Gravity UV Aeration Control Panel

Single Phase · 120 VAC | Factory-Integrated CAM-4G Cellular Alarm Notification

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

DOCUMENT VERSION 2.2
PREPARED BY Legacy Controls, 6200 FL-46, Mims, FL 32754
SYSTEM PLATFORM Hydro-Action® · Gravity-Flow Aerobic Treatment
DATE July 2026
UL FILE NUMBER E547664
COMPLIANCE UL 508A Listed

PRODUCT OVERVIEW

Engineered and manufactured by Legacy Controls for AKHA Manufacturing, LLC, the CP-001-2-0003 provides continuous aeration compressor control, UV disinfection supervision, and high-water monitoring for Hydro-Action gravity-flow aerobic treatment systems. The factory-integrated CAM-4G module delivers battery-backed SMS alerts the moment an alarm occurs. This UL Listed panel must not be altered or modified; this is the only manual provided and covers both the panel and the integrated cellular monitoring system.

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 and a dedicated control circuit that keeps the alarms 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 operates at 120 VAC and contains both main power circuits and a separately fed control circuit. The integrated CAM-4G module operates on 120 VAC and contains non-rechargeable backup batteries. Improper handling can result in serious injury, death, electrical shock, fire, or equipment damage.

- **Qualified Personnel Only —** Installation and maintenance must be performed by licensed electricians or qualified technicians familiar with local electrical codes (NEC), UL standards, and control panel safety practices.
- **Power Off Procedures —** Disconnect BOTH the main breaker and the control circuit feed before opening the panel or performing any wiring. Use proper lockout/tagout procedures. The control circuit remains energized even when the main breaker is OFF. Always verify with a voltage tester.
- **Battery Safety (CAM-4G) —** The integrated CAM-4G module contains four non-rechargeable AA batteries. Do not attempt to recharge them. Remove batteries before performing any internal service on the module. Replace annually or upon receiving a low-battery SMS alert. Dispose of used batteries properly per local regulations.
- **Antenna Connection —** Connect only the factory-supplied 4G/LTE paddle antenna or approved extension antennas. Finger-tighten the SMA connector only; do not use tools or excessive force.
- **Environmental Protection —** Install the panel in a location protected from direct weather and physical damage. The CAM-4G module must be installed inside a Type 4X weather-tight enclosure for proper environmental protection.
- **Sensor Inputs —** All CAM-4G inputs are dry-contact or conductivity-sensing only (safe to touch, no voltage present). Never apply external voltage, current, or power to any input terminal.
- **UV Lamp Handling —** Handle and dispose of UV lamps according to local regulations. Avoid direct exposure to UV light.
- **High-Water Alarm — If the high-water alarm float is activated, immediately investigate to prevent system backup or overflow.**
- **Field Wiring — Use copper conductors rated minimum 60 °C. Torque to the Dinkle rated value for each terminal type — DK4N / DK4N-PE terminals (GG12) to 0.6 N·m (5.3 in-lbs) and DK2.5N / DK2.5N-PE terminals to 0.4 N·m (3.5 in-lbs).**
- **Unauthorized Modifications —** Do not modify, alter, or bypass any factory-installed components, including the integrated CAM-4G module. Doing so will void the UL listing and 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

Control Panel

PARAMETER	SPECIFICATION
Model / Document	CP-001-2-0003 · Operation Manual
Electrical	120 VAC, 60 Hz, single phase — dual feeds: main power + control circuit · Total FLA 10 A · SCCR 5 kA
Compressor Circuit	120 V, ¼ HP max (5.0 FLA) — motors must incorporate internal overload protection
UV Ballast	Electronic or magnetic · 25–35 W customer-supplied lamp
Control System	Air pressure switch (compressor verification) · PRI51/1 current monitoring relay (UV lamp supervision) · high-water alarm float · R1 alarm relay (120 VAC coil, dry contact output NO/NC/COM)
Alarm System	Integrated red beacon (visual) + 95 dB horn (audible) · silence push-button · powered from the control circuit
Enclosure	Type 4X (NEMA 4X) polycarbonate
Terminals	Dinkle DK4N / DK4N-PE (GG12 power distribution): M3 screw, torque 0.6 N·m (5.3 in-lbs), 22–10 AWG · Dinkle DK2.5N / DK2.5N-PE (all other positions): M2.5 screw, torque 0.4 N·m (3.5 in-lbs), 22–12 AWG · -PE variants are ground (PE) terminals
Field Wiring	Copper conductors, 60 °C minimum, 600 V rated
Operating Temperature	–30 °F to 140 °F
Certifications	UL Listed per UL 508A · UL File Number E547664

