Spray Irrigation Control Panel · Smart Timer + UV

120 VAC · Single Phase · Dual Feed | Time Dose · SHT-13/2 Wi-Fi Timer | Failsafe Lockout

ENGINEERED & MANUFACTURED FOR AKHA MANUFACTURING, LLC · HYDRO-ACTION® SYSTEMS

DOCUMENT VERSION **3.0 (Full)**
DATE **August 2026**
MODEL **CP-001-3-0006**
UL FILE NUMBER **E547664**
PREPARED BY **Legacy Controls · 6200 FL-46, Mims, FL 32754**
COMPLIANCE **UL 508A Listed**
SYSTEM PLATFORM **Hydro-Action®**
WEB **hydro-action.com**

PRODUCT OVERVIEW

The CP-001-3-0006 is a UL 508A Listed control panel manufactured by Legacy Controls for AKHA Manufacturing, LLC, for Hydro-Action® aerobic treatment units with spray irrigation dispersal and UV disinfection. From two 120 V feeds it powers and supervises the aeration compressor, continuously powers and monitors the UV lamp through a PRI-51 current monitoring relay, and drives a time-dosed spray/dose pump scheduled by an Elko SHT-13/2 Wi-Fi smart timer. Protection is failsafe: air pressure loss or a UV lamp fault raises the alarm and locks out the spray/dose pump so under-treated effluent cannot be dispersed, while high water raises the alarm only — when treatment is healthy the panel keeps dosing to bring the level down. A control circuit on its own feed keeps the alarm system live even when the main breaker is off.

IMPORTANT NOTICE — SUPPORT & WARRANTY ADMINISTRATION

This control panel is manufactured by Legacy Controls for AKHA Manufacturing, LLC and is intended for use with Hydro-Action wastewater treatment systems. **ALL technical support, warranty claims, service questions, callbacks, and customer communications must be directed to AKHA Manufacturing, LLC.**

AKHA Manufacturing, LLC · 2055 Pidco Dr. / P.O. Box 640, Plymouth, Indiana 46563
Toll Free 800-370-3749 · Phone (574) 936-2542 · Fax 574-936-2298 · hydro-action.com

Legacy Controls provides manufacturing and warranty support to AKHA Manufacturing, LLC and does not accept direct inquiries or claims from end users or installers for this product line.

⚠ READ FIRST — CONTROL CIRCUIT

This panel is fed by TWO separate 120 V circuits: main power (terminal 1) and a dedicated control circuit (terminal 2) that keeps the alarm system powered during main power loss. **The control circuit remains energized even when the main breaker is OFF — disconnect BOTH feeds and verify with a voltage tester before opening the panel.** Neutrals from both feeds must land on the same neutral bus in the feeder panel.

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1. SAFETY INSTRUCTIONS

WARNING **Risk of electric shock and serious injury.** This control panel contains two separately fed 120 V circuits. Improper handling can result in serious injury, death, electrical shock, fire, or equipment damage. Only qualified personnel familiar with local electrical codes (NEC), UL 508A standards, and onsite wastewater treatment systems should install, operate, or maintain this panel.

Critical Safety Requirements

- **Power Off Procedures —** Disconnect BOTH the main feed and the control circuit feed before opening the panel or performing any wiring, and use proper lockout/tagout procedures. The control circuit remains energized when the main breaker is off. Always verify with a voltage tester.
- **Failsafe Lockouts —** Never override the air loss or UV fault lockouts under any circumstances. They exist to prevent dispersal of under-treated effluent.
- **UV Lamp —** Handle and dispose of UV lamps according to local regulations. Never look directly at an energized UV lamp.
- **Grounding —** Ensure proper grounding of the panel and all connected equipment per NEC requirements.
- **Overload Protection —** There are no overload devices inside this panel. The spray/dose pump and the aeration compressor must each incorporate integral motor overload protection. The control circuit shall not exceed 5 A.
- **High Water Alarm —** If the high water alarm activates, investigate immediately to prevent system backup or overflow. High water never locks out the pump.
- **PPE —** Wear insulated gloves, safety glasses, and appropriate protective clothing when working near electrical components or the treatment plant.
- **Field Wiring —** Use 26–10 AWG copper conductors rated 600 V, 60 °C minimum. Torque all terminal screws to 0.79 N·m (7.0 in-lbs).
- **Unauthorized Modifications —** Any alteration, modification, or unauthorized repair will void the UL listing, the manufacturer's warranty, and may create serious safety hazards.

