

Service Procedures

The Service Procedures section contains detailed instructions for performing repair and calibration procedures on your DEEP TANK Processors.

Read the procedure you are going to perform in its entirety, before starting work on the processor.

WARNING! A number of these procedures involve the use and testing of potentially fatal voltages. Such procedures must be undertaken only by qualified technicians.

NOTE: Circuit cards are not considered field repairable. If you isolate a problem to a specific circuit card, return the card to your dealer or to maker for an exchange, rather than attempting local repair.

Attempts to repair circuit cards could invalidate the warranty on the circuit card and the entire processor. At the very least, attempted repairs could destroy the card's exchange value.

At the end of the Service Procedures section are circuit descriptions, schematics and wiring diagrams.

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Troubleshooting Processor Problems

Symptom	Probable Cause	Remedy
1. Developing speed not constant.	A. Excessive load on drive motor.	A. Check that racks are Seated and turn freely.
	B. Drive Motor Sensor out of adjustment.	B. Readjust.
	C. Drive shaft thrust bearing binding.	C. Lubricate with Lube #4.
2. Solution temperature too high.	A. Temp. control value changed.	A. Re-program with correct value.
	B. Shorted heater relay.	B. Replace heater relay.
	C. Defective temp. sensor.	C. Replace.
3. Solution temperature too low.	A. Temp. control value changed.	A. Re-program with correct value.
	B. Over Temperature sensor tripped.	B. Reset.
	C. Heater failed.	C. Replace.
	D. Heater relay open.	D. Replace relay.
	E. Defective temp. sensor.	E. Replace.
4. Dryer temperature too high.	A. Temp. control value changed.	A. Re-program with correct value
	B. Failed temp. sensor.	B. Replace temp. sensor.
	C. Dryer Klixon failed.	C. Replace Klixon.
5. Dryer temperature too low.	A. Temp. control value changed.	A. Re-program with correct value.
	B. Open dryer Klixon.	B. Reset Klixon.
	C. Failed control relay.	C. Replace.
6. Film jams	A. Film not cut square or has ragged edges	A. Cut film square.
	B. Top crossover not correctly positioned.	B. Check crossover position.
	C. Chemical crystals on underside of top crossover guides.	C. Clean top crossover guides with warm water.

Troubleshooting Processor Problems

Symptom	Probable Cause	Remedy
	D. Improper fixing, fixer too old, pH too high, or improperly-mixed fixer or fixer replenisher.	D. Check pH; if pH is above 5.0, dump and mix fresh. Follow mfg's instruction exactly. Check with Chem. tech rep.
	E. Film skewed at feed rollers.	E. Feed film straight.
7. Film jams in dryers.	A. Fixer incorrect. B. Film not cut square or has ragged edges. C. Dryer ladder guides positioned incorrectly.	A. See 6D, above. B. Cut film straight. C. Remove dryer cover plate and adjust guides.
8. Developing time not consistent.	A. Refer to Symptom 1.	A. Refer to Symptom 1.
9. Films overlap or skew.	A. Bound rack rollers. B. Rack bearings are worn.	A. Clean each roller; check for causes of binding. B. Replace worn bearings.
10. Film transports but fails to drop into receiving basket.	A. Film is tacky B. Fixer solution out of control; pH exceeds mfg limits. C. Wash water too cold	A. Increase dryer temp. B. See film tech rep (and Symptom 6D) pH should be below 5.0. C. Keep wash water 7-10 deg.F below DEV temp.
11. Film is tacky, wet or curled when leaving dryer.	A.. Improper fixing. B. Dryer temp too low. C. Transport speed too fast to dry material.	A. See 6D. B. Set dryer temp. higher. C. Program DEV time & temp. to accommodate drying.

Troubleshooting Processor Problems

Symptom	Probable Cause	Remedy
12. Dirt particles on film.	A. Foreign particles in dryer or on squeegee rollers.	A. Run several outdated sheets of unexposed film or clean-up sheets.
	B. ‡Algae‡ deposits of film.	B. Clean wash tank and wash racks with nylon scrub brush and warm water. Drain wash tank each Night.
	C. Foreign particles on squeegee roller(s).	C. Clean squeegee roller(s).
13. Scratches on base side of film.	A. Dirty feed tray surface.	A. Clean feed tray.
	B. Material contacting rack guides.	B. Isolate the tank causing a problem and repair guide.
14. Scratches on emulsion side of film.	A. Dirt on feed rollers	A. Clean feed rollers.
	B. Chemicals crystallized on underside of crossover guides.	B. Clean crossover guides.
	C. Dirt or silver accumulation on rollers.	C. Clean rollers using nylon scrub pad and warm water or Developer Systems Cleaner for dev. rack/fixer Systems Cleaner for fixer Rack.
	D. Roller in rack not turning.	D. Check all rollers and Gears; repair as required.
	E. Dirt on upper squeegee roller(s)	E. Clean rollers with warm water.
	F. Upper squeegee rollers do not turn freely.	F. Check roller end bearings for wear, damage; replace if necessary.

