



WL4

HEATED STRIP TANK

Installation, Operation & Maintenance Manual

For Water & Solvent Based Stripping Applications



Earlier build shown; current tanks use a torsion-spring lid hinge.

Model: WL4-SD

2000W Total Heater Power | 240VAC Single Phase | Single Main Disconnect

Document Revision 3.1 · October 2026

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Revision History

Revision	Date	Changes
2.1	May 2026	Photo-integrated edition.
3.0	October 2026	Single main disconnect (the separate heater disconnect is removed); model designator WL4-SD (was WL4-DD). Section 12 replaced by the Rev D wiring drawing set: RL2 fed through K2 common, flasher 0 V return added, temperature probe wiring added, alarm light on L2 (no neutral), common-feed tags L1-T1A-CRM-18 and L1-T1A-COM-18. Snap disc 205°F auto-reset; low-temperature alarm 150°F; 12 AWG minimum supply wire. Torsion-spring lid hinge, drip guard, side and bottom drains with 7-gauge reinforcement pads. Corrected controller key names, schedule example, troubleshooting, figure captions and page numbers.
3.1	October 2026	Controller described as on/off with a differential (not PID); the 200°F high-temperature setting is an alarm, not a heater cutoff. Controller procedures (passcode, setpoint, schedules, alarms, tests) follow Genesis manual 44-0371. Thermistor table corrected to the Genesis 80-0319 data sheet ($\approx 10.0\text{ k}\Omega$ at 180°F); Section 12 is drawing Rev E. Added: SDS and flash-point guidance, first startup and checkout (5.5), lockout notes for the energized supply terminals, annual alarm, snap disc and temperature checks, heater-to-ground test, tank capacity and minimum level, weekend use of setback schedules, contact details. Heat-up time given for solvent and water-based solutions; site ambient 50–95°F. Figures renumbered (the cover photo is no longer Figure 1).

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1. GLOSSARY OF TERMS

This glossary defines technical terms, abbreviations, and component references used throughout this manual. Familiarize yourself with these definitions before proceeding to installation or operation sections.

1.1 Electrical Terms

Term	Definition
AC (Alternating Current)	Electrical current that reverses direction periodically. The WL4 operates on 240VAC.
AWG (American Wire Gauge)	Standard for measuring wire diameter. Lower numbers indicate larger wire. The WL4 uses 10–22 AWG wire.
Breaker	Automatic switch that interrupts current flow when amperage exceeds its rating. Protects circuits from overload.
DC (Direct Current)	Electrical current flowing in one direction. The indicator circuit uses 12VDC from the controller.
Differential	The band around the setpoint within which the on/off controller switches the heat call on and off. Set in the controller SETPOINT menu (0.1–7.0°F).
DPDT (Double Pole Double Throw)	Relay with two independent switch mechanisms, each with common, normally open, and normally closed contacts.
Form C	A relay contact set with a common, a normally open, and a normally closed terminal.
Ground	Electrical connection to earth providing a safety path for fault currents.
L1, L2	Line 1 and Line 2: the two hot legs of 240VAC single-phase power. There is no neutral conductor.
Lockout	Locking a disconnect in the off position so equipment cannot be energized during service.
N.C. (Normally Closed)	Contact that is closed (conducting) when the relay or switch is de-energized.
N.O. (Normally Open)	Contact that is open (non-conducting) when the relay or switch is de-energized.
On/Off Control	Control method that switches heat fully on below the setpoint and fully off above it, within the differential. The WL4 controller works this way.
SPST-NO	Single Pole Single Throw, Normally Open. Simple relay with one switch that is open when de-energized.
SSR (Solid State Relay)	Electronic switch with no moving parts. Controls heater power via semiconductor switching.

1.2 Component Abbreviations

Abbreviation	Component	Function
BH	Breaker, Heater	13A double-pole breaker protecting the heater circuit
BR	Breaker, Control	5A double-pole breaker protecting the control circuit
CE	Ceramic Terminal	High-temperature terminal block in the secondary enclosure
CSA	Current Sensor A	1A trip point sensor detecting any heater current

Abbreviation	Component	Function
CSB	Current Sensor B	6A trip point sensor detecting full heater load
CT	Controller	Genesis Wizard WHMC temperature controller (two-probe version)
CTRA	Controller Alarm Relay	Relay K1 (form C); switches the red alarm light on top of the main enclosure
CTRH	Controller Heater Relay	Relay K2 (form C) controlling the heat call signal
DS	Main Disconnect	Lockable 2-pole rotary switch; the only disconnect on the WL4
F1	Fuse 1	1A fast-blow fuse protecting the 12VDC indicator circuit
FL	Flasher	LSC-100B module providing flashing output for fault indication
FMC	Flexible Metal Conduit	Vapor-tight conduit carrying conductors between enclosures
GM	Ground Main	Main ground bus bar
H1, H2	Heater 1, Heater 2	1000W strip heaters (2 total)
P1, P2	Temperature Probes	Redundant 100K NTC thermistor probes on the tank wall
RL1	Relay 1	DPDT relay energized when heat is called
RL2	Relay 2	SPST-NO relay energized when heat is NOT called (fault detection)
SD	Snap Disc	Mechanical high-temperature safety cutoff (N.C., opens at 205°F, auto-reset)
SSR	Solid State Relay	Switches heater power on and off
T1, T1A, T1B	Terminal blocks	240VAC power distribution terminal blocks
T2A, T2B, T2R	Terminal blocks	12VDC indicator circuit terminal blocks

1.3 Chemical Terms

Term	Definition
MEA (Monoethanolamine)	Common component in stripping solutions. Attacks common gasket materials and produces corrosive vapors that damage copper.
NMP (N-Methyl-2-pyrrolidone)	A common stripping solvent. Excellent solvent properties but attacks many plastics and elastomers.
KOH (Potassium Hydroxide)	Caustic additive enhancing stripping action. Highly alkaline.
Flash Point	The lowest temperature at which a liquid gives off enough vapor to ignite. Listed in Section 9 of the solution's SDS.
SDS (Safety Data Sheet)	The supplier's data sheet for a chemical: hazards, flash point, PPE, handling, first aid and disposal.
Sludge	Accumulated coating residue that settles at the tank bottom during stripping operations.

1.4 Materials and Ratings

Term	Definition
17-7 PH Stainless Steel	Precipitation-hardening stainless steel. Used for the lid torsion spring.
304 Stainless Steel	Common stainless alloy with good corrosion resistance. Used for the tank structure.
316 Stainless Steel	Marine-grade stainless with enhanced corrosion resistance. Used for wetted fittings.
Calcium Silicate	Rigid, non-wicking insulation material. Will not absorb chemicals.
ePTFE (Expanded PTFE)	Chemically inert gasket material resistant to MEA and NMP.
FFKM (Perfluoroelastomer)	High-performance elastomer combining chemical resistance with flexibility.
Glass-filled PTFE	PTFE reinforced with glass fiber for wear resistance. Used for the lid hinge bushings.
Mineral Wool	Fibrous insulation material. Non-combustible, does not absorb moisture.
NEMA 4X	Enclosure rating indicating protection against water, dust, and corrosion.
NTC Thermistor	Negative Temperature Coefficient sensor. Resistance decreases as temperature increases.
PTFE (Polytetrafluoroethylene)	Chemically inert fluoropolymer. Resistant to virtually all chemicals.
TGGT	Teflon-Glass-Glass-Teflon. High-temperature wire insulation type.

2. SAFETY INFORMATION

Read and understand all safety information before installing, operating, or servicing this equipment. Failure to follow safety instructions may result in serious injury, death, or equipment damage.

2.1 Hazard Identification

- ⚠ WARNING:** ELECTRICAL HAZARD: This equipment operates at 240VAC. Contact with energized components can cause severe injury or death. Always open and lock out the main disconnect before servicing.
- ⚠ WARNING:** THERMAL HAZARD: Tank surfaces and solution reach 180°F (82°C) during operation. Contact causes severe burns. Allow equipment to cool before maintenance.
- ⚠ WARNING:** CHEMICAL HAZARD: The stripping solution may contain chemicals such as MEA, NMP, or KOH. These chemicals are corrosive and produce harmful vapors. Use appropriate PPE including chemical-resistant gloves, safety glasses, and respiratory protection. Ensure adequate ventilation.
- ⚠ WARNING:** FIRE HAZARD: Many stripping solutions are combustible. Before first use, and whenever you change solutions, review the Safety Data Sheet (SDS) for the solution you are using: its flash point, recommended operating temperature, PPE, ventilation and storage requirements. Never set the controller to heat a solution to or above its flash point.

The standard snap disc (205°F) is selected for solutions operated at about 180°F, such as NMP- or benzyl alcohol-based strippers. A solution that must run cooler can be fitted with a lower-temperature snap disc; contact US Strip Tank (see the Table of Contents page).

2.2 Personal Protective Equipment

The following PPE is required when working with this equipment, in addition to any PPE the solution's SDS requires:

Task	Required PPE
Normal Operation	Safety glasses, chemical-resistant gloves when handling parts
Solution Handling	Face shield, chemical-resistant gloves, chemical apron, respiratory protection
Electrical Service	Insulated gloves rated for 240VAC, safety glasses
Tank Maintenance	Face shield, chemical-resistant gloves, chemical suit, respiratory protection

2.3 Safety Systems Overview

The WL4 incorporates multiple safety systems to protect personnel and equipment:

2.3.1 Redundant High-Temperature Protection

Two independent systems guard against overtemperature. The controller drops the heat call when the solution reaches setpoint, and turns on the red alarm light and its buzzer if the temperature stays above the 200°F high-temperature alarm for longer than the alarm delay. The alarm does not switch the heaters off. The mechanical snap disc is the hardwired cutoff in the heater power path: it opens at 205°F regardless of controller status and resets automatically when it cools.

The controller acts through the SSR. If the SSR fails shorted, the snap disc is the only cutoff, and the heaters will cycle on it until the fault is corrected. The flashing RED LED (Section 2.3.2) identifies this condition.

2.3.2 SSR Failure Detection

A hardwired relay logic circuit detects SSR failure independent of the controller. If current flows through the heaters when the controller is not calling for heat, the RED indicator flashes to alert the operator. This detection works even if the controller malfunctions.

2.3.3 Main Disconnect

The lockable main disconnect (DS) is the only disconnect on the WL4. Opening it removes power from both the control circuit and the heater circuit. Open and lock out the main disconnect before any work on heater wiring, the snap disc, or the ceramic terminals.