CAUTION A main panel disconnect switch must be supplied and installed in the field. Always verify with a voltage tester before working inside the panel.

2. SPECIFICATIONS

Panel Identification & Electrical Ratings

PARAMETER	SPECIFICATION
Model	CP-001-3-0006
UL File Number	E547664
Supply	120 VAC, 60 Hz, single phase — dual feeds: main power (terminal 1) + dedicated control circuit (terminal 2)
Total FLA / SCCR	25 A · SCCR 5 kA
Spray / Dose Pump	120 V, 1 HP (20 FLA) — largest motor · integral motor overload required
Compressor (Air Pump)	120 V, ¼ HP (5.0 FLA) · integral motor overload required
Panel Branch Protection	CB1 20 A pump · CB2 5 A compressor · CB3 5 A control
Feeder Protection (Field Supplied)	Upstream, at the feeder panel (not in this panel): 30 A main feed · 5 A control feed
Timer / Scheduler	Elko SHT-13/2 Wi-Fi smart timer — Channel 1 drives the spray/dose pump (contacts 15/18); Channel 2 is spare
Protection & Monitoring	PRI-51 UV current relay · Tecmark air pressure switch · pump level float (5–6) · high water alarm float (7–8)
Alarm System	Beacon + horn — powered by the control circuit; remains live if the main breaker trips
Enclosure	NEMA 4X polycarbonate — indoor or weatherproof outdoor
Operating Temperature	–20 °C to 50 °C
Field Wiring	26–10 AWG copper, 600 V, 60 °C · terminal torque 0.79 N·m (7.0 in-lbs)
Compliance	UL 508A Listed · File E547664

Key Components

PARAMETER	SPECIFICATION
Elko SHT-13/2 Wi-Fi Smart Timer (T1)	Schedules every spray/dose cycle on Channel 1 — phone-browser programming, no app required · built-in run-time hour meter (see Section 6)
Elko EP PRI-51 Current Monitor (CM1)	Continuously supervises UV lamp current — lamp failure or end-of-life triggers alarm and pump lockout (see Section 7)
Tecmark Air Pressure Switch (N.O.)	Verifies compressor operation — loss of pressure triggers alarm and pump lockout
Elko EP VS220-20 UL Contactor (M1)	Installation contactor switching the spray/dose pump — coil powered from the control circuit
ENI-T8-32-P2SC-N UV Ballast	Electronic ballast powering the UV lamp — sourced through Legacy Controls
Pump Level Float (terminals 5–6)	Customer supplied, normally open — enables the spray/dose pump; the timer cannot dose without sufficient level
High Water Alarm Float (terminals 7–8)	Customer supplied, normally open — alarm only; pump operation is unaffected
Control Circuit	Dedicated 120 V feed — keeps the alarm system live during main power loss

3. INSTALLATION INSTRUCTIONS

WARNING Installation must be carried out by qualified personnel only. Follow local electrical codes (NEC) and consult the panel schematic and connection diagram.

