



ENSIGN

Technical Manual

Ensign 40-2





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 site	www.insingermachine.com

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ENSIGN 40-2

Counter Type Dishwasher

-  43 Racks Per Hour | 16" x 16"
-  Only 0.75 Gallons of Water Per Rack
-  Compact Design
-  Made in the USA

STANDARD FEATURES

- Tank heat: electric immersion heater
- Thermometer for wash
- Thermometer for final rinse
- Vacuum breaker
- Manifold clean-out brush
- Automatic tank fill
- Low water protection
- Detergent connection provision
- Space saving compact design
- Single point electrical connection: motor, controls, tank heat. (Optional booster requires separate connection)
- Fully automatic operation
- Side mounted control panel (NEMA 12)
- Simplified scrap screen design
- Standard frame drip proof motor
- Door safety switch

OPTIONS

- ☐ Stainless steel steam coil tank heat
- ☐ Pressure reduction valve and line strainer
- ☐ Stainless steel frame
- ☐ Steam booster
- ☐ Remote electric booster
- ☐ Totally enclosed motor
- ☐ Drain cooldown
- ☐ Scale inhibitor
- ☐ Plastic 16" x 16" rack (plate or silver)

SPECIFIER STATEMENT

Specified unit will be an Insinger Ensign 40-2 single tank counter type dishwasher. Features include thermometer for wash thermometer for final, rinse, vacuum breaker, automatic tank fill, space saving compact design, fully automatic operation, door safety switch.



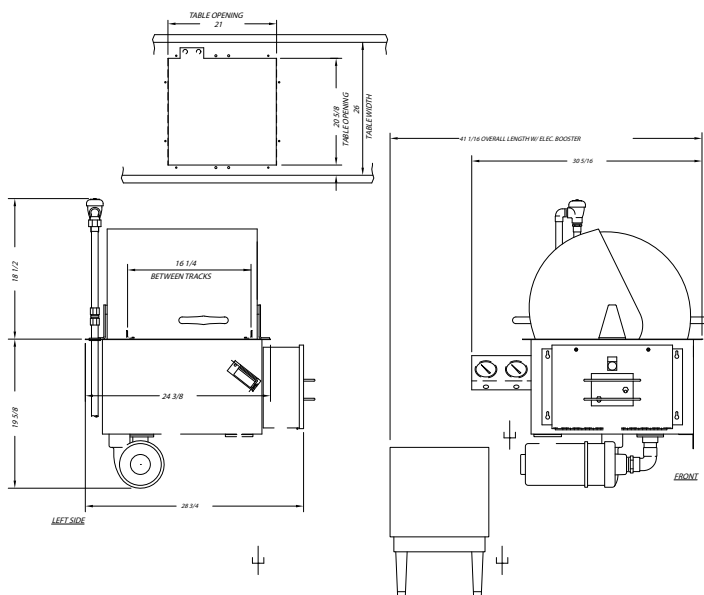
SPECIFICATIONS

Capacity	Racks Per Hour	43
	Dishes Per Hour	720
Heating & Venting	Wash Tank Heat	7.5 kW
	Rinse Tank Heat	15 kW
	Booster Heat (40°F Rise)	6 kW
	Booster Heat (70°F Rise)	12 kW
Water	Water Inlet Temperature	140°F
	Water Consumption (20 PSI)	.75 gal/rack
	Wash Tank Capacity	8.1 gal
	Peak Drain Flow	9 gal/min
Steam	Steam Tank Consumption (20 PSI)	6 lbs/hr
	Steam Consumption (20 PSI, 40°F Rise)	22 lbs/hr
	Steam Consumption (20 PSI, 70°F Rise)	38 lbs/hr
Other	Drive Motor HP	1/15
	Wash Motor HP	1.0
	Shipping Weight	400 lbs

ELECTRICAL

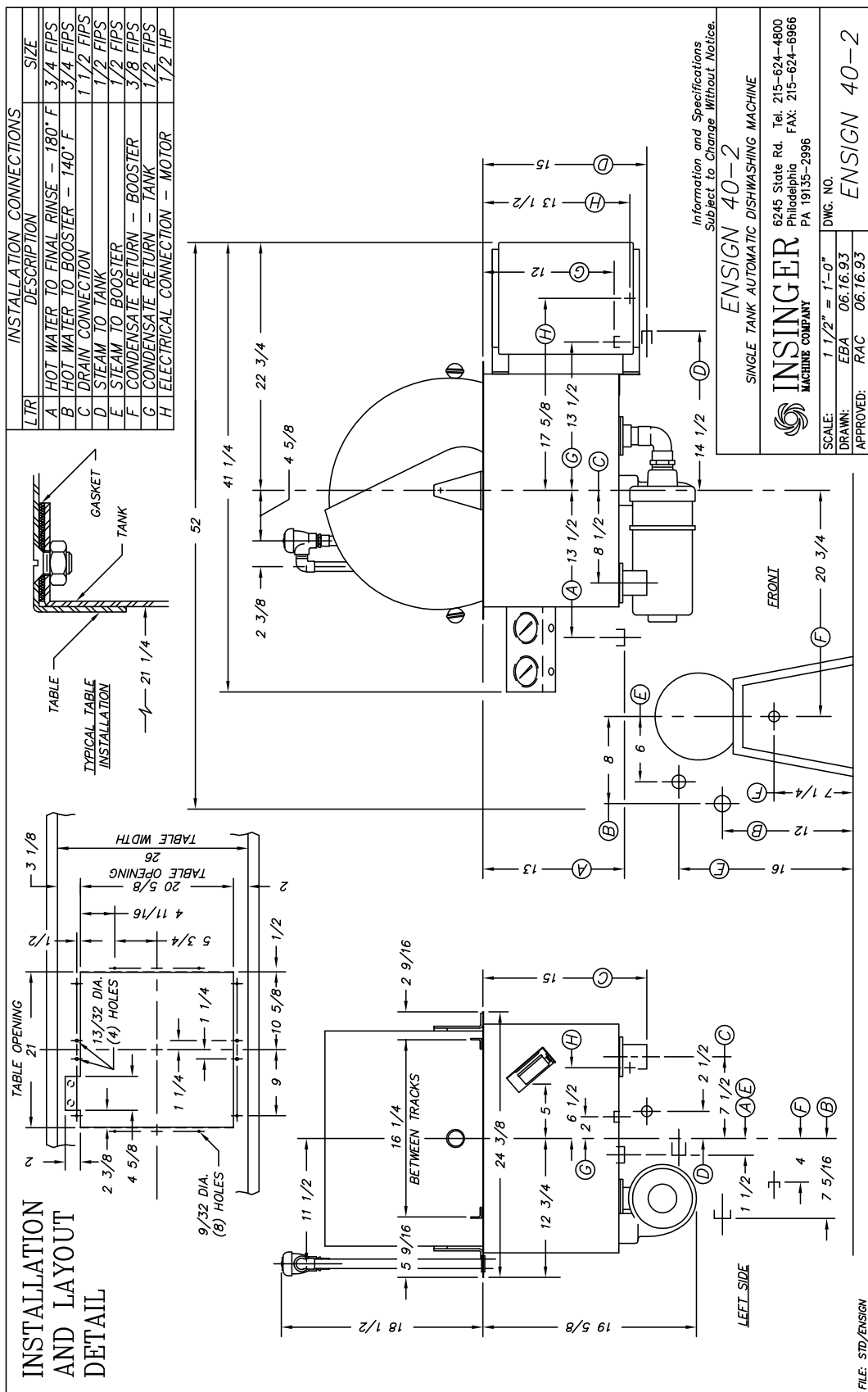
		Electric (Ensign 40-2)	6 kw Booster	12 kw Booster
Electrical Options	115/60/1	23.7 amps	Contact Factory	
	208/60/1	15.0 amps	28.9 amps	57.7 amps
	208/60/3	6.9 amps	25 amps	33.4 amps
	240/60/1	11.8 amps	25 amps	50 amps
	240/60/3	6.0 amps	21.6 amps	28.9 amps
	380/50/3	3.8 amps	Contact Factory	
	480/60/3	3.1 amps	10.8 amps	14.5 amps
Steam				
Electrical Options	115/60/1		10.7 amps	
	208/60/1		7.0 amps	
	208/60/3		2.7 amps	
	240/60/1		5.5 amps	
	240/60/3		2.4 amps	
	380/50/3		1.5 amps	
	480/60/3		1.4 amps	

TECHNICAL DRAWINGS



Contact Insinger Sales at 800-344-4802 for an installation drawing specific to your application.
 Note: Due to product improvement we reserve the right to change information and specifications without notice.

Technical Drawings



Contact Insinger Sales at 800-344-4802 for an Installation Drawing Specific to Your Application
This drawing is available on the Insinger Web site at www.insingermachine.com

ENSIGN 40-2**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 the Insinger Ensign 40-2.

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 3-2008 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:

**NOTE:**

Indicates helpful operating hints or tips.

**WARNING:**

Indicates potential physical danger.

CAUTION:

Indicates potential equipment damage.

Ensign 40-2 Counter Type Dishwasher**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 or start-up that said Insinger product shall be free from defects in material and workmanship. Whichever one of the two aforesated limited warranty time periods is the shortest 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. An RMA# must be obtained from the Insinger Warranty Department before returning any material. Return may be done through an Authorized Service Agency. Furnish serial number of machine and RMA # 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 15 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

Ensign 40-2 Counter Type Dishwasher

Machine Specifications

Insinger model Ensign 40_2 stainless steel counter type dishwasher with automatic timing of the wash and rinse cycle with either electric immersion heater for tank heat and electric heat exchange booster for rinse or steam coils for tank heat and steam heat exchange booster for rinse.

ELECTRICAL REQUIREMENTS

(specified by end-user):

1/2 HP, 110-120/240 single phase or 208-220/460VAC three phase, 60 cycle. Motor operates through a timed cycle controller. Rinse operates through a 24VAC solenoid valve actuated by the timed cycle controller.

Feed:

Side door loading, counter top installation. Direction of feed specified by end-user.

Tools:

No special tools required for cleaning or maintenance. Cleanout brush provided for the spray pipes. Machine must be welded into the tabletop (unless provided with a stand).

Dishbaskets:

16" square plastic inserts.

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 the table cut-out. Refer to installation drawing in this section for table cut-out dimensions. Weld the dish machine into the table. Install temp gauges.

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.

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.

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

CAUTION:

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

Tabling

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

Initial Start-Up Adjustments

Tank Overfill Adjustment

1. Locate tank overfill timer in the control panel.
See the control panel layout drawing located in Section 4, Electrical Schematic and Replacement Parts.
2. The overfill timer starts timing when the upper level float is actuated. Adjust the overfill timer potentiometer to turn the tank fill solenoid off when the water level is 1/4" below the lip of the overflow tube.
3. The timer has a built in dwell timing delay of 5 seconds (nominal to dampen float bounce caused by tank water motion).

Final Rinse Pressure Adjustment

1. The final rinse pressure must be adjusted to 20PSI. This is done by adjusting the pressure regulator.

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 valve. 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.



NOTE:

An interlock is provided to shut the machine down if the doors are open, therefore the machine will not run if the doors are opened.