The heater breaker (BH) can be switched off to stop heating while the controller stays powered for scheduling and status, but it is not a lockout point.

⚠ WARNING: The SSR and the snap disc switch L1 only. Whenever the main disconnect and the heater breaker are closed, the heater terminals remain connected to L2 (120V to ground), even when the SSR is off or the snap disc is open.

⚠ WARNING: The supply (line-side) terminals of the main disconnect stay energized when it is open. To work on them or on the supply wiring, lock out the facility breaker that feeds the tank. After any lockout, verify zero voltage with a meter before touching a conductor.

2.3.4 Circuit Protection

Separate breakers protect the control circuit (5A) and heater circuit (13A). A 1A fuse protects the 12VDC indicator circuit. These devices interrupt power before wiring or components are damaged by overcurrent conditions.

3. SYSTEM DESCRIPTION

3.1 Intended Use

The WL4 Heated Strip Tank is designed for heating water or solvent-based coating stripping solutions to their optimal operating temperature of 180°F (82°C). The system is specifically engineered for solvent or water based chemical stripping solutions that are either alkaline or acid activated.

Metal parts (aluminum and steel) are lowered into the heated solution where old coatings are chemically removed. Stripped coating material settles to the tank bottom as sludge for periodic removal.

NOTE: This equipment is intended for industrial use only. Do not use for food preparation, medical applications, or any purpose other than coating removal.

3.2 System Architecture

The electrical system uses a two-rung architecture that separates control and power circuits for safety and serviceability. Both rungs are fed from the single lockable main disconnect.

3.2.1 Rung 1: Control Circuit (5A Breaker)

The control circuit provides always-on 240VAC power to the Genesis controller, current sensors, indicator relay coils, alarm light, and SSR control input. This circuit remains powered whenever the main disconnect is closed, allowing controller programming and status monitoring even when the heater breaker is off.

3.2.2 Rung 2: Heater Circuit (13A Breaker)

The heater circuit carries power through the heater breaker (BH), the SSR, and the snap disc safety to the strip heaters. Switching BH off stops heating without affecting the control circuit; for service, lock out the main disconnect. The heaters are wired in parallel, each drawing approximately 4.17A at 240VAC.

3.3 Major Components

3.3.1 Main Control Enclosure

The main enclosure is a NEMA 4X rated 304 stainless steel cabinet measuring 16" × 24" × 8". It houses the Genesis controller, main disconnect, breakers, SSR, relays, current sensors, terminal blocks, and indicator LEDs. A red alarm light on top of the enclosure is switched by the controller's alarm relay (Section 3.3.5). The enclosure mounts to the tank frame via standoff brackets, maintaining a 3" insulated gap from the inner tank exterior wall.



Figure 1. Control enclosure side of the WL4 tank. On the right-side cabinet: the red controller alarm light (top) and the main disconnect (yellow plate, red lockable handle). Earlier build shown: the black-handled heater disconnect above the main disconnect and the steel counterbalance lid arm have since been removed. Current tanks have a single main disconnect and a torsion-spring lid hinge. Also visible: the FFKM lid seal, the 3" PTFE-lined chimney vent, and forklift slots in the base.

All wiring between the main control enclosure and the secondary junction enclosure is routed through vapor-tight flexible metal conduit (FMC) sealed with NEMA 4X liquid-tight fittings. This protects the inter-enclosure conductors from corrosive vapors emitted by the heated stripping solution. See Figure 2.

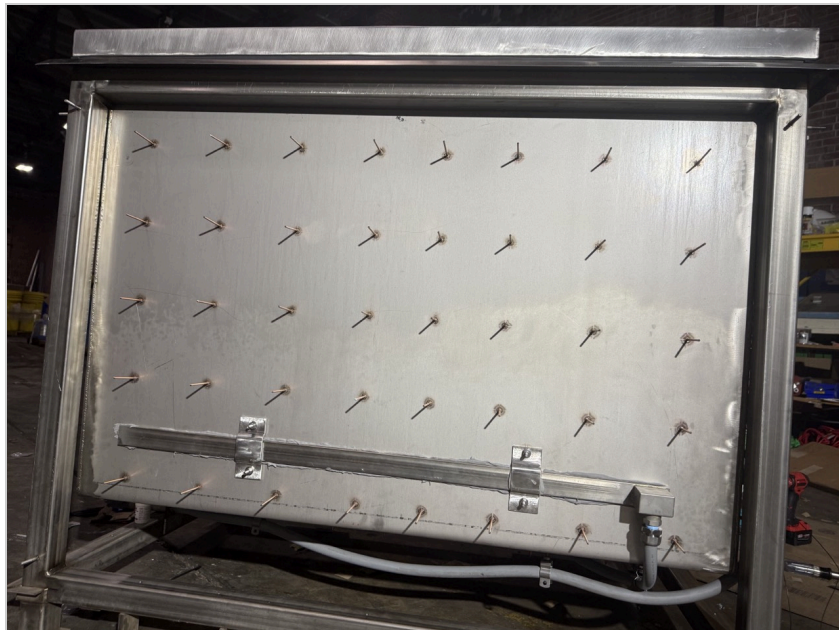


Figure 2. Vapor-tight flexible metal conduit (FMC) routing between the main control enclosure and the secondary junction enclosure behind the exterior paneling. The FMC carries the L1/L2 heater conductors, snap-disc safety wires, and ground from the main enclosure to the ceramic terminal blocks shown in Figure 4. Liquid-tight NEMA 4X fittings at each end maintain the ingress rating against splashing solution and corrosive vapor. The studded panel is the standoff/mounting structure that maintains the 3" insulated gap between the main enclosure back wall and the tank exterior.

3.3.2 Secondary Junction Enclosure

The secondary junction is a smaller NEMA 4X rated 304 stainless steel enclosure (Hammond 1414N4SSC4 or equivalent, Type 4X/4/13/12, IP66, 6" × 4" × 4") mounted on the outside of the inner tank wall, behind the exterior paneling. It is reached through a bolted service panel in the paneling (the "snap disc panel"), secured by four nuts on the same side of the tank as the main control enclosure (see Figure 3). Inside the smaller enclosure are the snap disc thermostat and ceramic high-temperature terminal blocks where heater leads transition from TGGT high-temperature wire to standard PTFE-insulated wire routed back to the main enclosure through vapor-tight FMC (see Figure 4).



Figure 3. Secondary junction enclosure panel ("snap disc panel"), next to the main control enclosure. The bolted stainless steel panel is secured by 4 nuts and provides service access to the smaller NEMA 4X enclosure that houses the snap disc and heater wire terminations. The red light on top of the main enclosure (upper left) is the controller alarm light. The panel is on the same side as the bracket/handle hook used for forklift handling. Earlier build shown with the steel counterbalance lid arm.



Figure 4. Interior of the secondary junction enclosure. Top: liquid-tight conduit fitting where the FMC bundle from the main enclosure enters; the red and black PTFE-insulated wires drop down to the snap disc. Center: snap disc thermostat (round disc, N.C., opens at 205°F, auto-reset) wired in series with the L1 heater hot path; yellow insulated crimp quick-connects secure the leads at the snap disc tabs. Lower left and right: ceramic high-temperature terminal blocks where TGGT-insulated heater leads (cloth-jacketed, white) transition to standard PTFE-insulated wires. Bottom: two liquid-tight conduit fittings where the heater leads exit toward the strip heaters. Hammond enclosure label (1414N4SSC4, Type 4X/4/13/12, IP66) visible at right.

3.3.3 Strip Heaters

Two 1000W strip heaters are mounted horizontally on the interior tank walls, 6" above the tank bottom. Each heater measures 40" long × 1.5" wide × 0.5" thick. Heater terminals are enclosed and epoxy-filled for moisture resistance.

3.3.4 Temperature Sensor (Redundant Probes)

Two 100K NTC thermistor probes (Genesis 80-0319) are mounted externally on the tank wall via lug connections inside a small NEMA 4X probe enclosure. Each probe reads solution temperature conductively through the 7-gauge (0.1793") stainless steel tank wall. Silicone thermal pads ensure good thermal contact between each sensor and the tank wall. Redundancy lets the controller cross-check readings: if the primary probe fails open or short, the controller can fall back to the secondary probe rather than tripping a SENSOR alarm and shutting down heating mid-shift. The WL4 controller is a two-probe version built by Genesis for this tank; Genesis manual 44-0371 describes the standard one-probe control.



Figure 5. Redundant thermistor probe enclosure on the tank exterior. Two lug-style probes are bolted to the stainless tank wall through silicone thermal pads (cream-colored backing). The blue-jacketed loop is the nickel-plated copper lead from one probe; the second probe attaches at the lower-left lug and is aluminum, galvanically separated from the stainless steel tank. Probe leads exit through a liquid-tight conduit fitting at the bottom of the enclosure and return to the controller via the vapor-tight FMC. Disconnect both leads before measuring resistance using the table in Section 4.4.

3.3.5 Genesis Wizard WHMC Controller

The Genesis Wizard Heat Modulation Control (WHMC) provides on/off temperature control with an adjustable differential, scheduling (20 weekly setback schedules plus 9 holiday schedules), a passcode lock, a log of the last four alarms, alarm outputs, and the 12VDC supply for the indicator circuit. Its real-time clock keeps time for up to 5 days without power. The controller's fan relay and 4–20 mA modulation output are not used on the WL4.

When the controller signals an alarm, its alarm relay (CTRA, relay K1) turns on the red alarm light on top of the main enclosure, and the controller sounds its buzzer and shows the cause on the display (see Section 7.4). Full menu details are in the Genesis manual (Part Number 44-0371).

3.3.6 Drain Valves and Vent

The tank has two 316 stainless steel ball-valve drains: a 1-inch side drain for routine liquid removal and a 2-inch bottom sludge drain for periodic removal of accumulated coating residue. Each drain fitting is welded to the tank through a 7-gauge reinforcement pad (a 6-inch pad on the 1-inch side drain and an 8-inch pad on the 2-inch bottom drain) for durability at the fittings operators handle most. The 3" chimney vent (PTFE-coated fiberglass) on top of the lid connects to facility exhaust. See Figure 6.