1. **Mounting —** Secure the NEMA 4X enclosure to a stable vertical surface in a location protected from direct weather and physical damage.
2. **Power Supply —** Bring two separate 120 V circuits from the feeder panel: a 30 A main feed and a 5 A dedicated control circuit feed. This is feeder protection at the main panel, not part of this panel. Install a field-supplied main disconnect switch upstream.
3. **Control Circuit —** The dedicated 120 V feed keeps the alarm system operational if the main breaker trips. Neutrals from both feeds must land on the same neutral bus in the feeder panel. Supply the control circuit from the same branch circuit as a frequently used light or receptacle so that a loss of power to the alarm circuit is noticed promptly.
4. **Field Wiring —** Use 26–10 AWG copper conductors rated 600 V, 60 °C minimum and wire all field devices exactly as shown on the terminal connection diagram. Torque all terminal screws to 0.79 N·m (7.0 in-lbs).
5. **Float Installation —** Install both customer-supplied normally open (N.O.) floats in the dose tank: the pump level float on terminals 5 and 6 at the minimum level for a full dose, and the high water alarm float on terminals 7 and 8 above it.
6. **UV Lamp —** Install the customer-supplied UV lamp into the ballast socket per the lamp manufacturer’s instructions before energizing.
7. **Program the Timer —** Set the SHT-13/2 date, time, and dose schedule per Section 6 before placing the system in service.
8. **Sealing —** Verify all conduit entries are properly sealed to preserve the Type 4X rating.
9. **Commissioning Test —** Energize the control circuit, then main power. Confirm the compressor starts and the UV lamp powers (allow 1–2 minutes warm-up). Test every protection before leaving the site: interrupt the airline (alarm + pump lockout), interrupt the UV lamp (alarm + lockout), lower the pump level float (no dose, no alarm), and lift the high water float (alarm only — pump operation unaffected). Verify the silence push-button and record the hour meter reading.

4. WIRING AND CONNECTIONS

Refer to the CP-001-3-0006 Line Drawing v1.4 and Connection Diagram v1.3 (reproduced on the following pages for reference) for complete wiring details.

Main Power & Control Circuit Feed

Main power lands on terminal 1 (L1) and supplies the spray/dose pump and the aeration compressor. The dedicated control circuit lands on terminal 2 and powers the alarm system, the timer, and the control logic; it shall not exceed 5 A.

SAFETY NOTE Neutrals from the separate main power and control circuit feeds must be landed on the same neutral bus in the feeder panel to maintain equipotential bonding, ensure an adequate fault-current return path for proper overcurrent device operation, and prevent neutral overload or hazards due to miswiring.

Terminal Schedule

TERMINAL	CONNECTION
1	L1 main power in
2	Control circuit power in
3	Aeration compressor power — 120 V, ¼ HP (5.0 FLA)
4	Spray/dose pump (black) — 120 V, 1 HP (20 FLA), through contactor M1
5 & 6	Pump level float — customer supplied, N.O.
7	Alarm power
8	Alarm signal — the high water alarm float lands across terminals 7 and 8
9	UV ballast power
10	UV bulb common
11	UV bulb 1 power
12	UV bulb 2 power
N	Neutral bus — incoming, load, alarm, and ballast neutrals
G	Ground bus — incoming, load, and ballast grounds

Field Connections

- Aeration compressor — 120 V, ¼ HP (5.0 FLA), terminal 3 and neutral
- Spray/dose pump — 120 V, 1 HP (20 FLA), terminal 4 and neutral, through contactor M1
- Pump level float — customer supplied, normally open, terminals 5 and 6
- High water alarm float — customer supplied, normally open, across terminals 7 (alarm power) and 8 (alarm signal)
- UV ballast and lamp — ballast power on terminal 9; bulb common, bulb 1, and bulb 2 on terminals 10, 11, and 12; lamp customer supplied, field installed
- Air pressure switch — Tecmark, wired COM / N.O. per the schematic
- Alarm devices — beacon and horn on the control circuit

WARNING Verify all connections match the schematic before energizing. Incorrect wiring can cause faults or create safety hazards.

