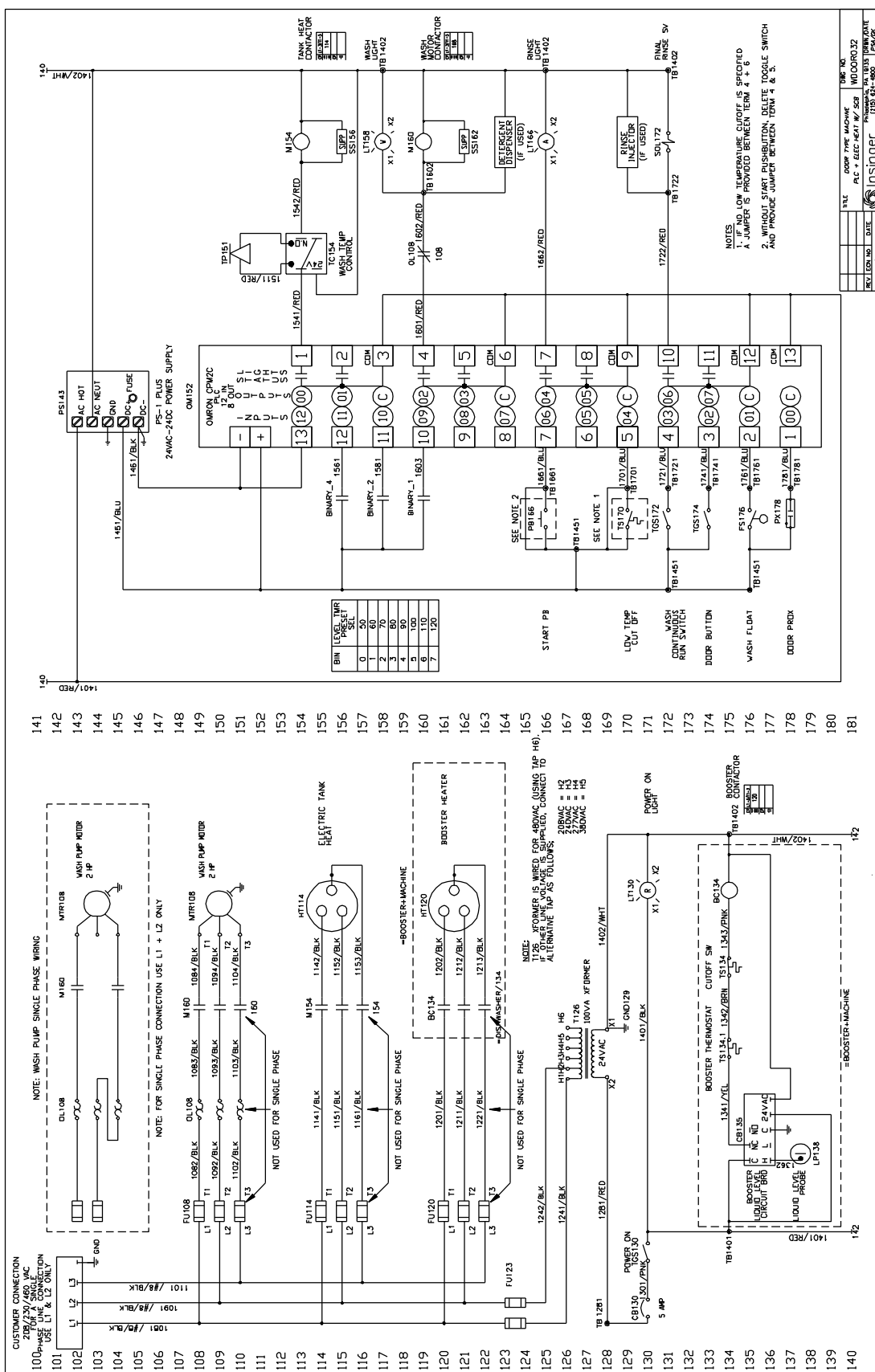
M	1898	9.28.01	TITLE	DOOR TYPE MACHINE STEAM HEAT	DWG. NO.	WDOOR010
L	1619	8.1.98	REV	ECN NO	DATE	DRWN/DATE
REV	ECN NO	DATE	Philadelphia, PA 19135 (215) 624-4800 FAX (215) 624-6966		RAF	4.11.95
FILE: WIRE \ WDOOR010						



M	1988	7.7.03	TITLE	DOOR TYPE MACHINE	DWG. NO.	WDDOOR20
L	1998	9.28.01		ELECTRIC HEAT		
REV	ECN NO	DATE	Philadelphia, PA 19135 (215) 624-4800 FAX (215) 624-6966		DRWN/DATE	RAF 04.12.95
FILE: WIRE\WDDOOR20						







ITEM	DESCRIPTION	PART NO.	QTY	ITEM	DESCRIPTION	PART NO.	QTY	ITEM	DESCRIPTION	PART NO.	QTY
19	DATA DECAL	SK-3715	1	31	GROUNDING STUD, 1/4-20	D309C-GC-4G	1	39	FUSE (W/ 3 PH SCB) 6 KW TANK HEAT	DE9-193	3
20	TIMER (LIQUID LEVEL)	DE7-35	1	32	LOCKWASHER, 1/4	D313C-G5	1		KTK-R-10	DE9-194	
21	TERMINAL BLOCK ASSY	DE3-9	1	33	HEX NUT, 1/4-20	D312C-GC-2	1		KTK-R-15	DE9-195	
22	TERMINAL BLOCK ASSY	DE3-3	1	34	CONTROL BOX	1089-194	1		KTK-R-20	DE9-195	
	208-460 V, 3 PHASE	DE3-3		35	CONTROL BOX COVER	1089-193	1		KTK-R-20	DE9-185	
	220 SINGLE PHASE	DE3-3		36	GASKET	9007-001	1		KTK-R-20	DE9-195	
23	DECAL - SINGLE PHASE W/SCB	DE3-154	1	37	NUT	D312C-EF-5	4	40	FUSE BLOCK, 2 POLE (W/ 1 PH SCB)	DE9-185	1
	DECAL - PUSHBUTTON START	SK-4502		38	FUSE BLOCK, 3 POLE (W/ 3 PH SCB)	DE9-186	1	41	FUSE (W/ 1 PH SCB) 3 KW TANK HEAT	DE9-195	2
	DECAL - NO PB START (REF)	SK-3662		39	FUSE (W/ 3 PH SCB) 3 KW TANK HEAT	DE9-192	3		KTK-R-20	DE9-207	
24	SWITCH, DPDT (POWER ON)	DE5-11	1		460 V	DE9-192			KTK-R-25	DE9-189	
25	PILOT LIGHT (RED)	DE9-107	1		380 V	DE9-192		42	OVERLOAD BASE	DE2-60	1
26	PILOT LIGHT (WHITE)	DE9-108	1		230 V	DE9-193			KTK-R-30	DE9-22	1
27	PILOT LIGHT (AMBER)	DE9-109	1		208V	DE9-194		44	LABEL, SELECTOR SWITCH	SK-4513	1
28	CIRCUIT BREAKER (SA)	DE9-43	1		FUSE (W/ 3 PH SCB) 5 KW TANK HEAT	DE9-194	3				
29	SWITCH (AUTO - MANUAL)	DE5-11	1		460 V	DE9-193					
30	BOOT	DE9-13	AR		380 V	DE9-193					
					230 V	DE9-194					
					208V	DE9-195					

ITEM	DESCRIPTION	PART NO.	QTY
39	FUSE (W/ 3 PH SCB) 6 KW TANK HEAT	DE9-193	3
40	FUSE BLOCK, 2 POLE (W/ 1 PH SCB)	DE9-185	1
41	FUSE (W/ 1 PH SCB) 3 KW TANK HEAT	DE9-195	2
42	OVERLOAD BASE	DE2-60	1
43	SWITCH, SPDT	DE9-22	1
44	LABEL, SELECTOR SWITCH	SK-4513	1

NOT SHOWN

ITEM	DESCRIPTION	PART NO.	QTY
39	ELECTRIC IMMERSION HEATER	DE13-SD73	5 KW
	440-480/3	DE13-SD73	
	380/3	DE13-SC53	
	220-240/3	DE13-SC43	
	240/1	DE13-SC41	
	220/1	DE13-SC31	
	208/3	DE13-SC23	
	208/1	DE13-SC21	
	TEMPERATURE SENSOR	DE9-252	1
	START PUSHBUTTON STATION	DE9-76	1
	BRACKET, PUSHBUTTON	1434-10	1

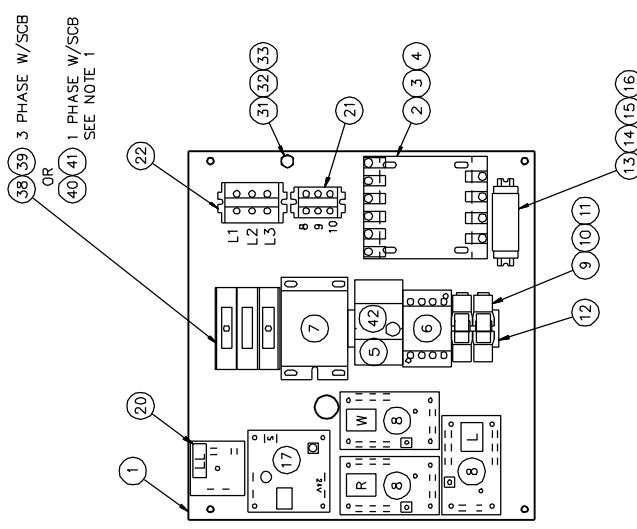
18-5
CONTROL PANEL LAYOUT

Insinger
Philadelphia, PA 19135 DRWN/DATE
(215) 674-4600 MFJ 5.24.95
FAX (215) 624-6966
FILE: SKETCH LSP-3490

SCALE	DWG. NO.
1"=4"	SK-3490
REV. ECN NO. DATE	
X 2024	12.1.04
W 1945	7.17.02

SHEET 2 OF 2

ITEM	DESCRIPTION	PART NO.	QTY	ITEM	DESCRIPTION	PART NO.	QTY	ITEM	DESCRIPTION	PART NO.	QTY
13	DIN RAIL (15 mm)	DE3-42	1	8	TIME DELAY BOARD (WASH & RINSE)	DE7-27	3	1	COMPONENT MTG PLATE (13.5 x 12.69)	SK-3749	1
14	TERMINAL SECTION	DE3-39	14	9	RELAY BASE	DE2-37	1	2	TRANSFORMER (100 VA, 24 VAC)	DE6-6	1
15	TERMINAL END COVER PLATE	DE3-40	1	10	RELAY	DE2-38	1		ALL VOLTAGES EXCEPT 120 V	DE6-14	
16	TERMINAL END CLAMP	DE3-41	2	11	RELAY HOLD DOWN SPRING	DE3-43	1	3	FUSE BLOCK KIT (100 VA XFMR)	DE9-163	1
17	TEMPERATURE CONTROL BOARD	DE9-251	1	12	DIN RAIL (35 mm)	DE9-84	1		FOR DE6-6	DE9-191	
								4	FUSE (100 VA TRANSFORMER PRIMARY)	DE9-166	2
									460 V FNO-R-.75	DE9-166	
									380 V FNO-R-.75	DE9-166	
									220 - 230 V FNO-R-1.4	DE9-168	
									208 V FNO-R-1.5	DE9-200	
									115 V FNO-R-2.8	DE9-201	
								5	OVERLOAD RELAY (1 HP PUMP)	DE2-52	1
									460/3/60 1.6-2.5 A	DE2-52	
									380/3/50 1.6-2.5 A	DE2-52	
									230/3/60 2.5-4 A	DE2-53	
									220/3/50 2.5-4 A	DE2-53	
									220/1/60 5.5-8 A	DE2-55	
									208/3/60 2.5-4 A	DE2-53	
									115/1/60 12-18 A	DE2-58	
									OVERLOAD RELAY (2 HP PUMP)	DE2-53	1
									460/3/60 2.5-4 A	DE2-53	
									380/3/50 2.5-4 A	DE2-53	
									230/3/60 4-6 A	DE2-54	
									220/3/50 4-6 A	DE2-54	
									220/1/60 9-13 A	DE2-57	
									208/3/60 5.5-8 A	DE2-55	
									115/1/60 16-24 A	DE2-61	
								6	CONTACTOR (PUMP) SP4	DE1-93	1
									CONTACTOR (ELECT TANK HEAT, 3, 5 OR 6 KW)	DE1-109	1
									30 A RES	DE1-109	
									30 A RES	DE1-109	
									ALL 220-240 V, 1 PH	DE1-109	
									3 KW 30 A RES	DE1-109	
									5 KW 50 A RES	DE1-110	
									6 KW 65 A RES	DE1-111	



NOTES:
 1. A FUSE BLOCK FOR TANK HEATERS (ITEM 38 OR 40) IS USED ONLY WHEN A SELF-CONTAINED BOOSTER IS PROVIDED.

