

Time-Based Dosing Control Panel · UV Disinfection

240 VAC Pump · 120 VAC Control | Time-Dose · SHT-13/2 Wi-Fi Timer | Failsafe Lockout

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

DOCUMENT VERSION 3.0 (Full)

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MODEL CP-001-3-0006-240V

UL FILE NUMBER E547664

PREPARED BY Legacy Controls · 6200 FL-46, Mims, FL 32754

COMPLIANCE UL 508A · NSF/ANSI 40 compatible

SYSTEM PLATFORM Hydro-Action®

WEB hydro-action.com

PRODUCT OVERVIEW

The CP-001-3-0006-240V is a UL 508A Listed control panel that both powers and protects a time-dosed dispersal system with UV disinfection. A 240 V main feed powers the spray/dose pump (up to 2 HP), while a dedicated 120 V control circuit powers the air compressor, UV ballast, alarm system, and the Elko SHT-13/2 Wi-Fi smart timer that schedules every dose. Protection is layered and failsafe: low air pressure or a UV lamp fault raises the alarm and locks out the spray/dose pump; the timer enable float blocks short doses; and high water raises the alarm only — by design, the pump stays on schedule, because high water means it is not keeping up.

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 circuits**: a 240 V main feed that powers only the spray/dose pump, and a dedicated 120 V control circuit that powers the air compressor, UV ballast, alarm system, and timer. The control circuit **remains energized when the 240 V 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 a 240 V main pump circuit and a separately fed 120 V control circuit. 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 240 V main breaker and the 120 V control circuit breaker before opening the panel, and use proper lockout/tagout procedures. The control circuit remains energized when the 240 V main is off. Always verify with a voltage tester.
- **Control Circuit** — The 120 V control circuit powers the compressor, UV ballast, alarm system, and timer. A dedicated feed is required. Neutrals from both feeds must land on the same neutral bus.
- **Failsafe Lockouts** — Never override the air loss or UV fault lockouts under any circumstances. They exist to prevent discharge 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** — The compressor and spray/dose pump must incorporate internal overload protection.
- **High Water Alarm** — If the high water alarm activates, investigate immediately to prevent system backup or overflow.
- **Field Wiring** — Use copper conductors rated 60 °C minimum. Torque all terminal screws to 4–5 in-lbs (0.45–0.56 N·m).
- **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 for the 240 V circuit. Always verify with a voltage tester before working inside the panel.

2. SPECIFICATIONS

Panel Identification & Electrical Ratings

PARAMETER	SPECIFICATION
Model	CP-001-3-0006-240V
UL File Number	E547664
Main Power (Pump Circuit)	240 VAC, 60 Hz, single phase — powers the spray/dose pump only
Control Power (Dedicated Feed)	120 VAC, 60 Hz, single phase — dedicated feed required; powers compressor, UV, alarm, timer
Spray / Dose Pump	240 V, up to 2 HP (20 FLA)
Compressor (Air Pump)	120 V, ¼ HP (5.0 FLA) — panel rated ½ HP max; internal overload protection required
Total FLA / SCCR	Approx. 25 A combined (20 A pump + control side) · SCCR 5 kA
Feeder Protection (Field Supplied)	Upstream, at the feeder panel (not in this panel): 240 V pump feed 30 A · 120 V control feed 10–15 A
Timer / Scheduler	Elko SHT-13/2 Wi-Fi smart timer — daily, weekly, astronomical, and cycle programs · built-in run-time hour meter
Protection & Monitoring	PRI-51 UV current relay · air pressure switch · timer enable float (7–8) · high-water alarm float (9–10)
Alarm System	Beacon + horn — powered by the control circuit; remains live if the 240 V main trips
Enclosure	Polycase ZH-100804 · NEMA 4X polycarbonate · 10.0 × 8.4 × 5.2 in external
Field Wiring	Copper conductors, 60 °C minimum · terminal torque 4–5 in-lbs (0.45–0.56 N·m)
Compliance	UL 508A Listed · NSF/ANSI 40 compatible