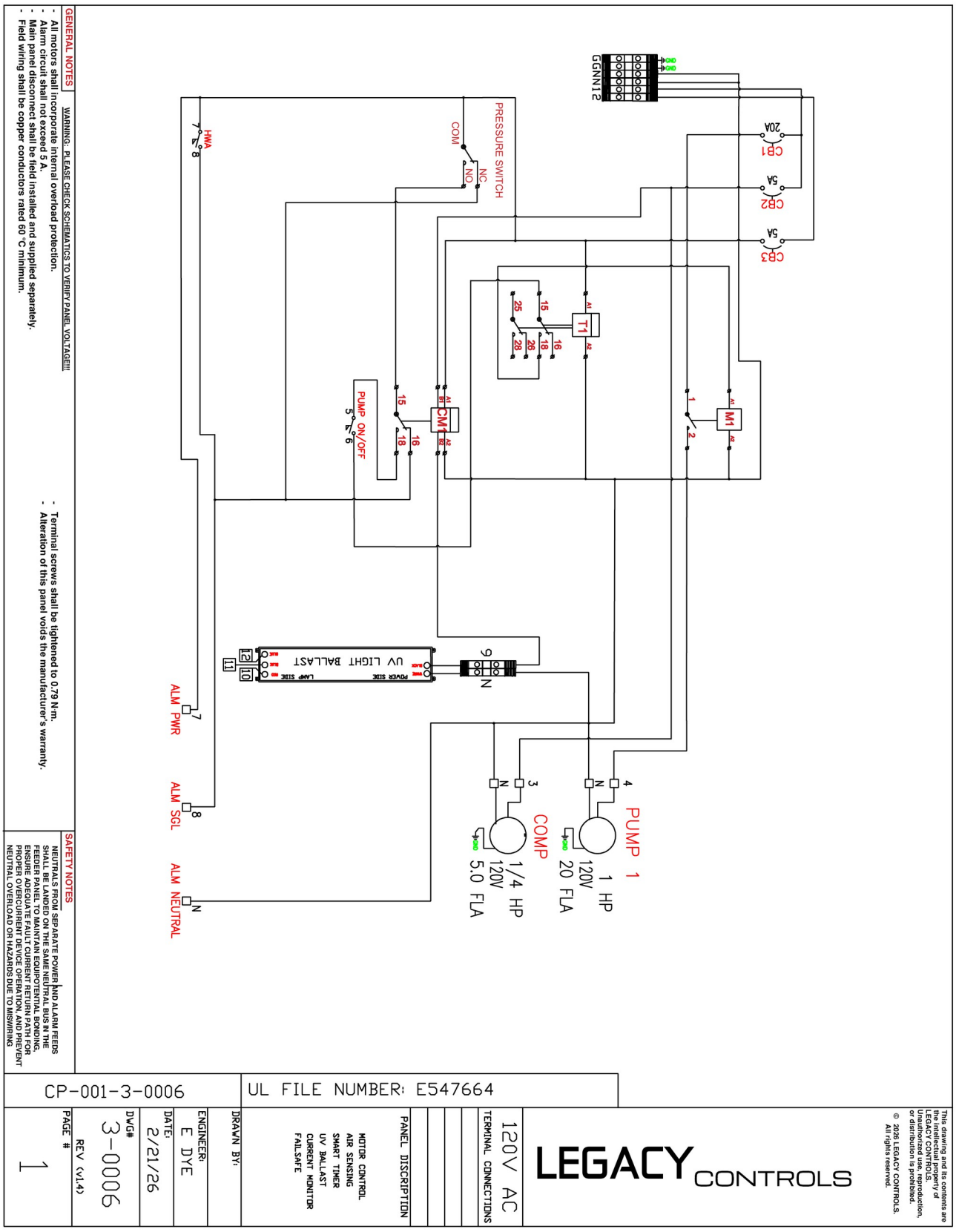

FIGURE 1 — LINE DRAWING v1.4 (REFERENCE)