5. Press the power switch to the ON position. The switch will light up red when on. The machine will fill the tank, run through a complete wash/rinse cycle and shut-off.
6. When the tank is full the tank heat will operate automatically. Proper wash tank temperature is 160° F minimum. Proper final rinse temperature is 180° F minimum at 20 PSI ± SPSI, 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 7-9.
10. Upon completion of ware cleaning press the power switch to the "OFF" position. The switch light will go off.
11. Refer to the cleaning procedures for proper clean-up of the dishmachine.
12. A switch on the control panel labeled "De-lime" is provided for use when de-liming the machine. When activated, this switch will keep the machine in an indefinite wash cycle.
13. A switch on the control panel labeled "Heavy Cycle" will activate the extended wash cycle for heavily soiled ware.
14. 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. Turn the power switch to off.
2. Drain unit by removing overflow tube.
3. Metal surfaces may be hot- use caution.
4. Remove all internal removable parts including spray manifolds, scrap screens, drain overflow tube and suction strainer.
5. Remove the end caps from the spray manifolds and clean with the brush provided. Flush the manifolds.
6. Flush scrap screens
7. Clean drain overflow tube.
8. Clean suction strainer of build-up

CLEANING PROCEDURES (continued)

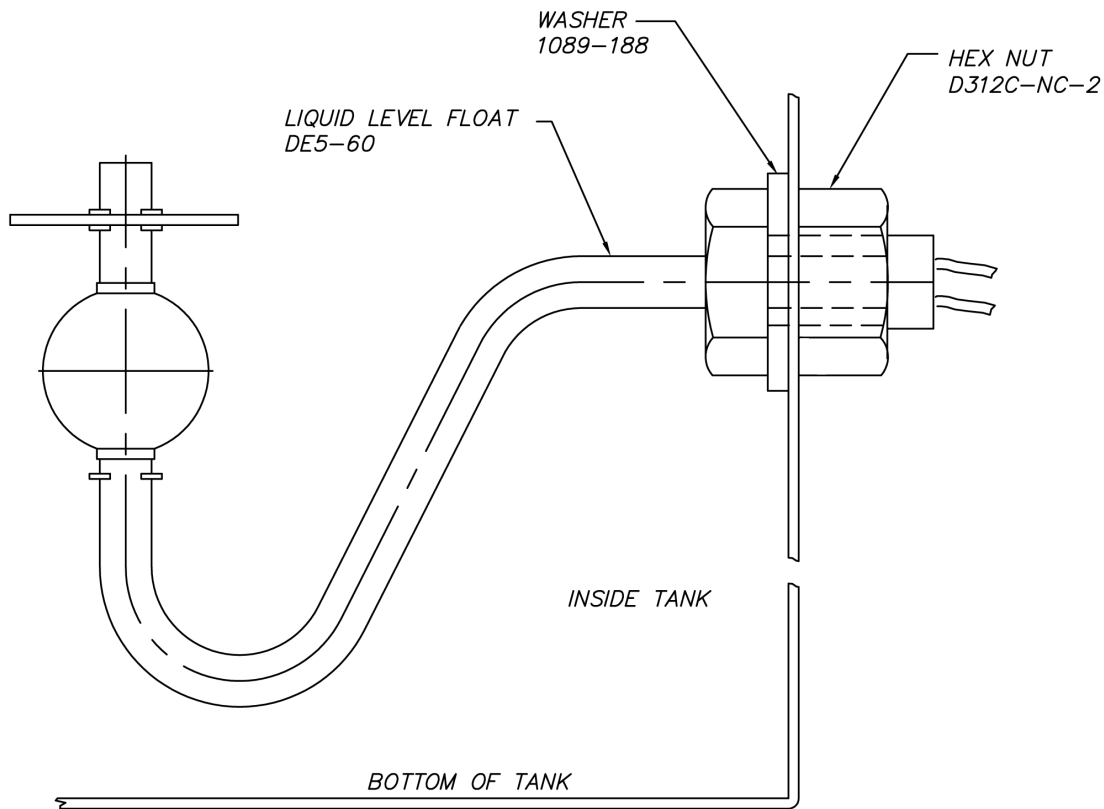
9. Clean the tank level float with a plastic abrasive pad (do not use steel wool).
10. Final rinse nozzles should be cleaned of matter clogging the jet spray.
11. The doors should be left open to allow drying of interior surfaces.


NOTE:

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

CAUTION:

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



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.



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.

MAINTENANCE PROCEDURES

Solenoid Valve Disassembly

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.

Liner 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-2462.



NOTE:

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

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

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.
4. Install in reverse of removal.



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.

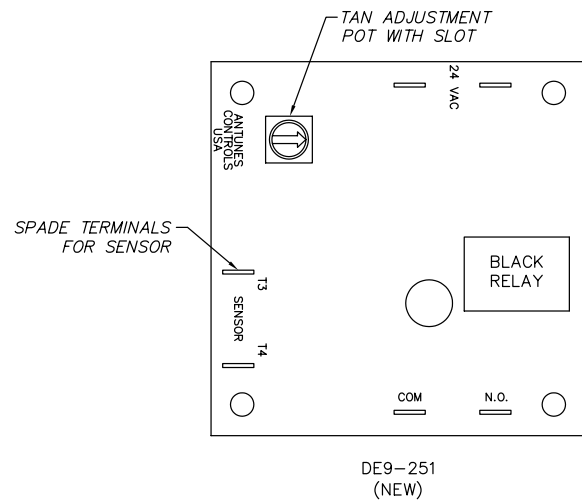
Troubleshooting Tank Temperatures

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

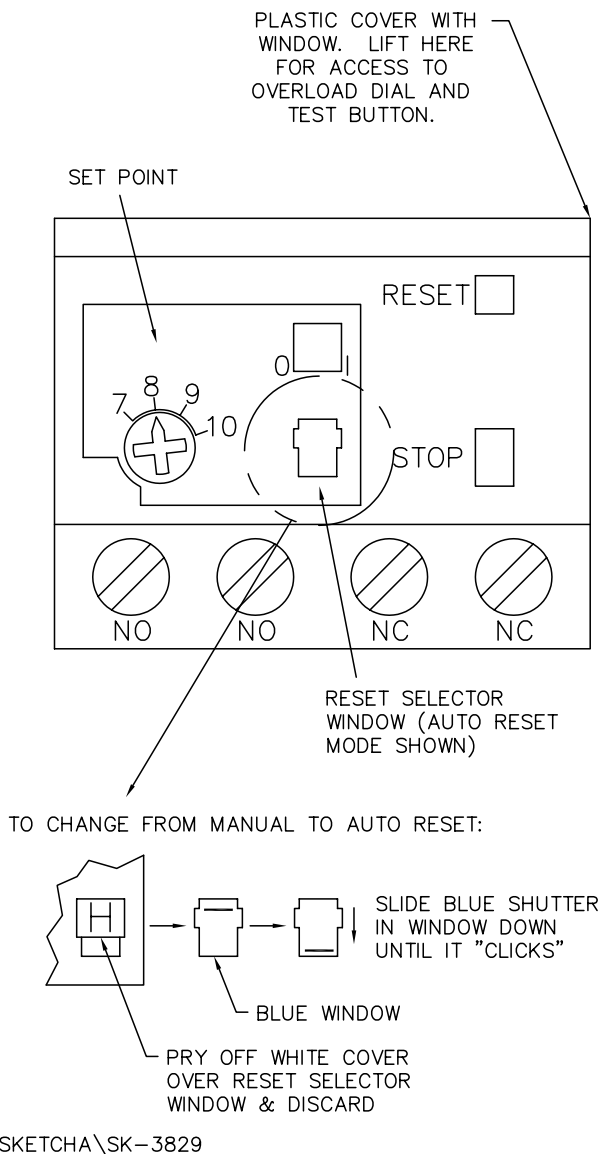
1. If temperature does not change check the temperature control board (P/N DE9-251) proper operation. If the temperature control board is faulty, replace.
2. Verify steam pressure per machine specifications.
3. Verify steam trap is not clogged. If so, replace.



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 4 to identify the overload, adjust by turning the dial to the appropriate AMP draw.



OVERLOAD RELAY SETTINGS

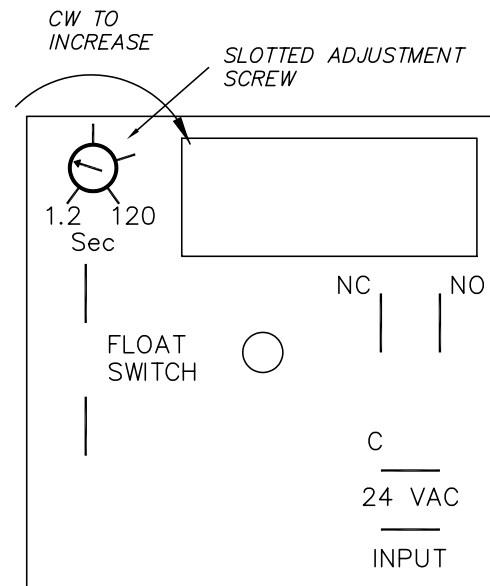
Level System

The level control system consists of one overflow timer (P/N DE7-35) and one level float (P/N DE5-60) 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.

Also consists of a Hi-Limit switch in electric heated unit. Hi-Limit in series with float. Inspect Hi-Limit for damage. Be careful when cleaning not to damage it.



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.