Troubleshooting Processor Problems

Symptom	Probable Cause	Remedy
15. Increase in film density.	A. Film is over-exposed.	A. Coordinate exposure with DEV. time.
	B. Dev. time value changed.	B. Re-program.
	C. DEV. temp. too high.	C. Re-program DEV. temp.
	D. Excessive DEV. time, due to electrical or mechanical problem.	D. See Symptom 1.
	E. New developer improperly mixed.	E. Dump and mix fresh, following mfg's instruction exactly. Contact chem teac. Replace if problem repeats.
16. Decrease in film density.	A. Film is under-exposed.	A. Coordinate exposure with DEV. time.
	B. Developer under-replenished.	B. Check repl. rates and repl. system; correct as required.
	C. DEV. temp. too low.	C. See Symptom 3.
	D. DEV. time too short, DEV. time value incorrectly programmed.	D. Re-program correct developing time.
	E. New developer improperly mixed.	E. Dump developer, mix fresh.
17. No replenisher flow	A. Failed repl. pump.	A. Repair or replace repl. pump.
	B. Dirty pump valves.	B. Clean.
	C. Failed repl. relay.	C. Replace relay.
	D. Clogged repl. line	D. Clean or replace.
	E. Replenishment Calibration incorrect.	E. Correct value in program.
	F. Kinked repl. hose.	F. Straighten.
	G. REPL Rate @ 0	G. Program higher value.

Troubleshooting Processor Problems

Symptom	Probable Cause	Remedy
18. DEV. or FIX repl. amount not correct.	A. Dirty replenisher pump valves. B. Failed repl. pump.	A. Clean or replace. See Service Procedure 5-3 B. Repair or replace repl. Pump.
19. No OXI Replenishment.	A. OXI value not in replenishment program.	A. Re-program.

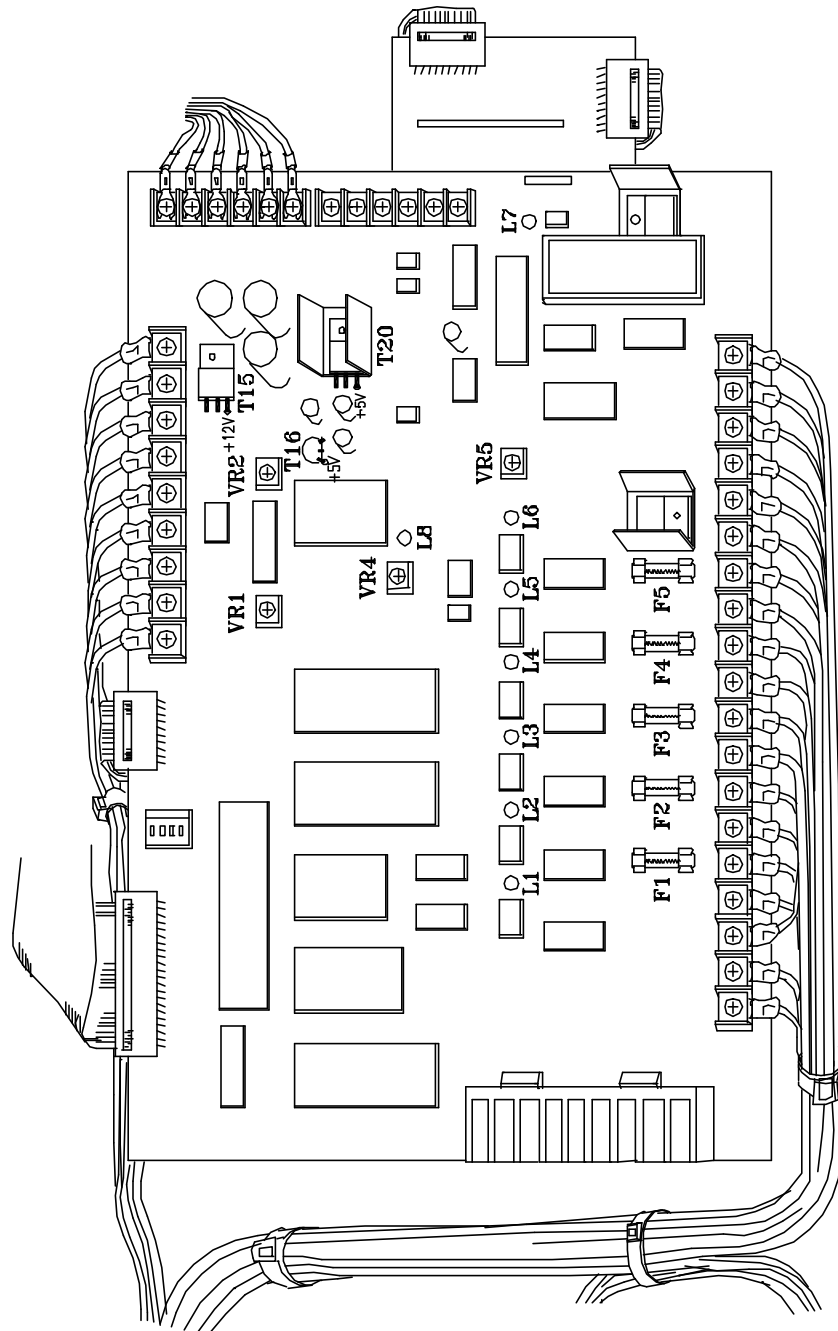


Figure 5-1. Power Mother Board

Motherboard Functions & Calibration Service Procedure 5-1

The following describes the various service functions found on the TS-8909-2 motherboard, located under the feed tray of the processor. See Figure 5-1, Page 5-8.

Please note that if this board requires replacement that it may have an exchange value, and that such exchange value may be voided if any field repairs are made to components on the board.

Power Supplies

The following nominal power supply voltages are found as indicated on the board:

1. Connector CD, AC Power Supplies

Remove and measure at the plug connector for two center tapped AC voltages, 13-0-13 and 9-0-9 as marked on the board. If either voltage is not found check transformer PT-1004.