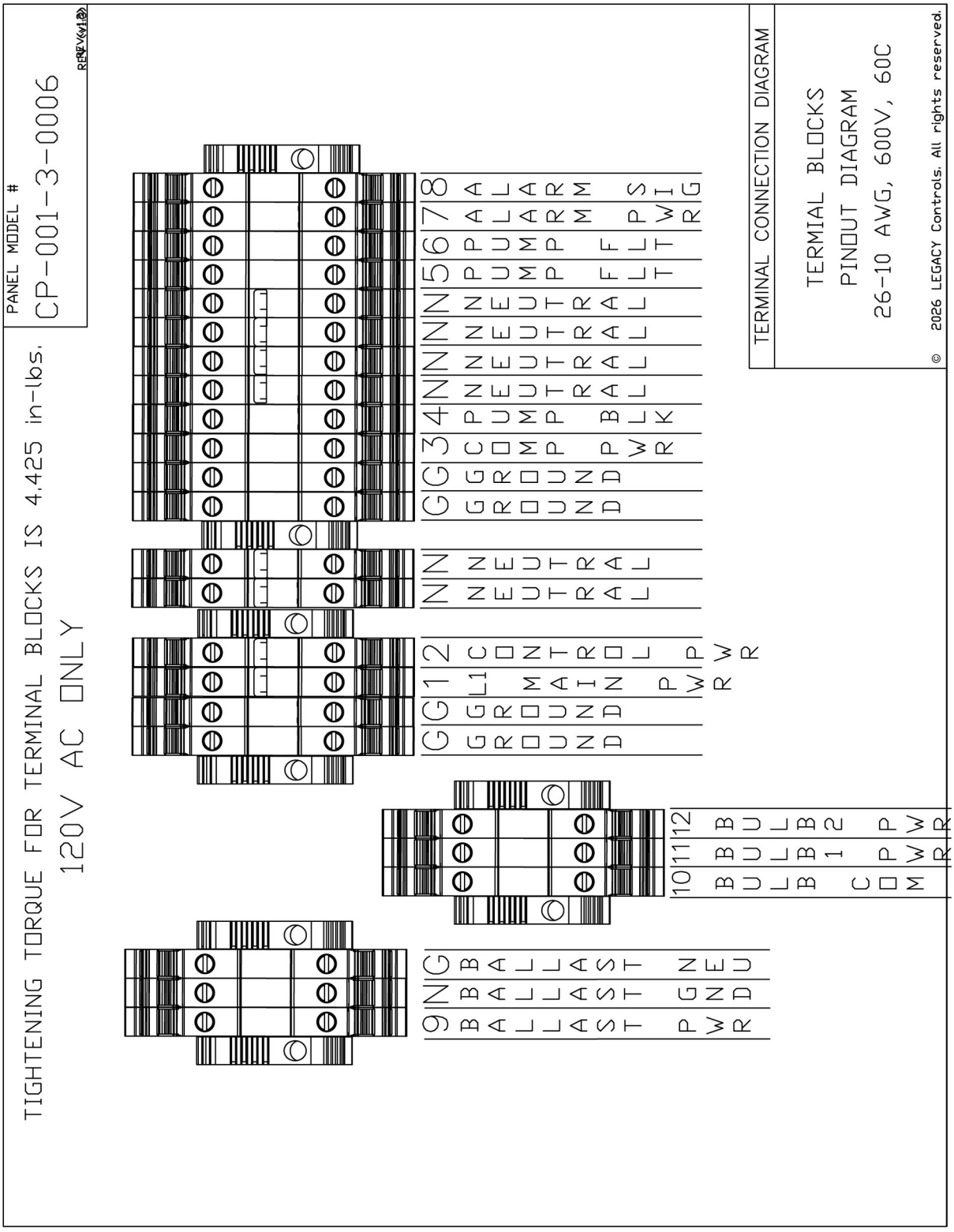

FIGURE 2 — CONNECTION DIAGRAM v1.3 (REFERENCE)

5. OPERATION

System Initialization

Verify all field wiring against the connection diagram, confirm the UV lamp is installed, and program the SHT-13/2 (Section 6). Energize the control circuit feed, then main power. The compressor starts immediately and runs continuously; the UV lamp powers and may require 1–2 minutes of warm-up. The spray/dose pump stays idle until its programmed schedule calls a dose.