TITLE: CONTROL PANEL LAYOUT

18-5

Philadelphia, PA 19135 DRWN/DATE
 (215) 674-4800 MFJ 5.24.95
 FAX (215) 624-8866
 FILE: SRETOR\SR-3490 DWG. NO.

SCALE: 1=4

REV. ECN NO. DATE

SK-3490

SHEET 1 OF 2

ITEM	DESCRIPTION	PART NO.	QTY	ITEM	DESCRIPTION	PART NO.	QTY	ITEM	DESCRIPTION	PART NO.	QTY
13	DIN RAIL (15 mm)	DE3-42	1	8	FUSE BLOCK, 3 POLE (LITTELFUSE)	L60060C-3C	1	1	COMPONENT MTC PLATE (13.5 x 12.69)	SK-3749	1
14	TERMINAL SECTION	DE3-39	14	9	FUSE (W/ 3 PH SCB) FOR 1.35 KW BOOSTER HEATER		3	2	TRANSFORMER (100 VA, 24 VAC) ALL VOLTAGES EXCEPT 120 V	DE6-6	1
15	TERMINAL END COVER PLATE	DE3-40	1		460 V	TKR-R-20		3	FUSE BLOCK KIT (100 VA XFMR) FOR DE6-6	DE6-14	1
16	TERMINAL END CLAMP	DE3-41	2		380 V	TKR-R-25		4	FUSE (100 VA TRANSFORMER PRIMARY) FOR DE6-14	DE9-163	2
17	TEMPERATURE CONTROL BOARD	DE9-251	1	10	OMRON PLC	CPM2C-20CDR-D	1		460 V	DE9-191	2
18	LEVEL TMR PRESET SELECT	75-1	1	11	DCPS 24VDC POWER SUPPLY	DCPS	1		380 V	DE9-166	2
				12	DIN RAIL (.35 mm)	DE9-84	1		220 - 230 V	DE9-168	2
									208 V	DE9-200	2
									115 V	DE9-201	1
									460/3/60	DE2-52	1
									380/3/50	DE2-52	1
									230/3/60	DE2-53	1
									220/3/50	DE2-53	1
									220/1/60	DE2-55	1
									208/3/60	DE2-55	1
									115/1/60	DE2-58	1
									460/3/60	DE2-53	1
									380/3/50	DE2-53	1
									230/3/60	DE2-54	1
									220/3/50	DE2-54	1
									220/1/60	DE2-57	1
									208/3/60	DE2-55	1
									115/1/60	DE2-61	1
									CONTACTOR (PUMP) SP4	DE1-93	1
									CONTACTOR (ELECT TANK HEAT, 3, 5 OR 6 KW)	DE1-109	1
									ALL 3 PHASE	DE1-109	1
									30 A RES	DE1-109	1
									ALL 220-240 V, 1 PH	DE1-109	1
									3 KW 30 A RES	DE1-109	1
									115-120 V, 1 PH	DE1-110	1
									5 KW 50 A RES	DE1-110	1
									6 KW 65 A RES	DE1-111	1

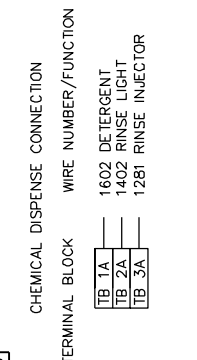
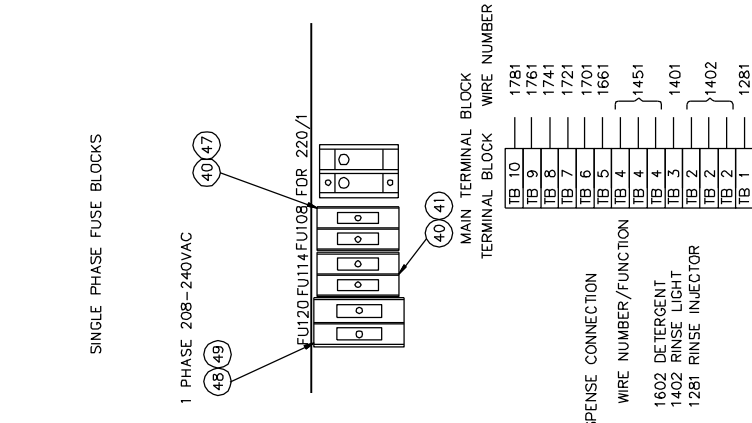
TITLE
18-5 FLC CONTROL
CONTROL PANEL LAYOUT

Philadelphia, PA 19135
(215) 624-4800
FAX (215) 624-6966
PSA
06.04.04

Insinger
FILE: SKETCH SK-4674
SCALE
DWG. NO
1=4
SK-4674

REV ECN NO DATE

SHEET 1 OF 2



DETERGENT DISPENSE TO TERMINALS 1A AND 2
RINSE INJECTOR TO TERMINALS 3A AND 2

ITEM	DESCRIPTION	PART NO.	QTY	ITEM	DESCRIPTION	PART NO.	QTY	ITEM	DESCRIPTION	PART NO.	QTY
19	DATA DECAL	SK-3715	1	31	GROUNDING STUD, 1/4-20	D309C-GC-4G	1	39	FUSE (W/ 3 PH SCB) 6 KW TANK HEAT	DE9-193	3
20	TIMER (LIQUID LEVEL)	DE7-35	1	32	LOCK WASHER, 1/4	D313C-G5	1		460 V	KTK-R-10	
21	TERMINAL BLOCK ASSY	DE3-9	1	33	HEX NUT, 1/4-20	D312C-GC-2	1		380 V	KTK-R-15	
22	TERMINAL BLOCK ASSY	DE3-9	1	34	CONTROL BOX	1089-194	1		230 V	DE9-195	
	208-460 V, 3 PHASE	DE3-3	1	35	CONTROL BOX COVER	1089-193	1		208V	KTK-R-20	
	220 SINGLE PHASE	DE3-3	1	36	GASKET	9007-001	1		FUSE BLOCK, 2 POLE (W/ 1 PH SCB)	DE9-185	1
23	DECAL - PUSHBUTTON START	SK-4502	1	37	NUT	D312C-EF-5	4		FUSE (W/ 1 PH SCB) 3 KW TANK HEAT	DE9-195	2
	DECAL - NO PB START (REF)	SK-3862	1	38	FUSE BLOCK, 3 POLE (W/ 3 PH SCB)	DE9-186	1		220 V	KTK-R-20	
24	SWITCH, DPDT (POWER ON)	DE5-11	1	39	FUSE (W/ 3 PH SCB) 3 KW TANK HEAT	DE9-192	3		220 V	KTK-R-25	
25	PILOT LIGHT (RED)	DE9-107	1		460 V	DE9-192			220 V	KTK-R-30	
26	PILOT LIGHT (WHITE)	DE9-108	1		380 V	DE9-192			FUSE (W/ 1 PH SCB) 6 KW TANK HEAT	DE9-189	2
27	PILOT LIGHT (AMBER)	DE9-109	1		230 V	DE9-193			220 V	DE2-60	1
28	CIRCUIT BREAKER (5A)	DE9-43	1		208V	DE9-193			220 V	DE2-63	1
29	SWITCH (AUTO - MANUAL)	DE5-11	1		FUSE (W/ 3 PH SCB) 5 KW TANK HEAT	DE9-194	3		OVERLOAD BASE (DE2-61 ONLY)	DE5-22	1
30	BOOT	DE9-13	AR		460 V	DE9-193			OVERLOAD BASE (DE2-61 ONLY)	SK-4513	1
					380 V	DE9-194			SWITCH, SPDT	K37L-TA18-C	1
					230 V	DE9-195			DIGITAL TEMPERATURE METER	DE9-192	3
					208V	DE9-195			FUSE (W/ 3 PH SCB) 2HP WASH PUMP	DE9-192	2
									460 V	DE9-192	2
									380 V	DE9-192	2
									230 V	DE9-193	2
									208V	DE9-193	2
									FUSE (W/ 1 PH SCB) 2 HP WASH PUMP	DE9-195	2
									208-230 V	L60060C-2C	1
									FUSE BLOCK, 2 POLE (LITTELFUSE)	CCMR 50	2
									FUSE (W/ 1 PH SCB) FOR 13.5 KW BOOSTER HEATER	CCMR 60	2
									230 V		
									208V		

ITEM	DESCRIPTION	PART NO.	QTY
31	GROUNDING STUD, 1/4-20	D309C-GC-4G	1
32	LOCK WASHER, 1/4	D313C-G5	1
33	HEX NUT, 1/4-20	D312C-GC-2	1
34	CONTROL BOX	1089-194	1
35	CONTROL BOX COVER	1089-193	1
36	GASKET	9007-001	1
37	NUT	D312C-EF-5	4
38	FUSE BLOCK, 3 POLE (W/ 3 PH SCB)	DE9-186	1
39	FUSE (W/ 3 PH SCB) 3 KW TANK HEAT	DE9-192	3
	460 V	DE9-192	
	380 V	DE9-192	
	230 V	DE9-193	
	208V	DE9-193	
	FUSE (W/ 3 PH SCB) 5 KW TANK HEAT	DE9-194	3
	460 V	DE9-193	
	380 V	DE9-193	
	230 V	DE9-194	
	208V	DE9-195	

ITEM	DESCRIPTION	PART NO.	QTY
43	SWITCH, SPDT	DE5-22	1
44	LABEL, SELECTOR SWITCH	SK-4513	1
45	DIGITAL TEMPERATURE METER	K37L-TA18-C	1
46	FUSE (W/ 3 PH SCB) 2HP WASH PUMP	DE9-192	3
	460 V	DE9-192	
	380 V	DE9-192	
	230 V	DE9-193	
	208V	DE9-193	
47	FUSE (W/ 1 PH SCB) 2 HP WASH PUMP	DE9-195	2
	208-230 V	DE9-195	
48	FUSE BLOCK, 2 POLE (LITTELFUSE)	L60060C-2C	1
49	FUSE (W/ 1 PH SCB) FOR 13.5 KW BOOSTER HEATER	CCMR 50	2
	230 V	CCMR 60	
	208V	CCMR 60	

ITEM	DESCRIPTION	PART NO.	QTY
50	TEMPERATURE SENSOR	DE9-252	1
51	START PUSHBUTTON STATION	DE5-76	1
52	BRACKET, PUSHBUTTON	1434-10	1