2. DC Power Supplies, Test Points T15-T20

Check for the following voltages between the indicated test points.

T15	+12 VDC
T16	+ 6 VDC
T20	+ 5 VDC

3. Voltage Regulator

A 5 volt dc voltage regulator is located next to connector CD.

Calibration Potentiometers

The following calibration potentiometers are located on the motherboard. See the specific calibration procedure for each potentiometer before attempting any adjustments.

VR1	Calibration for DRYER Temp Display.
VR2	Calibration for DEVELOPER Temp Display.
VR4	Drive motor sensor sensitivity.
VR5	Drive motor ‡Stop‡ adjustment for night mode.

Motherboard Function & Calibration Service Procedure 5-1, Cont.

LED Indicators

The following LED indicator lights are located on the motherboard and indicate the operation of the following functions:

L1	DEV Heat ON
L2	DRY Heat ON
L3	Wash Water Solenoid ON
L4	Replenishment Pump ON
L5	Circulation Pump ON
L6	Dryer Fan ON
L7	Not Used
L8	Drive Motor Sensor ON (Flashes with each pulse)

FUSES

The following fuses are located on the motherboard, protected loads are indicated.

F1	Drive Motor Power Supply
F2	Wash Water Solenoid
F3	Replenishment Pump
F4	Circulation Pump
F5	Dryer Fans

Calibration Procedures

Developer Temperature Display Adjustment

NOTE: VR3 is factory set and should not be readjusted in the field.

1. Place a metal thermometer in the developer solution.
2. Adjust VR2 until Dev. Temp. display agrees with thermometer.

Drive Motor ‡Stop‡ mode for Night Operation

When using the night function the drive motor will stop in standby mode. If the motor does not stop, adjust as follows:

1. Put the processor in NIGHT mode by pressing Key [9] on the touchpad.
2. Turn VR5 clockwise until the drive motor runs. Then slowly turn counter-clockwise until the motor stops turning. Place your hand on the motor, if it is humming or vibrating slightly it is not completely stopped. After finding the completely stopped position, turn VR5 one additional index number counter-clockwise.
3. The VR5 should not be adjusted too tight. The motor should run slowly and smoothly when the processor is put back to the DAY mode.

Drive Motor Sensor Sensitivity

If the sensitivity on the drive motor sensor is set too high or too low erratic operation of the speed control or the replenishment circuit will occur. Adjust to the correct sensitivity as follows:

1. With the drive motor in process mode, adjust VR4 clockwise and then counter-clockwise to find the upper and lower limits of consistent flashing of LED L8, center VR4 between the two extremes.

Drive Chain Service Procedure 5-2

The drive chain between the gear reduction unit and the drive shaft requires only minimal maintenance.

Once a Year:

1. With the Processor power OFF, inspect the tension in the drive chain. There should be no more than 6mm (1/4 $\frac{1}{2}$) of movement on the slack side.
2. If necessary, loosen the four motor attaching screws and adjust the chain.
3. Using a stiff bristled brush and a cloth, dean excessive lubricants and residue off the chain. Rotate the driveshaft by hand to reposition the chain for cleaning.

Lightly lubricate the cleaned chain with the #4 lubricant included with the processor. Take care not to over lubricate as excessive oil will collect dirt and dust residue, reducing the life expectancy of your drive chain.

Cleaning & Servicing

Replenisher Pumps

Procedure 5-3

Deep tank processors utilize a single bellow type pump to deliver replenisher to the developer and fix tanks. The following steps will correct most problems that may occur.

Pumps run, but deliver little or no chemistry

1. Check lines. Inspect replenishment lines between replenisher tanks and pump inputs for kinks or other damage. Disassemble and clean in-line filter(s) if installed.
2. Replenishment lines should not be lengthened, nor should the tanks be positioned such that more than 1.2 meters of chemical lift is required.
3. The pumps will not function if either of the check valves in each pump is obstructed with debris or crystallized chemistry.
 - A. If the pump delivers only a small amount of chemistry, try cleaning its check valves in place. Place the pump's pickup in a container of warm water, not over 49 degrees C. (120 degrees F.) and activate the Manual Replenishment function (key [7]) to activate the pumps. The warm water will usually remove hardened chemical residue.

(Continued on Next Page)

These two parts shall not be placed in opposite directions, also, they should not be clogged by foreign material. Flow to Processing Tank from Replenishment Tank

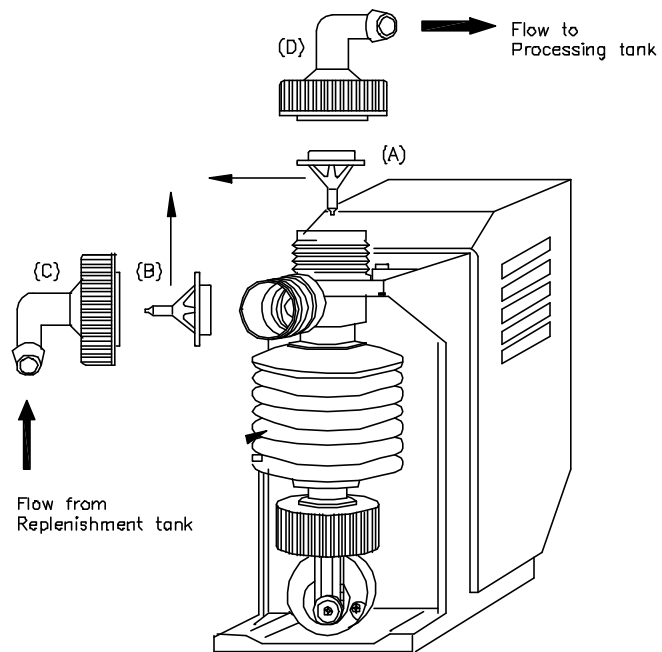


Figure 5-2. Replenishment Pump Valves

Cleaning & Servicing

Replenisher Pumps Procedure 5-3, cont.