Key Components

PARAMETER	SPECIFICATION
Elko SHT-13/2 Wi-Fi Smart Timer	Programmable time-based dose schedules on Channel 1 — phone-browser programming, no app required (see Section 6)
PRI-51 Current Monitoring Relay	Constant-engaged UV lamp supervision — lamp failure or degradation triggers alarm and spray/dose pump lockout (see Section 7)
Air Pressure Switch (N.O.)	Verifies compressor operation — low pressure triggers alarm and spray/dose pump lockout
Timer Enable Float (N.O.)	Terminals 7–8 — enables the timer and blocks short doses; the pump cannot run without sufficient water for a full dose
High Water Alarm Float (N.O.)	Terminals 9–10 — alarm only, by design; pump operation is unaffected
240 V Pump Contactor	Switches the spray/dose pump — coil powered from the 120 V control circuit
UV Ballast & Lamp	Provides final effluent disinfection — lamp is customer-supplied and field-installed

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 Polycase ZH-100804 NEMA 4X enclosure (10.0 × 8.4 × 5.2 in) to a stable vertical surface protected from direct weather and physical damage.
2. **Power Supply** — Bring two circuits from the feeder panel: a 240 V pump feed (30 A breaker) and a dedicated 120 V control feed (10–15 A breaker). This is feeder protection at the main panel, not part of this panel. Install a field-supplied main disconnect on the 240 V circuit.
3. **Control Circuit** — The dedicated 120 V feed keeps the compressor, UV, alarm, and timer powered independently of the pump circuit — the alarm stays live if the 240 V main trips. Neutrals from both feeds must land on the same neutral bus in the feeder panel.
4. **Field Wiring** — Use copper conductors rated 60 °C minimum and wire all field devices exactly as shown on the terminal connection diagram. Torque all terminal screws to 4–5 in-lbs (0.45–0.56 N·m).
5. **Float Installation** — Install both N.O. floats in the dose tank (pump vault): the timer enable float (terminals 7–8) at the minimum level for a full dose, and the high water alarm float (terminals 9–10) 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. **Commissioning Test** — Energize the 120 V control circuit first (compressor and UV start), then the 240 V main. Confirm the pump doses on schedule with the timer enable float up. Test every protection before leaving the site: interrupt the airline (alarm + pump lockout), interrupt the UV lamp (alarm + lockout), lower the timer enable float (no dose, no alarm), and lift the alarm float (alarm only — pump unaffected). Record the hour meter reading.

4. WIRING AND CONNECTIONS

Refer to the CP-001-3-0006-240V Line Drawing 240V v1.0 and Connection Diagram 240V v1.0 (reproduced on the following pages for reference) for complete wiring details.

