

PLC Drip Nitrogen Reduction Control Panel

120 VAC · Single Phase | Siemens LOGO! PLC Control | Drip Dispersal · Nitrogen Reduction

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

DOCUMENT VERSION **1.0**

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ENGINEERING MODEL **CP-001-1-0002**

PANEL MODEL **MCP-LV120-15A-PLCFS-1P-R1.0**

UL FILE NUMBER **E547664**

COMPLIANCE **UL 508A Listed**

READ FIRST — TWO SEPARATE 120 V FEEDS

This panel is fed by TWO separate 120 V circuits — main power on terminal 1 and a dedicated alarm / control feed on terminal 3. The alarm feed keeps annunciation live when main power is lost, so terminal 3 REMAINS ENERGIZED with the main feed off. Disconnect both circuits before opening the panel. The remote alarm circuit must not exceed 5 A.

1. SAFETY INSTRUCTIONS

- **Qualified personnel only** — installation and maintenance by licensed electricians or qualified technicians, per NEC and local code.
- **Power off procedures** — disconnect BOTH the main feed and the alarm / control feed before opening the panel. The alarm circuit remains energized with the main breaker off. Verify with a voltage tester.
- **Field-supplied devices** — the main panel disconnect and pressure switches 1 and 2 must be provided and installed by the installer.
- **Motor overloads** — this panel contains no overload devices. Every connected motor must incorporate integral overload protection.
- **High water** — investigate immediately to prevent backup or overflow. High water annunciates only and does not stop treatment.
- **Unauthorized modification** — alteration of this panel voids the warranty and the UL listing.

2. SPECIFICATIONS

PARAMETER	SPECIFICATION
Operating voltage	120 VAC, 60 Hz, single phase — all circuits
Supply feeds	Main power (terminals 1 / 2) and a separate alarm / control feed (terminals 3 / 4)
Connected load	24.0 A total across four motors
Branch protection	CB1 20 A · CB2 20 A · CB3 10 A · CB4 10 A
Alarm circuit	Remote alarm circuit must not exceed 5 A
Control platform	Siemens LOGO! PLC — 8 digital inputs, 4 relay outputs
Overload protection	None in panel — motor-integral required
Field wiring	26–10 AWG copper, 600 V, 60 °C minimum
Listing	UL 508A Listed · File E547664

MOTOR LOADS

LOAD	TERMINAL	RATING	FLA
Dose pump	8	3/10 HP	7.0 A
Mixer	7	3/10 HP	7.0 A
Recirculation pump	6	1/4 HP	5.0 A
Compressor	5	1/4 HP	5.0 A

3. INSTALLATION

1. **Mounting** — mount the panel on a stable vertical surface protected from direct weather and physical damage. Follow all NEC, state and local code.
2. **Power supply** — bring two separate 120 V circuits — main power and a dedicated alarm / control circuit. Install a field-supplied main disconnect upstream.
3. **Motor connections** — land each motor on its numbered terminal with its neutral and ground, per the terminal table.
4. **Solenoids and floats** — land the field and filter flush solenoids and all floats per the terminal table.
5. **Pressure switches** — install field-supplied pressure switches 1 and 2.
6. **Terminations** — torque to the Dinkle rated value for each terminal type — DK4 0.6 N·m, DK2.5 0.4 N·m, DK10 per the Dinkle datasheet. Never apply a single blanket figure across terminal types.
7. **Commissioning** — run the functional test in the Quick Start Guide before leaving the site.

4. TERMINAL CONNECTIONS

Refer to Line Drawing V4.8.1 · Connection Diagram V4.8.1 and the Terminal Connection Diagram, sheet 2 of 2 (provisional) for complete wiring detail.

TERMINAL	DEVICE	NOTES
1	L1 utility power	Main power feed
2	X1 alarm power	Alarm / control circuit feed — separate circuit
N	N utility neutral	Main neutral
N	N2 alarm neutral	Alarm circuit neutral
5	Compressor	1/4 HP · 120 V · 5.0 FLA
6	Recirculation pump	1/4 HP · 120 V · 5.0 FLA — see drawing note W-011
7	Mixer	3/10 HP · 120 V · 7.0 FLA — see drawing note W-011
8	Dose pump	3/10 HP · 120 V · 7.0 FLA
10	Field solenoid	Drip field flush valve
11	Filter solenoid	Filter backflush valve
12 · 13	Recirculation float	Recirculation enable pair
14	Floats common	Common return for terminals 15, 16 and 17
15	Drip enable float	Dose permissive — PLC dose on/off
16	Override float	Forces a dose cycle out of schedule; overrides are counted
17	Alarm float	High water — annunciation only
N	Neutral (5 positions)	Motor and field device neutrals
G	Ground (4 positions)	Panel and field device grounding

5. OPERATION

Normal operation

The Siemens LOGO! PLC runs the dose schedule continuously. A dose cycle energizes the dose pump for the programmed ON time, then rests for the programmed OFF time, provided the drip enable float permits dosing. The mixer and recirculation pump operate on the treatment schedule, and the compressor supplies aeration. The PLC also sequences the filter backflush and drip field flush solenoids, and runs the failsafe logic.

Override

The override float forces a dose cycle outside the normal schedule whenever demand requires it. The PLC counts and retains every override. The count is a maintenance record: a climbing count indicates sustained high inflow and should be investigated at the source, not corrected at the panel.

Hand controls

REF	CONTROL	FUNCTION
B1	Rotary selector	Alarm horn silence
B2	Momentary push-button	Alarm test
B3	Filter flush (HAND)	Manual filter backflush
B4	Dose pump (HAND)	Manual dose cycle
B5	Field flush (HAND)	Manual drip field flush

Alarms

A high-water condition activates the beacon, the horn and the remote alarm output. The horn is silenced with the B1 rotary selector; the beacon remains lit until the condition clears. B2 tests the alarm. High water never interrupts dosing, recirculation, mixing or aeration.

6. PLC PROGRAMMING

SETTING	VALUE
Dose ON time	12 minutes
Dose OFF time	1.75 hours
Override	Engages whenever demand requires it. The PLC counts and retains total overrides.

PROGRAMMING ACCESS The PLC ships programmed and verified. Do not alter the program, timers or retentive counters without written direction from AKHA Manufacturing, LLC — the dose schedule is set to the treatment system's design flow.

7. ROSTERED COMPONENTS

COMPONENT	FUNCTION
Siemens LOGO! PLC	Time schedule, motor sequencing, filter and field flush, override counting and failsafe. Eight digital inputs (I1–I8), four relay outputs (Q1–Q4).
M1 · M2 · M3 relays	Motor control relays driven by the PLC outputs.
R1 relay	Alarm relay — dry contact output (COM / NO / NC).
Current monitoring relay	Verifies motor current; contacts 15 · 16 · 18.
Pressure switch 1 · 2	Field supplied. Pressure switch 2 drives the R1 coil.

8. MAINTENANCE

- Record the PLC override count at every service visit
- Inspect and exercise the filter and field flush solenoids
- Verify all floats respond and their PLC input LEDs follow

- Confirm motor running currents against the load table
- Test the alarm with B2 and confirm the remote alarm output
- Inspect enclosure seals, latches and conduit entries

COMPLETE PANEL DOCUMENTATION Scan for the current Specification Sheet, Troubleshooting Guide, Quick Start Guide and drawings.



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