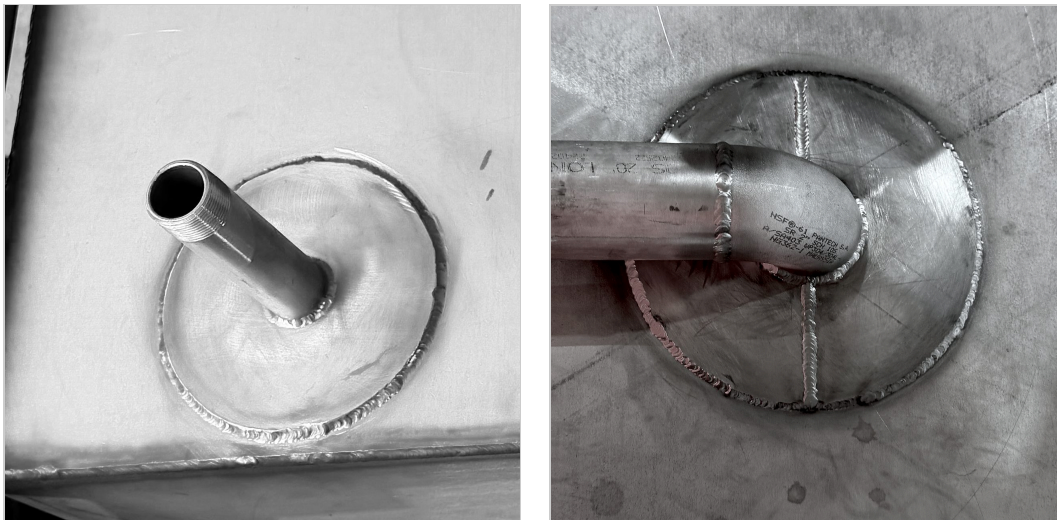


Figure 6. Drain reinforcement pads, shown during fabrication before the valves are fitted. Left: 1-inch side drain on its 6-inch 7-gauge pad. Right: 2-inch bottom sludge drain on its 8-inch 7-gauge pad.

3.3.7 Lid, Hinge, and Drip Guard

The insulated lid (welded-in calcium silicate) seals against the tank rim with an FFKM seal and carries the 3" chimney vent. It opens on a torsion-spring hinge: a 17-7 PH stainless steel spring running on glass-filled PTFE bushings assists opening and closing (Figure 7).

When the tank runs with the lid closed, heated solvent-based strippers can condense on the underside of the lid. A stainless drip guard flap below the lid edge redirects that condensate back into the tank, reducing operator exposure, chemical waste, and cleanup around the work area (Figure 8).

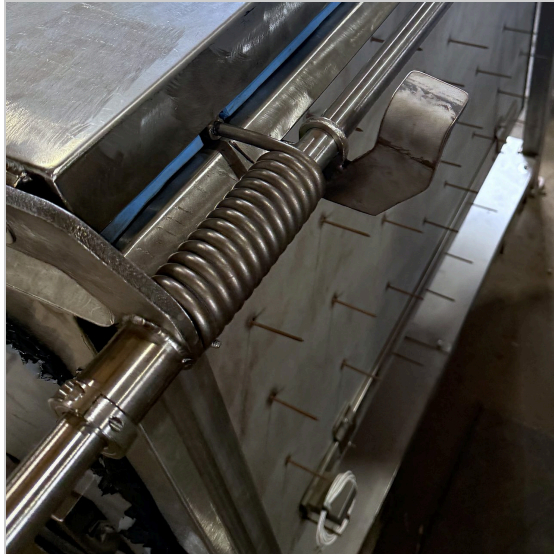


Figure 7. Lid torsion-spring hinge: 17-7 PH stainless steel spring on glass-filled PTFE bushings.



Figure 8. Stainless drip guard flap below the lid edge (lid open). Condensate on the underside of the lid runs onto the flap and back into the tank.

4. SPECIFICATIONS

4.1 Electrical Specifications

Parameter	Value
Input Voltage	240VAC Single-Phase, 60Hz
Supply Circuit	20A minimum, dedicated
Minimum Supply Wire Size	12 AWG copper (upsized for long runs)
Disconnect	Single lockable 2-pole main disconnect
Total Connected Load	2000W
Operating Current	8.33A (both heaters)
Per-Heater Current	4.17A
Control Circuit Breaker	5A Double-Pole
Heater Circuit Breaker	13A Double-Pole
Indicator Circuit Protection	1A Fast-Blow Fuse

4.2 Temperature Specifications

Parameter	Value
Normal Operating Temperature	180°F (82°C), and always below the solution's flash point (SDS)
Temperature Control	On/off with adjustable differential (0.1–7.0°F)
High-Temperature Alarm	200°F (93°C); alarm light and buzzer only
Low-Temperature Alarm	150°F (66°C)
Snap Disc Cutoff Temperature	205°F (96°C), auto-reset; lower ratings available (Section 2.1)
Maximum Solution Temperature	200°F (93°C)
Temperature Probes	Two Genesis 80-0319, 100K NTC (100 kΩ ±3% at 77°F)
Sensor Range	-58°F to 572°F (-50°C to 300°C)
Sensor Accuracy	±0.5°F (±0.3°C)

4.3 Physical Specifications

Parameter	Value
Inner Tank Dimensions	30" W × 48" L × 32" H (approximate)
Working Capacity	About 160 gallons at the fill line, 6" below the rim (about 200 gallons brim-full)
Minimum Solution Level	4" above the heaters: about 11½" from the tank bottom, or 20" below the rim
Tank Wall Thickness	7 Gauge (0.1793") 304 Stainless Steel
Main Enclosure	16" × 24" × 8" NEMA 4X 304SS
Secondary Enclosure	6" × 4" × 4" NEMA 4X 304SS
Sidewall/Bottom Insulation	3" High-Density Mineral Wool
Lid Insulation	Calcium Silicate (welded-in)
Lid Hinge	Torsion spring, 17-7 PH stainless, glass-filled PTFE bushings
Sludge Drain	2" bottom drain on 8" 7-gauge reinforcement pad
Side Drain	1" side drain on 6" 7-gauge reinforcement pad
Vent	3" Chimney with PTFE-Coated Fiberglass Vent

4.4 Thermistor Resistance Table

Use this table to verify thermistor operation. Disconnect sensor leads before measuring resistance. Values are from the Genesis data sheet for probe 80-0319 ($\approx$ = interpolated between listed points). If the temperature implied by the reading differs from a calibrated thermometer by more than 3°F, check the probe mounting and thermal pad, then the cable; replace the probe if both are good.

Temperature (°F)	Temperature (°C)	Resistance (kΩ)
32	0	353.7
68	20	126.8
77	25	100.0
104	40	50.96
122	50	33.49
140	60	22.51
150	65.6	$\approx$ 18.2
158	70	15.44
176	80	10.80
180	82.2	$\approx$ 10.0
194	90	7.686
200	93.3	$\approx$ 6.88
212	100	5.556

5. INSTALLATION

5.1 Site Requirements

Verify the following requirements are met before installation:

Requirement	Specification
Electrical Service	240VAC single-phase, 20A minimum dedicated circuit
Floor	Level concrete capable of supporting the tank plus about 160 gallons of solution
Ventilation	Exhaust connection for 3" chimney vent; minimum 100 CFM
Clearance - Sides	24" minimum for service access
Clearance - Front	36" minimum for parts loading
Ambient Temperature	50°F to 95°F (10°C to 35°C); the controller is rated to 99°F (37°C)
Solution SDS	On file at the tank before first fill (Section 2.1)

5.2 Positioning

1. Using a forklift rated for the tank weight, position the tank in the designated location using the integrated forklift slots.
2. Verify the tank is level in both directions using a spirit level on the tank rim. Shim as necessary.
3. Connect the 3" chimney vent to the facility exhaust system using appropriate PTFE-lined ductwork.

CAUTION: Do not move the tank when it contains more than one-third of its liquid capacity (about 55 gallons, a liquid depth of about 8½").

5.3 Electrical Connection

⚠ WARNING: Electrical installation must be performed by a qualified electrician in accordance with local codes and the National Electrical Code (NEC).

1. Verify incoming power is de-energized and locked out.
2. Route the supply conductors (12 AWG copper minimum on the 20A dedicated circuit; upsize for long runs) through the conduit entry on the main enclosure.
3. Connect L1 to the L1 terminal of the main disconnect, L2 to the L2 terminal, and ground to the ground bus (GM). There is no neutral connection.
4. Verify all connections are tight and torqued to the values marked on each device.
5. Close the enclosure and verify all covers and gaskets are properly seated.
6. Leave the main disconnect OPEN until the tank has been filled (Section 5.4).

⚠ WARNING: Never energize the heaters out of solution. With the factory 180°F setpoint, the controller calls for heat as soon as it is powered, so closing the main disconnect on an empty tank starts the heaters in air.

5.4 Initial Fill

⚠ WARNING: Wear appropriate PPE including face shield, chemical-resistant gloves, and respiratory protection when handling stripping solution.

1. Review the SDS for the solution (Section 2.1) and confirm the 180°F setpoint is suitable for it.
2. Verify both drain valves (2-inch bottom sludge drain and 1-inch side drain) are closed.
3. Open the lid.
4. Slowly fill the tank with stripping solution to the fill line, approximately 6" below the tank rim.
5. Close the lid, ensuring the FFKM seal is properly seated.

5.5 First Startup and Checkout

Perform this checkout after installation, with the tank filled. Controller menus are described in Section 7.

1. Confirm the solution is at least 4" above the heaters (Section 4.3).
2. Close the main disconnect and verify the heater breaker (BH) is on. The controller shows its startup message, then the date, time, mode, temperature reading and setpoint.
3. Unlock the controller (Section 7.2). In the CLOCK menu, set the time, date, year, day of the week and daylight saving.
4. Change the user passcode from the Genesis factory default (5) in the PASSCODE menu, and record it where authorized staff can find it.
5. Check the setpoint and alarm settings against Section 7.1 and the solution's SDS.
6. While the controller is calling for heat, verify the GREEN LED is on and, with a clamp meter, that the heater circuit draws about 8.3A.
7. In the TEST menu, set relay K1 to ON and verify the red alarm light on top of the enclosure lights. Press EXIT; forced relays return to automatic control.
8. Record the installation details in Section 13.1.