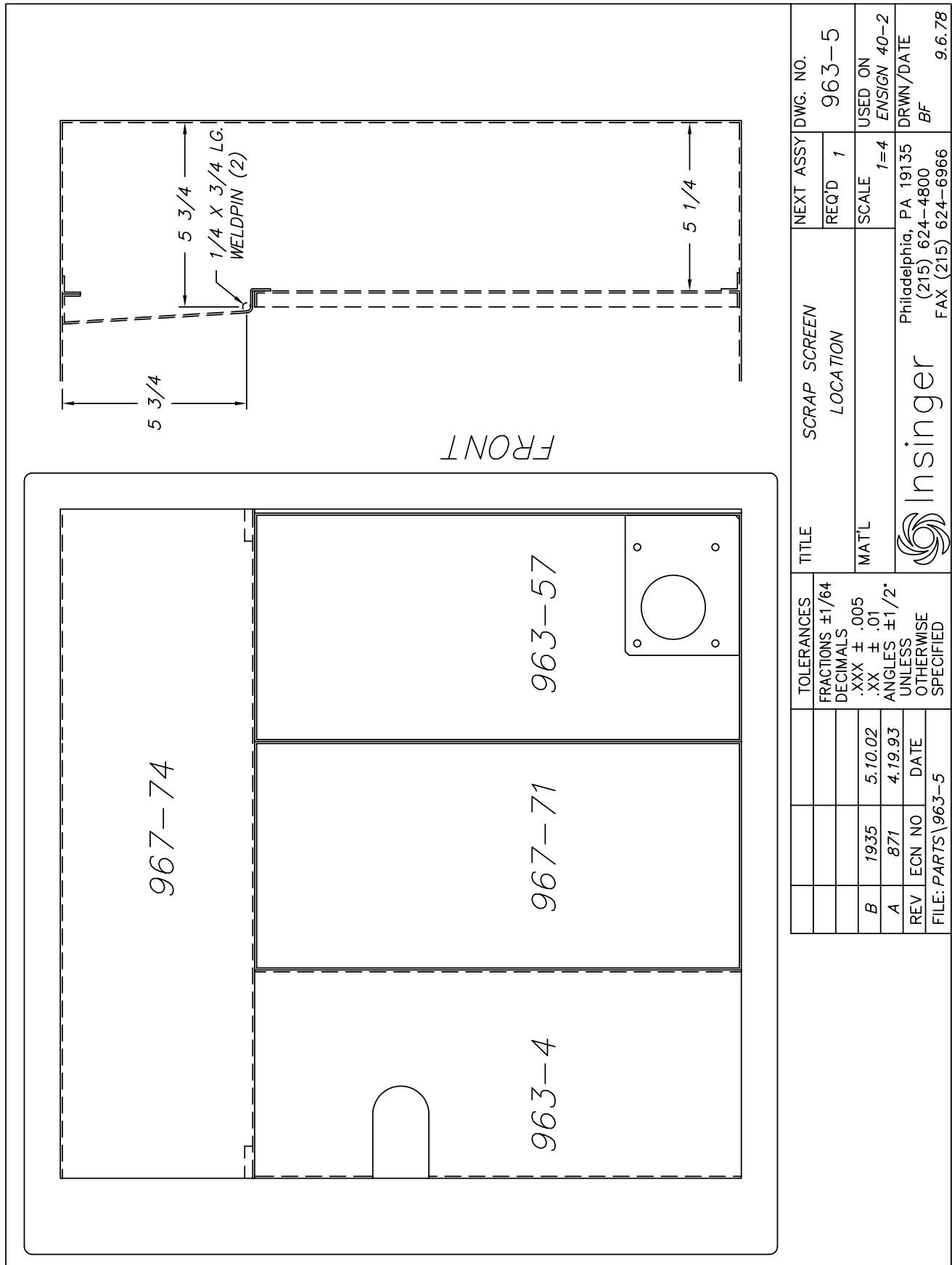


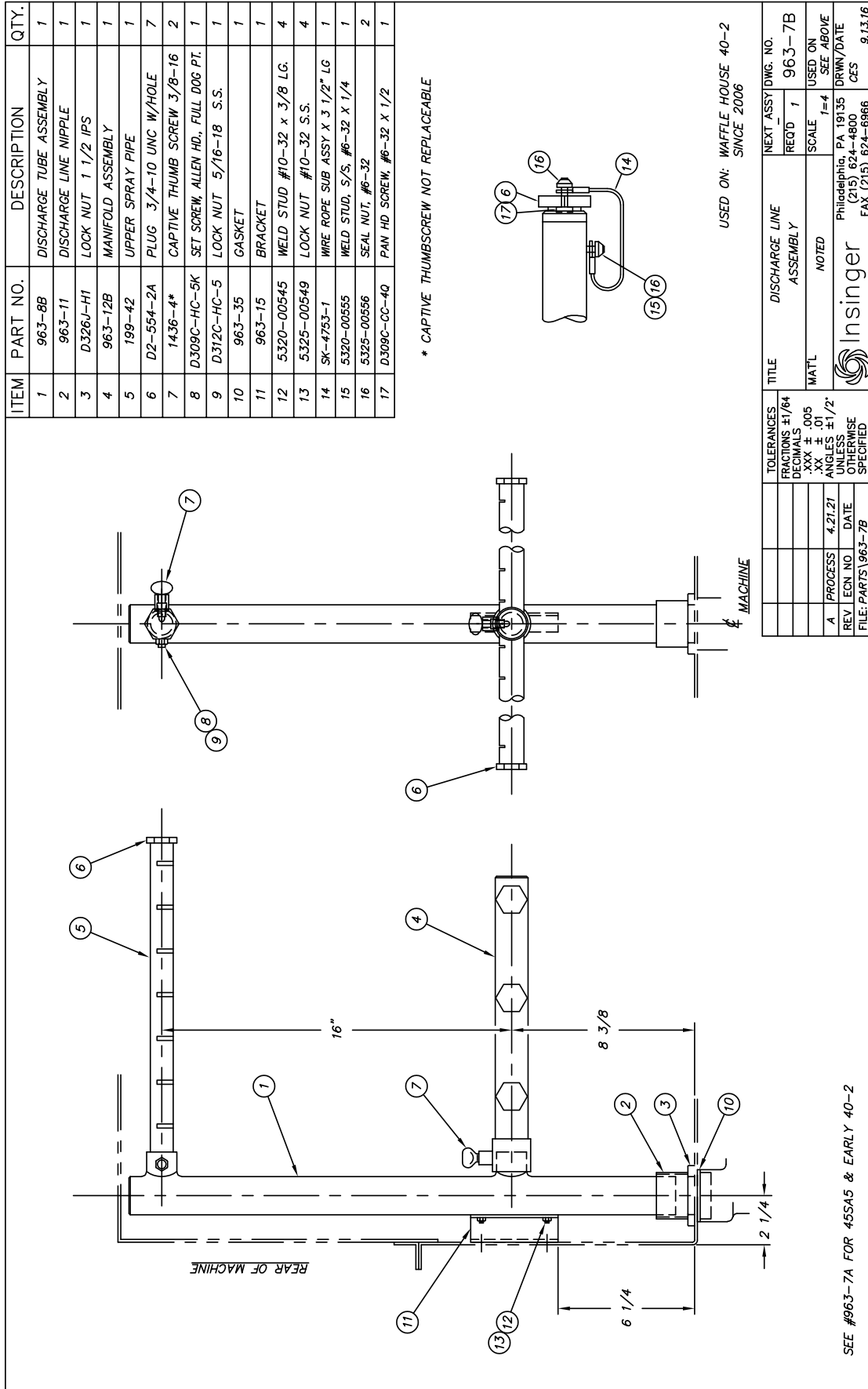
NOTE:

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

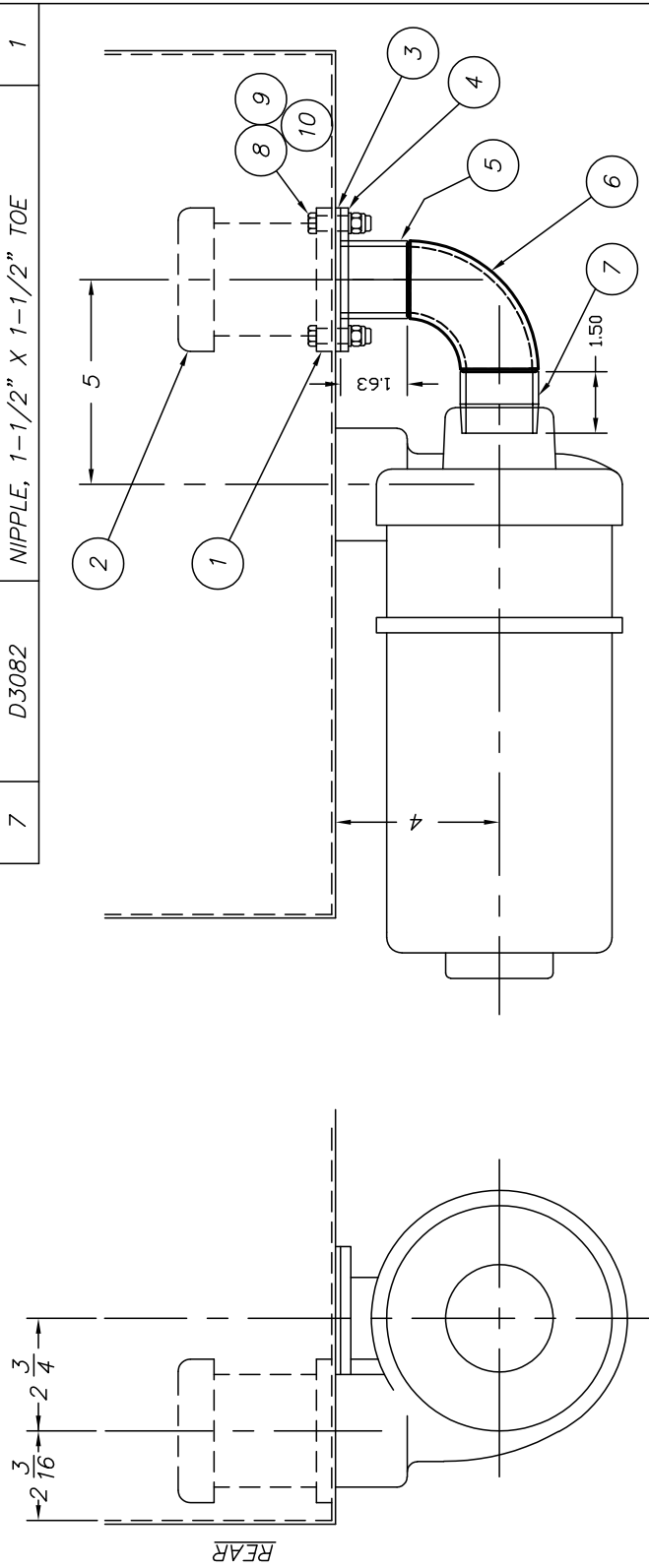
Basic Service Guide

BASIC SERVICE GUIDE		
SYMPTON	POSSIBLE CAUSE	SOLUTION
1. Machine will not operate	A. No power B. Blown fuse or tripped breaker C. Motor overloads tripped D. Door magnet broken or missing E. Door switch on manual	A. Check power supply B. Replace fuse; reset breaker C. Reset overload D. Replace E. Switch to automatic
2. Tank will not hold water	A. Drain overflow not seated or installed B. Pump petcock opened	A. Reseat or install drain overflow B. Close pump petcock
3. Tank fill beyond overflow	A. Obstruction in overflow tube or drain line B. Float dirty or bad	A. Remove obstruction B. Clean and/or replace
4. Water leaks around door	A. Doors not seating B. Clogged spray pipe C. Missing end caps on spray arms	A. Reseat doors B. Clean spray pipe with brush provided C. Install end caps
5. Weak or ineffective spray	A. Clogged spray pipe B. End cap missing on spray arms C. Manifolds not installed properly D. Pump rotation reversed E. Suction strainer clogged	A. Clean spray pipe with brush provided B. Install endcap C. Ensure proper placement of upper and lower pipes D. Arrow on pump housing indicates direction, correct strainer E. Clean suction strainer
6. Weak or ineffective final rinse spray	A. Lime deposits in spray nozzles B. Low water pressure C. Clogged line strainer D. Closed water supply valve E. Water valve/diaphragm	A. Clean or replace nozzles B. Adjust to 20PSI C. Remove line strainer and clean D. Open ball valve E. Replace diaphragm
7. Water hammer	A. Excessive water line pressure	A. Install water hammer valve
8. Machine vibrates or is noisy	A. Pump rotation reversed B. Broken impeller	A. Arrow on pump housing indicates direction, correct electrically B. Inspect or replace impeller
9. Final rinse will not shut off	A. Float dirty or bad B. Solenoid valve still powered-up C. Final rinse solenoid valve clogged D. Diaphragm worn	A. Clean and/or replace B. Check final rinse actuating circuit for proper operation C. Disassemble valve and clean internal parts of scale or replace D. Replace with solenoid valve repair kit
10. Tank not filling/tank heat coming on with no water in tank	A. Level float dirty B. Level control system not working	A. Clean level float B. Troubleshoot level control circuit
11. Tank temperature too low/high	A. Thermostat not adjusted B. Heat circuitry not working C. Electric heat—power turned off D. Electric heat—immersion heaters limed E. Steam heat—steam turned off F. Steam heat—not enough steam G. Steam heat—condensate traps clogged	A. Adjust thermostat B. Troubleshoot circuitry C. Check circuit breakers D. De-lime machine E. Turn steam on F. Adjust steam pressure per machine specs G. Clean or replace condensate traps





ITEM	PART NO.	DESCRIPTION	QTY.	ITEM	PART NO.	DESCRIPTION	QTY.
8	D309C-JC-12A	HHCS 3/8-16 X 1 1/2 LG	4	1	963-38	SUCTION STRAINER FLANGE	1
9	5325-00539	SEALNUT 3/8-16	4	2	D2-541	SUCTION STRAINER	1
10	D313A-J1	COPPER WASHER 3/8	4	3	D514	GASKET	1
				4	D134	FLANGE	1
				5	D207E-K12-10	TUBE, 1.63" LG 1-1/2" SCH 40 S/S	1
				6	4805-01332	ELBOW, 90 DEG 1-1/2" SCH-40 S/S	1
				7	D3082	NIPPLE, 1-1/2" X 1-1/2" TOE	1



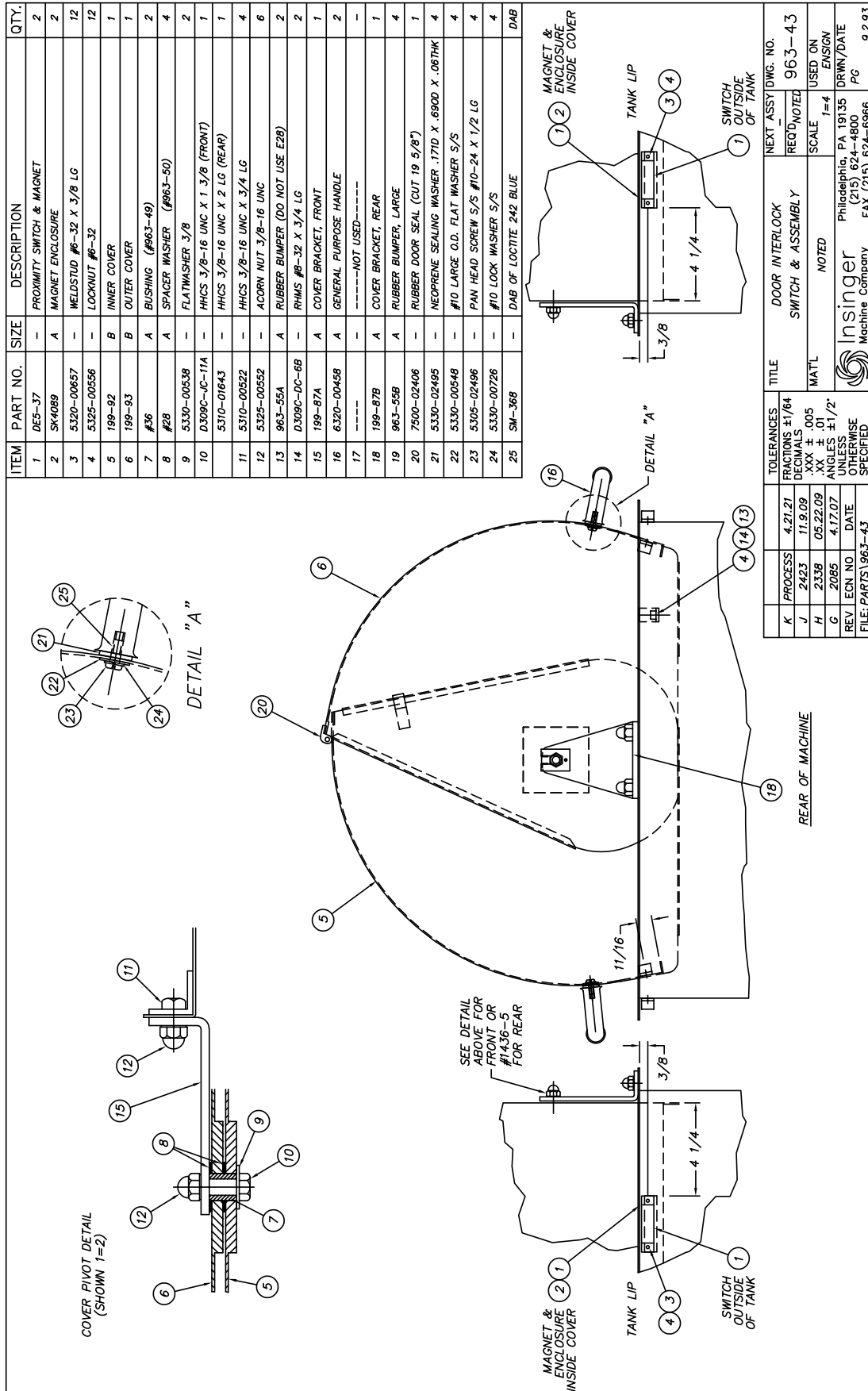
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Insinger
Philadelphia, PA 19135
(215) 624-4800
FAX (215) 624-6966