- B. Stubborn deposits and larger pieces of foreign material may require removal and cleaning of the valves and connectors.

Remove inlet and outlet connectors, as shown in Figure 5-2 to remove the valves.

Clean the valves, using hot water if necessary, to remove any chemical residue. Older valves may need to be replaced.

When assembling, be sure to install the pump valves exactly as they were removed, so that the ~~pointed~~ end of the valve points opposite the desired direction of flow.

Caution:

The segregation view of replenisher pump (see Fig. 5-2) (A)(B) are valves which are located in different directions at the exit of water-out and the entrance of water-in, never place them in the wrong way, otherwise, the solutions will fail to be replenished. Also, the valve itself shall not be clogged by any tiny foreign material to prevent the solutions from flowing in reverse, that is, the solutions flow in reverse flow to replenishment tank from the pump.

The interior structure of (C)(D) are different, never place them in reverse.

Pumps do not run, either for manual or automatic replenishment

1. Verify that fuse F3 has not failed.
2. Inspect for proper operation of the replenishment relay. Press key [7] to operate the relay. LED L4 should light indicating a signal has been sent to the pump relay.
3. 196-264 VAC to the pump will be found on Connector CE, Pins 13 & 14 if the relay is good.

Cleaning & Maintaining

Developer & Fixer Circulation Pumps Procedure 5-4

The developer and fixer circulation pumps, located below the wet section tanks, require periodic disassembly and cleaning. Do this when indicated in Preventive Maintenance or as required.

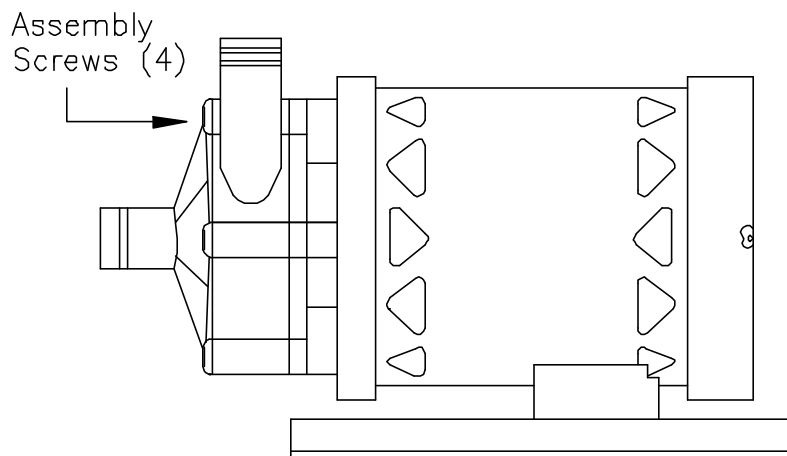


Figure 5-3. Circulation Pump

1. Drain all chemicals from the system being serviced or clamp off all lines leading to the pump head being serviced.
2. Place towels under the pump head being serviced. Carefully loosen and remove the assembly screws that hold the pump head to the adapter housing, as shown in figure 5-3.
3. Carefully remove, and then disassemble, the pump head, impeller and outer housing, taking care to note the position of all parts and spacers.
4. Soak all removed parts in warm water, then clean all surfaces with a cloth and/or stiff brush.
5. Carefully remove and clean the seal on the pump head.
6. Spin the impeller, it should turn freely, if not, clean as necessary.
7. Re-assemble the removed parts. Make sure the seal is properly seated on the pump head housing, then replace the head on the pump.
8. Re-install the pump head and check for leaks, first with the pump static, then operating.

Cleaning & Maintaining

Washer Valve Procedure 5-5

The water-in valve, if a massive foreign material is passing by, will happen to clog and fail to control its function that results in water leak or flow difficulty inside the valve. Please dismantle it properly and clean the foreign material away (as shown in Fig. 5-4). This part is easily blocked by foreign material and result in malfunctioning.