6. OPERATION

6.1 Control Panel Overview

The main control panel contains the following operator-accessible components:

Component	Location	Function
Main Disconnect (DS)	Lower left side of enclosure	Master power on/off; the only disconnect. Lockable.
Heater Breaker (BH)	Inside main enclosure	Turns heating off while the controller stays on. Not a lockout point.
Genesis Controller	Upper center panel	Temperature display, setpoint, programming
Alarm Light	Top of main enclosure	Lights when the controller signals an alarm
GREEN LED	Left panel	Normal heating, full load
YELLOW LED	Left panel	Degraded heating, one heater only
RED LED	Left panel	Fault condition (solid or flashing)

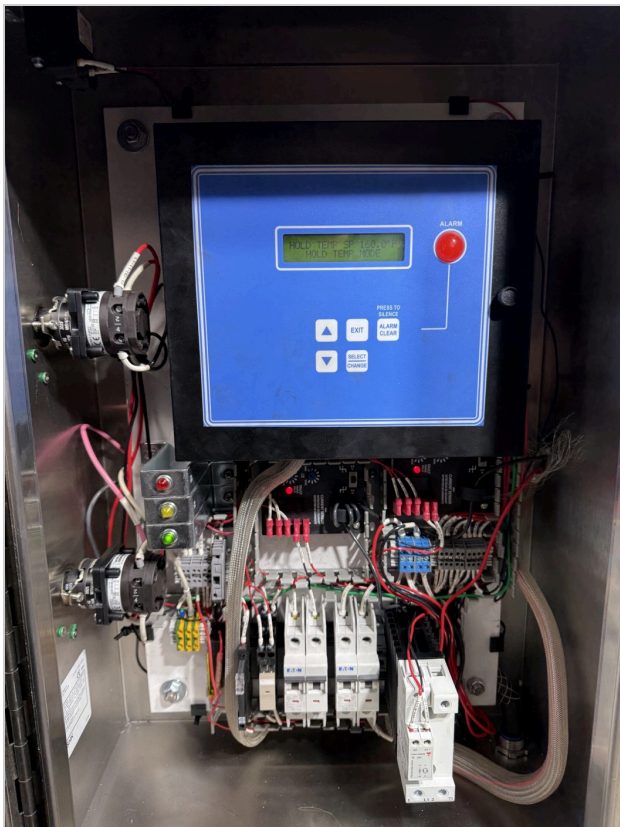


Figure 9. Inside the main NEMA 4X control enclosure. Top: Genesis Wizard WHMC controller (blue panel) with LCD display, UP/DOWN arrows, EXIT, SELECT/CHANGE and ALARM CLEAR keys, and red ALARM indicator. Middle left: rotary disconnect switches and the GREEN/YELLOW/RED status LEDs (Section 6.2). Earlier build shown with a separate heater disconnect (upper switch); current tanks have only the main disconnect (lower). Middle right and below: terminal blocks (T1/T1A/T1B), current sensors CSA (1A trip) and CSB (6A trip), RL1/RL2 indicator relays, control breaker BR (5A) and heater breaker BH (13A), and the SSR with heat sink at lower right. Conductor colors: red = L1 control, black = L2 control, white = 12VDC indicator returns.

6.2 LED Status Indicators

The LED indicators provide immediate visual feedback on system status:

LED State	Heat Called?	Current	Meaning	Action Required
GREEN	Yes	8.33A	Normal operation, both heaters running	None
YELLOW	Yes	~4.17A	Degraded operation, one heater failed	Schedule heater replacement
RED (solid)	Yes	0A	SSR open, snap disc tripped, heater breaker off, or open heater circuit	Check snap disc, SSR, heater breaker (BH), wiring
OFF	No	0A	Standby, temperature at setpoint	None; normal idle state
RED (flashing)	No	≥1A	SSR stuck closed: DANGER	DISCONNECT POWER IMMEDIATELY

⚠ WARNING: A flashing RED LED indicates the SSR has failed in the closed (conducting) position. Heaters are running uncontrolled. Disconnect power immediately using the main disconnect or facility breaker.

NOTE: While the controller holds temperature, the LED switches between GREEN (heating) and OFF (standby); both are normal. Solid RED is also expected whenever the heater breaker (BH) is switched off while the controller is calling for heat.

6.3 Startup Procedure

1. Verify the tank contains adequate solution: at least 4" above the heaters, which is about 11½" from the tank bottom or no lower than 20" below the rim. Solution can hide the heaters, so measure.
2. Verify the lid is in place and the exhaust system is operating.
3. Close the main disconnect. The controller will power on and display current temperature.
4. Verify the heater breaker (BH) inside the main enclosure is on.
5. Verify the controller setpoint is 180°F (82°C), or the temperature your solution's SDS allows.
6. The system will begin heating. The GREEN LED illuminates when heaters are energized; YELLOW or RED indicates a fault (Section 6.2).
7. Allow time to reach operating temperature from a cold start: about 10–12 hours for solvent-based solutions. Water-based solutions hold more heat and take roughly twice as long.

NOTE: A TEMP LOW ALARM is expected while the solution heats from cold and is below 150°F. Pressing ALARM CLEAR acknowledges it, but it returns after the alarm delay until the solution passes 150°F (Section 7.4).

6.4 Normal Operation

1. Verify the controller reading is at the setpoint (within the differential) and the LED is GREEN or OFF, not YELLOW or RED.
2. Open the lid. Parts may be loaded using appropriate handling equipment.
3. Lower parts into the solution slowly to minimize splashing. Use a basket or rack, and keep parts clear of the heaters on the tank walls and off the sludge on the tank bottom.
4. Allow parts to soak for the required stripping time (varies by coating type and thickness).
5. Remove parts and rinse according to your facility procedures.

6. Close the lid between loading cycles to minimize vapor loss and heat loss.

CAUTION: Never leave the tank operating unattended with the lid open.

6.5 Shutdown Procedure

At the end of each shift:

1. Remove all parts from the tank.
2. Close the lid and ensure it is properly seated.
3. Leave the main disconnect closed so the controller keeps temperature and runs its schedules.

For weekends and holidays, leave the main disconnect closed and let the setback and holiday schedules (Section 7.3) lower the temperature and bring it back before the next shift. Opening the main disconnect stops the schedules, and the tank must then heat from cold (Section 6.3).

For an extended shutdown or for service:

1. Open and lock out the main disconnect.
2. Allow the tank to cool completely before any maintenance.
3. On restart, if the controller has been without power for more than 5 days, reset its clock (Section 7.3) before relying on schedules.

7. CONTROLLER PROGRAMMING

The WL4 uses a Genesis Wizard WHMC controller, built by Genesis as a two-probe version for this tank. Genesis manual 44-0371 has the complete menu reference; it describes the standard one-probe control. This section covers the settings and procedures used on the WL4.

At the main display, ▲ and ▼ scroll through the menus (ALARM LOG, STATUS, SET MODE, TEST, SETPOINT, CONFIGURATION, CALIBRATION, CLOCK, PASSCODE and SCHEDULE). SELECT/CHANGE enters a menu or changes a value, and EXIT returns to the main display. The STATUS menu shows every current setting without unlocking.

7.1 Factory Default Settings

Parameter	Setting	Notes
Temperature Setpoint	180°F	Normal operating temperature; never at or above the solution's flash point
High Temperature Alarm	200°F	Alarm light and buzzer after the high-alarm delay; does not switch off heat
Low Temperature Alarm	150°F	Alarm light and buzzer after the low-alarm delay
Display Units	°F	May be changed to °C (CONFIGURATION menu)
User Passcode	5	Genesis factory default; change it at installation (Section 5.5)
Temperature Probes	2 × 100K NTC	Replace only with Genesis 80-0319

7.2 Unlocking and Setting the Temperature Setpoint

Settings can be changed only while the controller is unlocked; a change attempted while locked shows DENY. Unlocking lasts 120 minutes.

1. At the main display, press ▲/▼ to reach <PASSCODE MENU> and press SELECT/CHANGE.
2. Press SELECT/CHANGE, use ▲/▼ to enter the user passcode, and press SELECT/CHANGE. The controller enters UNLOCK MODE.
3. Press ▲/▼ to reach <SETPOINT MENU> and press SELECT/CHANGE. The first screen is TEMPERATURE SETPOINT.
4. Press SELECT/CHANGE, use ▲/▼ to set the value, and press SELECT/CHANGE to store it.
5. Press EXIT to return to the main display. To lock the controller at once, enter a wrong passcode in the PASSCODE menu.

The SETPOINT menu also holds the on-off differential, the setback, hold and holiday setpoints, and the high and low alarm setpoints and delays.

NOTE: Key names follow the controller front panel (Figure 9): ▲, ▼, EXIT, SELECT/CHANGE, and ALARM CLEAR.

CAUTION: Do not set the operating temperature above 190°F, and never at or above the flash point on the solution's SDS. Higher temperatures approach the 200°F alarm and the 205°F snap disc.

7.3 Clock and Schedules

The controller runs schedules only in RUN SCHEDULE mode (SET MODE menu) and only while the main disconnect is closed. During a scheduled period it holds the setback (or holiday) setpoint; at all other times it holds the normal

temperature setpoint.

1. Check the clock in the CLOCK menu: time, date, year, day of the week and daylight saving. The clock keeps time for up to 5 days without power.
2. In the SETPOINT menu, set the setback and holiday setpoints.
3. In the SCHEDULE menu, program up to 20 weekly SETBACK schedules (start day and time, end day and time, 24-hour clock) and up to 9 HOLIDAY schedules (start and end month/day and time).
4. In the SET MODE menu, select RUN SCHEDULE.

Example: To let the tank drift down over the weekend and be at 180°F for a 7:00 AM Monday start, set the setback setpoint to 160°F and program SETBACK schedule 1 to start FRI 17:00 and end MON 01:00. The insulated tank cools slowly, and recovering from 160°F takes a few hours, well within the six hours allowed.

NOTE: Keep the setback and holiday setpoints above the 150°F low-temperature alarm, or the alarm light will come on during every setback period. For an unscheduled shutdown, FRC SETBACK MODE in the SET MODE menu holds the setback setpoint until you select RUN SCHEDULE again.

7.4 Alarms

In alarm, the controller turns on relay K1 (CTRA), which lights the red alarm light on top of the main enclosure; it also sounds its buzzer, flashes its front-panel ALARM light, and shows the cause on the display. Alarm delays (2–120 minutes each) are set in the SETPOINT menu.