Integrated CAM-4G Cellular Alarm Notification Module

PARAMETER	SPECIFICATION
Cellular Radio	4G LTE CAT-1 with 3G/2G fallback · factory-installed 4G/LTE paddle antenna (SMA, finger-tight only)
Power / Backup	120 VAC ± 20%, hardwired inside primary enclosure · 4 × AA non-rechargeable batteries (field replaceable, replace annually)
Sensor Inputs	4 total — dry contact or conductivity sensing, configurable NO/NC (safe to touch; never apply external voltage)
Audible Alarm	External 100 dBA output — configurable with panel alarm; silent on power failure
Temperature Sensor	Factory-set high/low thresholds · ±5 °F accuracy
Enclosure / Temperature	Type 4X weather-tight (installed in panel enclosure) · –30 °F to 140 °F (lithium)
Configuration	Via SMS commands from any standard cellular phone
Notification	SMS text to up to 3 pre-programmed numbers — includes unit name, input name, serial number, date/time, and alarm status
Certifications	FCC Parts 15, 22, 24 · RoHS compliant · IC RSS-132 & RSS-133

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 —** Mount the panel vertically on a stable wall or post or horizontally in a location protected from direct weather and physical damage. Must follow all NEC, state, and local code.
2. **Power Supply —** Bring two separate 120 V circuits: one for main power (15A breaker) and one dedicated for the Control / Alarm circuit (5 A max). Install a main disconnect switch upstream (field supplied). Internal branch-circuit protection is sized according to the connected load and control system requirements. The installer shall select the upstream feeder/main disconnect and size all supply conductors in accordance with the National Electrical Code (NEC), including Articles 240, 310, and 430
3. **CAM-4G Module —** The module is factory pre-wired and integrated. Do not modify its power connections or internal wiring.
4. **Field Devices —** Connect the compressor, UV ballast, and high-water float as shown on the terminal connection diagram and schematic.
5. **UV Lamp —** Install the customer-supplied UV lamp (25–35 W).
6. **Terminations —** Torque DK4N / DK4N-PE terminals (GG12) to 0.6 N·m (5.3 in-lbs) and DK2.5N / DK2.5N-PE terminals to 0.4 N·m (3.5 in-lbs).
7. **Sealing —** Verify all conduit entries are properly sealed to preserve the Type 4X rating.
8. **Commissioning Test —** Test all functions — compressor operation, pressure switch, UV monitoring, high-water alarm, and CAM-4G SMS notifications — before leaving the site.

4. WIRING AND CONNECTIONS

Refer to CP-001-2-0003 Line Drawing v1.1 and Connection Diagram v1.0 (reproduced below for reference) for complete wiring details.