*** = INSIDE PIPING TO BE NICKEL PLATED



TOLERANCES:		4.21.21		FRACTIONS ±/64		TITLE		FINAL RINSE SPRAY		NEXT ASSY		DWG. NO.	
.0005 ± .005		.0005 ± .005		.0005 ± .005		COIL ASSEMBLY		COIL ASSEMBLY		Q_1		963-22	
.XX ± .01		.XX ± .01		.XX ± .01		AS NOTED		AS NOTED		SCALE		USED ON	
.51.02		.51.02		.51.02		MATERIAL		MATERIAL		Q_1		ENGIN/DATE	
.51.02		.51.02		.51.02		INSINGER		INSINGER		Q_1		DRWN/DATE	
.51.02		.51.02		.51.02		PHILADELPHIA, PA 19135		PHILADELPHIA, PA 19135		Q_1		RFRN	
.51.02		.51.02		.51.02		(215) 624-4800		(215) 624-4800		Q_1		8.12.91	
.51.02		.51.02		.51.02		FAX (215) 624-6966		FAX (215) 624-6966		Q_1		8.12.91	
.51.02		.51.02		.51.02		OTHERWISE SPECIFIED		OTHERWISE SPECIFIED		Q_1		8.12.91	
.51.02		.51.02		.51.02		REV		REV		Q_1		8.12.91	
.51.02		.51.02		.51.02		ECN		ECN		Q_1		8.12.91	
.51.02		.51.02		.51.02		NO DATE		NO DATE		Q_1		8.12.91	
.51.02		.51.02		.51.02		PARTS		PARTS		Q_1		8.12.91	
.51.02		.51.02		.51.02		963-22		963-22		Q_1		8.12.91	



ITEM	PART NO.	DESCRIPTION	QTY.
37	D319A-E3-E2	90° UNION ELBOW 3/4 C X 3/4 MIPS	1
38	D318F-E1-E1	UNION 3/4 FIPS	1

NOTES:

** ***= INSIDE PIPING TO BE NICKEL PLATED

TEMPORARY "O" RINGS (3)
D2-585 AT FACTORY
BRASS FERULE LOOSE
FOR FIELD ASST

BRASS FERULE
AT FACTORY

MACHINE

MACHINE

MACHINE

FLUSH TO
TANK BOTTOM

FRONT VIEW

10-3/4
(STUD
CLIP)

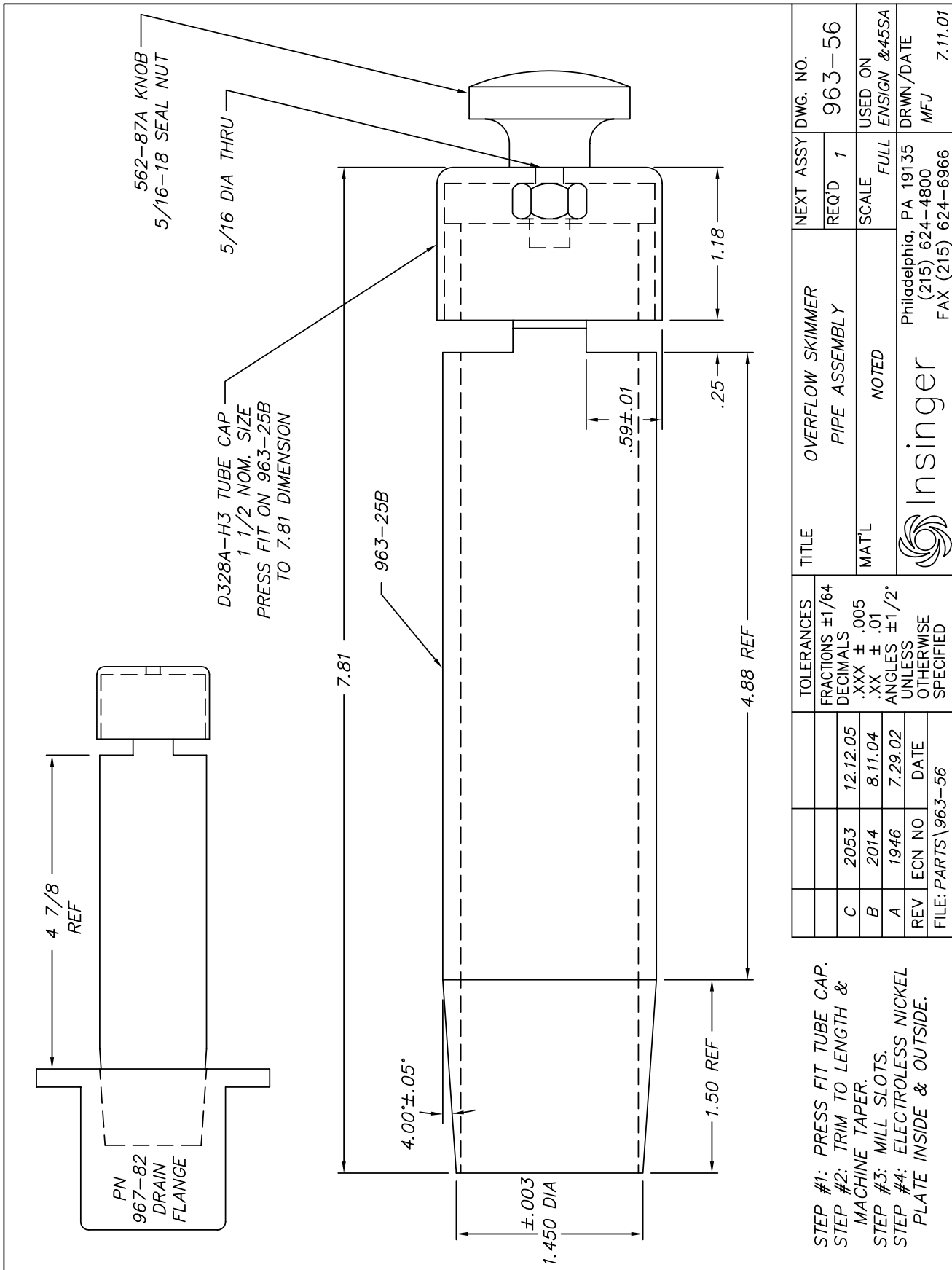
WAS WAFFLE HOUSE ONLY,
NOW STANDARD

ITEM	PART NO.	DESCRIPTION	QTY.
1	963-22	SPRAY COIL ASSEMBLY	1
2	7400-01822	FINAL RINSE ASSEMBLY, TOP, 40-2	1
4	4905-01830	Solenoid Water, 3/4" NPT 24VAC 50/60HZ	1
5	D2482	"Y" STRAINER 3/4 IPS	1
6	D2243	VACUUM BREAKER 3/4 IPS	1
7	D320F-E1D1E1	TEE 3/4 FIPS x 1/2 FIPS x 3/4 FIPS	1
8	D320J-D1D1E1	TEE 1/2 FIPS x 1/2 FIPS x 3/4 FIPS	1
9	D320F-E1D1E1	TEE 3/4 FIPS x 3/4 FIPS x 1/2 FIPS	1
10	D316F-E1-E2	90° ST ELL, 3/4 F X 3/4 M	1
11	D316A-E3-E2	90° ST ELL, 3/4 C x 3/4 MIPS	1
12	D316A-E3-E3	90° ELBOW 3/4 C	3
13	D316F-U6-D2	45° FLARE COMP TUBE X 1/2 MIPS 90° EL	1
14	1436-15	TWIN ELBOW ADAPTER	REF
15	D318A-E3-E2	UNION 3/4 C x 3/4 MIPS	1
16	4825-01050	HEX RED. 1/2 MIPS x 1/4 FIPS	1
17	D326F-E1	LOCK NUT 3/4 IPS	1
18	D314F-EA-14	NIPPLE 3/4 IPS x 1 3/4 LG. ALL THD.	1
19	D314F-EC-00	CLOSE NIPPLE 3/4 IPS	3
20	4805-01389	NIPPLE S/S 1/2 IPS x 2" LG.	1
22	D351F-U6	45° FLARE COMP TUBE NUT 5/8	REF
23	D207A-B6-20	COPPER TUBE 3/4 CTS x 5" LG.	1
24	D207A-B6-28	COPPER TUBE 3/4 CTS x 7 LG.	1
25	D207A-B6-71	COPPER TUBE 3/4 CTS x 17 3/4 LG.	1
26	D207A-B6-16	COPPER TUBE 3/4 CTS x 4" LG.	1
27	D207A-B6-9	COPPER TUBE 3/4 CTS x 2 1/4 LG.	1
28	963-24	BRACKET	1
29	963-51	UPPER RINSE TUBE CLIP	1
30	D2062	GROMMET	2
31	D2497	PETCOCK	1
32	SK1433	PRESSURE GAUGE	1
33	D207A-B6-12	COPPER TUBE 3/4 CTS x 3" LG	1
34	D317F-E5-E5	ADAPTER 3/4C COMPRESSION, NO FLARE	2
35	D207A-B6-55	COPPER TUBE 3/4 CTS x 13 5/8 LG	1
36	D317A-E3-E2	3/4 C x 3/4 MIPS ADAPTER	1

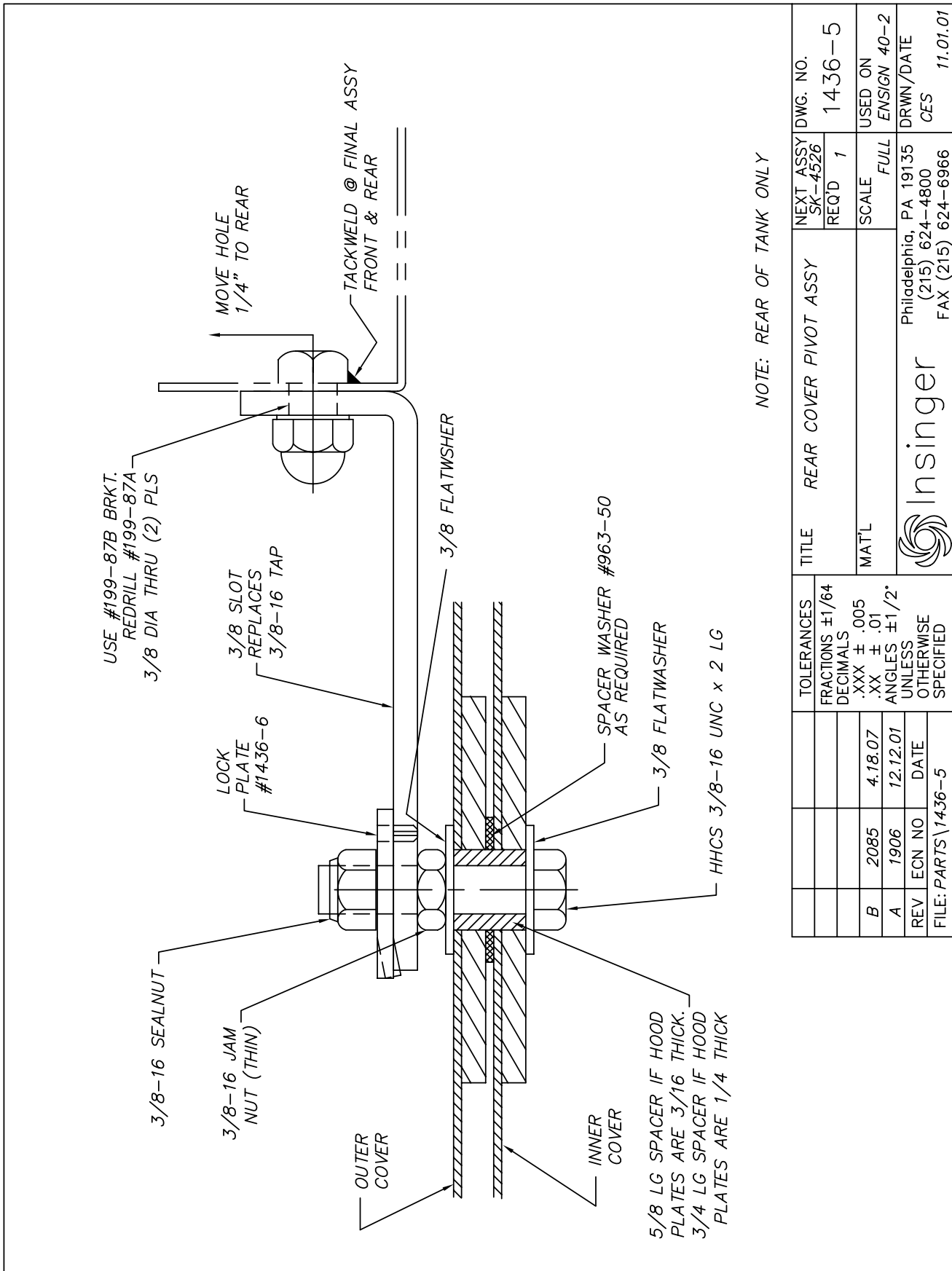
TOLERANCES	9.11.2019	11.6.09	9.24.09	9.22.03	70.29.02
H	2881	2423	2400	1996	1955
G					
F					
E					
D					
REV	ECN NO	DATE			