Normal Operation

The compressor runs continuously whenever main power is present, verified by the air pressure switch. The UV lamp is continuously powered and supervised by the PRI-51 current monitor. The spray/dose pump runs when the SHT-13/2 Channel 1 output is active, the pump level float indicates sufficient water for a full dose, and no failsafe lockout is present. With no faults present, the beacon is off and the horn is silent.

Alarm & Lockout Behavior

CONDITION	DETECTED BY	PANEL RESPONSE
Air pressure loss	Tecmark air pressure switch (N.O.)	Alarm · spray/dose pump LOCKED OUT
UV lamp fault / end-of-life	PRI-51 current monitor	Alarm · spray/dose pump LOCKED OUT
Insufficient dose level	Pump level float (5–6)	Timer cannot engage the pump — no alarm
High water	High water alarm float (7–8)	Alarm only — pump stays on schedule by design
Main power loss	—	Alarm system remains live on the control circuit feed

FAILSAFE PROTECTION Air loss and UV fault lock out the spray/dose pump so under-treated effluent cannot be dispersed; lockouts clear automatically when the condition is corrected, and must never be bypassed. High water is intentionally alarm-only — when treatment is healthy, the panel keeps dosing to bring the level down.

6. SHT-13/2 SCHEDULE PROGRAMMING

MANUFACTURER DOCUMENTATION **Elko EP SHT-13 Data Sheet**

Scan for the official manufacturer document with complete functions, ranges, and wiring detail — elkoep.com · Datasheet_SHT-13.pdf

SCAN FOR DATA SHEET

The Elko SHT-13/2 Wi-Fi smart timer provides precise time-based control of the spray/dose pump on Channel 1 (contacts 15/18). It supports daily, weekly, astronomical (sunrise/sunset), and cycle programs — up to 200 programs total. Programming is done on the front panel, or from your phone's web browser via the built-in web server (2.4 GHz Wi-Fi, no app required). Wi-Fi is optional — the panel operates fully without it. Channel 2 is not used on this panel and is reserved as a spare.

Button Functions

- **OK —** confirm selection / toggle manual override (Auto → Manual ON → Manual OFF)
- **Up / Down —** navigate menus and adjust values
- **Back/Reset —** exit the menu or return to the previous screen

Setting Date and Time (First Step)

10. Press and hold the Down button until the menu appears.

11. Select "Date/Time" and press OK.

12. Set Year → Month → Day → Hour → Minute using Up/Down, confirming each with OK.

13. Choose the time format (12h/24h) and Daylight Saving (Auto or Off), then exit with Back. The clock is now running.

Creating Time Programs (Primary Method)

Fixed ON/OFF dose times, repeatable daily or on selected weekdays:

14. Enter the menu (hold Down), select "Program" → OK, then "New Program" → OK.

15. Choose Channel 1 — the output that controls the spray/dose pump contactor.

16. Select mode "Time" (recommended for most dose schedules).

17. Set the ON time → OK, then the OFF time → OK.

18. Select the active days — Daily, or specific weekdays.

19. Confirm and save with OK. Repeat for additional programs; they execute in order.

Worked Example — Four Doses Per Day

Create four separate Time programs on Channel 1, each with a short ON duration (typically 5–10 minutes), spaced through the day per the site's design flow and local regulations. Set all four to Daily or the required weekdays. The pump doses only while the pump level float indicates sufficient water for a full dose.