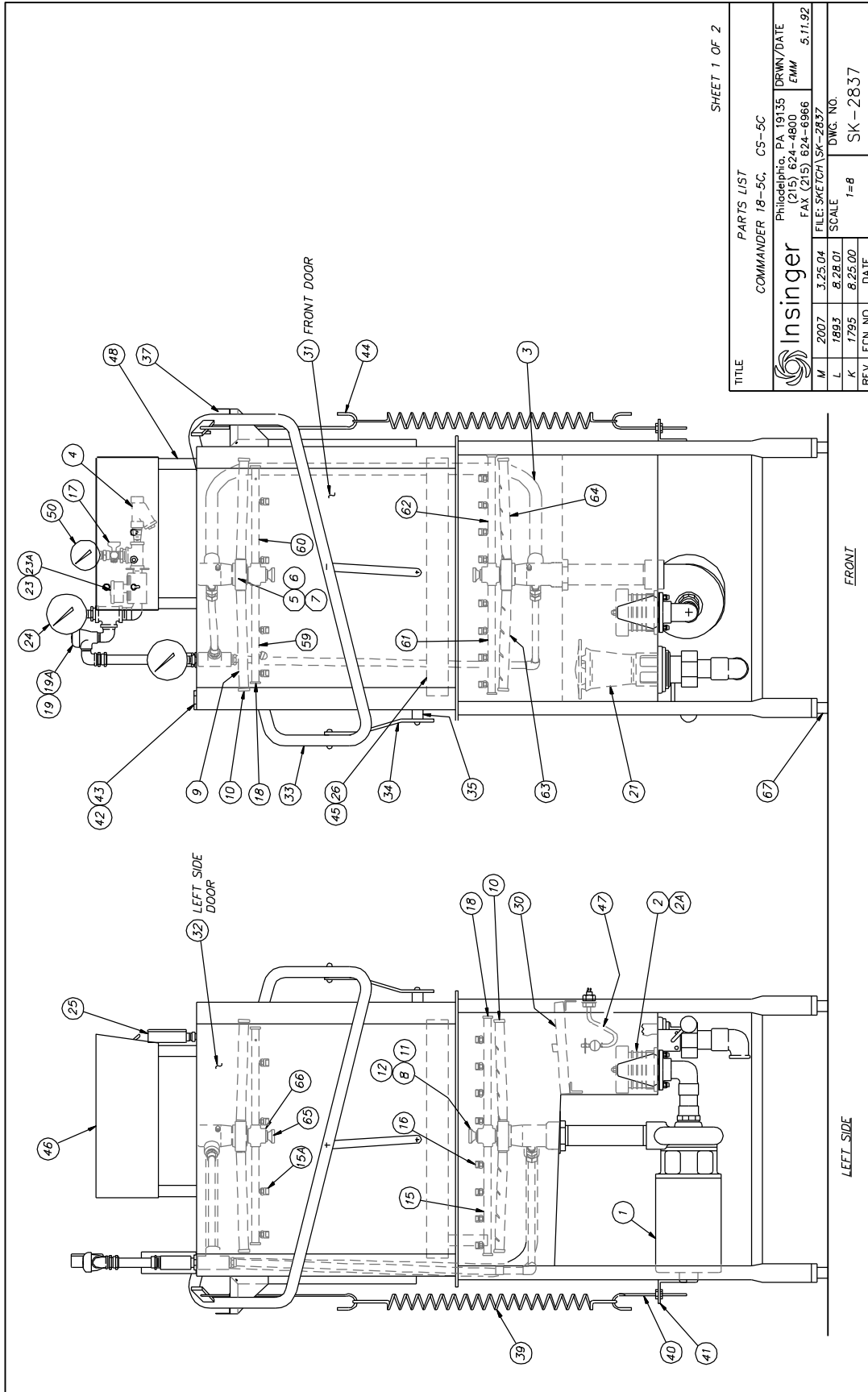
NOT SHOWN

SHEET 2 OF 2

TITLE: 18-5 PLC CONTROL CONTROL PANEL LAYOUT

Insinger Philadelphia, PA 19135 DRWN/DATE
 (215) 624-4800 PSA 06.04.04
 FAX (215) 624-6966
 FILE: SKETCH/ SK-4674

SCALE: 1=4 DWG. NO. SK-4674
 REV. ECN. NO. DATE



SHEET 1 OF 2

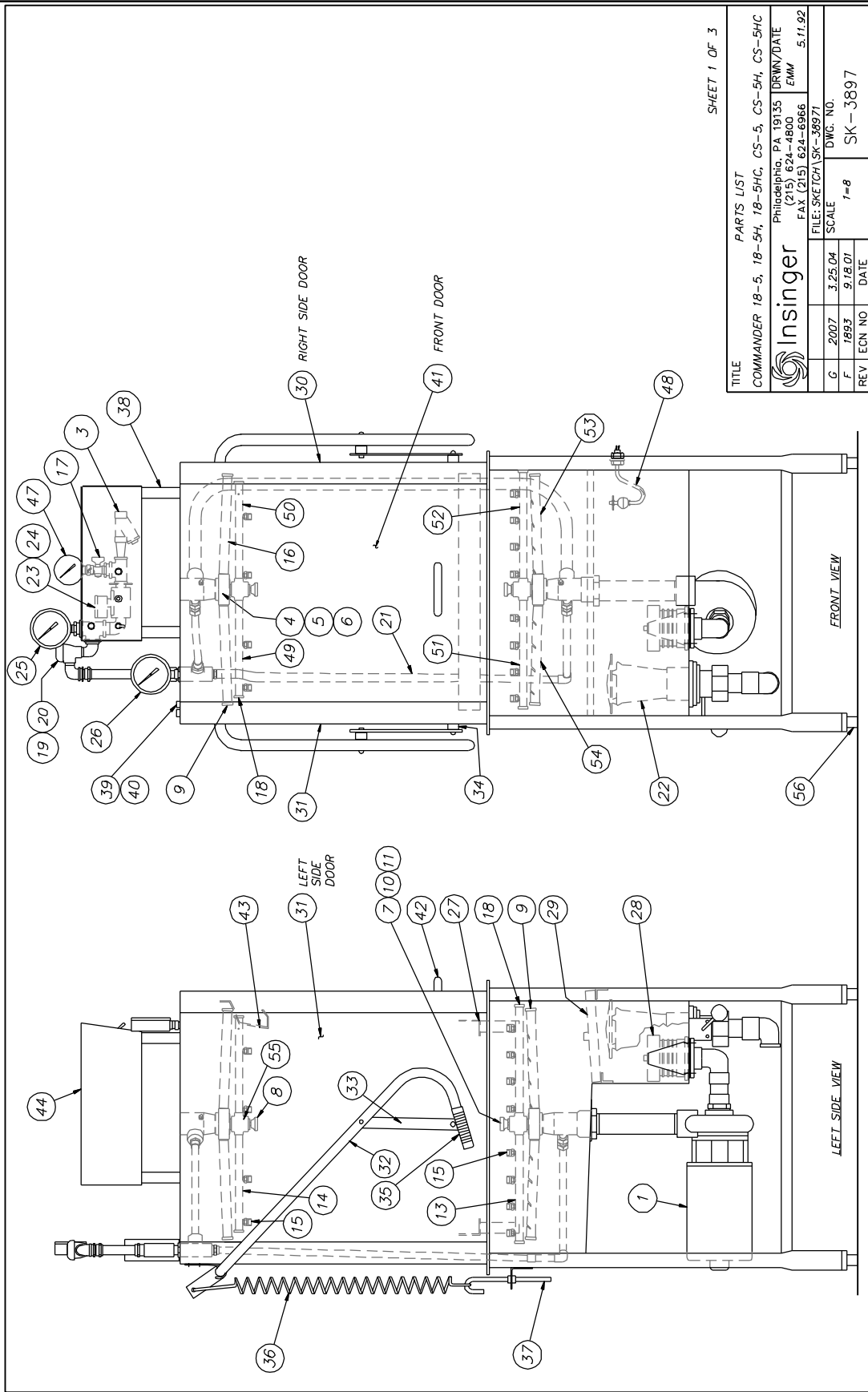
TITLE		PARTS LIST	
COMMANDER 18-5C, CS-5C		Phitolephio, PA 19135	
Insinger		(215) 624-4800	
M 2007 3.25.04		FAX (215) 624-6966	
L 1893 8.28.01		FILE: SKETCH\SK-2837	
K 1795 8.25.00		SCALE	
REV LEGN NO		DWG. NO.	
DATE		1=B SK-2837	

PARTS LIST: 18-5C, CS-5C

SHEET 2 OF 2

REV	ECON NO	DATE	TOLERANCES	TITLE	NEXT ASSY	DWG. NO.
J	1767	5-4-00	FRACTIONS ±1/64	PARTS LIST	RETD -	SK-2837
K	1795	8-23-00	DECIMALS ±.005	18-5C, CS-5C	SCALE 1"=1'	USED ON
L	1893	8-28-01	XXX ±.005	DATE	DRWN/DATE	EMM
M	2007	4-25-04	ANGLES ±1/2°	Insinger	PHILADELPHIA, PA 19135	5.11.92
FILE: SKETCH\SK-2837			UNLESS OTHERWISE SPECIFIED	FAX (215) 624-6986		

ITEM	PART NO.	DESCRIPTION	REQ.
1	1089-19	PUMP & MOTOR ASS'Y (1 H.P. - SPECIFY VOLTAGE)	1
2	D2-541	SUCTION STRAINER	1
2A	D3-825	SUCTION STRAINER SPRING	1
3	1463-16	DISCHARGE LINE ASS'Y	1
4	D2483A	"Y" STRAINER, 1/2	1
5	1084-76	SPRAY HUB - WASH	2
6	D2-563	O-RING	2
7	952-27	BUSHING, PLASTIC (WASH ARM HUB)	2
8	1089-178	BUSHING, PLASTIC (RINSE ARM PLUG)	1
9	1434-5	UPPER WASH SPRAY PIPE	2
10	D2-554-2	PLUG, 3/4-10 UNC-2A (WASH ARM)	4
11	D2-584	LOCKING SCREW	1
12	1084-22	SPRAY HUB - RINSE	1
15	1463-21	RINSE, LOWER SPRAY PIPE ASS'Y	1 SET
15A	1463-20	RINSE, UPPER SPRAY PIPE ASS'Y	1 SET
16	D2867	SPRAY NOZZLES - UPPER & LOWER RINSE ARM	12
17	D2497	PETCOCK	1
18	D2-554-1	PLUG, 9/16-12 UNC-2A	4
19	D2241A	VACUUM BREAKER, 1/2	1
19A	D2914RK	VACUUM BREAKER REPAIR KIT	1
21	SK-3028	DRAIN ASS'Y (WITH PARTS LIST)	1
23	D2606	SOLENOID VALVE, 1/2	1
23A	D2641	SOLENOID VALVE REPAIR KIT	1
24	D2495	TEMPERATURE GAUGE - FINAL RINSE	1
25	D2390	TEMPERATURE GAUGE	1
26	1089-107	TRACK ASS'Y	2
29	-	-	-
30	1089-10	SCRAP SCREEN	1
31	1089-208E	DOOR - FRONT	1
32	1089-208A	DOOR - LEFT SIDE	1
33	1084-126	DOOR ARM	1
34	1084-119	LINK - DOOR	2
35	957-26	SPACER - DOOR ARM LINK	2
36	-	-	-
37	D2-551	PIVOT BALL	1
39	SK-2294A-001	SPRING	2
40	957-27	SPRING EXTENSION - LOWER	2
41	1089-118	SPRING BRACKET	1
42	DE5-37	SWITCH, MAGNETIC	1
43	DE5-37A	MAGNET	1
44	957-49	SPRING EXTENSION - UPPER	2
45	1089-108	CORNER TRACK	1
46	SK-3490	CONTROL BOX ASS'Y	1
47	DE5-60	LIQUID LEVEL FLOAT ASS'Y.	1
48	1440-7	CONTROL BOX POST	4
49	-	-	-
50	SK-1433	PRESSURE GAUGE	1
52	-	-	-
53	-	-	-
54	-	-	-
55	-	-	-
56	-	-	-
57	-	-	-
58	-	-	-
59	1434-7A	UPPER RINSE PIPE	1
60	1434-7B	UPPER RINSE PIPE	1
61	1434-7C	LOWER RINSE PIPE	1
62	1434-7D	LOWER RINSE PIPE	1
63	1089-23A	LOWER WASH PIPE	1
64	1089-23B	LOWER WASH PIPE	1
65	1463-29	SUPPORT ASS'Y UPPER HUB	1
66	1463-25	RINSE HUB-UPPER	1
67	D2874	BULLET FOOT	4

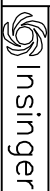


SHEET 1 OF 3

PARTS LIST	
TITLE	
COMMANDER 18-5, 18-5H, 18-5HC, CS-5, CS-5H, CS-5HC	
Philadelphia, PA 19135 DRWN/DATE	
(215) 624-4800 EMM	
FAX (215) 624-6966 5.11.92	
FILE: SKETCH\SK-3897	
G	2007 3.25.04 SCALE DWG. NO.
F	1893 9.18.01 1-8 SK-3897
REV	ECN NO DATE