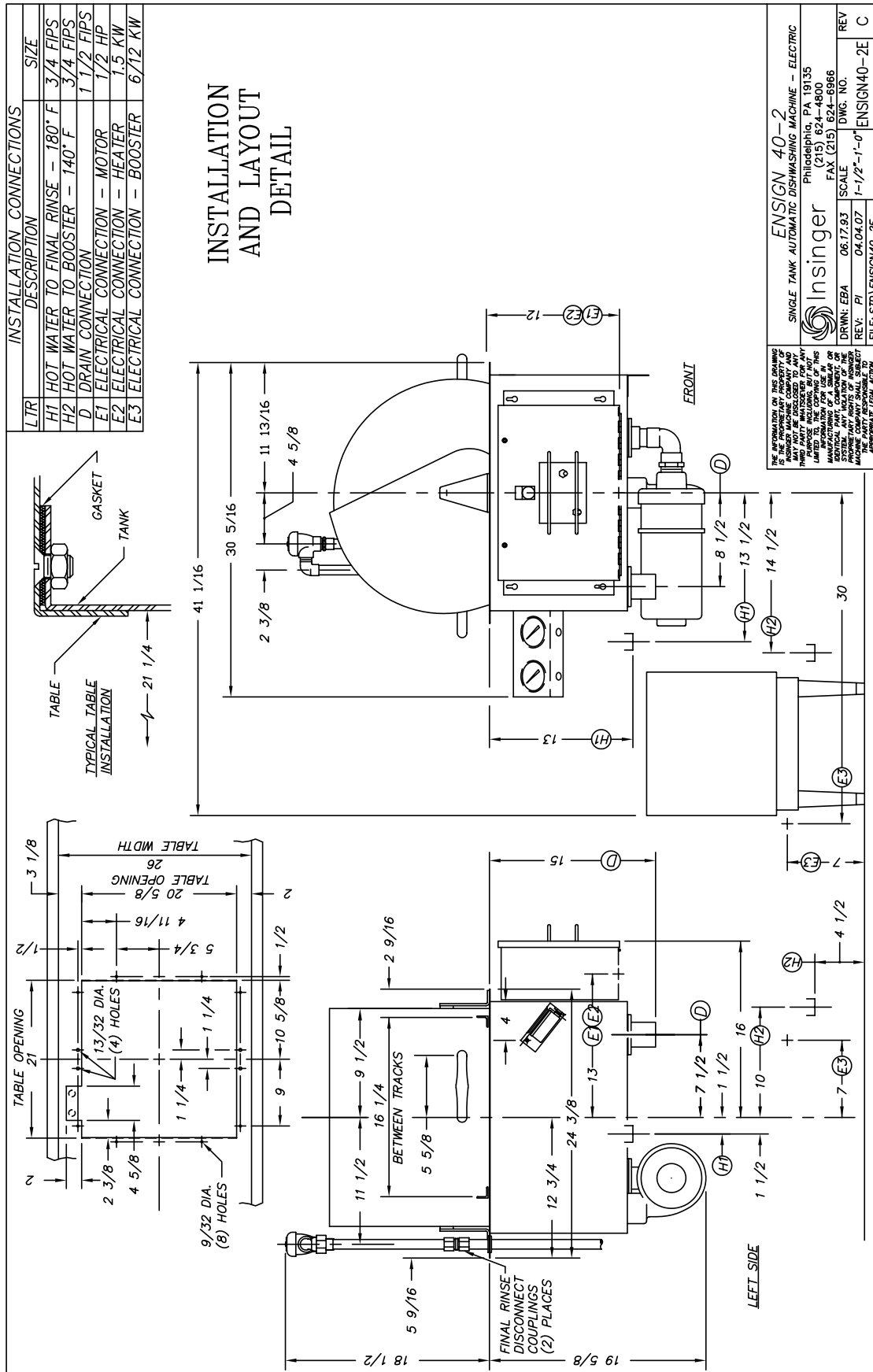
TITLE	FINAL RINSE	PIPING ASSY	SCALE	USED ON
MAT'L	AS NOTED	1=8	ENGIN	40-2

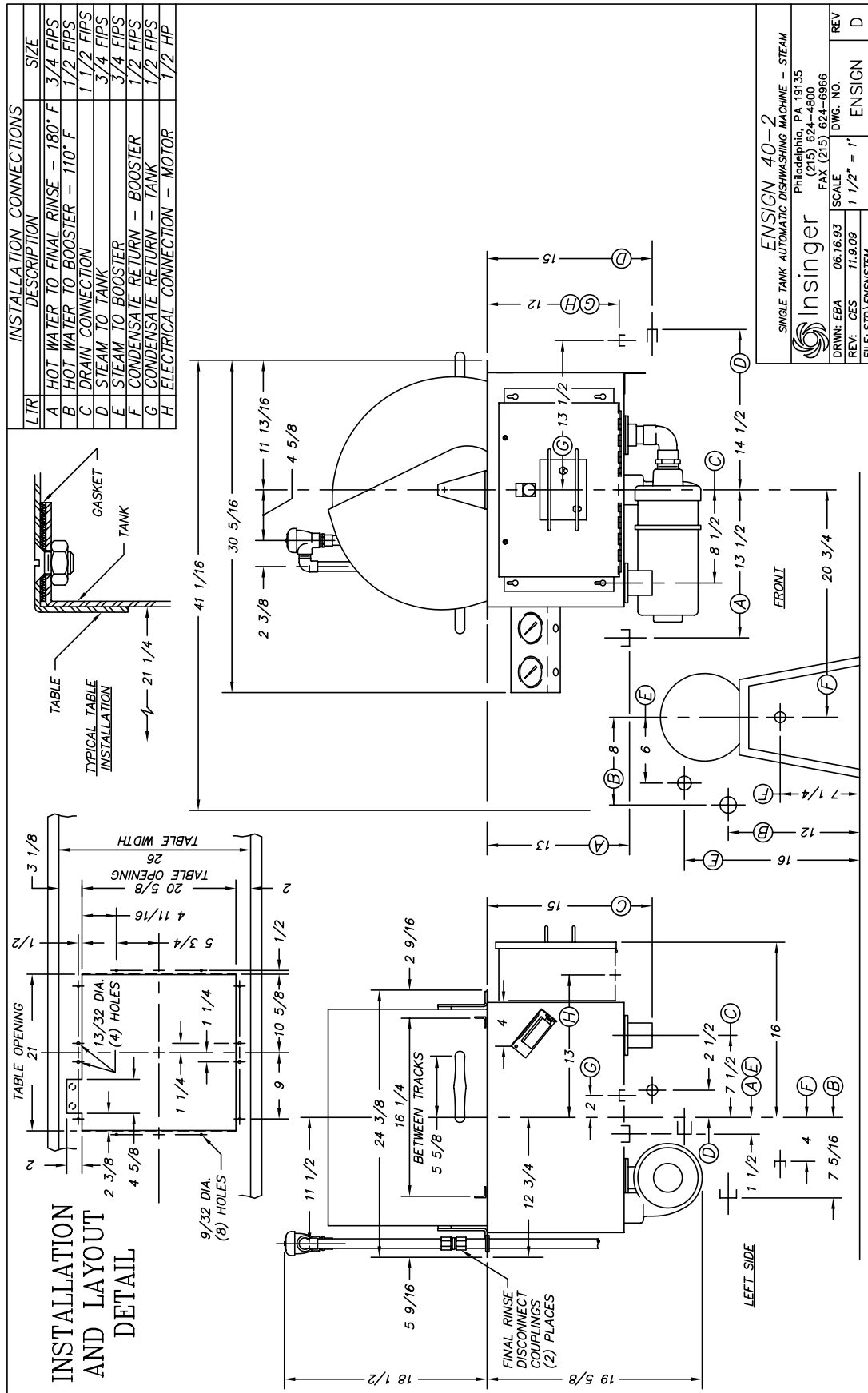
INSINGER	Philadelphia, PA 19135	DRWN/DATE	5.21.01
	(215) 624-4800	GP	
	FAX (215) 624-6966		



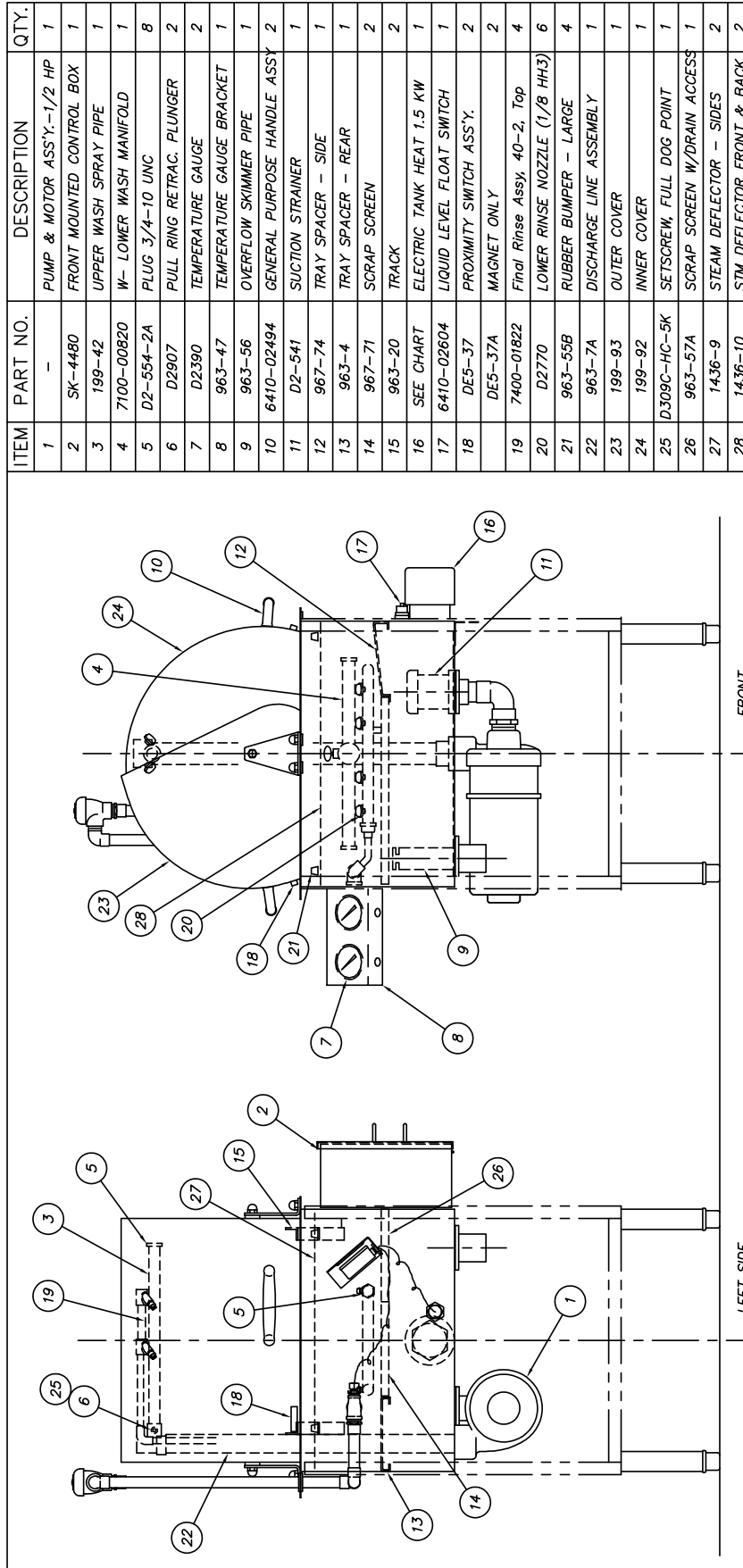
					TITLE	OVERFLOW SKIMMER PIPE ASSEMBLY	NEXT ASSY	DWG. NO.		
									REQ'D	1
C	2053	12.12.05			MAT'L	NOTED	SCALE	FULL	USED ON	ENSGN & 45SA
B	2014	8.11.04								
A	1946	7.29.02								
REV	ECN NO	DATE	 Insinger Philadelphia, PA 19135 (215) 624-4800 FAX (215) 624-6966				DRWN/DATE		7.11.01	
FILE: PARTS\963-56							MFJ			











COUNTER TOP MODELS DO NOT HAVE A STAND OR FRONT PANEL.