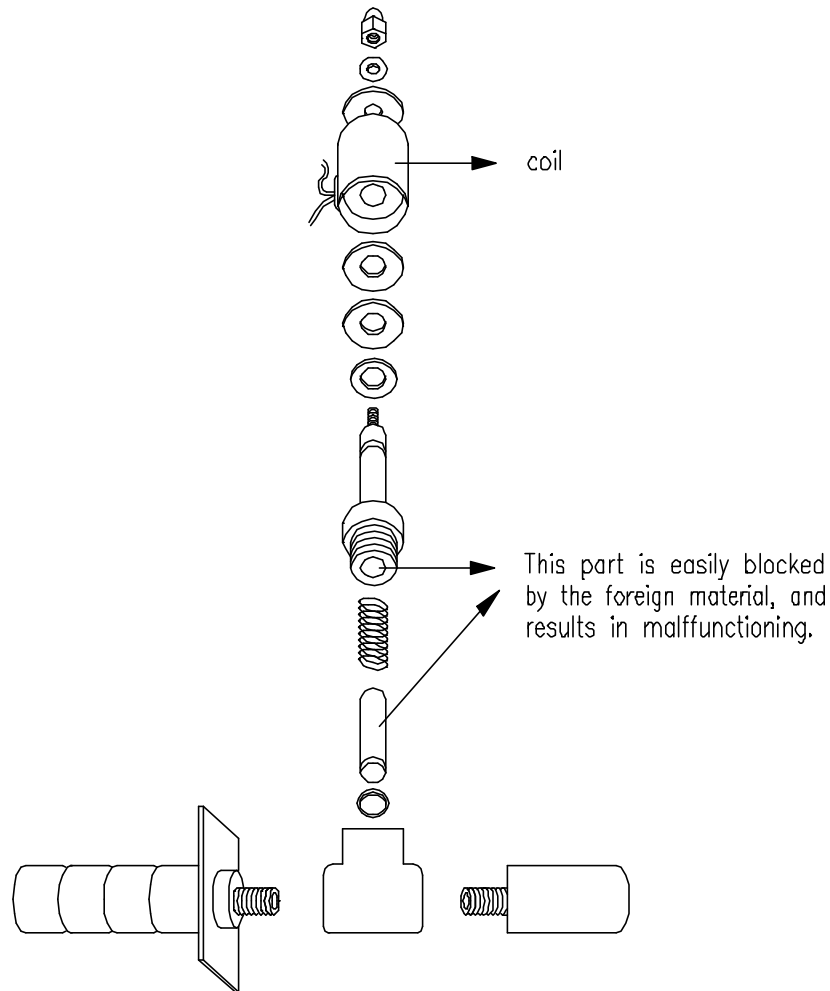


Figure 5-4. Water Valve

Reset & Servicing Heater Protection Procedure 5-6

A. DEVELOPER HEATER PROTECTION SYSTEM

There are two systems to protect developer heater.

1. The safety buzzer will be sound when the temperature of developer system is higher than 45°C, and the display will show ERR.01.

You need to verify the circulation pump fails or something is clogged in circulation pipe.

2. There is a heater protector NO.1 located on the left side of Develop tank. It automatically shuts off the heater power when the temperature of Developer exceeds 50°C. When the developer temperature cools back to 40°C, the heater protector will turn on the heater power again.

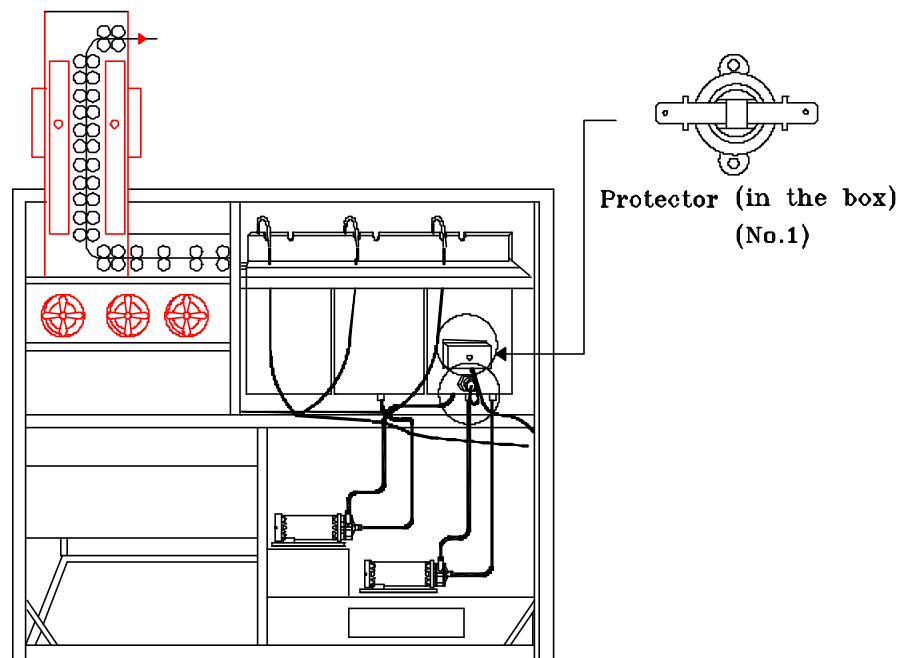


Figure 5-5. Dev. Fix Klixon

Reset & Servicing

Heater Protection Procedure 5-6 (Continued)

B. DRYER HEATER PROTECTION SYSTEM

There are two systems to protect dryer heater.

1. The safety buzzer will be sounded when the temperature of dryer system is higher than 70°C, and the display will show ERR.02.

You need to verify (A) the fan fails.

2. The heater protector will be shut off dryer heater power automatically when the protection system is failed and the temperature of dryer system is higher than 104°C.

You need to verify (A) the dryer temperature sensor fails (B) the fan fails.

Functions of dryer overheated protection:

Automatically operates at 104°C to shut off heater power . Automatically restore the heater functions when temperature cools down below 85°C.