Alarm (display)	Setting	Cause
TEMP HIGH ALARM	200°F	Above the high alarm for longer than the high-alarm delay
TEMP LOW ALARM	150°F	Below the low alarm for longer than the low-alarm delay; expected during heat-up
SENSOR OPEN	Always on	Probe wire broken or disconnected; immediate, clears itself when repaired
SENSOR SHORT	Always on	Probe or cable shorted; immediate, clears itself when repaired

Press ALARM CLEAR once to silence the buzzer, then press it again while *ALARM SILENCED* is displayed to clear the alarm. If the cause has not been corrected, the alarm returns after the delay. The ALARM LOG menu keeps the last four alarms with date and time.

⚠ WARNING: The high-temperature alarm only signals. It does not switch off the heaters; the snap disc is the hardwired cutoff (Section 2.3.1).

8. THEORY OF OPERATION

8.1 Temperature Control Loop

The Genesis WHMC controller continuously monitors the solution temperature via the 100K NTC thermistor probes mounted on the tank wall. When the measured temperature falls below the setpoint, the controller energizes relay K2 (CTRH, Controller Heater Relay).

K2 is a form C relay. Its common is fed from terminal T1A (wire L1-T1A-COM-18). When K2 energizes, its normally-open contact closes, providing 240VAC to the SSR control input and the RL1 relay coil. The SSR conducts, allowing power to flow through the snap disc safety switch to the heaters. The heaters remain energized until the temperature reaches setpoint, at which point K2 de-energizes, its normally-closed contact feeds RL2, and the heating cycle ends.

The controller is an on/off control: the heat call is either fully on or off, switching around the setpoint within the on-off differential set in the SETPOINT menu (0.1–7.0°F). A smaller differential holds temperature more closely but cycles K2 and the SSR more often.

8.2 Current Sensing Logic

Two current-sensing relays monitor the L2 return path from the heaters:

CSA (Current Sensor A) trips at 1A, detecting ANY current flow through the heaters. When current is present, CSA's normally-closed contact opens and its normally-open contact closes.

CSB (Current Sensor B) trips at 6A, detecting FULL LOAD current (both heaters operating). This threshold is set between single-heater current (4.17A) and full current (8.33A).

This arrangement distinguishes three states: no current (0A), partial current (~4.17A, one heater), and full current (8.33A, both heaters).

8.3 Relay Logic for LED Indication

RL1 is a DPDT relay that energizes whenever heat is called (K2 N.O. closed). It routes the 12VDC indicator signal based on heat call status.

RL2 is an SPST-NO relay that energizes when heat is NOT called (K2 N.C. closed). It routes any detected current through the flasher module to create a flashing fault indication.

The logic produces five distinct states:

State	Heat Call	Current	LED Result
Normal Heating	Yes (RL1 on)	8.33A (CSA+CSB trip)	GREEN
Degraded Heating	Yes (RL1 on)	4.17A (CSA trips, CSB no)	YELLOW
Open Fault	Yes (RL1 on)	0A (CSA no trip)	RED solid
Standby	No (RL2 on)	0A (CSA no trip)	OFF
Stuck SSR Fault	No (RL2 on)	≥1A (CSA trips)	RED flash

8.4 Safety Independence

The hardwired relay logic (RL1, RL2, CSA, CSB, flasher) operates independently of the controller firmware and software. If the controller malfunctions or displays incorrect information, the LED indicators still correctly reflect the actual state of current flow and heat call signals. Similarly, the snap disc high-limit safety operates as a direct mechanical switch in the heater power path. It will interrupt heater power at 205°F regardless of controller status.

9. TROUBLESHOOTING

9.1 Symptom-Based Troubleshooting

Before troubleshooting, note the LED state and check the controller ALARM LOG, which keeps the last four alarms with date and time.

Symptom	Possible Cause	Corrective Action
Controller no power	Main disconnect open	Close main disconnect
	Control breaker (BR) tripped	Reset BR
GREEN but not heating	Solution level too low	Open the main disconnect at once; heaters must never run out of solution. Refill, then restart
	Excessive heat loss	Close lid; check insulation
YELLOW instead of GREEN	One heater burned out	Test resistance (Section 9.2); replace
RED solid	Heater breaker (BH) switched off	Normal while BH is off and heat is called
	Heater breaker (BH) tripped	Turn BH on; if it trips again, test the heaters to ground (Section 9.2)
	SSR failed open	Test the SSR (Section 9.3); replace
	Snap disc tripped	Check for overtemperature; the snap disc resets automatically when it cools
	Open heater connection at CE, or both heaters failed	Check connections; test heaters (Section 9.2)
RED flashing	SSR failed shorted	DISCONNECT POWER; replace SSR
Snap disc trips repeatedly	SSR shorted (RED flashing), setpoint too high, or low solution level	Check the LEDs, setpoint and level before restarting
All LEDs off	12V fuse (F1) blown	Replace F1
	12V output failed	Measure the controller 12VDC output (12V $\pm$ 0.3V); see Genesis 44-0371
	Desired temperature reached, system standby	Normal condition
Alarm light on (top of enclosure)	Controller alarm active: high or low temperature, sensor fault	Read the controller display and ALARM LOG; correct the cause; press ALARM CLEAR (Section 7.4)
	TEMP LOW ALARM during heat-up or setback	Normal below 150°F; keep setback above 150°F (Section 7.3)
SENSOR OPEN alarm	Broken or disconnected probe wire	Check connections and cable continuity; measure the probe (Section 4.4)
SENSOR SHORT alarm	Shorted cable or probe	Measure the probe with leads lifted (Section 4.4); replace the cable or probe
Reading differs from a thermometer by more than 3°F	Probe not seated on its thermal pad; cable fault	Check mounting and resistance; then correct in the CALIBRATION menu (Section 10.6.1)

Symptom	Possible Cause	Corrective Action
Settings will not change (DENY)	Controller locked	Enter the passcode (Section 7.2)
Schedules run at the wrong time	Clock lost after more than 5 days without power; wrong day or daylight saving	Reset the CLOCK menu (Section 7.3)

9.2 Heater Testing

To test the heaters:

1. Open and lock out the main disconnect, and verify zero voltage at the heater breaker (BH) with a meter.
2. Disconnect heater leads at the ceramic terminal block.
3. Measure resistance across each heater's two leads.
4. Expected resistance: 57.6Ω per heater ($240V^2 \div 1000W = 57.6\Omega$).
5. Open circuit (infinite resistance) indicates a failed heater element.
6. Very low resistance indicates a short circuit.
7. Measure from each heater lead to the tank (ground). A good heater reads open; any reading to ground means the heater sheath has failed and the heater must be replaced. An insulation tester (megohmmeter) gives the most reliable result.

9.3 SSR Testing

⚠ WARNING: These checks are made on live 240VAC circuits. They must be performed by qualified personnel wearing PPE rated for 240VAC. The heaters must be covered with solution.

To test SSR operation:

1. Verify the controller is calling for heat (STATUS menu shows HEATER ON 1). To force the heat call on or off, use the TEST menu (relay K2 ON / OFF); forced relays return to automatic when you exit the menu.
2. Measure AC voltage at the SSR control input terminals (A1/A2). It should read ~240VAC when heat is called.
3. Measure AC voltage at the SSR load output terminals. It should read near 0V when the SSR is conducting (heat called), or line voltage when not conducting.
4. If control voltage is present but the load does not switch, the SSR has failed open.
5. If the load conducts without control voltage, the SSR has failed shorted.

10. MAINTENANCE

10.1 Maintenance Schedule

Interval	Task	Reference
Daily	Visual inspection of LEDs and temperature display	Section 10.2
Daily	Check solution level	Section 10.2
Weekly	Verify exhaust system operation	Section 10.3
Weekly	Check enclosure door seals	Section 10.3
Monthly	Remove sludge accumulation	Section 10.4
Monthly	Clean vent	Section 10.4
Quarterly	Inspect all electrical connections	Section 10.5
Quarterly	Check snap disc continuity	Section 10.5
Annually	Full system inspection; replace gaskets	Section 10.6
Annually	Test temperature reading, alarms, snap disc and LEDs	Section 10.6

10.2 Daily Inspection

Before each operating shift:

1. Verify the GREEN LED illuminates when heating and the display shows the correct setpoint temperature.
2. Check solution level is adequate (minimum 4" above heaters, maximum approximately 6" below tank rim).
3. Verify the exhaust system is operating (feel for airflow at the vent connection).
4. Look for any leaks, unusual odors, or signs of equipment damage.

10.3 Weekly Inspection

1. Verify exhaust flow rate meets minimum requirements (100 CFM).
2. Inspect enclosure door gaskets for damage or deterioration.
3. Verify the lid seal is intact and properly seated.

10.4 Monthly Maintenance

10.4.1 Sludge Removal

Coating residue accumulates at the tank bottom and must be removed periodically to maintain effective stripping and prevent heater damage. Use the two drains described in Section 3.3.6 (see Figure 6).

1. Open and lock out the main disconnect, so the heaters cannot come on as the level drops.
2. Allow the tank to cool to 120°F or less.
3. Drain the liquid out of the tank through the 1-inch side drain into suitable containers for reuse.
4. Place a suitable container under the 2-inch bottom sludge drain.
5. Open the sludge drain valve and allow sludge to flow out. If thick, a double diaphragm pump may be required.
6. Rinse the tank bottom until the rinse-out water runs clear, then close the drain.
7. Dispose of sludge and rinse water according to facility hazardous waste procedures.

8. Refill with the retained solution plus fresh makeup to the fill line, at least 4" above the heaters, before closing the main disconnect.

10.4.2 Vent Cleaning

1. Remove the vent from the chimney.
2. Rinse with clean water to remove accumulated residue.
3. Inspect for damage or deterioration of the PTFE coating.
4. Replace if damaged. Reinstall clean.

10.5 Quarterly Maintenance

⚠ WARNING: Open and lock out the main disconnect before performing electrical maintenance. Its supply terminals stay energized; do not touch them unless the facility breaker is also locked out.

1. Open the main disconnect and lock out.
2. With a meter, verify there is no voltage at terminal block T1 and at the heater breaker (BH).
3. Open the main enclosure door (refer to Figure 9 for the internal layout).
4. Open the secondary junction enclosure and verify the snap disc and ceramic terminals (refer to Figure 4).
5. Inspect the terminal connections downstream of the main disconnect for tightness. Re-torque as needed.
6. Check for signs of corrosion, discoloration, or damage.
7. Verify the snap disc is closed (continuity) at room temperature.
8. Close the enclosures and restore power.