ITEM	MACHINE	PART No.	DESCRIPTION	REQ.
1	18-5, CS-5 18-5H, CS-5H	1089-19 1089-19A	PUMP & MOTOR ASS'Y (1 H.P. - SPECIFY VOLTAGE) PUMP & MOTOR ASS'Y (2 H.P. - SPECIFY VOLTAGE)	1
2				
3		D2483A	"Y" STRAINER, 1/2	1
4		1084-76	SPRAY HUB - WASH	2
5		D2-563	O-RING	2
6		952-27	BUSHING, PLASTIC (WASH ARM HUB)	2
7		1089-178	BUSHING, PLASTIC (RINSE ARM HUB)	1
8		1463-29	SUPPORT ASS'Y UPPER HUB	1
9		D2-554-2	PLUG, 3/4-10 UNC-2A (WASH ARM)	4
10		D2-584	LOCKING SCREW	1
11		1084-22	HUB-LOWER RINSE ARM	1
12		-	-	1
13		1434-9	LOWER SPRAY PIPE ASS'Y. - RINSE	1
14		1434-8	UPPER SPRAY PIPE ASS'Y. - RINSE	1
15		D2867	SPRAY NOZZLE - UPPER & LOWER RINSE ARM	12
16		1434-5	UPPER WASH PIPE	2
17		D2497	PETCOCK	1
18		D2-554-1	PLUG, 9/16-12 UNC-2A	4
19		D2241A	VACUUM BREAKER, 1/2	1
20		D2914RK	VACUUM BREAKER REPAIR KIT	1
21		1463-18	FINAL RINSE ASSEMBLY (W/ PARTS LIST)	1
22		SK-3028	DRAIN ASSEMBLY (W/PARTS LIST)	1
23		D2606	SOLENOID VALVE, 1/2	1
24		D2641	SOLENOID VALVE REPAIR KIT	1
25		D2495	THERMOMETER - FINAL RINSE	1
26		D2390	THERMOMETER	1
27		1084-14A	TRACK ASS'Y	2
28		D2-541	SUCTION STRAINER	1
29		1089-10	SCRAP SCREEN	1
30	18-5, CS-5 18-5H, CS-5H 18-5HC, CS-5HC	1089-208B 1089-208G 1089-208K	DOOR - RIGHT SIDE	1
31	18-5, CS-5 18-5H, CS-5H 18-5HC, CS-5HC	1089-208A 1089-208F 1089-208J	DOOR - LEFT SIDE	1
32	18-5, CS-5 18-5H, CS-5H 18-5HC, CS-5HC	1084-25 1463-9 1463-9	DOOR ARM	1
33	18-5, CS-5 18-5H, CS-5H	1084-38 1463-8	LINK, ARM-DOOR	2
34	18-5, CS-5 18-5H, CS-5H	957-26 1463-7	SPACER, DOOR LINK	2
35		D2245	GRIP - DOOR HANDLE	2
36		SK-2294A-001	SPRING	2
37	18-5, CS-5 18-5H, CS-5H	957-27 1463-14	SPRING EXTENSION - LOWER	2
38	18-5, CS-5	1440-7	POST - CONTROL BOX	4
39		DE5-37	SWITCH, MAGNETIC	1
40		DE5-37A	MAGNET	1
41	18-5, CS-5 18-5H, CS-5H 18-5HC, CS-5HC	1089-208C 1089-208H 1089-208L	DOOR - FRONT	1
42		D2099	HANDLE, FRONT DOOR	1
43		1089-59	FRONT DOOR HANGER LATCH	1
44		SK-3490	CONTROL BOX ASS'Y	1

PARTS LIST: 18-5, 18-5H, 18-5HC
CS-5, CS-5H, CS-5HC

FILE: SKETCH SK-99972	TOLERANCES	TITLE	SCALE	USED ON
G 2007 3.25/04	FRACTIONS ±1/64	PARTS LIST	1=1	SK-3897
F 1895 9.18/01	DECIMALS ±.005			
E 1795 8.25/00	XXX ±.005			
D 1781 5.3/00	ANGLES ±1/2°			
REV. ECH. NO. DATE	UNLESS OTHERWISE SPECIFIED			
 Philadelphia, PA 19135 (215) 624-4800 FAX (215) 624-6966				

SHEET 2 OF 3

ITEM	MACHINE	PART No.	DESCRIPTION	REQ.
45				
46				
47		SK-1433	PRESSURE GAUGE	1
48		DE5-60	LIQUID LEVEL FLOAT ASS'Y.	1
49		1434-7A	UPPER RINSE PIPE	1
50		1434-7B	UPPER RINSE PIPE	1
51		1434-7C	LOWER RINSE PIPE	1
52		1434-7D	LOWER RINSE PIPE	1
53		1089-23A	LOWER WASH PIPE	1
54		1089-23B	LOWER WASH PIPE	1
55		1463-25	RINSE HUB-UPPER	1
56		D2874	BULLET FOOT	4

PARTS LIST: 18-5, 18-5H, 18-5HC
CS-5, CS-5H, CS-5HC

G	2007	3.25.04	TOLERANCES	
F	1803	9.18.01	FRACTIONS ±1/64	
E	1795	8.25.00	DECIMALS	
D	1761	5.3.00	.XXX ± .005	
REV	ECN NO	DATE	ANGLES ±.01	
			FINISHES ±1/2"	
			OTHERWISE SPECIFIED	

FILE: SKETCH\SK-3897Z	TITLE	PARTS LIST	NEXT ASSY DWG. NO.
			REQD -
			SCALE 1=1
			USED ON
			DRWN/DATE
			EMM 5.11.92

SHEET 3 OF 3

ITEM	PART NO.	DESCRIPTION	QTY.
40° RISE	1192-1	SELF CONTAINED BOOSTER ASSY	1
70° RISE	1452-1	SELF CONTAINED BOOSTER ASSY	1
	D2396	BURNING THERMOSTAT	1
	D322F-C1-E2	HEX RED. 3/4 MIPS x 3/8 FPS	1
	D2339	BALL VALVE 1/2 IPS	1
	D316F-D1-D2	90° ST. ELL. 1/2 IPS	1
	D314F-DC-00	CLOSE NIPPLE 1/2 IPS	3
	D2508A	PRESS. REG. & STRAINER 1/2 IPS	1
	D320F-D1D1D1	TEE 1/2 IPS	2
	D328F-20-A	SQUARE HEAD PLUG 1/2 IPS	2
	D317A-D3-D2	ADAPTER 1/2 C X 1/2 MIPS	1
	D316A-D3-D3	90° ELL. 1/2 C	1
	D316A-E1-D3	90° ST. ELL. 3/4 FPS x 1/2 C	2
	D314F-ES-16	NIPPLE 3/4 IPS x 2" LG	1
	D314F-EC-00	CLOSE NIPPLE 3/4 IPS	1
	D2693	TEMP. & PRESS. RELIEF VALVE 3/4 IPS	1
	D316F-E1-E2	90° ST. ELL. 3/4 IPS	2
	D314F-ES-40	NIPPLE 3/4 IPS x 5 LG	1
	D314F-ES-24	NIPPLE 3/4 IPS x 3 LG	1
	D319A-D3-D3	90° UNION ELL. 1/2 C	2
	D319A-D3-D2	90° UNION ELL. 1/2 MIPS x 1/2 C	1
	D322F-B1-C2	HEX RED. 3/8 MIPS x 1/4 FPS	1
	D329-5	DRAIN VALVE 1/4 IPS	1
	D207A-B4-13	COPPER TUBING 1/2 CTS X 3 1/4 LG	1
	D207A-B4-19	COPPER TUBING 1/2 CTS X 4 3/4 LG	1
	D207A-B4-XX	COPPER TUBING 1/2 CTS X 5 1/8 LG	1
	D207A-B4-XX	COPPER TUBING 1/2 CTS X 6 1/8 LG	1
	D207A-B4-XX	COPPER TUBING 1/2 CTS X 7 7/8 LG	1
	D207A-B4-XX	COPPER TUBING 1/2 CTS X 8 7/8 LG	1
	D207A-B4-178	COPPER TUBING 1/2 CTS X 44 1/2 LG	1
	D207A-B4-XX	COPPER TUBING 1/2 CTS X 41 11/16 LG	1
	D207A-B4-XX	COPPER TUBING 1/2 CTS X 2 5/8 LG	1
	925-49	BRACKET	1

TOLERANCES	4.28.04	4.24.03	4.24.03	4.24.03
FRACTIONS ± 1/64				
DECIMALS				
XXX ± .005				
UNLESS OTHERWISE SPECIFIED				

TITLE	SELF-CONTAINED BOOSTER INSTALLATION	NEXT ASSY DWG. NO.
RECD	1	1089-199
MATL		USED ON 1-8 18-5
SCALE		SCALE 1-8
REV		DRWN/DATE
ECON NO		19135
DATE		624-4800
FILE: PARTS \1089-199		624-6966

Insinger
Philadelphia, PA 19135
(215) 624-4800
FAX: (215) 624-6966

ITEM	PART NO.	DESCRIPTION	QTY.
1	1192-1	SELF-CONTAINED BOOSTER ASSY.	1
2	1452-1	SELF-CONTAINED BOOSTER ASSY.	1
3	D322F-C1-E2	BURNING THERMOSTAT	1
4	D2339	HEX RED. 3/4 MIPS x 3/8 RIPS	1
5	D316F-D1-D2	BALL VALVE 1/2 IPS	1
6	D314F-DC-00	90° ST. ELL. 1/2 IPS	1
7	D2308A	GLOSE NIPPLE 1/2 IPS	3
8	D320F-D1D1D1	PRESS. REG. & STRAINER 1/2 IPS	1
9	D328F-20-A	TEE 1/2 IPS	2
10	D318A-D3-D3	SQUARE HEAD PLUG 1/2 IPS	2
11	D318F-D2-D3	UNION 1/2 C X 1/2 C	1
12	D316A-D3-D3	ST. UNION 1/2 MIPS x 1/2 C	1
13	D316A-D3-E1	90° ELL. 1/2 C	2
14	D314F-EC-00	90° ST. ELL. 3/4 RIPS x 1/2 C	2
15	D2883	GLOSE NIPPLE 3/4 IPS	1
16	D316F-E1-E2	GLOSE NIPPLE 3/4 IPS	1
17	D314F-ES-28	TEMP. & PRESS. RELIEF VALVE 3/4 IPS	1
18	D314F-ES-16	90° ST. ELL. 3/4 IPS	2
19	D319A-D3-D3	NIPPLE 3/4 IPS x 3 1/2 LG	1
20	D322F-B1-C2	NIPPLE 3/4 IPS x 2" LG	1
21	D329-5	90° UNION ELL. 1/2 C	1
22	D2-7A-B4-13	90° UNION ELL. 1/2 MIPS x 1/2 C	1
23	D207A-B4-19	HEX RED. 3/8 MIPS x 1/4 RIPS	1
24	D207A-B4-66	DRAIN VALVE 1/4 IPS	1
25	D207A-B4-62	COPPER TUBING 1/2 CTS X 3 1/4" LG	1
26	D207A-B4-6	COPPER TUBING 1/2 CTS X 4 3/4" LG.	1
27	D207A-B4-6	COPPER TUBING 1/2 CTS X 16 1/2 LG	1
28	D207A-B4-6	COPPER TUBING 1/2 CTS X 15 1/2 LG.	1
29	D207A-B4-6	COPPER TUBING 1/2 CTS X 2" LG	1
30	D207A-B4-6	COPPER TUBING 1/2 CTS X 1 1/2 LG	1
31	D207A-B4-177	COPPER TUBING 1/2 CTS X 44 1/4 LG	1
32	D207A-B4-167	COPPER TUBING 1/2 CTS X 41 3/4 LG	1
33	D207A-B4-5	COPPER TUBING 1/2 CTS X 1 1/4" LG.	1
34	D207A-B4-8	COPPER TUBING 1/2 CTS X 2 LG	1
35	925-49	SUPPORT BRACKET	1
36	D207A-B4-20	COPPER TUBING 1/2 CTS X 5 LG	1