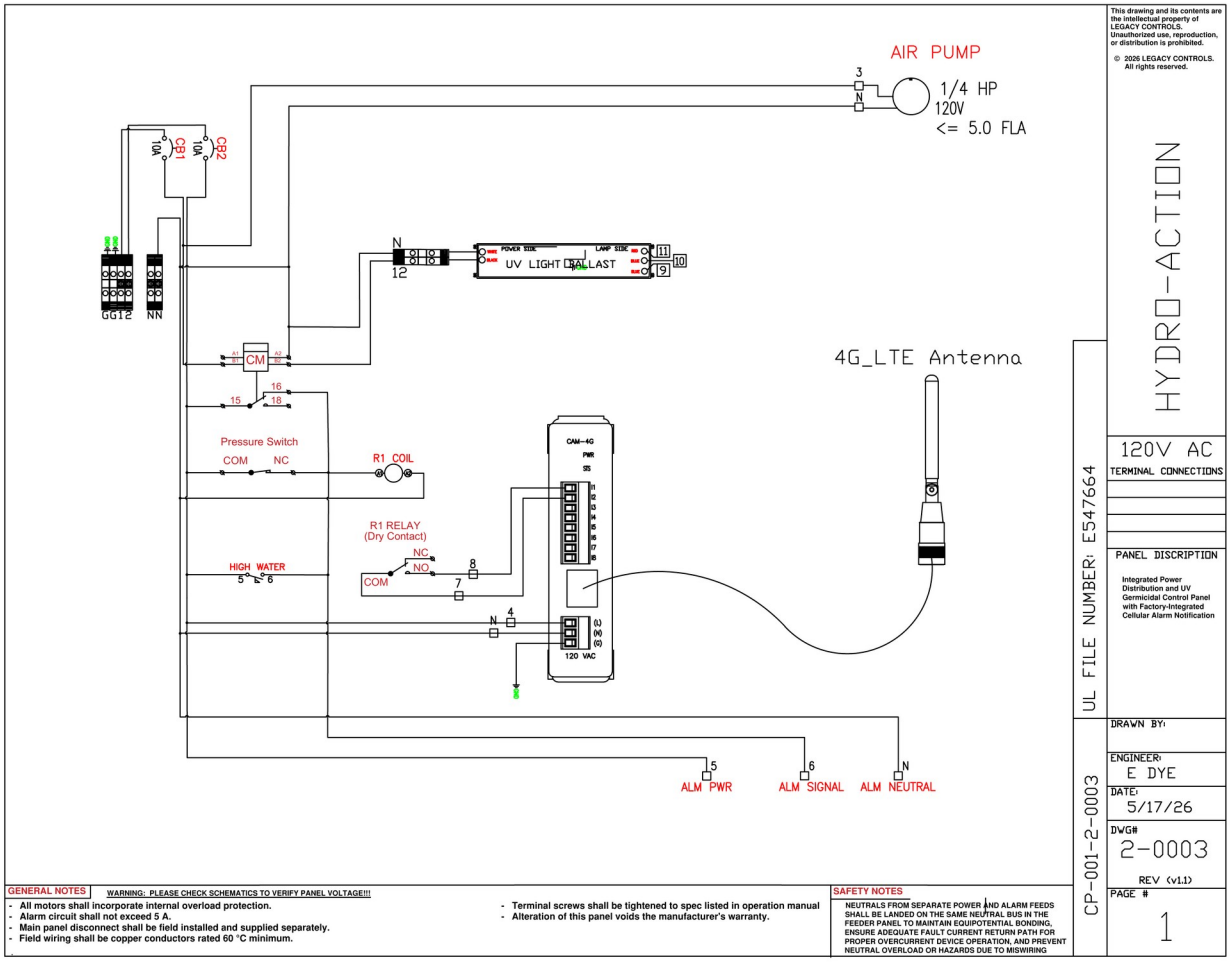

FIGURE 1 — LINE DRAWING v1.1 · CP-001-2-0003 (REFERENCE)

Main Power & Control Circuit Feed

Connect main power (L1, N, G) and the control circuit feed (X1, N, G) as shown on the schematic. The control circuit ensures alarm functionality during main power loss and shall not exceed 5 A.

> **SAFETY NOTE: Neutrals from the separate 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.**

CAM-4G Factory Integration

The CAM-4G module is factory pre-wired for power and selected alarm monitoring points, including the R1 alarm relay — a 120 VAC coil energized in the panel that switches a dry contact output (NO/NC/COM). The external antenna is factory installed. All CAM-4G internal wiring is factory completed and should not be altered unless directed by AKHA Manufacturing, LLC technical support.

Field Connections

- Air Compressor
- UV lamp
- High-water float
- Alarm devices (red beacon + horn)

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

5. OPERATION

Normal Panel Operation

Startup: Verify wiring. Install the customer-supplied UV lamp. Energize both the main and control circuit power feeds.

Automatic Mode: The compressor runs continuously whenever main power is present. The air pressure switch verifies compressor operation. The PRI51/1 current monitoring relay supervises UV lamp current. The high-water float triggers the alarm (beacon + horn).

Alarm: A UV fault, compressor fault (low pressure), or high-water condition activates the beacon, horn, and sends an SMS message to registered telemetry numbers. Use the silence push-button to mute the horn; the beacon remains lit until the condition is resolved. Monitor the system regularly.