10.6 Annual Maintenance

Perform a comprehensive system inspection including:

1. All quarterly maintenance items.
2. Complete drain and tank interior inspection.
3. Heater inspection for scale buildup or damage, and the heater-to-ground test (Section 9.2).
4. Replacement of all ePTFE gaskets and the FFKM lid seal.
5. Temperature reading check (Section 10.6.1).
6. Alarm test (Section 10.6.2), snap disc test (Section 10.6.3) and LED check (Section 10.6.4).

Record the results in the annual checklist (Section 13.6).

10.6.1 Temperature Reading Check

1. With the tank at operating temperature, measure the solution with a calibrated thermometer on the probe side of the tank.
2. Compare with the controller reading. Readings within 3°F are acceptable.
3. If they differ by more than 3°F, check the probe mounting and thermal pads (Figure 5) and the probe resistance (Section 4.4).
4. If the probes are good, unlock the controller and enter the thermometer reading in the CALIBRATION menu (adjustable $\pm 10^\circ\text{F}$ from the raw reading). UNDO TEMP in the same menu restores the raw reading.

10.6.2 Alarm Test

1. Unlock the controller (Section 7.2) and note the high-alarm setpoint and delay in the STATUS menu.

2. In the SETPOINT menu, set the high alarm a few degrees below the current reading and the high-alarm delay to 2 minutes.
3. After the delay, verify the red alarm light, the buzzer and TEMP HIGH ALARM on the display.
4. Restore the original high-alarm setpoint and delay, then clear the alarm (Section 7.4).
5. Repeat for the low alarm by setting it a few degrees above the current reading, then restore it.

10.6.3 Snap Disc Test

1. Open and lock out the main disconnect and verify zero voltage (Section 10.5).
2. Remove the snap disc panel and the secondary junction enclosure cover, label the leads, and remove the snap disc.
3. Heat the disc slowly on a hot plate or in an oven beside a reference thermometer while watching continuity with an ohmmeter.
4. Record the temperature at which it opens. It should open near its 205°F rating and close again as it cools. Replace it if it does not open, or opens well away from its rating.
5. Reinstall the disc with the leads on the same tabs and close the enclosure and panel.

10.6.4 LED Check

1. With the tank filled and BH on, use the TEST menu to set relay K2 ON. GREEN lights and the heater circuit draws about 8.3A.
2. Switch BH off. RED lights solid. Switch BH back on.
3. Set K2 OFF. The LEDs go out.
4. Press EXIT to return the relays to automatic control.

11. MOVING OR REPOSITIONING THE TANK

⚠ WARNING: The tank must NOT be lifted or moved when it contains more than one-third (1/3) of its liquid capacity: about 55 gallons, a liquid depth of about 8½". Moving a heavily loaded tank risks structural damage and creates a severe spill hazard.

If the tank must be relocated:

1. Shut down the heating system completely: open and lock out the main disconnect.
2. Allow the solution to cool to a safe handling temperature (below 100°F).
3. Drain the tank until it contains no more than one-third of its capacity using the 1-inch side drain (see Figure 6).
4. Collect drained solution in appropriate containers for reuse or disposal.
5. Lock out the facility breaker feeding the tank and verify zero voltage at the supply terminals of the main disconnect, then disconnect the supply wiring at the main enclosure.
6. Cap or plug any open conduit entries.
7. Using a forklift rated for the tank weight plus remaining liquid, lift the tank using the integrated forklift slots.
8. Transport to the new location and position as described in Section 5.2.
9. Reconnect electrical service per Section 5.3.
10. Refill with retained solution and fresh makeup as needed, at least 4" above the heaters, before closing the main disconnect.

12. WIRING DIAGRAMS AND WIRE LIST

This section contains the WL4 electrical drawing set (drawing revision E, 4 sheets). It replaces the wire list in earlier editions of this manual and lists every conductor wire by wire. Use it for installation verification, troubleshooting, and repair.

Sheet	Contents
1	240 VAC power & control schematic: Rung 2 heater circuit and Rung 1 control circuit
2	12 VDC indicator logic, LED state table, and temperature probe wiring
3	Wiring list, 240 VAC (12.1–12.3): supply, control, and heater circuits
4	Wiring list, ground, 12 VDC, and sensors (12.4–12.6); terminal block summary; resistance checks

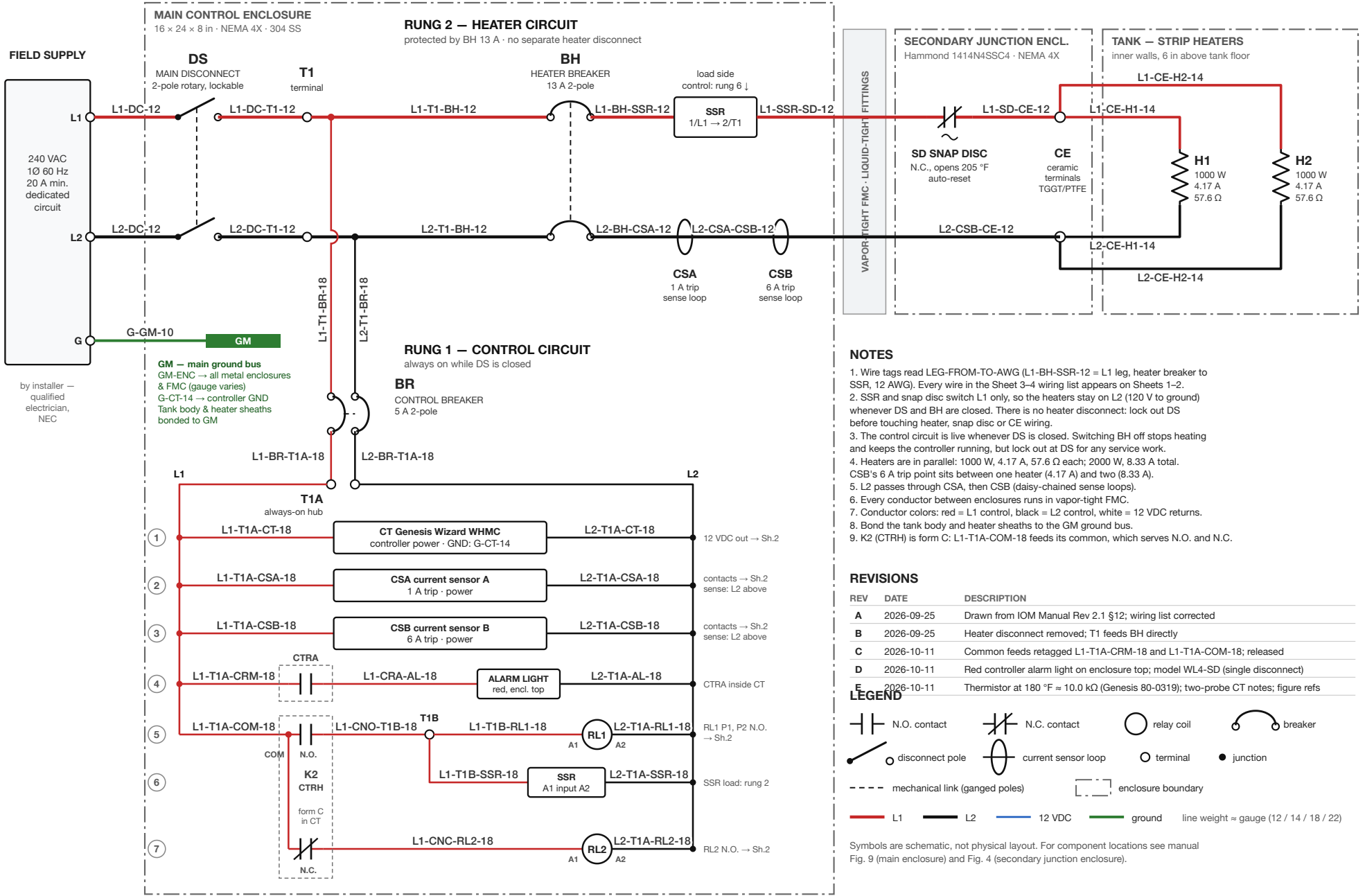
Reading the Drawings

1. Wire tags read LEG-FROM-TO-AWG. For example, L1-BH-SSR-12 is the L1 leg from the heater breaker to the SSR in 12 AWG wire.
2. Contacts are drawn de-energized: no heat call, no heater current, tank cold.
3. Dash-dot outlines mark enclosure boundaries. Conductors between enclosures run in vapor-tight FMC.
4. For physical component locations, refer to Figure 9 (main enclosure), Figure 4 (secondary junction enclosure), and Figure 2 (FMC routing).

⚠ WARNING: The main disconnect is the only disconnect. The SSR and snap disc switch L1 only, so the heater terminals stay connected to L2 whenever the main disconnect and heater breaker are closed. Lock out the main disconnect before working on any wiring shown in these drawings.

SHEET 1 — 240 VAC POWER & CONTROL SCHEMATIC

Rung 2 heater circuit (top) and Rung 1 control circuit (bottom). Contacts shown de-energized, no heater current, tank cold.



US STRIP TANK CO.