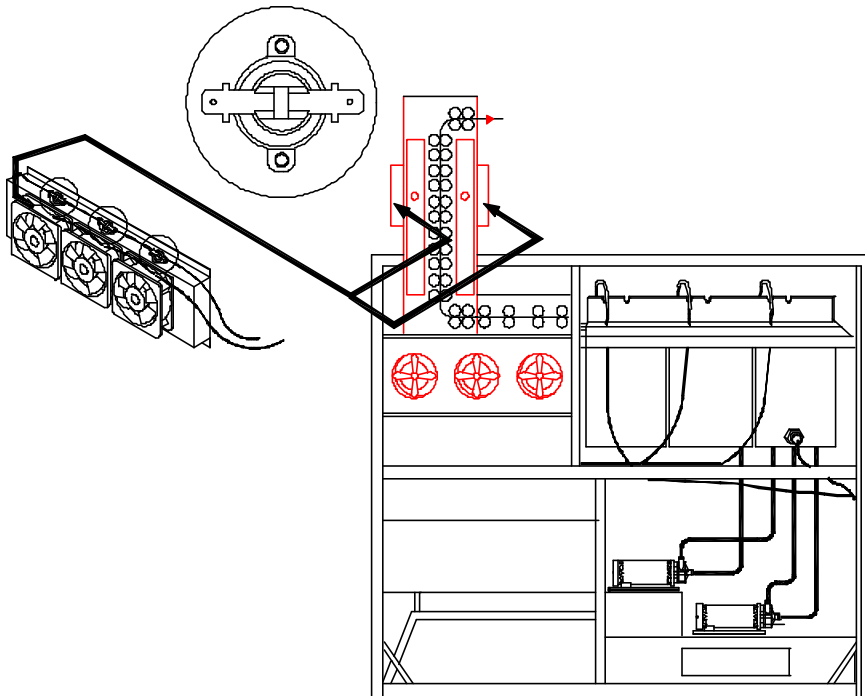


Figure 5-5. B Dryer Klixon

Schematics & Wiring Diagrams,

Procedure 5-7

The following are the wiring diagrams for DEEP TANK Processors.

Included are the following:

- Figure 5-6 Keypad Components, TS-8904
- Figure 5-7(a) Microswitch Feed In Sensor (For off-line only)
- Figure 5-7(b) Microswitch Feed In Sensor (For on-line only)
- Figure 5-8 Reciprocal Fix & Replenisher Board, TS-9108-1
- Figure 5-9 Daylight & Rewash Display & Control Unit (Optional) , TS-9007
- Figure 5-10 Motherboard Layout, TS-8909-2
- Figure 5-11(a) Wiring diagram/without Daylight Feed System(For off-line only)
- Figure 5-11(b) Wiring diagram/without Daylight Feed System(For on-line only)
- Figure 5-12(a) Wiring diagram/with Daylight Feed System (For off-line only)
- Figure 5-12(b) Wiring diagram/with Daylight Feed System (For on-line only)
- Figure 5-13 AC Power Schematic
- Figure 5-14 Main Control Box Parts Diagram
- Figure 5-15(a) Schematic, Motherboard & Keypad
- Figure 5-15(b) Schematic, Motherboard & Keypad
- Figure 5-16 Dryer Heater Connection Diagram

Keypad Components

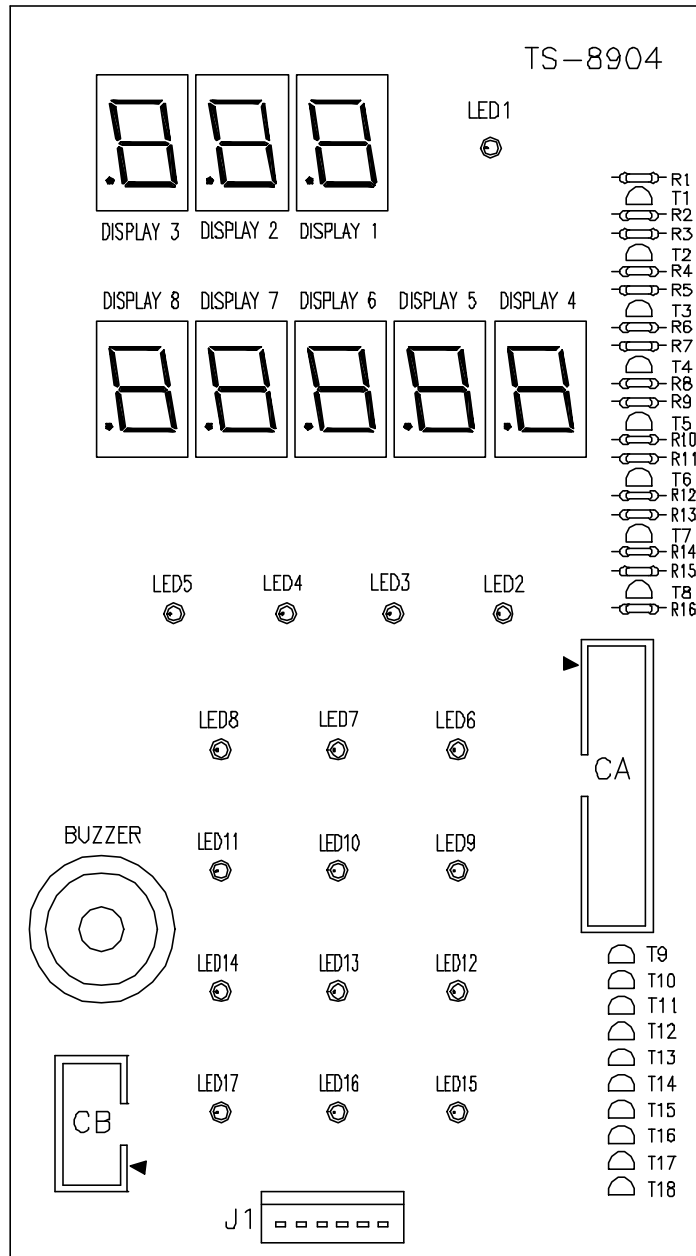
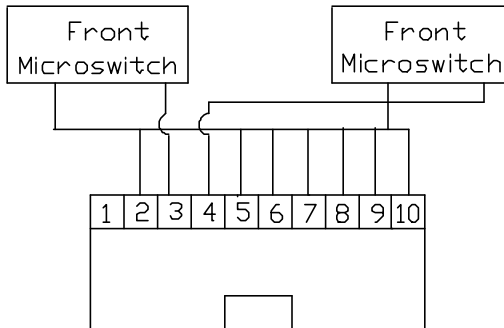
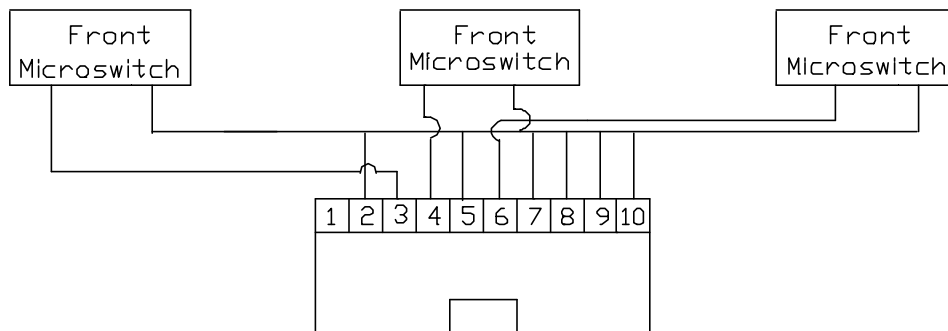