UV LAMP SUPERVISION — PRI-51/1 SETTING ASSISTANCE

The PRI-51/1 current monitoring relay's trip level and 0.5–10 s response delay are set at the factory for UV lamp supervision. If a replacement lamp or ballast requires field adjustment, scan the QR code for the manufacturer's setting instructions, or contact AKHA Manufacturing, LLC before making changes.

PRI-51/1 · ELKO

CAM-4G Cellular Alarm Notification (Integrated)

- Continuously monitors the configured sensor inputs and the onboard temperature sensor
- Upon an alarm condition, activates the audible and visual alarm and immediately sends SMS notifications to up to 3 pre-programmed phone numbers
- Every notification includes the unit name, specific input name, serial number, date/time, and alarm status
- Backup batteries ensure SMS notifications continue without interruption during utility power outages
- Configuration — phone numbers, input names, temperature thresholds, delays — is performed via simple SMS text commands from any cellular phone

Testing the CAM-4G Module

After installation and configuration, press the Test button on the CAM-4G module. The module should chirp twice and send a test SMS to all configured phone numbers confirming current status and serial number.

6. CAM-4G PROGRAMMING (SMS SETUP)

Onsite CAM-4G configurations are performed by text message from any cellular phone; no software or laptop is required. Send commands to the cellular number assigned to your unit (provided with the panel). The module confirms every command: two chirps plus a reply text showing the current settings indicate that the command was accepted; three short beeps indicate that the command was not understood; and five chirps indicate a cellular or transmission error.

Caller ID & Configure Mode

Until a phone number is stored, the unit accepts commands from any phone. Once numbers are stored, only stored numbers can send commands. To temporarily accept commands from any phone, hold the CONFIGURE/TEST button until the status light blinks red/green (Configure Mode); hold it again for about five seconds to exit — the unit chirps and the red/green pattern stops. The unit's assigned cellular number that is used for text commands is located on the unit itself along with the serial number.

To remove stored numbers, perform a factory reset, or configure any features not listed in the text commands, contact AKHA Manufacturing, LLC · Toll Free 800-370-3749 · Phone (574) 936-2542 · hydro-action.com.

Setup Sequence

1. **Alert numbers —** text “**`phone1 [xxx-xxx-xxxx]`**” using your own ten-digit mobile number. Repeat with **`phone2`** and **`phone3`** for up to three recipient numbers.
2. **Unit name —** text “**`name [unit name]`**” (up to 20 characters, e.g. the site or homeowner name). The name is included in every alert so the recipient knows which system is calling for help.
3. **Alert delay —** text “**`delay1 [seconds]`**” to require a condition to persist (0–9999 seconds, default 0) before the sounder and texts trigger — useful for suppressing nuisance trips from wave action on floats.
4. **Power-outage delay —** text “**`pwrdelay [seconds]`**” (0–999 seconds, default 5). Power-loss alerts are text-only with no sounder. On battery power the module sleeps to conserve the AA backup set — it continues monitoring and wakes to send alarm or power-restored texts but will not answer commands until utility power returns.
5. **Verify — exit Configure Mode (hold the CONFIGURE/TEST button for 5 seconds), then tap the CONFIGURE/TEST button. The unit chirps twice and sends a confirmation text with current status to every stored number. Repeat this test as needed or after any changes are made.**

Command Reference

TEXT COMMAND	EXAMPLE	FUNCTION
`settings`	`settings`	Returns the unit’s current settings in three messages
`status`	`status`	Returns the unit’s current status
`help / setup`	`help`	Returns the most-used commands and setup sequence
`phoneX [number]`	`phone1 5558882233`	Stores alert number 1, 2, or 3
`name [unit name]`	`Joe 1234 Unit St.`	Names the unit (up to 20 characters); included in every alert
`delayX [seconds]`	`delay1 30`	Alert delay for input 1–4, 0–9999 s; default 0 (immediate)
`pwrdelay [seconds]`	`pwrdelay 30`	Power-loss alert delay, 0–999 s; default 5 — text-only alert, no sounder
`contractor / contact`	`contact 5558001000`	Appends a service contractor name and number to every alarm text
`test`	`test`	Sends a test message to all stored numbers