WL4-SD Heated Strip Tank

2000 W · 240 VAC 1Ø 60 Hz · 20 A dedicated circuit

ELECTRICAL DRAWING PACKET

240 VAC power & control schematic

Wiring per WL4 IOM Manual Rev 2.1 §12, as corrected

REVISION

Rev E

Issued 2026-10-11

Supersedes Rev D (2026-10-11)

DRAWN

CHECKED

APPROVED

APPLIES TO

WL4-SD

single main disconnect

SHEET

1

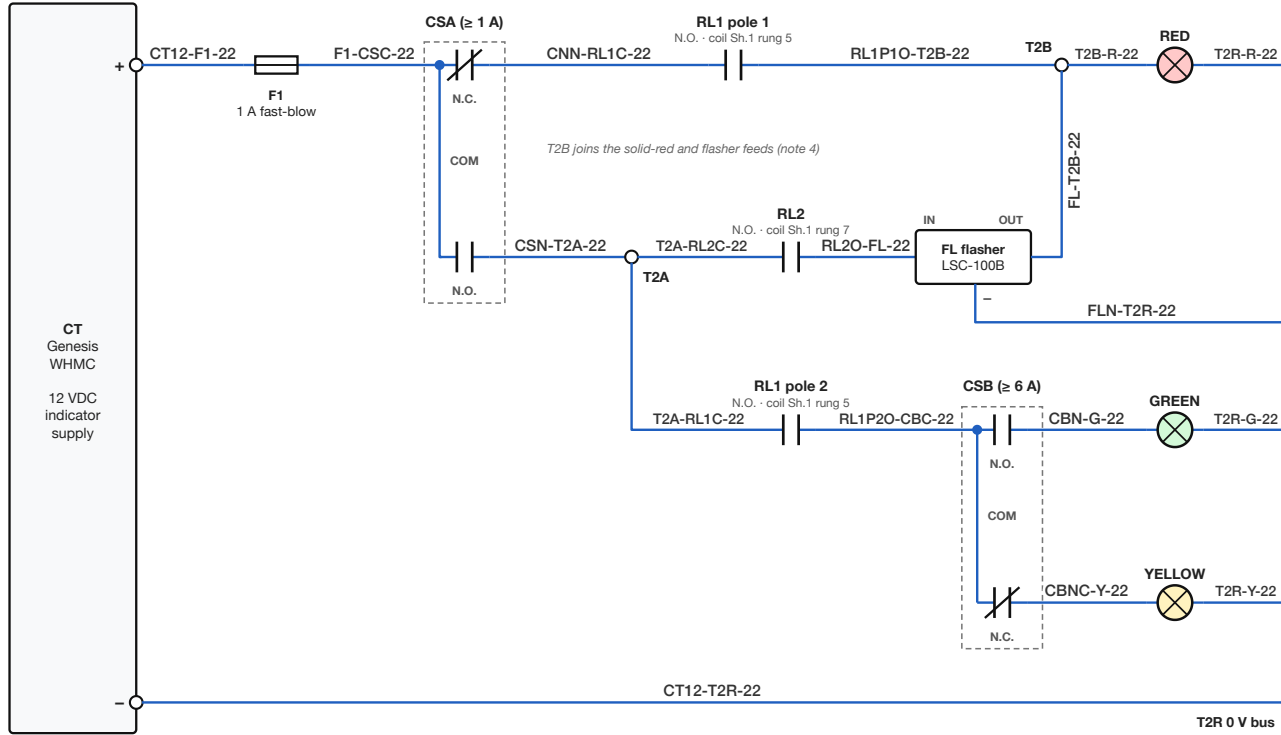
of 4

SHEET 2 — 12 VDC INDICATOR LOGIC & TEMPERATURE PROBES

Hardwired LED logic, independent of controller firmware. Relay and sensor contacts shown de-energized (no heat call, no heater current).

MAIN CONTROL ENCLOSURE — 12 VDC INDICATOR CIRCUIT

fed from the Genesis controller's 12 VDC output



LED STATES (manual §6.2, §8.3)

LED	Heat call	Current	Path energized
GREEN	Yes · RL1	≥ 6 A · both heaters	CSA N.O. → T2A → RL1-2 → CSB N.O.
YELLOW	Yes · RL1	1–6 A · one heater	CSA N.O. → T2A → RL1-2 → CSB N.C.
RED solid	Yes · RL1	< 1 A	CSA N.C. → RL1-1 → T2B
OFF	No · RL2	< 1 A	none (RL1-1 open) · normal standby
RED flashing	No · RL2	≥ 1 A	CSA N.O. → T2A → RL2 → FL → T2B · SSR stuck closed — disconnect power

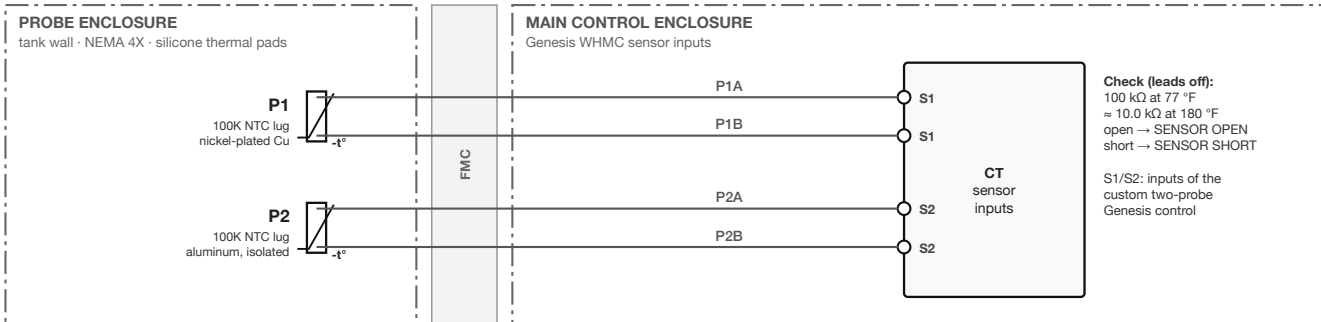
RED solid means heat is called but no current flows: SSR open, snap disc tripped, BH off or tripped, or an open heater connection.

DEVICE CROSS-REFERENCE

Device	Coil / power	Contacts used
K2 (CTRH)	inside CT	N.O. Sh.1 r5 · N.C. Sh.1 r7
CTRA	inside CT	N.O. Sh.1 r4
RL1 DPDT	Sh.1 r5 · 240 VAC	P1 N.O., P2 N.O. · Sh.2
RL2 SPST-NO	Sh.1 r7 · 240 VAC	N.O. · Sh.2
CSA 1 A	Sh.1 r2 · senses L2	COM / N.C. / N.O. · Sh.2
CSB 6 A	Sh.1 r3 · senses L2	COM / N.O. / N.C. · Sh.2
SSR	input Sh.1 r6	load Sh.1 rung 2 (L1)

TEMPERATURE PROBES

Two redundant 100K NTC probes, Genesis 80-0319 (manual §3.3.4, Fig. 5).



NOTES

- 12 VDC comes from the controller; F1 (1 A fast-blow) protects the whole indicator circuit.
- CSA, CSB, RL1 and RL2 are form-C / N.O. relay contacts, drawn de-energized.
- LSC-100B is a 12–24 VDC strobe module (three quick flashes, then a pause). Its (–) lead returns to T2R on FLN-T2R-22.
- T2B is fed by RL1 pole 1 and by the flasher. Optional: if the red LED flickers during a solid-red fault, add a blocking diode (1N4001) in each feed.
- All LED (–) leads return to T2R.

US STRIP TANK CO.

WL4-SD Heated Strip Tank

2000 W · 240 VAC 1Ø 60 Hz · 20 A dedicated circuit

ELECTRICAL DRAWING PACKET

12 VDC indicator logic & probes

Wiring per WL4 IOM Manual Rev 2.1 §12, as corrected

REVISION

Rev E

Issued 2026-10-11

Supersedes Rev D (2026-10-11)

DRAWN

CHECKED

APPROVED

APPLIES TO

WL4-SD

single main disconnect

SHEET

2

of 4

SHEET 3 — WIRING LIST, 240 VAC

Supply, control (Rung 1) and heater (Rung 2) circuits, wire by wire. Gauges are copper AWG.

Wire tag	From	To	AWG	Purpose / notes
12.1 Main incoming power				
L1-DC-12	Incoming L1	Main Disconnect (DS)	12	Main hot leg feed
L2-DC-12	Incoming L2	Main Disconnect (DS)	12	Main hot leg feed
L1-DC-T1-12	Main Disconnect	Terminal 1 (L1)	12	Switched L1 distribution
L2-DC-T1-12	Main Disconnect	Terminal 1 (L2)	12	Switched L2 distribution
G-GM-10	Incoming ground	Ground bus (GM)	10	Main system ground
12.2.1 Rung 1 — control breaker feed				
L1-T1-BR-18	Terminal 1 (L1)	Breaker Control BR (L1)	18	5 A double-pole breaker
L2-T1-BR-18	Terminal 1 (L2)	Breaker Control BR (L2)	18	5 A double-pole breaker
L1-BR-T1A-18	BR (L1)	Sub-Terminal 1A (L1)	18	Always-on 240 V hub
L2-BR-T1A-18	BR (L2)	Sub-Terminal 1A (L2)	18	Always-on 240 V hub
12.2.2 Controller power				
L1-T1A-CT-18	T1A (L1)	Controller CT (L1)	18	Controller power
L2-T1A-CT-18	T1A (L2)	Controller CT (L2)	18	Controller power
12.2.3 Alarm circuit				
L1-T1A-CRM-18	T1A (L1)	CTRA COM	18	Always-on 240 V to alarm relay common
L1-CRA-AL-18	CTRA N.O.	Alarm light, enclosure top (hot)	18	Closes on controller alarm
L2-T1A-AL-18	T1A (L2)	Alarm light (L2)	18	240 V return
12.2.4 Current sensor power				
L1-T1A-CSA-18	T1A (L1)	CSA power (L1)	18	1 A trip sensor, always energized
L2-T1A-CSA-18	T1A (L2)	CSA power (L2)	18	Power return
L1-T1A-CSB-18	T1A (L1)	CSB power (L1)	18	6 A trip sensor, always energized
L2-T1A-CSB-18	T1A (L2)	CSB power (L2)	18	Power return
12.2.5 RL1 coil — heat-called relay (DPDT)				
L1-T1A-COM-18	T1A (L1)	CTRH (K2) COM	18	Always-on 240 V to K2 common (feeds N.O. and N.C.)
L1-CNO-T1B-18	CTRH N.O.	Sub-Terminal 1B (L1)	18	Heat-call distribution
L1-T1B-RL1-18	T1B (L1)	RL1 coil A1	18	
L2-T1A-RL1-18	T1A (L2)	RL1 coil A2	18	240 V return
12.2.6 RL2 coil — fault-detection relay (SPST-NO)				
L1-CNC-RL2-18	CTRH N.C.	RL2 coil A1	18	RL2 energizes when heat is NOT called
L2-T1A-RL2-18	T1A (L2)	RL2 coil A2	18	240 V return
12.2.7 SSR control side				
L1-T1B-SSR-18	T1B (L1)	SSR control A1	18	240 V control signal when heat called
L2-T1A-SSR-18	T1A (L2)	SSR control A2	18	240 V return
12.3.1 Rung 2 — heater breaker (no separate heater disconnect)				
L1-T1-BH-12	Terminal 1 (L1)	Breaker Heater BH (L1)	12	13 A double-pole breaker
L2-T1-BH-12	Terminal 1 (L2)	Breaker Heater BH (L2)	12	13 A double-pole breaker
12.3.2 SSR load side and heater hot path (L1)				
L1-BH-SSR-12	BH (L1)	SSR load 1/L1	12	Main heater power in
L1-SSR-SD-12	SSR load 2/T1	Snap disc SD (in)	12	Switched heater power, via FMC
L1-SD-CE-12	Snap disc SD (out)	Ceramic terminal CE (L1)	12	High-limit safety, N.C., opens 205 °F, auto-reset
L1-CE-H1-14	CE (L1)	Heater 1 (L1)	14	≈ 4.17 A
L1-CE-H2-14	CE (L1)	Heater 2 (L1)	14	≈ 4.17 A
12.3.3 Current sense and heater return path (L2)				
L2-BH-CSA-12	BH (L2)	CSA sense loop (in)	12	Return current through CSA
L2-CSA-CSB-12	CSA sense loop (out)	CSB sense loop (in)	12	Daisy-chain to CSB
L2-CSB-CE-12	CSB sense loop (out)	Ceramic terminal CE (L2)	12	To heaters, via FMC
L2-CE-H1-14	CE (L2)	Heater 1 (L2)	14	Parallel return
L2-CE-H2-14	CE (L2)	Heater 2 (L2)	14	Parallel return

US STRIP TANK CO.