Figure 5-6. Components, Keypad, TS-8904

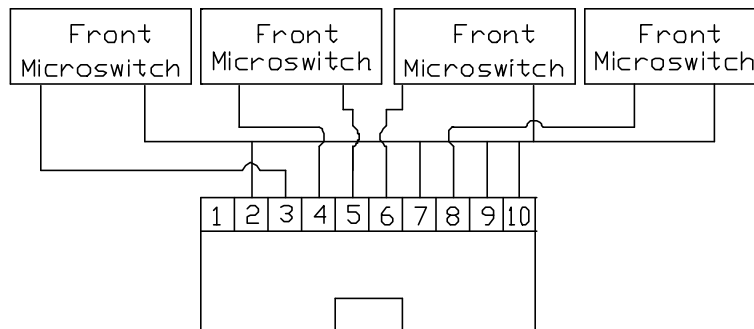
Microswitch Feed In Sensor Connection



2 MICROSWITCH SENSOR- For MX 1724, MX2224
and MX1729, MX2229



3 MICROSWITCH SENSOR- For MX2724, MX3224
and MX2729, MX3229



4 MICROSWITCH SENSOR- For MX3724, MX4224, MX4524
and MX3729, MX4229, MX4529

Figure 5-7(a). Microswitch Feed In Sensor(For off-line only)