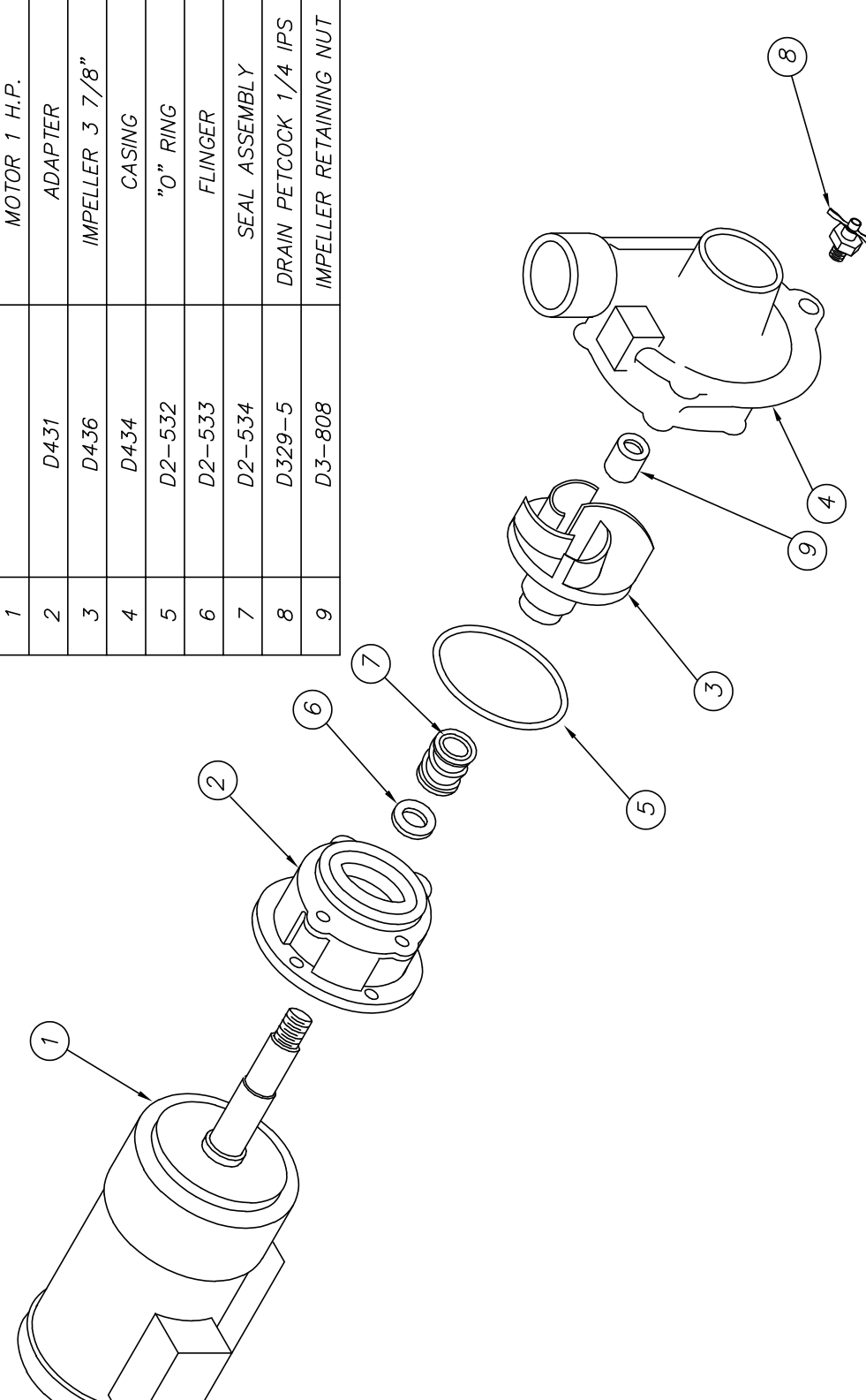
ITEM #16	ELECTRIC HEATER
4440-01475	208 VAC/1 PH
DE13-SB23	208 VAC/3 PH
DE13-SB41	220-240 VAC/1 PH
DE13-SB43	220-240 VAC/3 PH
DE13-SB53	380 VAC/3 PH
DE13-SB73	440-480 VAC/3 PH
DE13-SD21	110-115 VAC/1 PH

TOLERANCES	PROCESS	DATE	FILE: SKETCH	SK-2342
FRACTIONS ±1/64	G	4.28.21		
DECIMALS	F	12.11.19		
.XXX ± .005	E	24.23		
.XX ± .01	D	11.9.08		
ANGLES ±1/2°	REV	79.38		
UNLESS OTHERWISE SPECIFIED	ECN NO.	6.10.02		

TITLE	PARTS LIST	NEXT ASSY	DWG. NO.
MAT'L	ENSGN 40-2	REQD -	SK-2342
		SCALE	USED ON
		1=8	40-2
Insinger		Philadelphia, PA 19135 (215) 624-4800 FAX (215) 624-6866	
		DRWN/DATE CES 3.23.01	

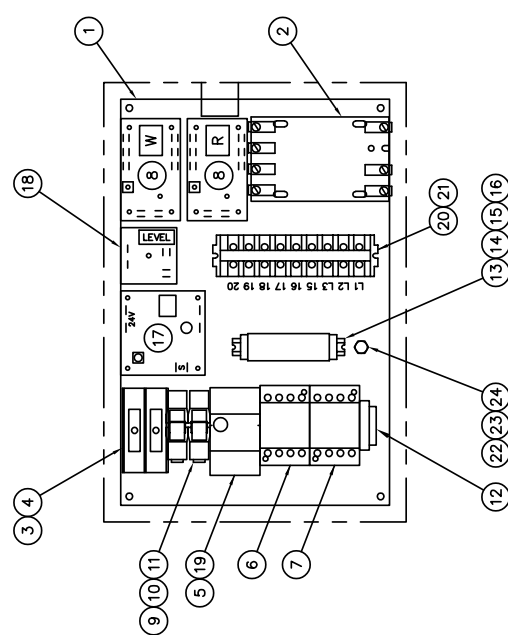
5KW 208 DERATED

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



TOLERANCES		TITLE		NEXT ASSY		DWG. NO.	
		PARTS LIST		REQ'D	SCALE	USED ON	
		1 HP PUMP		-	-	VARIOUS	
		MAT'L					
		Insinger		Philadelphia, PA 19135		DRWN/DATE	
				(215) 624-4800		MAM	
				FAX (215) 624-6966		11.11.93	

ITEM	DESCRIPTION	PART NO.	QTY	ITEM	DESCRIPTION	PART NO.	QTY
18	TIMER (LIQUID LEVEL)	5960-02286	1	1	COMPONENT MOUNTING PLATE	SK-4481	1
19	OVERLOAD BASE	6405-02316	1	2	TRANSFORMER (100 VA, 24 VAC)	5950-01164	1
20	TERMINAL BLOCK	5940-00655	9		ALL VOLTAGES EXCEPT 120 V		
21	TERMINAL BLOCK END	5940-00654	1		120 V	DE6-14	1
22	GROUNDING STUD, 1/4-20	5320-00542	1	3	FUSE BLOCK (100 VA XFMR)	DE9-185	1
23	LOCKWASHER, 1/4	5330-00390	1	4	FUSE (100 VA TRANSFORMER PRIMARY)		2
24	HEX NUT, 1/4-20	5325-00727	1		440 - 480 V FNQ-R-.75	DE9-166	
					380 V FNQ-R-.75	DE9-166	
					220 - 230 V FNQ-R-1.4	DE9-168	
					208 V FNQ-R-1.5	DE9-200	
					115 V FNQ-R-2.8	DE9-201	
				5	OVERLOAD RELAY (1/2 HP PUMP)		1
					460/3/60 1-1.7 A	DE2-50	
					380/3/50 1-1.7 A	DE2-50	
					230/3/60 1.6-2.5 A	DE2-52	
					220/3/50 1.6-2.5 A	DE2-52	
					220/1/60 4-6 A	5945-01116	
					208/3/60 1.6-2.5 A	DE2-52	
					115/1/60 7-10 A	DE2-56	
				6	CONTACTOR (PUMP) SP4	5945-02282	1
				7	CONTACTOR (ELECT TANK HEAT) SP4	5945-02282	1
				8	TIME DELAY BOARD (WASH & RINSE)	DE7-27	2
				9	RELAY BASE	5945-01118	AR
				10	RELAY	5945-01117	AR
				11	RELAY HOLD DOWN SPRING	5345-02313	AR
				12	DIN RAIL (35 mm)	4797-00460	1
				13	DIN RAIL (15 mm)	4797-00708	1
				14	TERMINAL SECTION	5940-00704	16
				15	TERMINAL END COVER PLATE	5940-00705	1
				16	TERMINAL END CLAMP	5940-00706	2
				17	TEMPERATURE CONTROL BOARD	5955-02284	1



NOT SHOWN

ELECTRIC IMMERSION HEATER (1.5 KW)

440-480 V, 3 PH

380 V, 3 PH

220-240 V, 3 PH

208V, 3PH

220-240 V, 1 PH

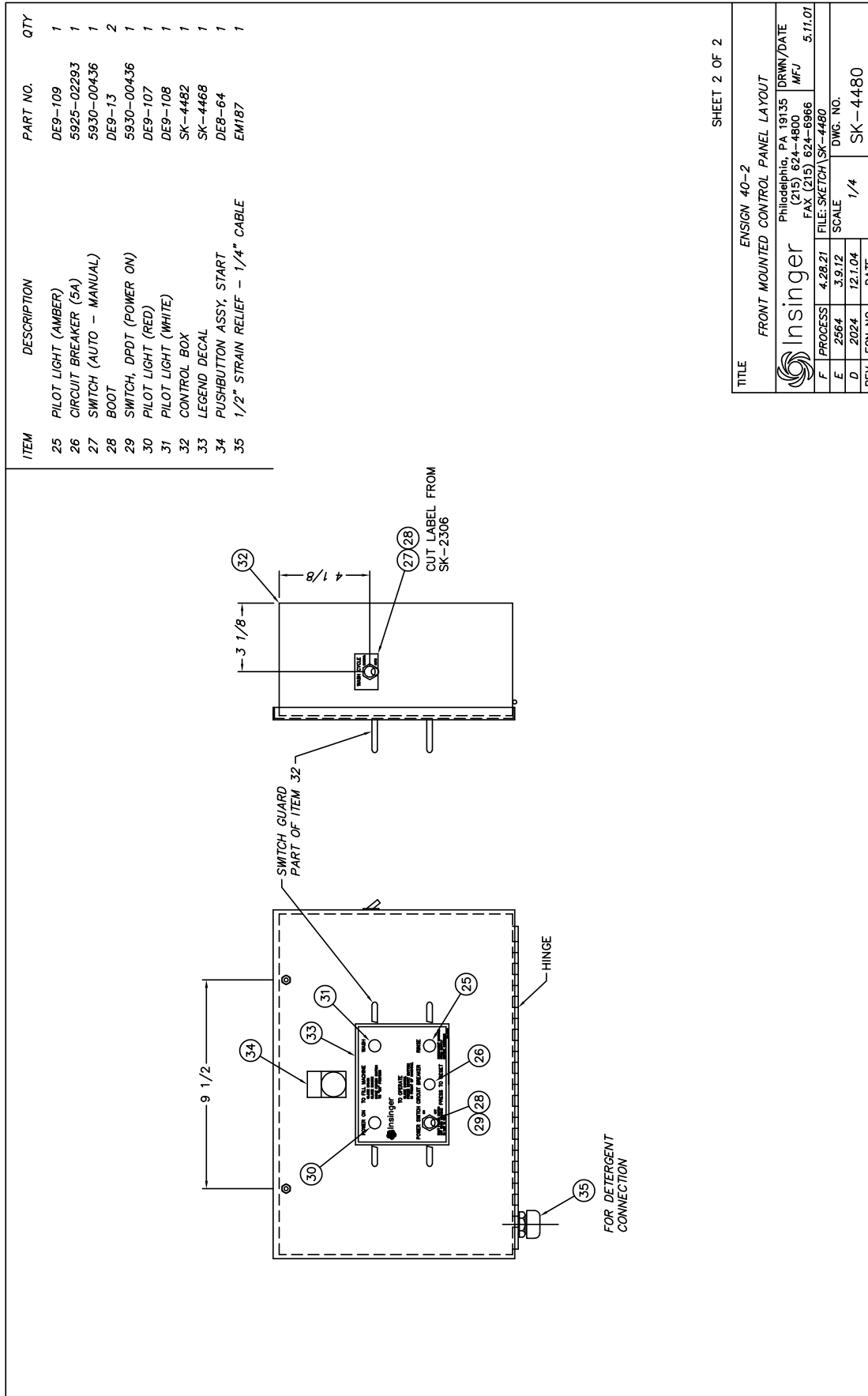
208V, 1 PH

110-120 V, 1 PH (5KW 208 DERATED)