Main Power & Control Circuit Feed

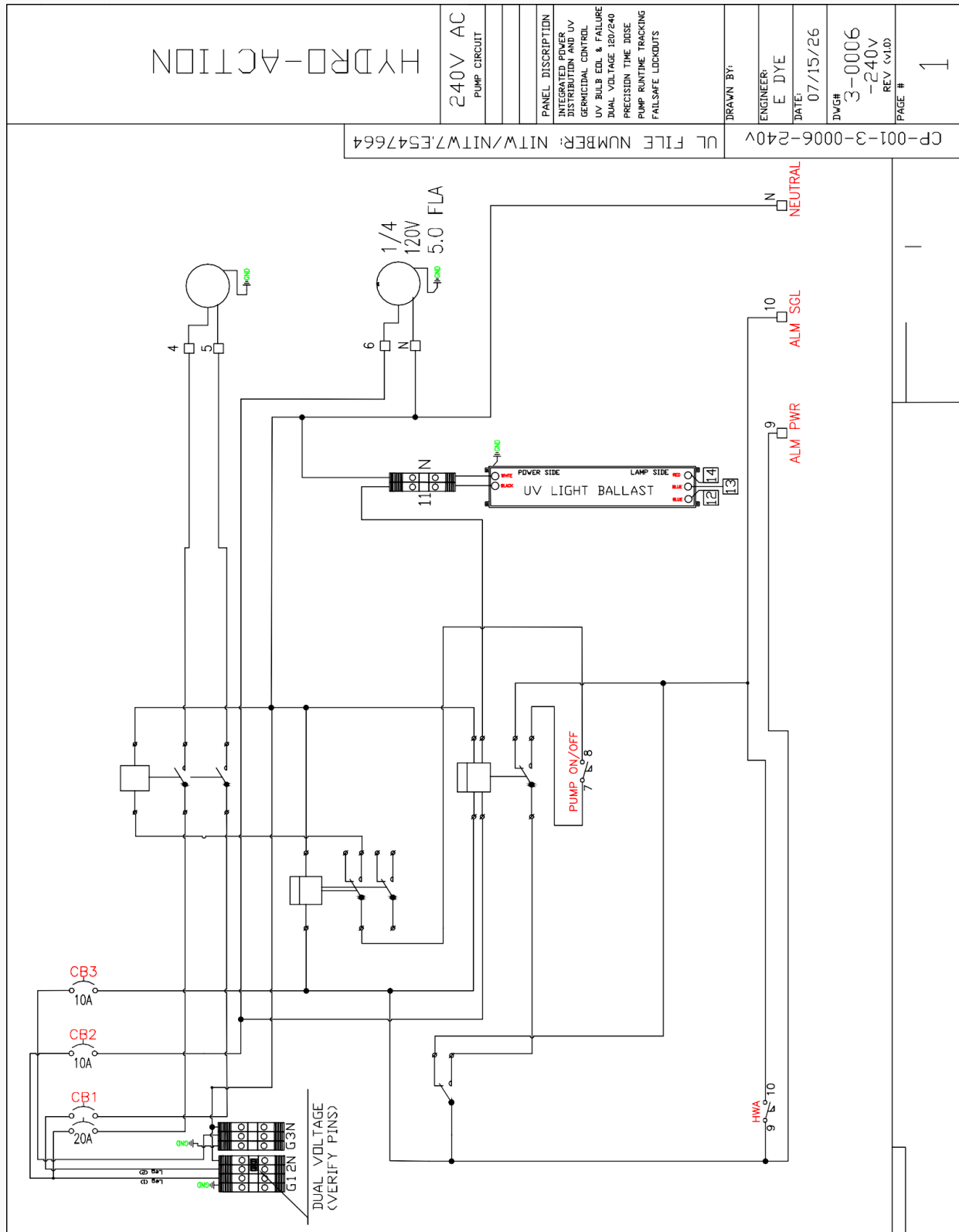
The 240 V main feed powers only the spray/dose pump, switched by the pump contactor (contactor coil on the control circuit). The dedicated 120 V control circuit powers the compressor, UV ballast, alarm system, and the SHT-13/2 timer.

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.

Field Connections

- Spray/dose pump — 240 V, up to 2 HP (20 FLA), through the pump contactor
- Aeration compressor — 120 V, ¼ HP (5.0 FLA), on the control circuit
- UV ballast and lamp — on the control circuit; lamp customer supplied, field installed
- Air pressure switch — per the schematic
- Timer enable float — terminals 7 and 8 (N.O.)
- High water alarm float — terminals 9 and 10 (N.O.)
- 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.