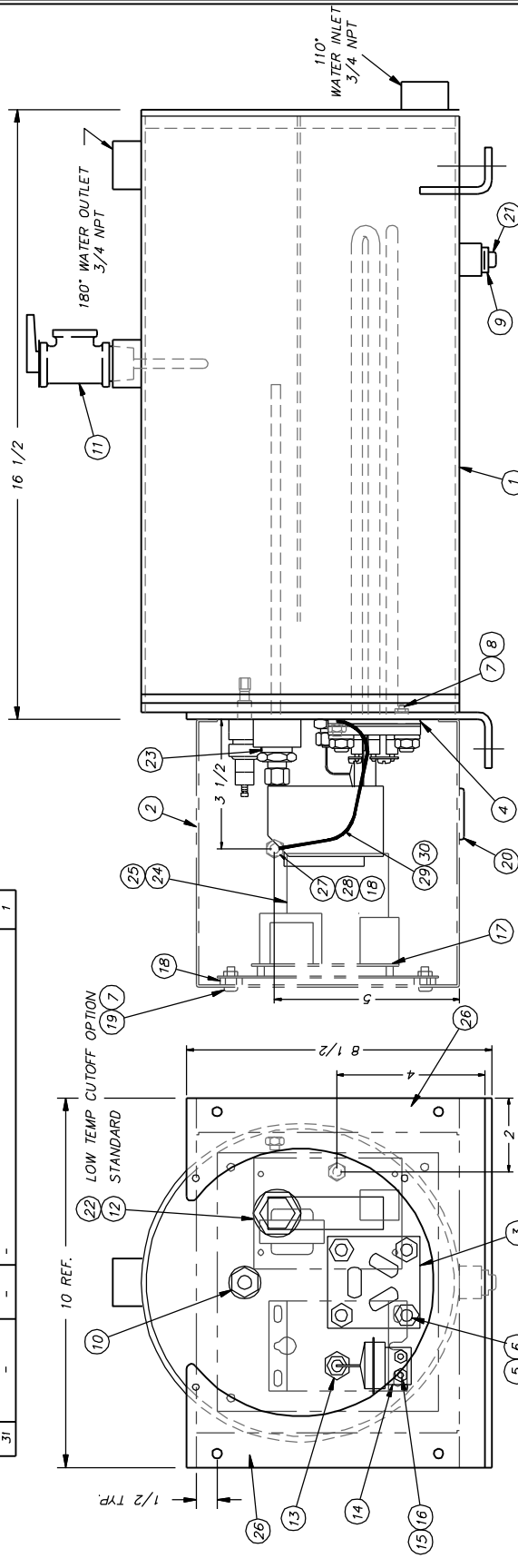
TOLERANCES:	1978	1972	1959	1634
FRACTIONS ±1/64	4.24.03	3.17.03	2.20.01	10.23.98
DECIMALS	.XXX ± .005	.XX ± .01	.XX ± .01	UNLESS OTHERWISE SPECIFIED
ANGLES ±1/2°				
DATE				
REV				
ECN NO.				
DATE				
FILE:	PARTS\1089-203			

TITLE	SELF-CONTAINED BOOSTER ASSEMBLY	NEXT ASSY DWG. NO.
REQD	1	1089-203
SCALE	1-8	USED ON 18-9C
NOTED		

Insinger
 Philadelphia, PA 19135 DRWN/DATE
 (215) 624-4800 CZS
 FAX (215) 624-6866 & 15.96

NO.	PART NO.	SIZE	DESCRIPTION	QTY.
1	04-10883	B	HUBBELL 1/4 4 GAL. VESSEL ASSEMBLY	1
2	1192-7	B	COVER, SATELLITE CONTROL BOX	1
3	SEE TABLE	-	HEATER, IMMERSION	1
4	DE9-136	A	GASKET, HEATER	1
5	D312C-JC-2	-	NUT, HEX 3/8-16 UNC-2B	4
6	D313C-J2	-	LOCKWASHER 3/8	4
7	D312C-EF-2	-	NUT, HEX #10-32 UNF-2B	8
8	D313C-E2	-	LOCKWASHER #10	8
9	D322F-C2-B1	-	REDUCER 3/8 MIPX X 1/4 FIPS	1
10	DE9-144	-	LIQUID LEVEL PROBE	1
11	D2683	-	TEMP.-PRESSURE RELIEF VALVE 3/4 NPT	1
12	D2396	-	THERMOSTAT LESS ENCL. (STANDARD)	1
13	DE5-61	-	HI-TEMP. CUT-OFF SWITCH 3/8 NPT	1
14	1192-11	A	BRACKET, CUT-OFF SWITCH	1
15	D312C-DC-2	-	NUT, HEX #8-32	3

NO.	PART NO.	SIZE	DESCRIPTION	QTY.
16	D309C-DC-2G	-	WELD STUD #8-32 X 1/4 LG.	2
17	1192-13	B	CONTROL BOARD ASSY	1
18	D312C-GC-2	-	NUT HEX 1/4-20	6
19	D309C-EF-4D	-	PAN HD SCREW #10-32 X 1/2 LG	4
20	D2759	-	SNAP-ON VENT PLUG	1
21	D329-5	-	DRAIN COCK 1/4 IPS	1
22	D3201	-	THERMOSTAT LESS ENCL. (LOW TEMP CUTOFF OPTION)	1
23	D323F-E2-C1	-	BUSHING, 3/4 TO 3/8	1
24	DE1-110	-	CONTACTOR (ALL 3 PH) 50 A RES	1
25	DE1-111	-	CONTACTOR (220 V, 1 PH) 65 A RES	1
26	1452-B	A	CONTROL BOX MOUNTING ANGLES	2
27	D309C-GC-5G	-	GROUNDING STUD, 1/4-20 X 5/8	2
28	D313C-G5	-	LOCKWASHER, 1/4, INT TOOTH	2
29	EW137	-	#8 STR WIRE, 24" LG.	1
30	DE3-151	-	RING LUG, 88-1/4R	2
31	-	-	-	1



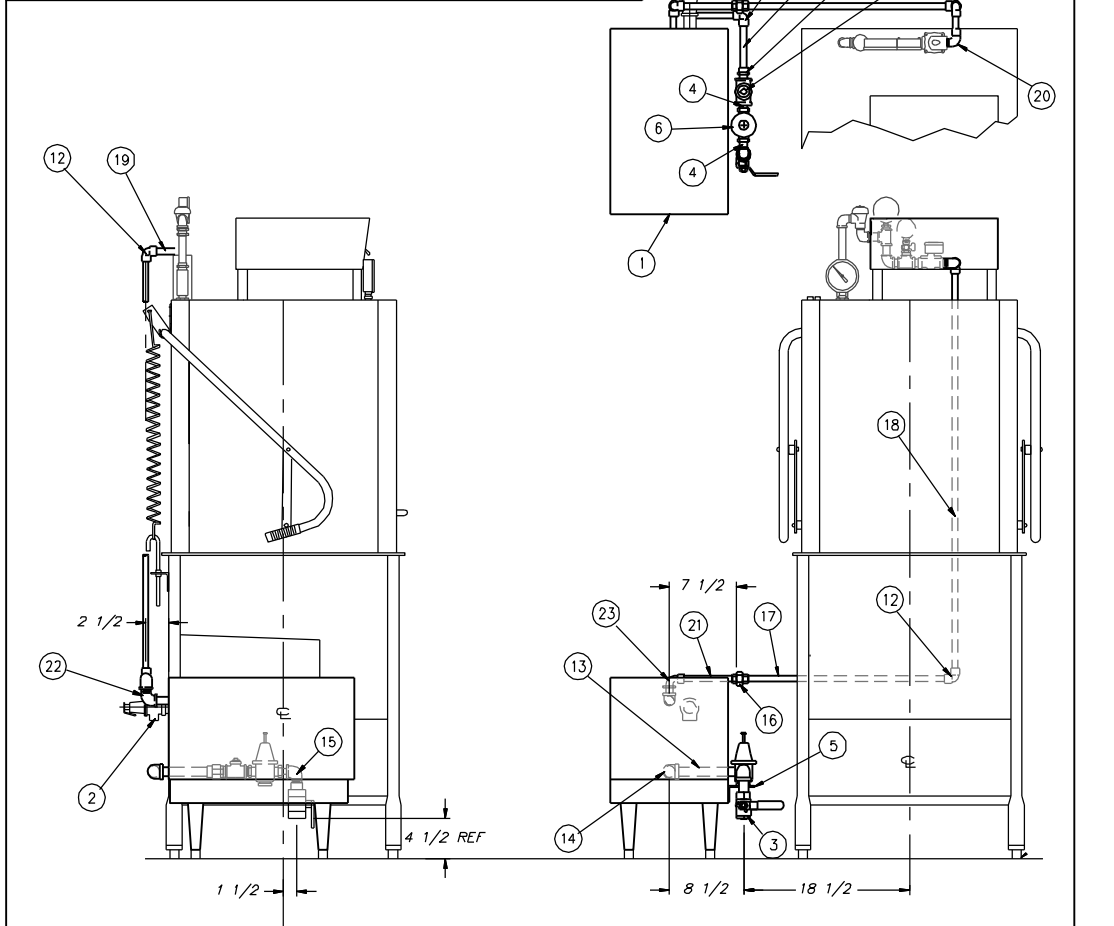
F	2033	3.15.05	TOLERANCES	FRACIONS ±1/64	DECIMALS ±.005	XX ±.01	ANGLES ±1/2°	UNLESS OTHERWISE SPECIFIED
E	1995	9.17.03	REV	1995	9.17.03	10.1.97	8.11.97	DATE
D	1758	4.28.00	REV	1758	4.28.00	10.1.97	8.11.97	DATE
C	1579	10.1.97	REV	1579	10.1.97	10.1.97	8.11.97	DATE
B	1573	8.11.97	REV	1573	8.11.97	10.1.97	8.11.97	DATE


ITEM	PART NO.	WATTAGE/VOLTAGE	ITEM	PART NO.	WATTAGE/VOLTAGE
3	DE13-BG23	13.5 KW / 208V-3PH		DE13-BG73	13.5 KW / 480V-3PH
	DE13-BG43	13.5 KW / 240V-3PH		DE13-BG31	13.5 KW / 220V-1PH
	DE13-BG53	13.5 KW / 380V-3PH		DE13-BG41	13.5 KW / 240V-1PH

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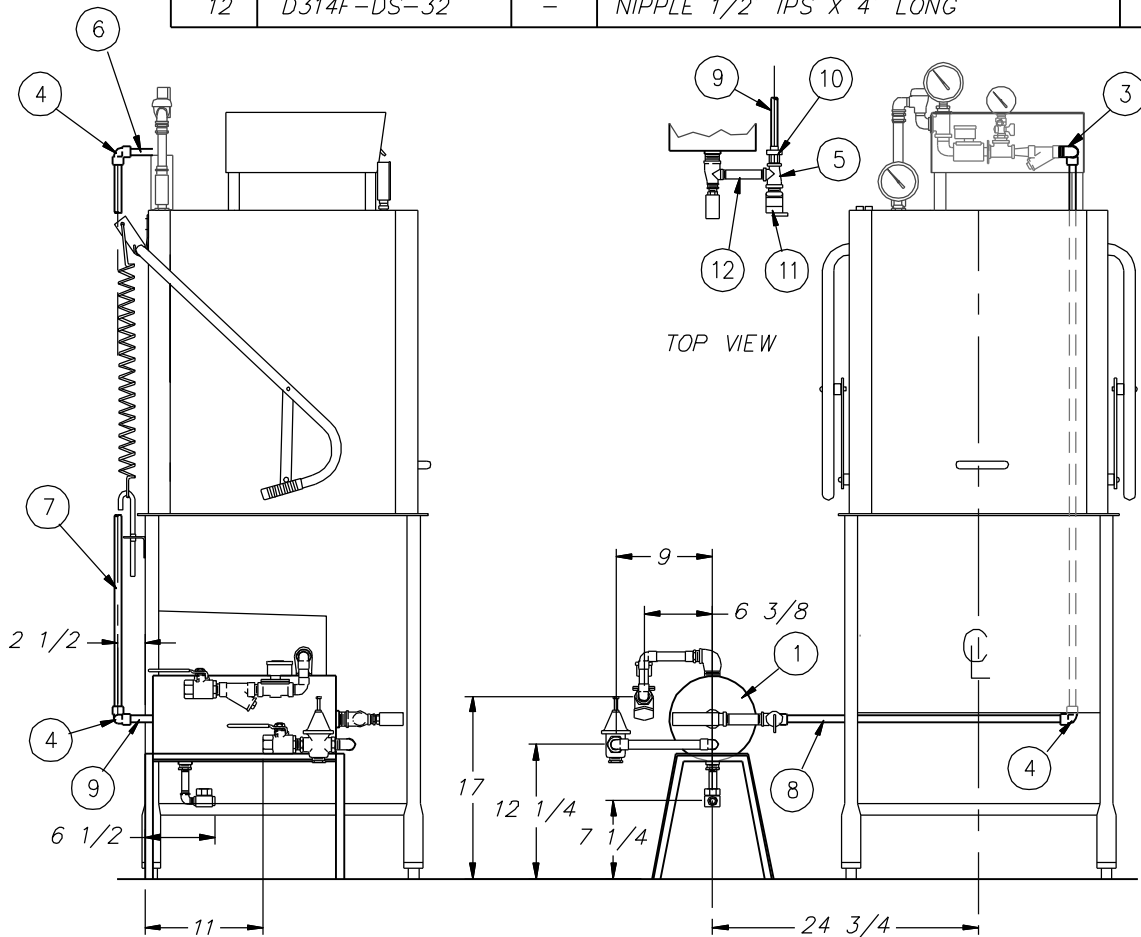
TITLE: 70° RISE SELF-CONTAINED BOOSTER ASSEMBLY
 MTL: NOTED
 SCALE: 3/8
 USED ON: 1452-1 18-5
 NEXT ASSY DWG. NO.: 1452-1
 REV: 1
 DRWN/DATE: CES