TEMPERATURE SENSOR

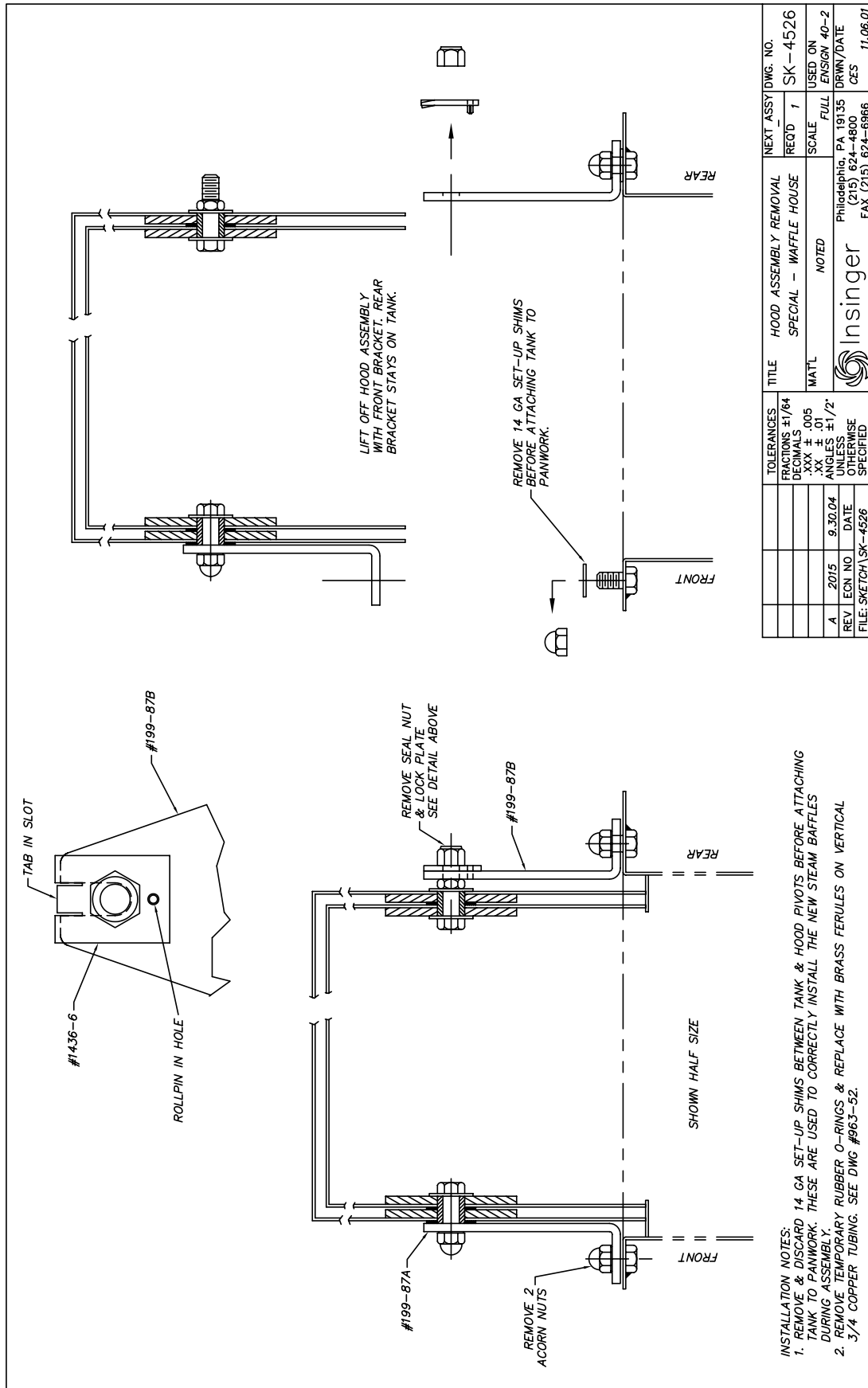
SHEET 1 OF 2

TITLE		ENGIN 40-2	
FRONT MOUNTED CONTROL PANEL LAYOUT		Philadelphia, PA 19135 DRWN/DATE	
Insinger		(215) 824-4800 MPJ	
F PROCESS 4.28.21		FAX (215) 824-6866	
E 2564 3.9.12		FILE: SKETCH SK-4480	
D 2024 12.1.04		SCALE	
REV		DWG. NO.	
ECN NO		1/4	
DATE		SK-4480	



SHEET 2 OF 2

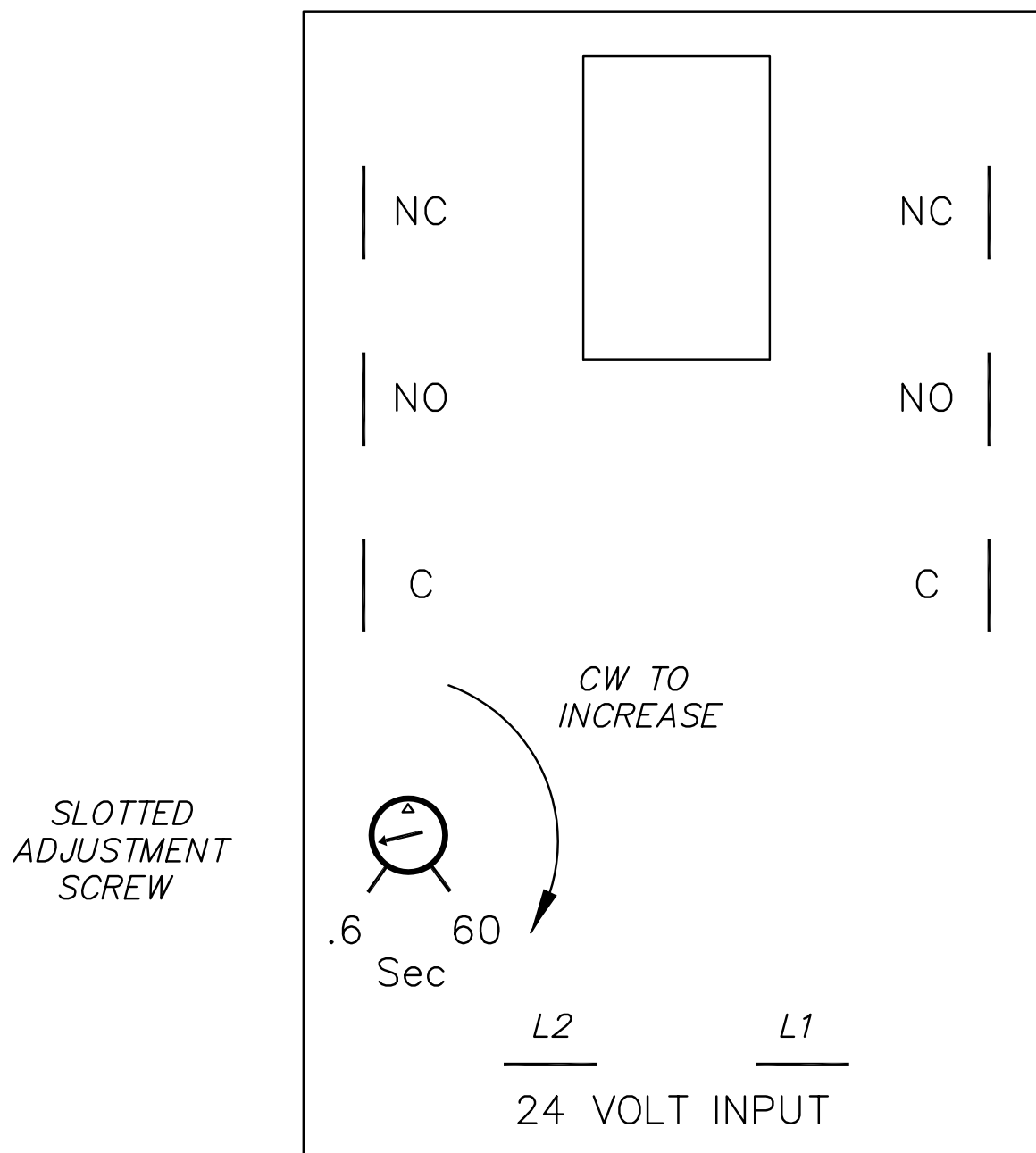
TITLE		ENGIN 40-2	
FRONT MOUNTED CONTROL PANEL LAYOUT			
Insinger		Philadelphia, PA 19135 DRWN/DATE	
		(215) 624-4800 M/FJ	
		FAX (215) 624-6966	
		5.11.01	
F	PROCESS	4.28.21	FILE: SKETCH\SK-4480
E	2564	3.9.12	SCALE
D	2024	12.1.04	DWG. NO.
REV	ECN NO	DATE	1/4
			SK-4480



TOLERANCES		TITLE		NEXT ASSY DWG. NO.	
FRACTIONS	±1/64	SPECIAL	HOOD ASSEMBLY REMOVAL	REQD	1
DECIMALS	.XXX ± .005	MAT'L	NOTED	SCALE	FULL
ANGLES	±1/2°			ENGIN	40-2
UNLESS OTHERWISE SPECIFIED				DRWN/DATE	CES 11.06.01