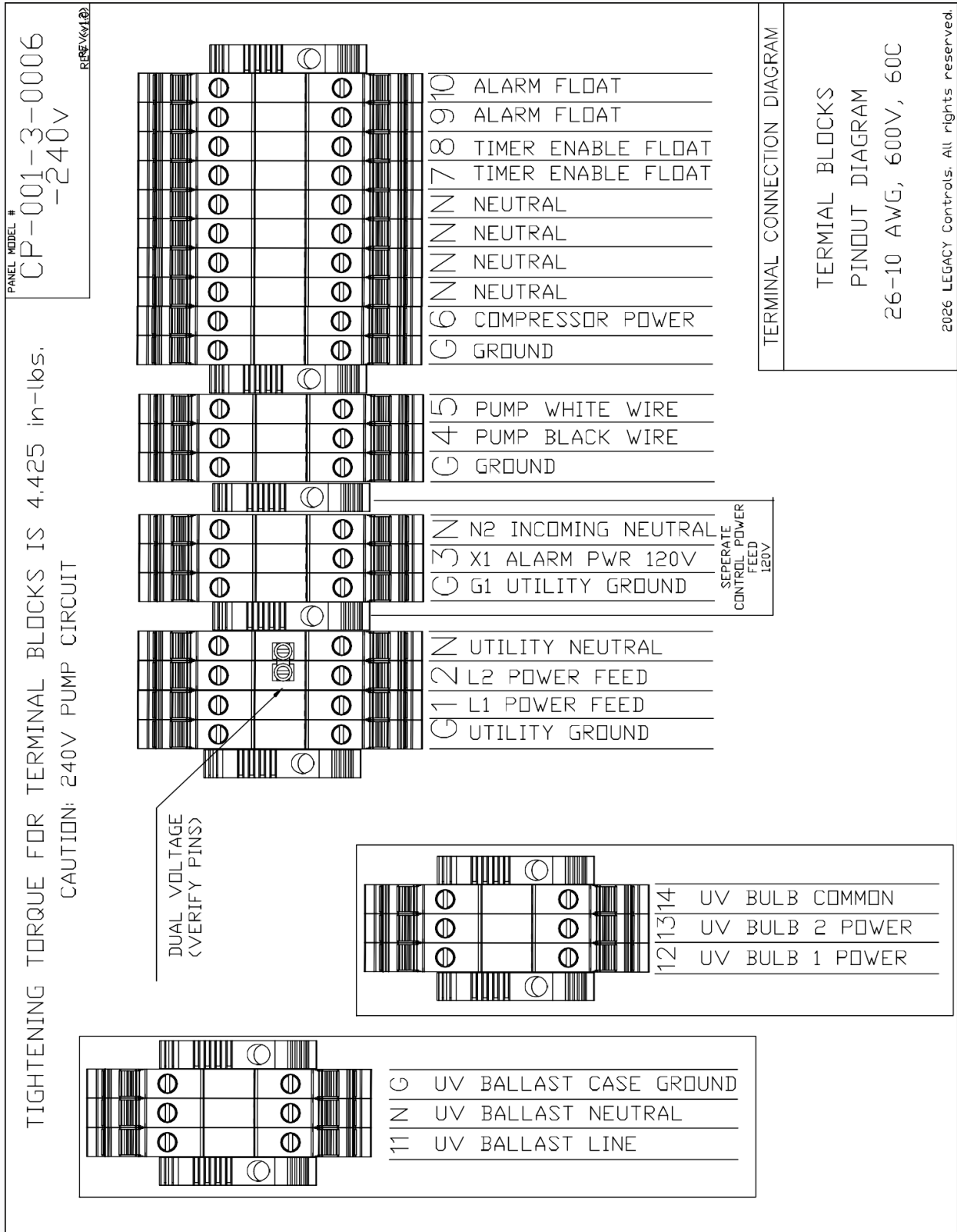


FIGURE 2 — CONNECTION DIAGRAM 240V v1.0 (REFERENCE)

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 120 V control circuit first — the compressor and UV lamp start immediately. Then energize the 240 V main. The spray/dose pump runs only on its programmed schedule, and only while the timer enable float indicates sufficient water.

Normal Operation

The compressor runs continuously on the control circuit, verified by the air pressure switch. The UV lamp is continuously powered and supervised by the PRI-51 current relay. The spray/dose pump runs per the SHT-13/2 schedule — when the timer output is active, the timer enable float is up, and no failsafe lockout is present. The Channel 1 hour meter accumulates pump run time for service tracking.

Alarm & Protection Behavior

CONDITION	DETECTED BY	PANEL RESPONSE
Low air pressure	Air pressure switch (N.O.)	Alarm · spray/dose pump LOCKED OUT
UV lamp fault or degradation	PRI-51 current relay — constant engaged	Alarm · spray/dose pump LOCKED OUT
Insufficient dose level	Timer enable float (terminals 7–8)	Timer cannot engage the spray/dose pump — no alarm
High water	Alarm float (terminals 9–10)	Alarm only — the pump stays on schedule by design
240 V main power loss	—	Alarm system remains live on the 120 V control circuit

FAILSAFE PROTECTION The only output this panel ever locks out is the spray/dose pump — on air loss or UV fault, 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](#)



The Elko SHT-13/2 Wi-Fi smart timer provides precise time-based control of the spray/dose pump on Channel 1. 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; the Elko EP app is optional). Wi-Fi is optional — the panel operates fully without it.