WL4-SD Heated Strip Tank

2000 W · 240 VAC 1Ø 60 Hz · 20 A dedicated circuit

ELECTRICAL DRAWING PACKET

Wiring list — 240 VAC

Wiring per WL4 IOM Manual Rev 2.1 §12, as corrected

REVISION

Rev E

Issued 2026-10-11

Supersedes Rev D (2026-10-11)

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APPLIES TO

WL4-SD

single main disconnect

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SHEET 4 — WIRING LIST, GROUND, 12 VDC & SENSORS

Ground, 12 VDC indicator and temperature-probe wiring. Gauges are copper AWG.

Wire tag	From	To	AWG	Purpose / notes
12.4 Ground				
GM-ENC	Ground bus (GM)	All metal enclosures & FMC	varies	Equipment grounding
G-CT-14	Ground bus (GM)	Controller ground	14	Dedicated clean reference
12.5.1 Controller 12 V supply				
CT12-F1-22	Controller 12 V +	Fuse F1 (in)	22	1 A fast-blow protection
F1-CSC-22	Fuse F1 (out)	CSA relay COM	22	12 V to current-sensor relay
CT12-T2R-22	Controller 12 V –	Terminal 2R	22	Common return bus
12.5.2 CSA relay outputs				
CNN-RL1C-22	CSA relay N.C.	RL1 pole 1 COM	22	No-current path (< 1 A)
CSN-T2A-22	CSA relay N.O.	Terminal 2A	22	Current-detected path (≥ 1 A)
12.5.3 RL1 pole 1 — red solid path				
RL1P10-T2B-22	RL1 pole 1 N.O.	Terminal 2B	22	Red when heat called and no current
12.5.4 RL2 fault path — red flash				
T2A-RL2C-22	Terminal 2A	RL2 COM	22	To fault relay contact
RL20-FL-22	RL2 N.O.	Flasher FL (in)	22	To LSC-100B strobe module
FL-T2B-22	Flasher FL (out)	Terminal 2B	22	Flashing output to red LED
FLN-T2R-22	Flasher FL (–)	Terminal 2R	22	Flasher 0 V return
12.5.5 RL1 pole 2 — green / yellow path				
T2A-RL1C-22	Terminal 2A	RL1 pole 2 COM	22	Current detected, to RL1
RL1P20-CBC-22	RL1 pole 2 N.O.	CSB relay COM	22	To CSB for load indication
12.5.6 CSB relay outputs				
CBN-G-22	CSB relay N.O.	Green LED (+)	22	Full load (≥ 6 A), both heaters
CBNC-Y-22	CSB relay N.C.	Yellow LED (+)	22	Partial load (< 6 A), one heater out
12.5.7 Red LED				
T2B-R-22	Terminal 2B	Red LED (+)	22	Fault indicator (solid or flash)
12.5.8 LED common returns				
T2R-R-22	Terminal 2R	Red LED (–)	22	Common return
T2R-G-22	Terminal 2R	Green LED (–)	22	Common return
T2R-Y-22	Terminal 2R	Yellow LED (–)	22	Common return
12.6 Temperature probes				
P1A / P1B	Probe 1 (Ni-plated Cu lug)	CT sensor input 1	lead	100K NTC, via probe enclosure and FMC
P2A / P2B	Probe 2 (aluminum lug)	CT sensor input 2	lead	Redundant 100K NTC on the second input of the custom two-probe Genesis control

TERMINAL BLOCK SUMMARY

Block	Circuit	Wires landed
T1 (L1/L2)	240 V after DS	DC-T1 in; T1-BR, T1-BH out
T1A (L1/L2)	240 V after BR 5 A	CT, CSA, CSB, CTRA COM (CRM), K2 COM (COM), alarm light, RL1, RL2, SSR
T1B (L1)	240 V heat call	CNO-T1B in; T1B-RL1, T1B-SSR out
T2A	12 V, current ≥ 1 A	CSN-T2A in; T2A-RL2C, T2A-RL1C out
T2B	12 V red feed	RL1P1O-T2B, FL-T2B in; T2B-R out
T2R	12 V common (0 V)	CT12-T2R; T2R-R, -G, -Y; FLN-T2R
CE (L1/L2)	heater terminations	SD-CE, CSB-CE in; CE-H1, CE-H2 out (TGGT)

Bond the tank body and heater sheaths to GM. S1 and S2 are the probe inputs of the custom two-probe Genesis control (manual 44-0371 shows the standard one-probe unit).

RESISTANCE CHECKS (POWER OFF, LEADS LIFTED)

Item	Expected
Each heater, at CE	57.6 Ω (240² ÷ 1000 W). Open = failed element; near 0 Ω = short
Both heaters in parallel	28.8 Ω
Snap disc, room temp	closed (≈ 0 Ω)
Thermistor at 77 °F	100 kΩ
Thermistor at 180 °F	≈ 10.0 kΩ
F1 fuse	≈ 0 Ω

US STRIP TANK CO.

WL4-SD Heated Strip Tank

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ELECTRICAL DRAWING PACKET

Wiring list — ground, 12 VDC, sensors

Wiring per WL4 IOM Manual Rev 2.1 §12, as corrected

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13. MAINTENANCE RECORDS

Use the following pages to document all maintenance activities performed on this equipment. Maintaining accurate records helps identify trends, schedule preventive maintenance, and provides documentation for warranty and regulatory purposes.

13.1 Equipment Information

Field	Value
Model Number	WL4-SD
Serial Number	
Installation Date	
Installation Location	
Installed By	
Warranty Expiration	
Stripping Solution (product)	
Flash Point from SDS	
Controller Passcode Changed (date / by)	

13.2 Daily Inspection Checklist

Complete this checklist at the start of each operating shift. Check (✓) each item when verified satisfactory. Note any issues in the Comments column.

Item	Check	Comments
Date / Shift:		
Controller displays correct temperature	☐	
GREEN LED illuminates when heating	☐	
Solution level adequate (4" above heaters)	☐	
Exhaust system operating	☐	
No visible leaks	☐	
No unusual odors	☐	
Lid seal properly seated	☐	
Enclosure doors closed	☐	
Inspector Initials:		

(Reproduce this page as needed for daily use)

13.3 Weekly Inspection Checklist

Item	Check	Comments
Week Ending:		
Exhaust flow rate verified (100 CFM min)	☐	
Main enclosure door gasket condition	☐	
Secondary enclosure gasket condition	☐	
Lid FFKM seal condition	☐	
Tank exterior: no damage or corrosion	☐	
Solution appearance (color, clarity)	☐	
Inspector Signature:		

13.4 Monthly Maintenance Checklist

Item	Check	Comments
Month/Year:		
Sludge removed from tank bottom	☐	Amount removed:
Vent cleaned	☐	
Vent condition (replace if damaged)	☐	
Solution topped off with fresh chemical	☐	Amount added:
All daily/weekly items verified	☐	
Technician Signature:		
Date Completed:		

13.5 Quarterly Maintenance Checklist

Item	Check	Comments
Quarter/Year:		
Main disconnect locked out before electrical work	☐	Lockout ID:
All terminal connections inspected/torqued	☐	
No corrosion or discoloration observed	☐	
Zero voltage verified at T1 and BH	☐	
Snap disc closed at room temp (continuity)	☐	
SSR mounting and heat sink secure	☐	
Relay mounting secure	☐	
Breakers tested (trip and reset)	☐	
Thermistor cable condition	☐	
All monthly items completed	☐	
Technician Signature:		
Date Completed:		

13.6 Annual Maintenance Checklist

Item	Check	Comments
Year:		
Complete tank drain performed	☐	
Tank interior inspected	☐	
Heater elements inspected for scale/damage	☐	
Heaters tested to ground (open)	☐	H1 / H2:
ePTFE panel gaskets replaced	☐	
FFKM lid seal replaced	☐	
Temperature reading checked (Section 10.6.1)	☐	Controller vs. thermometer:
Snap disc tested (Section 10.6.3)	☐	Opened at:
High and low alarms tested (Section 10.6.2)	☐	Settings restored:
LED check: GREEN / RED / OFF (Section 10.6.4)	☐	
All quarterly items completed	☐	
Fresh solution installed	☐	Volume:
System startup verified normal	☐	
Technician Signature:		
Supervisor Approval:		
Date Completed:		

13.7 Maintenance Log

Record all maintenance activities, repairs, and component replacements below.

[illegible]

(Continue on additional pages as needed)

13.8 Component Replacement Record

Track replacement of major components for warranty and lifecycle management.

Component	Date Installed	Date Replaced	Reason	Tech
Heater 1				
Heater 2				
SSR				
Snap Disc				
Thermistor (P1)				
Thermistor (P2)				
Controller				
RL1 Relay				
RL2 Relay				
CSA Sensor				
CSB Sensor				
Control Breaker (BR)				
Heater Breaker (BH)				
12V Fuse (F1)				
Flasher Module				
Alarm Light				
FFKM Lid Seal				
Panel Gaskets				
Vent				

— End of Manual —

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