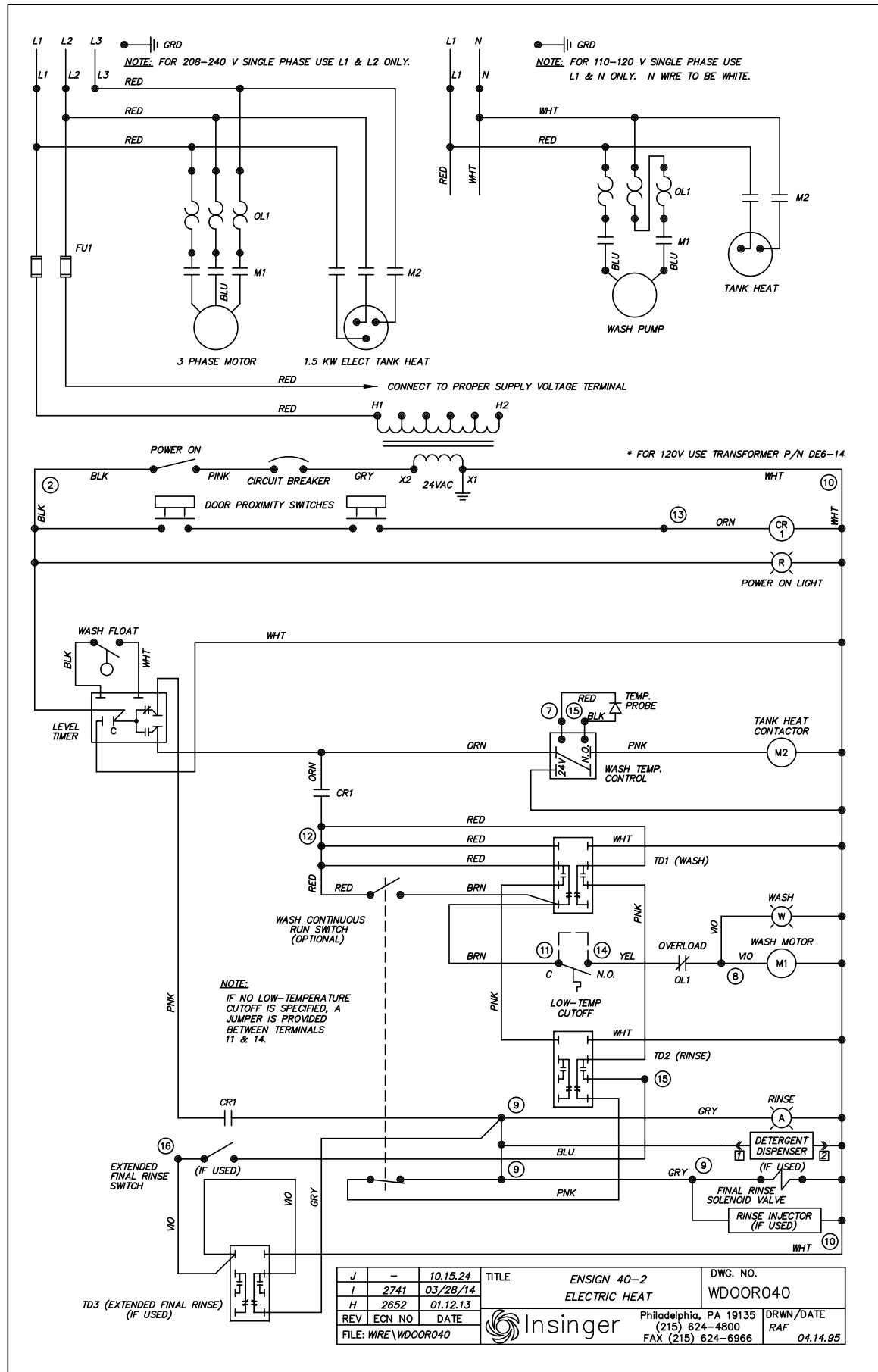
Insinger

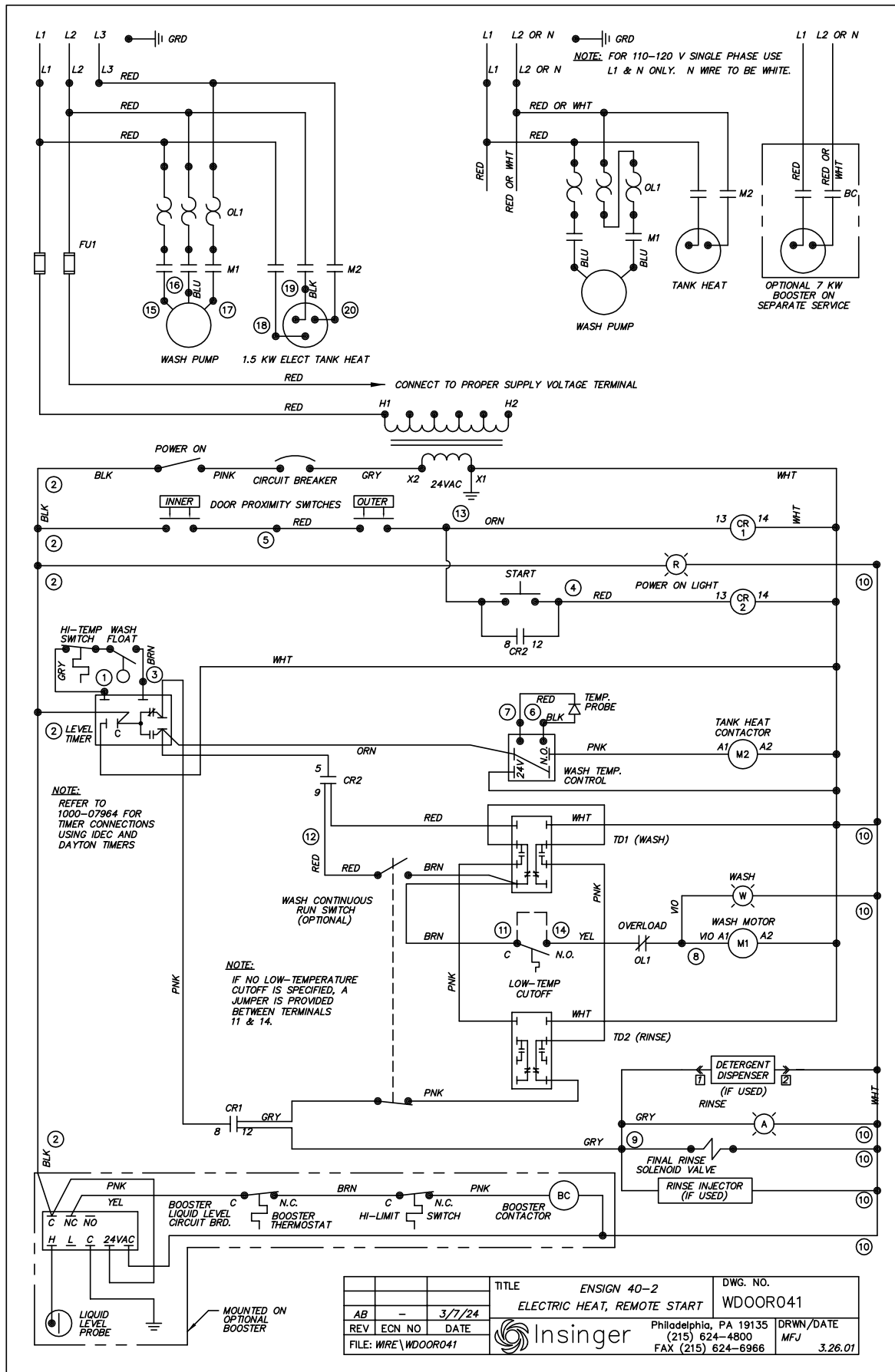
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 (215) 624-4800
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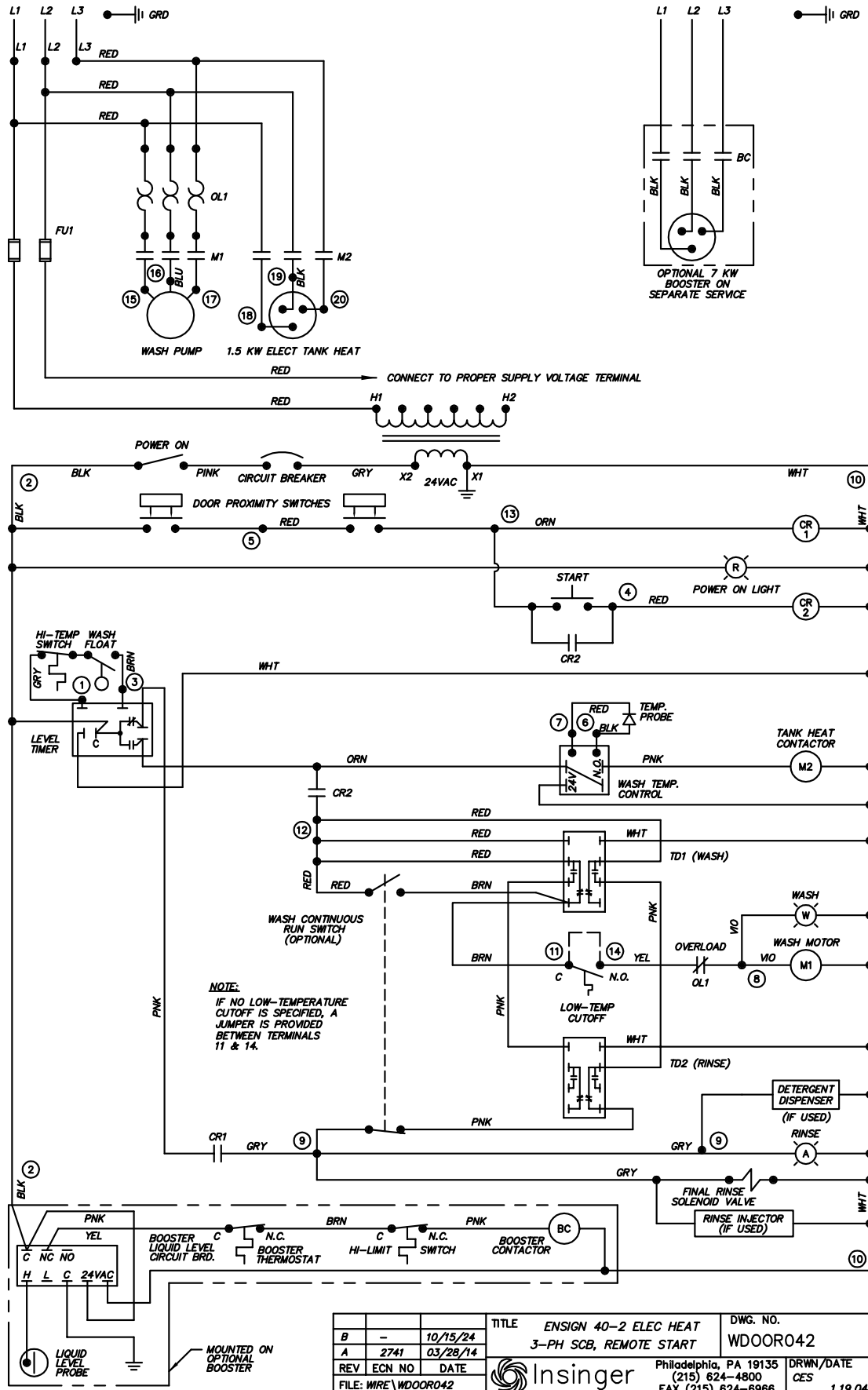


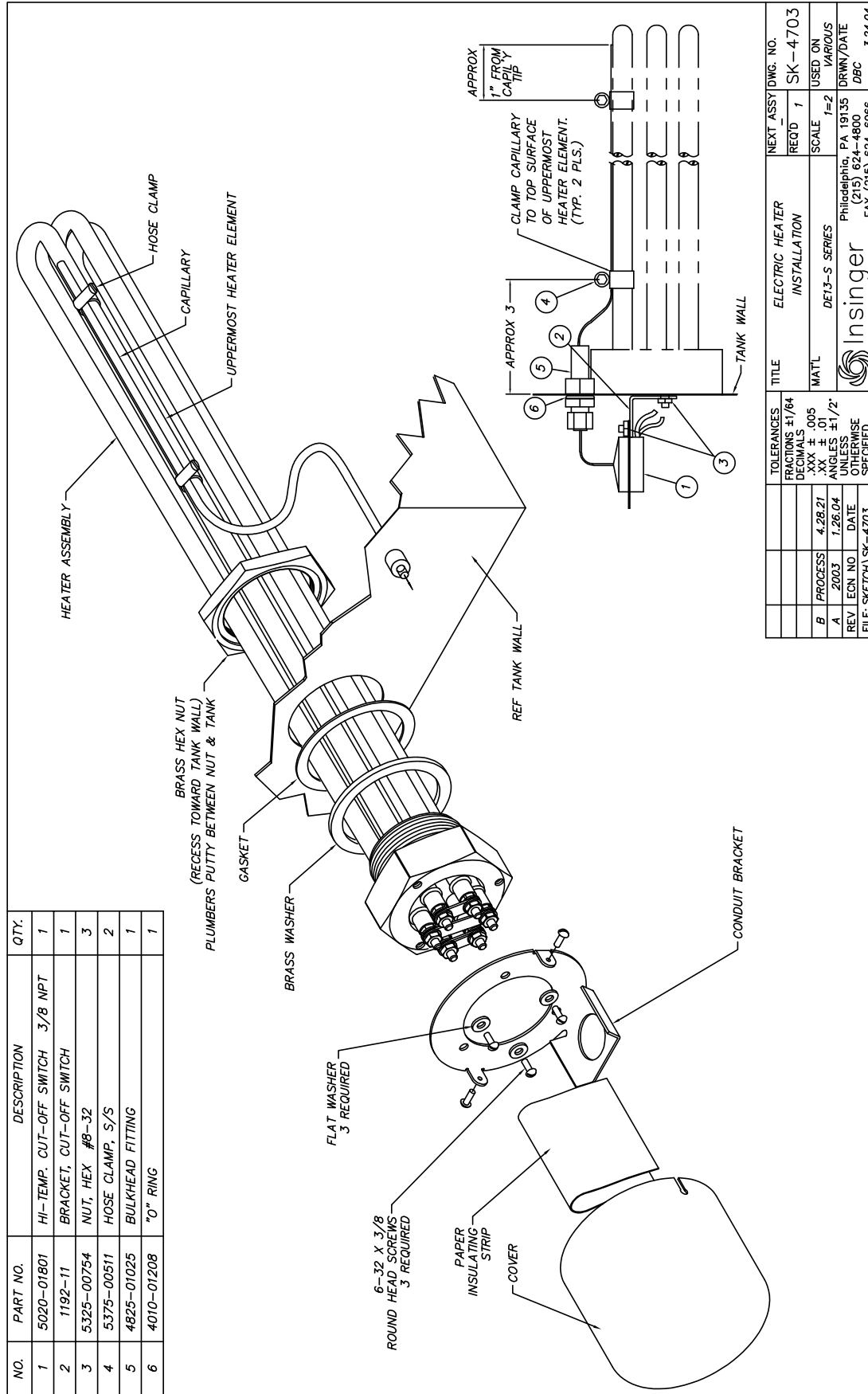
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