7. MAINTENANCE AND TROUBLESHOOTING

Maintenance Items

TASKS
Press the CAM-4G Test button; confirm SMS notifications are received at all programmed numbers within 60 seconds
Inspect all wiring connections, floats, and CAM-4G connections; verify input LEDs respond when sensors are manually actuated
Clean UV bulb outer glass; clean compressor intake filter; test alarm and pressure switch; inspect enclosure seals and latches
Replace the four AA backup batteries in the CAM-4G module; record the replacement date
Replace UV lamp upon fault or per the lamp manufacturer’s schedule; handle and dispose of UV lamps per local regulations

Troubleshooting

ISSUE	POSSIBLE CAUSE	RESOLUTION
No lights, compressor, or alarm	Main power loss	Check breaker and incoming voltage
UV fault	Lamp failed or end of life	Replace UV lamp
Compressor fault	No air pressure or bad switch	Check airline, compressor, and pressure switch
High water alarm	Excessive tank fluid level	Investigate influent restrictions or overflow
No SMS from CAM-4G	Signal issue, low batteries, or configuration problem	Check batteries, improve antenna location, verify phone numbers and signal strength
False or repeated alarms	Float positioning or nuisance trips	Verify floats; increase input delay settings via SMS if needed

IF ISSUES PERSIST Contact AKHA Manufacturing, LLC — Toll Free 800-370-3749 · Phone (574) 936-2542 · Hydro-Action.com

8. WARRANTY

CLAIMS ADMINISTRATION All warranty claims, support requests, and service issues for this control panel 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.

Definitions

For the purposes of this Limited Warranty:

- **"Product"** refers to the CP-001-2-0003 Gravity UV Aeration Control Panel with factory-integrated CAM-4G Cellular Alarm Notification Module, including all components, assemblies, firmware, and associated hardware as originally supplied by Legacy Controls.
- **"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 connection diagram, and applicable regulatory standards (including FCC Parts 15, 22, 24 and RoHS requirements). 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 using new, reconditioned, or equivalent parts. All repairs or replacements shall meet or exceed the original specifications, performance standards, and regulatory certification requirements. 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

This Limited Warranty does not cover, and Legacy Controls shall have no liability for: damage or failure resulting from misuse, abuse, negligence, accident, improper installation, operation, storage, or maintenance; alterations, modifications, or repairs performed by any party other than Legacy Controls or an Authorized Service Provider; normal wear and tear, cosmetic damage, or deterioration due to environmental conditions; damage caused by external factors such as acts of God, fire, flood, lightning, pests, or third-party equipment not supplied or approved by Legacy Controls; products that have been disassembled, tampered with, or used outside specified conditions; consequential, incidental, indirect, special, or punitive damages; products purchased from unauthorized sellers or through secondary markets; products used or installed outside the United States or in non-compliant systems; issues arising from software, firmware, or programming not provided by Legacy Controls; or consumable items such as batteries, fuses, or antennas unless the defect is due to manufacturing workmanship.

Limitations of Liability

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, LEGACY CONTROLS' TOTAL LIABILITY UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ORIGINAL PURCHASE PRICE OF THE PRODUCT. LEGACY CONTROLS SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, SPECIAL, PUNITIVE, OR EXEMPLARY DAMAGES, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, OR OTHERWISE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. This limitation applies regardless of whether damages arise from breach of warranty, negligence, or any other cause.

Disclaimer of Other Warranties

EXCEPT AS EXPRESSLY PROVIDED IN THIS LIMITED WARRANTY, LEGACY CONTROLS DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, AND NON-INFRINGEMENT.

Making a Warranty Claim

All warranty claims must be submitted through AKHA Manufacturing, LLC with proof of original purchase, the model number (CP-001-2-0003), and a detailed description of the issue. If return of the Product or a component is directed, ship prepaid with all original accessories and documentation. 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. For replacement components, consult an Authorized Service Provider to ensure compatibility and continued compliance.

Governing Law and Dispute Resolution

This Limited Warranty shall be governed by and construed in accordance with the laws of the State of Florida. Any disputes arising out of or relating to this Limited Warranty shall be resolved exclusively in the state or federal courts located in Brevard County, Florida.

Severability

If any provision of this Limited Warranty is held to be invalid or unenforceable, the remaining provisions shall remain in full force and effect.

Entire Agreement

This Limited Warranty constitutes the entire agreement between Legacy Controls and the Original Purchaser regarding the warranty for the Product and supersedes all prior or contemporaneous understandings, agreements, or representations, whether oral or written.