ITEM	PART NO.	SIZE	DESCRIPTION	QTY.
1	G6, G12	-	BOOSTER ASSEMBLY	1
2	HA03-01-005	-	RELIEF VALVE (HATCO)	1
3	D2339	-	BALL VALVE 1/2" IPS	1
4	D314F-DG-00	-	CLOSE NIPPLE 1/2" IPS	2
5	925-49	A	BRACKET	1
6	D250BA	-	PRESS. REG. & STRAINER 1/2" IPS	1
7	D320F-D1-D1-D1	-	TEE 1/2 FIPS X 1/2 FIPS X 1/2 FIPS	1
8	D322F-D2-B1	-	REDUCER 1/2 MIPS X 1/4 FIPS	1
9	D328F-B2A	-	PIPE PLUG 1/4 MIPS	1
10	D317A-D3-D2	-	ADAPTER 1/2 C X 1/2 MIPS	1
11	D207A-B4-26	-	COPPER TUBING 1/2 CTS X 6 1/2 LONG	1
12	D316A-D3-D3	-	90° ELBOW 1/2 C X 1/2 C	3
13	D207A-B4-30	-	COPPER TUBING 1/2 CTS X 7 1/2 LONG	1
14	D316A-E1-D3	-	90° ELBOW 1/2 C X 3/4 FIPS	1
15	D316A-D1-D2	-	90° STREET ELBOW 1/2 FIPS X 1/2 MIPS	1
16	D318A-D3-D3	-	UNION 1/2 C X 1/2 C	1
17	D207A-B4-90	-	COPPER TUBING 1/2 CTS X 22 1/2 LONG	1
18	D207A-B4-163	-	COPPER TUBING 1/2 CTS X 40 3/4 LONG	1
19	D207A-B4-12	-	COPPER TUBING 1/2 CTS X 3" LONG	1
20	D316A-D3-D2	-	90° ELBOW 1/2C X 1/2 MIPS	1
21	D207A-B4-27	-	COPPER TUBING 1/2 CTS X 6 3/4 LONG	1
22	D316A-E1-D2	-	90° STREET ELBOW 3/4 FIPS X 1/2 MIPS	1
23	D316A-D3-D1	-	90° STREET ELBOW 1/2 C X 1/2 FIPS	1



			TOLERANCES	TITLE	NEXT ASSY	DWG. NO.
			FRACTIONS ±1/64	ELECTRIC BOOSTER ASSEMBLY	REQ'D 1	1089-B7
			DECIMALS			
C	2007	3.25.04	XXX ± .005			
B	1859	2.20.01	XX ± .01			
A	1761	6.20.00	ANGLES ±1/2°			
REV	ECN NO.	DATE	UNLESS OTHERWISE SPECIFIED			
FILE:	PARTS/1089-87					
				MATL	SCALE	USED ON
				NOTED	1"=1'-0"	18-5 50-20 N2-NSU
				 Insinger	Philadelphi, PA 19135	DRWN/DATE
					(215) 624-4800	ESP
					FAX (215) 624-6966	3-23-88

ITEM	PART NO.	SIZE	DESCRIPTION	QTY.
1	1394-1	B	BOOSTER ASSEMBLY	1
2	D319A-D3-D3	-	90° UNION ELBOW 1/2" C	1
3	D319A-D3-D2	-	90° UNION ELBOW 1/2" C X 1/2" MIPS	1
4	D316A-D3-D3	-	90° ELBOW 1/2" C	3
5	D317A-D3-D2	-	ADAPTER 1/2" C X 1/2" MIPS	1
6	D207A-K4-12	-	COPPER TUBING 1/2" CTS X 3" LONG	1
7	D207A-K4-172	-	COPPER TUBING 1/2" CTS X 43" LONG	1
8	D207A-K4-86	-	COPPER TUBING 1/2" CTS X 21 1/2" LG	1
9	D207A-K4-72	-	COPPER TUBING 1/2" CTS X 18" LONG	1
10	D320FE1D1E1	-	TEE 3/4 FIPS X 1/2 FIPS X 3/4 FIPS	1
11	D2507	-	PRESSURE RELIEF VALVE 3/4 MIPS	1
12	D314F-DS-32	-	NIPPLE 1/2" IPS X 4" LONG	1



			TOLERANCES	TITLE	NEXT ASSY	DWG. NO.
			FRACTIONS ±1/64	SIDE MOUNT STEAM BOOSTER TO FINAL RINSE PIPING ASS'Y	REQ'D 1	1089-179
			DECIMALS			
B	1916	2.22.02	.XXX ± .005	MAT'L	SCALE	USED ON 18-5
A	1761	6.19.00	.XX ± .01	NOTED	1/16	50-20N2-NSU
REV	ECN NO	DATE	ANGLES ±1/2°	 Insinger Philadelphia, PA 19135 (215) 624-4800 FAX (215) 624-6966	DRWN/DATE	
FILE:	PARTS\1089-179		UNLESS OTHERWISE SPECIFIED		RFN 6-5-90	

NO.	DESCRIPTION	PART NO.	QTY.
1	STEAM INJECTOR	D942	1
2	LOCKNUT 1/2 IPS	D326F-D2	2
3	NIPPLE 1/2 IPS x 1 1/2" LG.	D314F-DA-12	1
4	90° STREET ELL 1/2 MIPS x 1/2 FIPS	D314F-D1-D2	2
5	CHECK VALVE 1/2 IPS	D2453	1
6	CLOSE NIPPLE 1/2 IPS	D314A-DCL	2
7	"Y" STRAINER 1/2 IPS	D2483A	1
8	SOLENOID 1/2 IPS	D2594	1

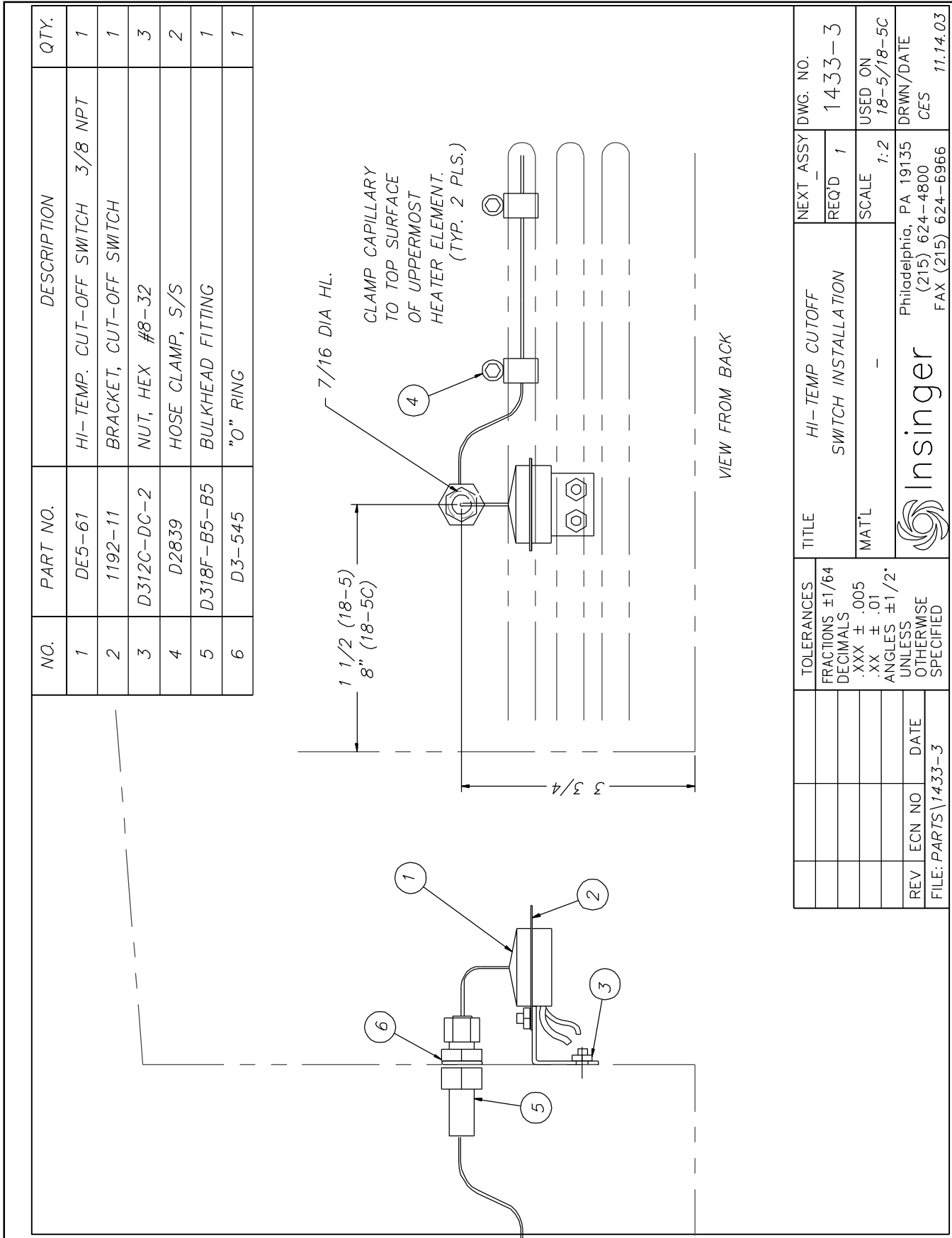
FRONT

REAR VIEW

SECTION A - A

1089-189 LIQUID LEVEL FLOAT

TOLERANCES	FRACTIONS ±1/64	TITLE	STEAM INJECTOR, DIODE & LIQUID LEVEL FLOAT LOCATIONS
	DECIMALS .XXX ± .005		
	.XX ± .01		
	ANGLES ±1/2°		
	UNLESS OTHERWISE SPECIFIED		
REV	ECN NO	DATE	
E	1583	12.1.97	
FILE: PARTS\1089-81			
NEXT ASSY DWG. NO.		1089-81	
SCALE		1=8	
USED ON		18-5, 18-5C	
DRWN/DATE		MAM	
FAX (215) 624-6966		Philadelphica, PA 19135	
		(215) 624-4800	
		MAM	
		7.24.92	



ITEM	PART NO.	DESCRIPTION	QTY.
1	D2-541	SUCTION STRAINER	1
2	D309C-JC-9A	HEX HD. S/S SCREW 3/8-16 x 1 1/8"	4
3	D313A-J1	COPPER WASHER 3/8	4
4	D312C-JC-5	LOCKNUT 3/8-16	4
5	D514	GASKET, PUMP FLANGE	1
6	D134	PUMP FLANGE	1
7	D316E-H3-H4	ELBOW 90° 1 1/2"C X 1 1/2 C FTG	1
8	D207E-K12-13	1 1/2 CU TUBE X 3 1/4 LG	1
9	D317E-H3-H2	ADAPTER 1 1/2"C X 1 1/2"M	1
10	D314F-HT-72	NIPPLE 1 1/2 IPS x 9" LG. LOE	1
11	D326F-H1	LOCKNUT 1 1/2 IPS	1

* ELECTROLESS NICKEL PLATE REQUIRED

* * *

#51 PUMP
 1 HP (3 7/8 IMP) 18-5
 2 HP (3 7/8 IMP) 18-5H
 1 HP 18-5 INTERNATIONAL

SIDE VIEW

TOLERANCES	TITLE	NEXT ASSY	DWG. NO.
FRACTIONS ±1/64	PUMP, MOTOR, & SUCTION ASSY	REQ'D	1089-19
DECIMALS		SCALE	USED ON
.XXX ± .005	MAT'L	1=4	185, CS-5
.XX ± .01	Philadelphia, PA 19135 (215) 624-4800 FAX (215) 624-6966		
ANGLES ±1/2°			
UNLESS OTHERWISE SPECIFIED	REV	ECN NO	DATE
	FILE: PARTS\1089-19		