Microswitch Feed In Sensor Connection

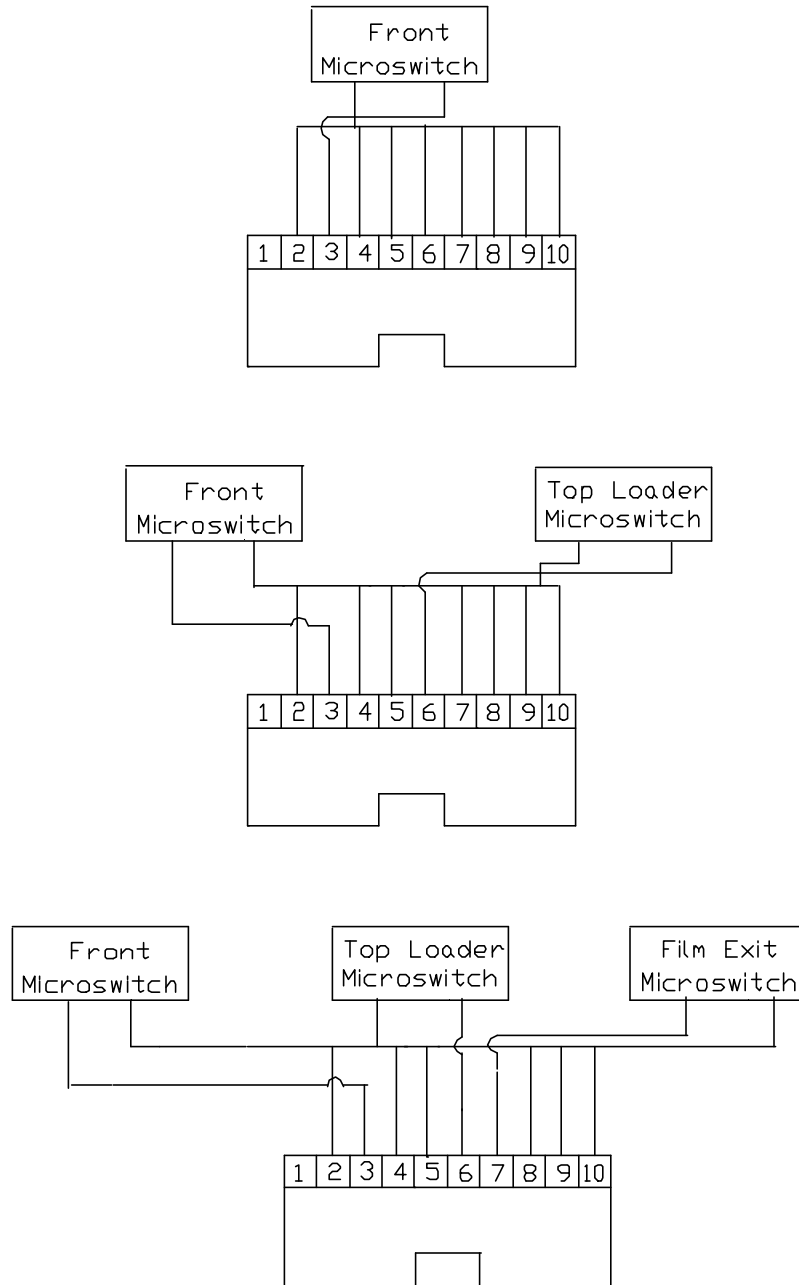


Figure 5-7(b). Microswitch Feed In Sensor (For on-line only)

Reciprocal Fix & Replenisher Board Circuit Card

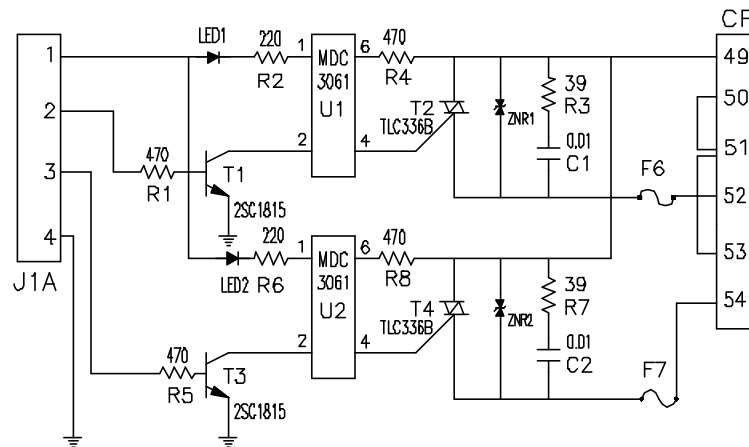
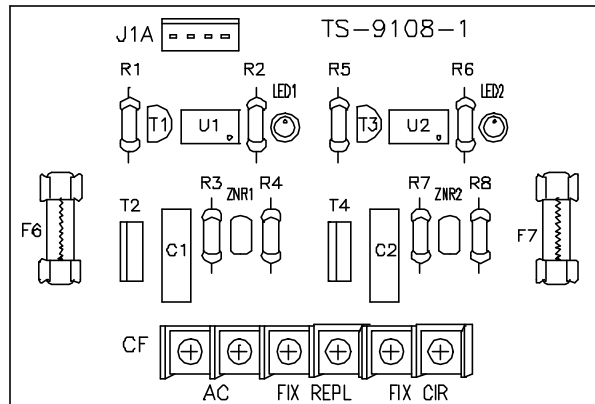
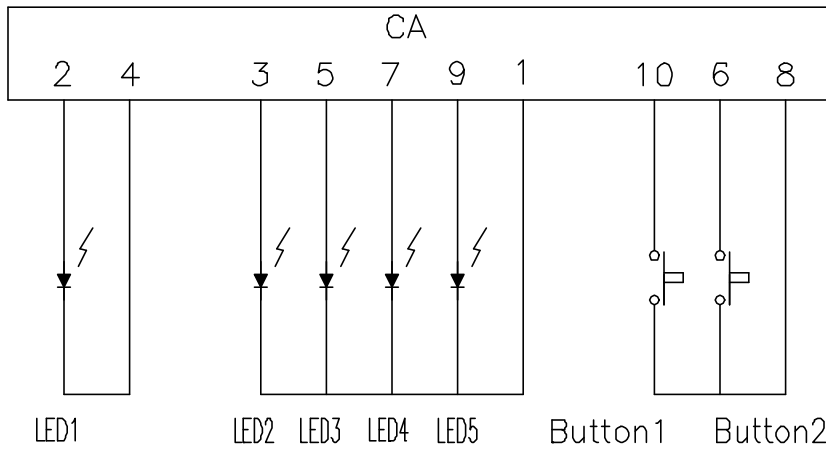
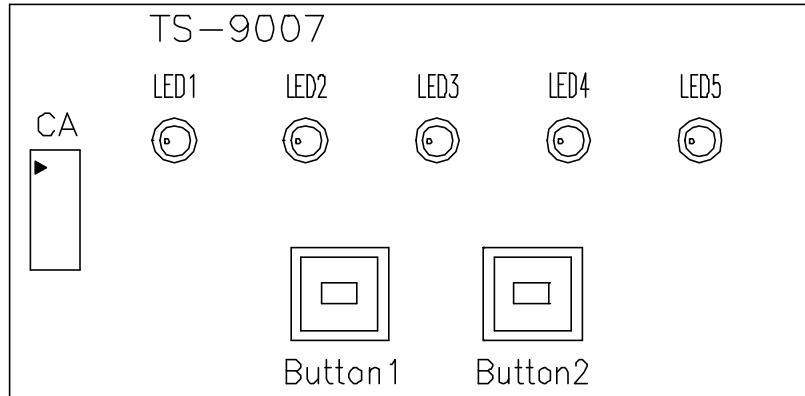


Figure 5-8. Reciprocal Fix & Replenisher Board , TS-9108-1

**Daylight & Rewash Display
& Control Unit (Optional)**



TS-9007 DIAGRAM

Figure 5-9. Daylight & Rewash Display & Control Unit (Optional) , TS-9007