Wi-Fi Setup for Remote Access (Optional)

20. Menu → "WiFi" → "Activation" → On, then select "Config Device" to create Access Point mode.

21. On your phone, connect to the timer's Wi-Fi network (SSID: SHT-13-XXXX; default password elkoep13).

22. Browse to 192.168.4.1 and enter your 2.4 GHz Wi-Fi credentials, then save. The timer joins your network.

23. Program from your phone's browser at the timer's IP address — no app required. Turn Wi-Fi off if unused.

Manual Override & Battery

Press OK briefly to cycle Auto → Manual ON → Manual OFF; the next scheduled event or a return to Auto resumes normal operation. A CR2032 battery maintains the clock and programs through power outages (typical life ~10 years); replace it positive-side-up behind the front cover and reset the time if needed.

VERIFY BEFORE LEAVING After any programming change, confirm the timer is in AUTO and test a manual cycle. The spray/dose pump runs only when the Channel 1 output is active, the pump level float is up, AND no failsafe lockout (UV or air) is present.

7. PRI-51 UV LAMP SUPERVISION

MANUFACTURER DOCUMENTATION **Elko EP PRI-51 Manual**

Scan for the official manufacturer document with complete functions, ranges, and wiring detail — elkoepna.com · PRI-51.pdf

SCAN FOR MANUAL

The PRI-51 current monitoring relay supervises the UV lamp by measuring its operating current — the constant-engaged principle: while the lamp draws normal current the relay holds engaged; a failed lamp, an end-of-life lamp drawing degraded current, or a disconnected lamp drops the relay, which raises the alarm and locks out the spray/dose pump.

Field Adjustment

Adjustment is only required after replacing the UV lamp or ballast with a different type:

24. Install the new lamp and energize the panel. Allow the lamp 1–2 minutes to warm up and stabilize.
25. Adjust the current threshold potentiometer so the relay holds reliably engaged with the lamp operating normally — the relay LED indicates the engaged state.
26. Verify detection: interrupt the lamp and confirm the relay drops, the alarm activates, and the spray/dose pump locks out.
27. Restore the lamp and confirm the alarm clears and the lockout releases.

FACTORY CALIBRATION The PRI-51 is calibrated at the factory for the supplied ballast and lamp type. Do not adjust the threshold during routine service — only after a lamp or ballast replacement, and only per the procedure above.

8. MAINTENANCE

Recommended service intervals below, or immediately upon any alarm condition. Record all readings — including the SHT-13/2 hour meter — on the maintenance log.

INTERVAL	TASK
As required	Replace the UV lamp when disinfection degrades or a UV fault occurs — handle and dispose of lamps per local regulations
Biannually	Clean the compressor intake filter · verify air pressure switch operation and test the low-pressure lockout
Biannually	Verify the SHT-13/2 is in AUTO with the correct schedule · record the Channel 1 hour meter reading · test a manual cycle
Biannually	Test the alarm beacon, horn, and silence push-button · confirm the alarm works with the main breaker OFF · inspect enclosure seals and latches
Annually	Re-torque all terminal screws to 0.79 N·m (7.0 in-lbs)
Always	Keep the enclosure door closed and fastened

OPERATOR NOTE Respond immediately to any audible or visual alarm, and silence the horn only after acknowledging the fault. Never override the air loss or UV fault lockouts.

9. TROUBLESHOOTING

Preliminary checks: verify both power feeds are live, check the SHT-13/2 timer status on its display or from your phone, and identify which fault is annunciating before working through the matrix below.