NO.	DESCRIPTION	PART NO.	QTY.
1	LOCKWASH. HEX	D356-D1	1
2	NIPPLE, CLOSE	D314F-DC-00	9
3	TEE	D30F-D1D1D1	3
4	PLUG, PIPE	D326-D2A	1
5	UNION, STRAIGHT	D30F-D1-D1	1
6	NIPPLE, PIPE	D314F-DS-36	1
7	ELBOW, 90° STREET	D316F-D1-D2	2
8	BREACER, VACUUM	D3014	2
9	NIPPLE, PIPE	D314F-DS-16	1
10	REDUCER, HEX	D32C-02-B1	2
11	GAUGE, TEMPERATURE	D2495	1
12	ELBOW, 90°	D30F-D1-D1	1
13	VALVE, SOLENOID (WATER)	D2606	1
14	BRACKET, PIPING SUPPORT	951-79	1
15	PETCOCK	D2497	1
16	GAUGE, PRESSURE	SK-1433	1
17	TEE	D320L-D1D1D1	1
18	ADAPTER	D317C-D3-D2	2
19	TUBING, S/S	D207C-84-36	2
20	UNION	D318C-D3-D1	2
21	REDUCER, FLUSH	D32C-02-C1	2
22	FOR 18-5S: TUBING, S/S	D207C-84-12	1
23	FOR 18-5H: TUBING, S/S	D207C-84-15	1
24	TUBING, S/S	D316C-D3-D3	1
25	LOWER WASH PIPE ASSY	1089-25	1
26	O-RING	D2-563	2
27	SCREW, LOCKING	D2-584	1
28	UPPER RINSE SPRAY PIPE ASSY	D2483A	1
29	LOWER RINSE SPRAY PIPE ASSY	1434-8	1
30	NIPPLE, PIPE	1434-9	1
31	SUPPORT ASSY UPPER HUB	D314F-DA-12	1
32	UPPER WASH PIPE ASSY	1434-6	1
33	ADAPTER	D329-2	1
34	CPVC TUBING	D207C-84-16	1
35	CLOSE NIPPLE CPVC	D314C-DC-00	1
36	HEX REDUCER, CPVC	D322C-D2-A1	1
37	TEE, CPVC	D320C-D10101	2
38	ADAPTER, CPVC	D317C-03-D2	3
39	TUBING, CPVC	D207C-84-33	1
40	TUBING, CPVC	D207C-84-30	1
41	CLAMP, CPVC	D2-577-1	1
42	90° ELBOW, CPVC	D316C-D3-D3	1
43	TUBING, CPVC	D207C-84-42	1
44	MELD STUD	D309C-FC-36	2
45	NIPPLE, PIPE	D314F-DS-14	1

J	1893	8.28.01	TOLERANCES	TITLE	FINAL RINSE ASS'Y	NEXT ASSY	DWG. NO.
H	1859	2.20.01	FRACTIONS 1/64	18-5 (ALL)	1463-1	1463-18	
G	1675	5.3.99	XX ± .005	MAT'L	SCALE	USED ON	
F	1653	2.12.99	.XX ± .01		1-8	18-5,CS-5	
E	1634	10.12.98	ANGLES ±1/2°				
REV	ECN NO.	DATE	UNLESS OTHERWISE SPECIFIED	Philadelphia, PA 19135 DRWN/DATE (215) 624-4800 FAX (215) 624-6966			
FILE:	PARTS\1463-18						

NOTES:

- * * * INDICATES ELECTROLESS NICKEL PLATED.
- ITEM #30 IS NOT REQUIRED WHEN A BOOSTER IS SPECIFIED, REPLACE WITH 90° UNION ELBOW 1/2" MPS, 1/2" COPPER.
- ITEM #30 IS NOT REQUIRED WHEN USING A SELF-CONTAINED BOOSTER.
- FOR MODEL 50-20N2-NSU, REPLACE ITEM #14 WITH 1084-83, ITEM #6 WITH 1/2" IPS x 1 1/2" LG. BRASS NIPPLE (D314F-DB) & ADD A 90° ELBOW 1/2" FIPS x 3/4" FIPS (D316F-D1-E1) TO INLET END OF Y-STRAINER WITH CLOSE NIPPLE D314F-DC-00.
- ITEM #3 & #10 REPLACE ITEM #12 FOR CS-5 APPLICATION.

FRONT

CS-5

SEE NOTE #5

FRONT

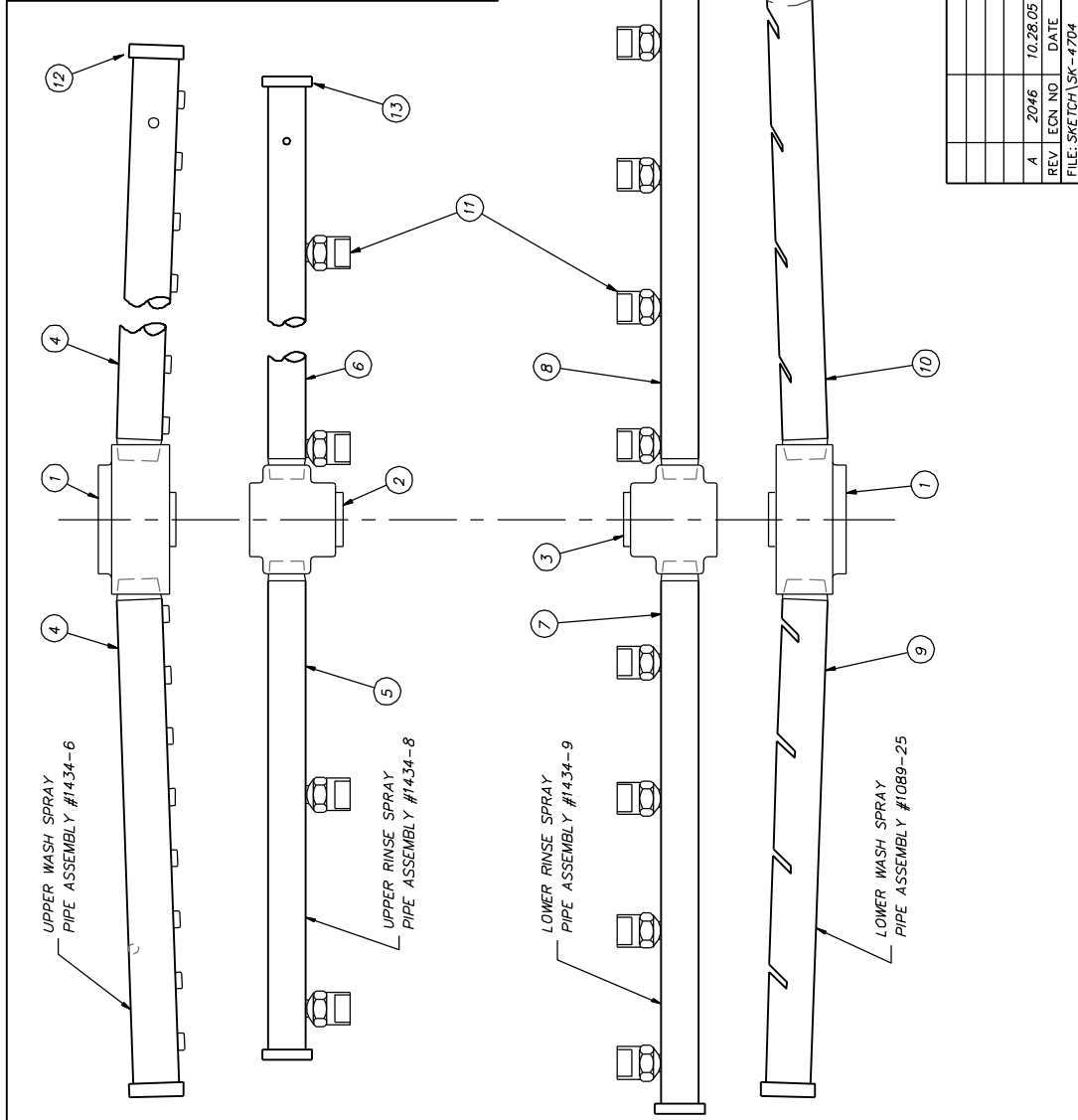
CS-5

SEE NOTES 2 & 3

FRONT

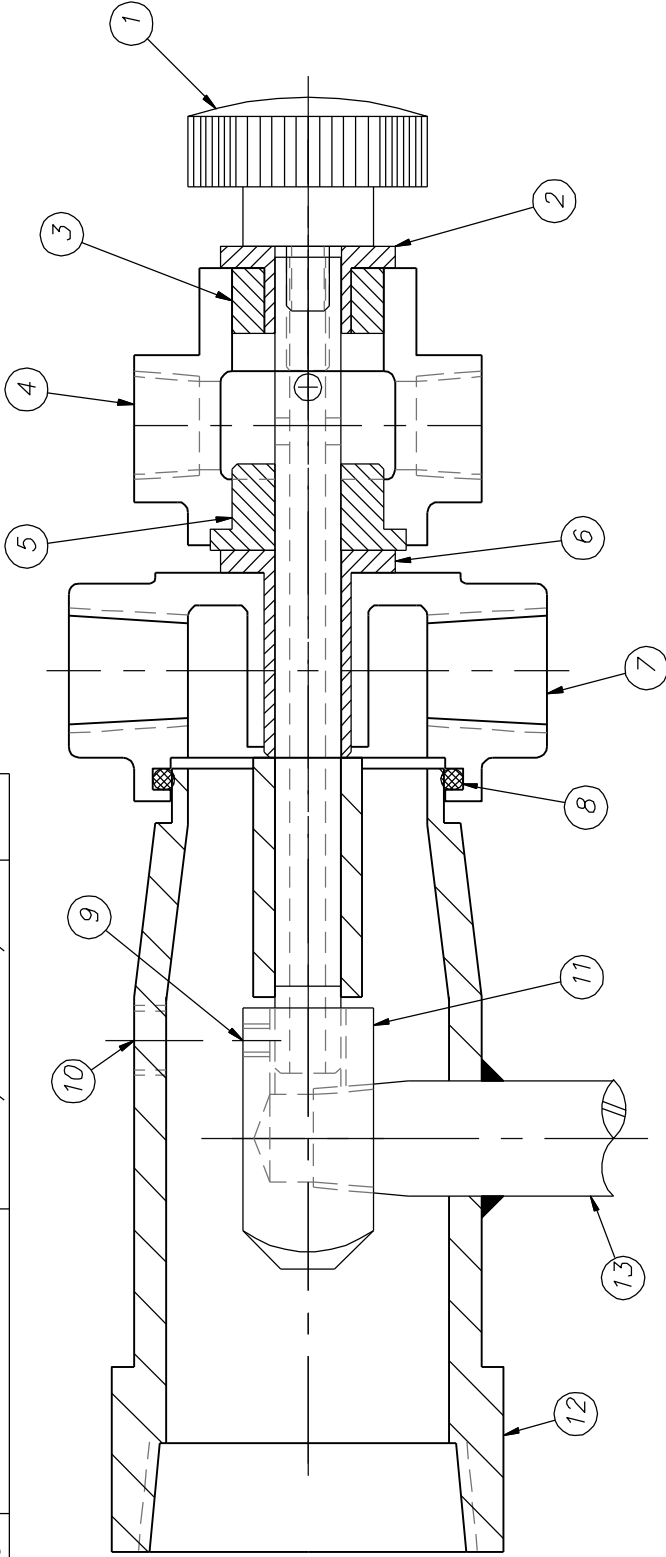
CS-5

ITEM	PART NO.	DESCRIPTION	QTY.
1	1084-76	WASH HUB	2
2	1463-25	UPPER RINSE HUB	1
3	1084-22	LOWER RINSE HUB ASSEMBLY	1
4	1434-5	UPPER WASH PIPE	2
5	1434-7A	UPPER RINSE PIPE	1
6	1434-7B	UPPER RINSE PIPE	1
7	1434-7C	LOWER RINSE PIPE	1
8	1434-7D	LOWERR RINSE PIPE	1
9	1089-23A	LOWER WASH PIPE	1
10	1089-23B	LOWER WASH PIPE	1
11	D2867	NOZZLE	12
12	D2-554-1	PLUG - 9/16-12 UNC-2A	4
13	D2-554-2	PLUG - 3/4-10 UNC-2A	4
14	SK-4753-1	WIRE ROPE SUB ASSY X 3 1/2" LG	8
15	D309-CC-2C	WELD STUD, S/S, #6-32 X 1/4	8
16	D372C-CC-5	SEAL NUT, #6-32	16
17	D309C-CC-4Q	PAN HD. SCREW, #6-32 X 1/2	8