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)

9. Press and hold the Down button until the menu appears.
10. Select “Date/Time” and press OK.
11. Set Year → Month → Day → Hour → Minute using Up/Down, confirming each with OK.
12. 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:

13. Enter the menu (hold Down), select “Program” → OK, then “New Program” → OK.
14. Choose Channel 1 — the output that controls the spray/dose pump contactor.
15. Select mode “Time” (recommended for most dose schedules).
16. Set the ON time → OK, then the OFF time → OK.
17. Select the active days — Daily, or specific weekdays (multiple days can be selected).
18. 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 timer enable float indicates sufficient water for a full dose.

Astronomical Mode (Optional)

For sunrise/sunset-based schedules, select “Astro” instead of “Time” in the program mode, enter the location by city or coordinates, and add offsets if needed (for example, +30 minutes after sunset).

Wi-Fi Setup for Remote Access (Optional)

19. Menu → “WiFi” → “Activation” → On, then select “Config Device” to create Access Point mode.
20. On your phone, connect to the timer's Wi-Fi network (SSID: SHT-13-XXXX; default password elkoep13).
21. Browse to 192.168.4.1 and enter your 2.4 GHz Wi-Fi credentials, then save. The timer joins your network.
22. 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 timer output is active, the timer enable float is up, AND no failsafe lockout (UV or compressor fault) 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



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:

23. Install the new lamp and energize the control circuit. Allow the lamp 1–2 minutes to warm up and stabilize.
24. Adjust the current threshold potentiometer so the relay holds reliably engaged with the lamp operating normally — the relay LED indicates the engaged state.
25. Verify detection: interrupt the lamp and confirm the relay drops, the alarm activates, and the spray/dose pump locks out.
26. 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 interval: every six months, or immediately upon any alarm condition. Record all readings — including the SHT-13/2 hour meter — on the maintenance log.

TASK	PROCEDURE	REFERENCE
Visual & Torque	Inspect for damage and corrosion · re-torque terminals to 4–5 in-lbs (0.45–0.56 N·m)	Schematic
Timer & Schedule	Verify the SHT-13/2 is in AUTO with the correct schedule · record the Channel 1 hour meter reading · test a manual cycle	Section 6
UV & PRI-51	Check or replace the UV lamp · verify PRI-51 supervision per the test procedure	Section 7
Compressor & Pressure Switch	Clean the intake filter · test the low-pressure lockout function	Schematic
Alarm & Failsafes	Test the beacon and horn · confirm the alarm works with the 240 V main OFF · verify both lockouts	Section 5

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

9. TROUBLESHOOTING

Preliminary checks: confirm both power feeds are live and check the SHT-13/2 timer status on its display or from your phone.

SYMPTOM	POSSIBLE CAUSE	ACTION
No compressor, no lights	120 V control power loss	Check the 120 V control feed breaker and wiring
Spray/dose pump never runs	Timer not in AUTO, no program, timer enable float down, active lockout, or no 240 V	Set the timer to AUTO and verify the schedule; confirm sufficient dose level; clear any UV or compressor fault; check the 240 V supply to the contactor
UV or compressor fault alarm	Lamp failure or loss of air pressure	Replace the UV lamp (Section 7) or repair the compressor/airline; the lockout clears when the condition is corrected
High water alarm	Inflow exceeding the dose schedule, restricted discharge, or pump undersized	Verify the pump runs on schedule; investigate inflow and discharge — the pump is never locked out by high water
Horn will not silence	Alarm circuit wiring or relay failure	Verify the alarm 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

CLAIMS ADMINISTRATION All warranty claims must be submitted through AKHA Manufacturing, LLC, using the contact information in the Important Notice at the beginning of this manual. Legacy Controls provides warranty support to AKHA Manufacturing, LLC as the authorized supplier.

Submit claims with proof of original purchase, the model number, and a detailed description of the issue. 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.

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