Electrical & Power Control Interfaces

Solar Integration

AOFS is designed to operate with existing farm power infrastructure, including solar panels, batteries, and inverters. The standard defines **two levels of solar integration**:

- **Level 1 (Default / Minimal Integration)**
  - Assumes solar or other renewable systems are already in place.
  - Field Controllers monitor battery voltage and current to enforce fail-safes and manage irrigation loads.
  - No direct control or dependency on panels, inverters, or charge controllers.
  - Ensures AOFS compliance without requiring changes to existing power setups.
- **Level 2 (Optional / Integrated Monitoring)**
  - Controllers can read solar generation metrics via standard protocols (e.g., Modbus, MQTT, RS485).
  - Irrigation schedules can adjust dynamically based on energy availability.
  - Enables advanced PUE optimization and analytics, while remaining hardware-agnostic.
  - Fully optional: farms can adopt this for energy efficiency improvements, but it is **not required for AOFS compliance**.

Guidelines:

- All AOFS-compliant deployments **must implement Level 1** monitoring for battery voltage/current and fail-safe logic.
- Level 2 integration can be added if farms wish to optimize irrigation schedules based on solar energy availability.
- Optional AI or analytics modules may use Level 2 data, but **core irrigation safety and operational compliance remain Level 1-centric**.

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