TOLERANCES	FRACTIONS ±1/64	DECIMALS ±.005	ANGLES ±.01	OTHERWISE SPECIFIED
REV	A	2046	10.28.05	DATE
FILE: SKETCH\SK-4704				
TITLE	SPRAY PIPE INSTALLATION ASSEMBLIES			
MATL	NOTED			
SCALE	I=2			
RECD	SK-4704			
USED ON	JB-5			
DRWN/DATE	Philadelph, PA 19135			
DWG. NO.	(215) 624-4800			
	FAX (215) 624-6986			
	3.24.04			

ITEM	PART NO.	DESCRIPTION	QTY.	ITEM	PART NO.	DESCRIPTION	QTY.
7	1084-76	WASH HUB	1	1	D2-584A	KNOB - LOWER	1
8	D2-563	"0" RING 1 3/4 OD X 3/32 W	1	2	1089-178	INSERT BUSHING - RINSE HUB	1
9	D309C-EF-2H	#10-32 X 1/4" SETSCREW	1	3	1089-177	BUSHING - RINSE HUB	1
10	D328A-A2	PIPE PLUG 1/8 IPS	1	4	372-52	HUB MACHINING	1
11	1084-34	SHAFT ASSEMBLY	1	5	1084-35	BUSHING - RINSE HUB	1
12	1089-16	DISCHARGE TEE - LOWER	1	6	952-27	BUSHING - WASH HUB	1
13	D314C-C-20	NIPPLE 3/8 IPS X 2 1/2 LG.	1				



* LOWER RINSE HUB ASSEMBLY
#1084-22 CONSISTS OF:

- (1) #372-52 HUB MACHINING
- (1) #1084-35 BUSHING
- (1) #1089-177 BUSHING
- (1) #1089-178 BUSHING

TOLERANCES	TITLE	NEXT ASSY DWG. NO.
FRACTIONS ±1/64	18-4 & 18-5	SK-4705
DECIMALS	LOWER MANIFOLD ASSY	REQ'D -
.XXX ± .005	MAT'L -	SCALE 1=1
.XX ± .01		USED ON 18-4 & 18-5
ANGLES ±1/2°		DRWN/DATE DBC
UNLESS OTHERWISE SPECIFIED	Insinger	FAX (215) 624-6966
REV	ECN NO	DATE
	FILE: SKETCHA \ SK-4703	

ITEM	PART NO.	DESCRIPTION	QTY.	ITEM	PART NO.	DESCRIPTION	QTY.
7	1084-34	SHAFT ASSEMBLY	1	1	1463-29	SUPPORT ASSY - UPPER HUB	1
8	D328A-A2	PIPE PLUG, 1/8 IPS	1	2	1463-25	RINSE HUB - UPPER	1
9	1089-15C	DISCHARGE TEE - UPPER	1	3	952-27	BUSHING - WASH HUB	1
10	1089-28	PLUG (PRESS FIT)	1	4	1084-76	WASH HUB	1
11	D314C-C-20	NIPPLE 3/8 IPS X 2 1/2 LG.	1	5	D2-563	"O" RING, 1 3/4 OD X 3/32 W	1
				6	D309C-EF-2H	#10-32 X 1/4" SETSCREW	1

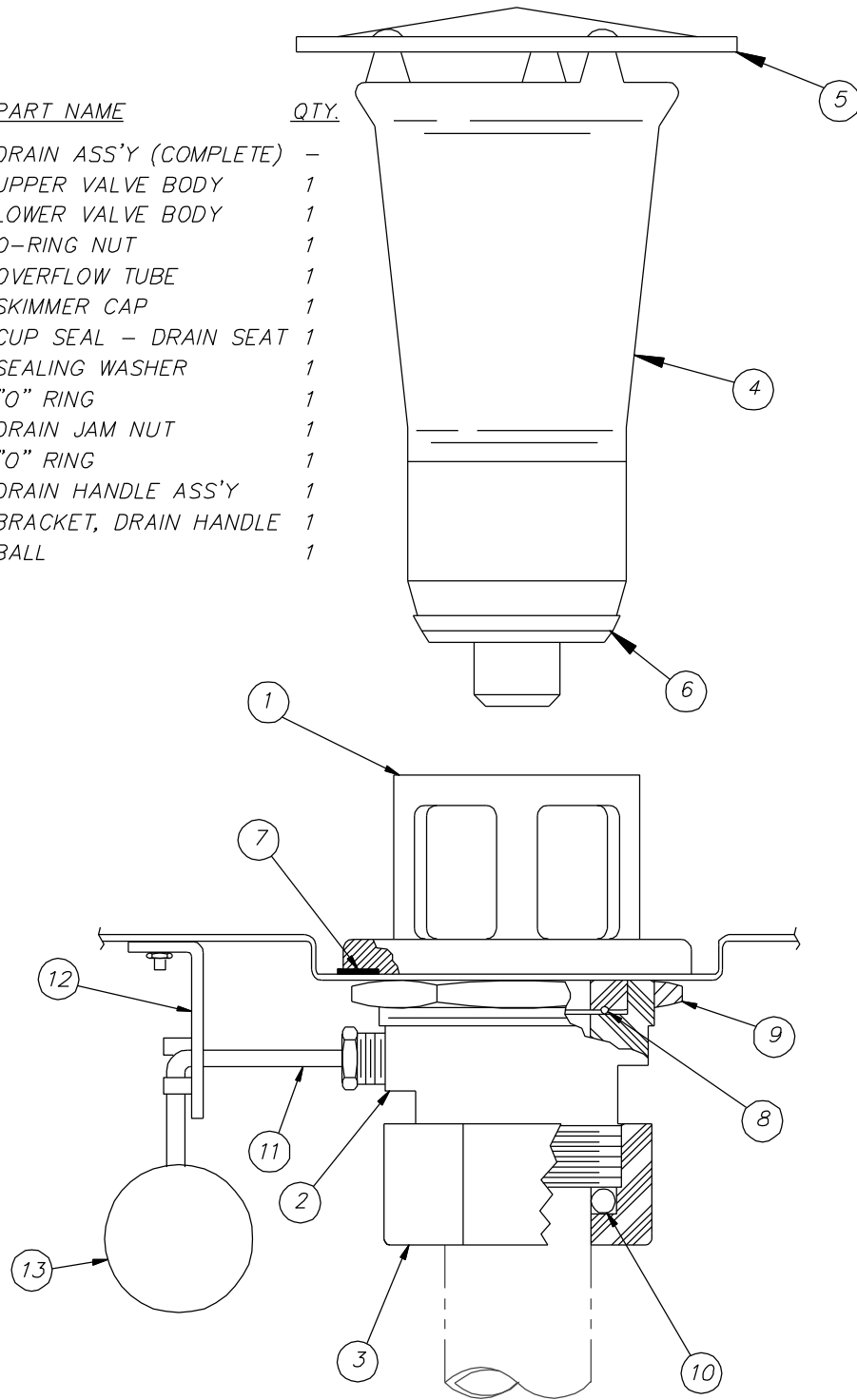
* ITEM #1 SUB-ASSEMBLY
CONSISTS OF:

- #1463-26 BEARING BOSS
- #1463-27 THRUST COLLAR
- #1463-28 KNURLED KNOB
- D309C-GC-8A 1/4-20 X 1 LG
HHCS

TOLERANCES	FRACTIONS ±1/64	DECIMALS .XXX ± .005	.XX ± .01	ANGLES ±1/2°	UNLESS OTHERWISE SPECIFIED
REV	A	ECN NO	2007	DATE	3.25.04
FILE: SKETCHA \ SK-4073					

TITLE	UPPER MANIFOLD ASSEMBLY	NEXT ASSY	DWG. NO.
MAT'L	NEW STYLE 18-5	REQ'D	1463-18
	NOTED	SCALE	SK-4073
		USED ON	18-5
		DRWN/DATE	19135
		CES	11.18.98
		FAX (215) 624-6966	

ITEM	PART NO.	PART NAME	QTY.
	954-50	DRAIN ASS'Y (COMPLETE)	-
1	954-50A	UPPER VALVE BODY	1
2	954-50B	LOWER VALVE BODY	1
3	954-50C	O-RING NUT	1
4	1169-179D	OVERFLOW TUBE	1
5	D193	SKIMMER CAP	1
6	D2-557	CUP SEAL - DRAIN SEAT	1
7	954-9	SEALING WASHER	1
8	D2-549	"O" RING	1
9	D305A	DRAIN JAM NUT	1
10	D2-550	"O" RING	1
11	1100-79A	DRAIN HANDLE ASS'Y	1
12	954-8C	BRACKET, DRAIN HANDLE	1
13	D2-507	BALL	1



SK-3028

△ ECN# 1989 7.7.03
 △ ECN# 1761 5.5.00
 △ ECN# 1512 12.20.96

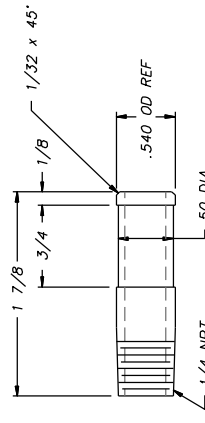
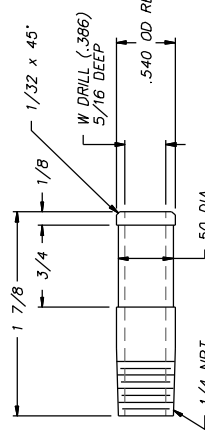
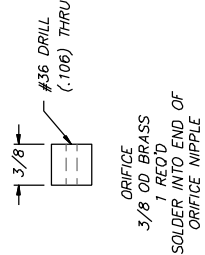
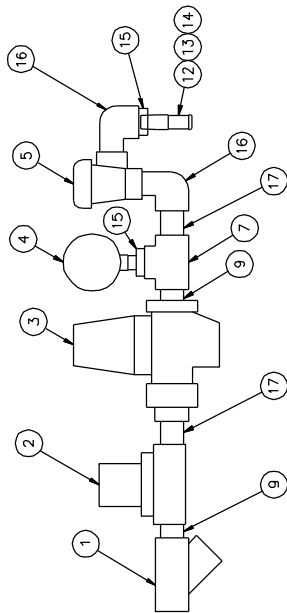
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MAM 2.11.93

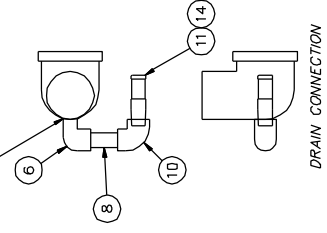

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ITEM	PART NO.	SIZE	DESCRIPTION	QTY.
1	D2483A	-	Y STRAINER, 1/2"	1
2	D2606	-	SOLENOID VALVE, 1/2", 24 VAC	1
3	D2508A	-	PRESSURE REGULATOR, 1/2", 10-35 PSI	1
4	SK-1433	-	PRESSURE GAUGE, 1/4", 1-100 PSI	1
5	D2241A	-	VACUUM BREAKER, 1/2"	1
6	D316F-B1-B2	-	STREET ELBOW, 1/4"	1
7	D320F-D1D1D1	-	TEE, 1/2"	1
8	D314F-BS-12	-	NIPPLE, 1/4" X 1 1/2	1
9	D314F-DC-00	-	NIPPLE, 1/2" CLOSE	2
10	D316F-B1-B1	-	90° ELBOW, 1/4"	1
11	SK-4086A	-	ORIFICE HOSE NIPPLE	1
12	SK-4086B	-	HOSE NIPPLE	1
13	D2865	-	1/2" ID REINFORCED PVC HOSE	AR
14	D2864	-	HOSE CLAMP, 1/2 - 7/8	2
15	D322F-D2-B1	-	HEX REDUCER, 1/2 - 1/4	2
16	D316F-D1-D2	-	STREET ELBOW, 1/2"	2
17	D314F-DS-14	-	NIPPLE, 1/2 X 1 3/4	2
18	SK-4087	A	WIRING DIAGRAM	1
19	EM-259	-	3/4" CONDUIT CLAMP	2



1/4" NPT TAP INTO DRAIN
SOLDER IN PLACE



PRESSURE	GPM
5	0.75
10	1.0
15	1.4
20	1.5
25	1.6
30	1.7
35	1.8
40	1.9

TOLERANCES	TITLE	DRAIN COOL DOWN ASSY	NEXT ASSY DWG. NO.
FRACTIONS ±1/64	RECD	1	SK-4086
DECIMALS ±.005	SCALE	1=4	USED ON 18-5
XX ±.01	MATL		
XX ±.01			
ANGLES ±1/2°			
UNLESS OTHERWISE SPECIFIED			

REV	ECN NO	DATE
C	1990	8.8.03
B	1939	6.5.02
A	1863	3.1.01

FILE:SKETCH\SK-4086

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