SYMPTOM	POSSIBLE CAUSE	ACTION
No lights, no compressor, no alarm	Both feeds lost, or main feed lost with control feed also open	Check both feeder breakers and incoming voltage at terminals 1 and 2
Alarm active, no compressor or UV	Main breaker tripped — control circuit still live	Reset the main breaker and investigate the cause of the trip
UV fault alarm, pump locked out	Lamp failed or at end-of-life; ballast fault; PRI-51 threshold drifted after a lamp change	Replace the UV lamp; verify the PRI-51 setting per Section 7
Air fault alarm, pump locked out	No air pressure, blocked or split airline, failed compressor, or faulty pressure switch	Inspect the airline, compressor, and Tecmark pressure switch
Spray/dose pump never runs	Timer not in AUTO, no program stored, pump level float down, or an active failsafe lockout	Set the timer to AUTO and verify the Channel 1 schedule; confirm sufficient dose level; clear any UV or air fault
Pump runs but nothing disperses	Restricted or frozen discharge line, closed valve, or failed pump	Inspect the discharge line and valves; verify pump output
High water alarm	Inflow exceeding the dose schedule, restricted discharge, or pump undersized	Verify the pump is dosing on schedule; investigate inflow and discharge — the pump is never locked out by high water
Horn will not silence	Silence circuit wiring or relay failure	Verify the silence circuit; contact AKHA Manufacturing

IF ISSUES PERSIST Contact AKHA Manufacturing, LLC with the model and serial number — Toll Free 800-370-3749 · Phone (574) 936-2542 · hydro-action.com

10. WARRANTY

Definitions

For the purposes of this Limited Warranty:

- **“Product”** refers to the UL Listed industrial control panel manufactured by Legacy Controls, including all components, assemblies, and associated hardware as originally supplied.
- **“Defect”** means a failure of the Product to conform to Legacy Controls’ published specifications due to faults in materials or workmanship under normal use and service.
- **“Authorized Service Provider”** means Legacy Controls or its designated dealers, distributors, or repair facilities authorized in writing by Legacy Controls.
- **“Original Purchaser”** means the end-user who first purchases the Product from Legacy Controls or an authorized dealer/distributor for use, not resale.
- **“Warranty Period”** means the period of two (2) years commencing from the date of original purchase as evidenced by valid proof of purchase.

Warranty Statement

Legacy Controls warrants to the Original Purchaser that the Product will be free from Defects in materials and workmanship for the Warranty Period when used in accordance with the instructions provided in this operation manual, the accompanying panel schematic and connection diagram, and applicable UL standards (including UL 508A for industrial control panels). This Limited Warranty is non-transferable and applies only to the Original Purchaser. It does not extend to any subsequent owners or users.

Coverage

If a Defect occurs during the Warranty Period, Legacy Controls or an Authorized Service Provider will, at its sole discretion, repair or replace the defective Product or component. Repaired or replaced Products or components are warranted for the remainder of the original Warranty Period or ninety (90) days from the date of repair or replacement, whichever is longer.

Exclusions & Limitations

This Limited Warranty does not cover damage or failure resulting from misuse, abuse, negligence, improper installation or maintenance, alterations by unauthorized parties, normal wear and tear, cosmetic damage, environmental deterioration, external factors, or products purchased from unauthorized sellers. Consumable items such as fuses, bulbs, batteries, and UV lamps are excluded unless the defect is due to manufacturing workmanship. Liability is limited to the original purchase price. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, LEGACY CONTROLS SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, SPECIAL, PUNITIVE, OR EXEMPLARY DAMAGES.

Making a Warranty Claim

All warranty claims must be submitted through AKHA Manufacturing, LLC, using the contact information in the Important Notice at the beginning of this manual, with proof of original purchase, the model number, and a detailed description of the issue. Legacy Controls provides warranty support to AKHA Manufacturing, LLC as the authorized supplier. The Product will be inspected to verify the Defect and eligibility, and the Original Purchaser will be notified of the results and proposed resolution within a reasonable time, typically within thirty (30) days of receipt.

Component Substitution

Legacy Controls reserves the right to substitute any control panel component with an alternative meeting equivalent specifications, including identical operational parameters and performance standards. Legacy Controls assumes full responsibility for the functional performance of any such substitution and for its continued compliance with all applicable regulatory and operational requirements.

Governing Law

This Limited Warranty shall be governed by the laws of the State of Florida. Any disputes shall be resolved exclusively in the state or federal courts located in Brevard County, Florida.