



Smart Refrigerator Monitoring

E-IOT smart refrigerator monitoring combines temperature sensing, door-status detection and light monitoring with wireless connectivity to the E-IOT cloud. Standalone cellular devices and battery-powered NeoMesh sensor nodes offer flexible installation options, helping operators monitor storage conditions, identify unusual operating patterns and respond to temperature excursions across distributed refrigerator fleets.

Products shown

- NeoMesh flat sensor node — E10T-FLATNODE-MESH-NC868-2XCR2477: a compact, battery-powered wireless sensor platform for monitoring through a local NeoMesh network.

- **SIM7080G-based cellular monitoring device:** an enclosed sensor platform providing a direct cellular communication path for individual refrigerators.
- **Fibocom MA510-based cellular monitoring device:** an alternative cellular platform for remote sensing and cloud reporting.
- **Refrigerated display cabinet application:** illustrates temperature monitoring at several shelf levels, together with door and lighting supervision.

Product features and operation

Visibility into refrigerated storage conditions

A refrigerator's displayed temperature provides only part of the picture. Conditions can vary between shelves, near the door and around the cooling-air outlets.

Sensors positioned at selected locations can provide a more representative view of the cabinet's internal environment. Measurements collected over time help operators assess temperature stability, identify warmer areas and observe recovery after door openings or restocking.

The number and placement of sensors can be adapted to the cabinet and the stored goods. Air-temperature readings describe conditions at the sensor location; they do not directly measure the core temperature of the products.

Door-status and light monitoring

Door openings influence both cabinet temperature and energy use. A suitably installed magnetic sensor and matching magnet can detect door state, allowing the application to record opening events and identify doors left open beyond a configured period.

Light sensing adds information about the cabinet's illumination. Depending on sensor placement, it can help verify whether internal lighting is operating or reveal changes associated with door activity.

Combining temperature, door and light readings provides useful context. A temperature rise following restocking, for example, can be distinguished from an unexplained increase while the door remains closed.

Direct cellular connectivity for individual refrigerators

The cellular monitoring devices provide a route to the E-IOT cloud without requiring access to the premises' Wi-Fi or Ethernet network.

This approach suits refrigerators installed across different shops, hospitality venues or customer locations, where local network access may be difficult to arrange or maintain.

The device collects readings and sends reports according to its configured communication schedule. The selected modem, subscription and available network determine the supported connectivity at each installation.

NeoMesh connectivity for groups of sensors

The flat NeoMesh node provides an alternative for sites with multiple monitoring points. Compatible nodes communicate through a local wireless mesh network, with a gateway forwarding their data to the E-IOT cloud.

This allows several refrigerators—or several measurement points within a larger installation—to share one cloud connection. The compact battery-powered format also supports retrofitting where additional power wiring would be inconvenient.

Node and gateway placement should be assessed on site because metal cabinets, insulation and surrounding equipment can affect radio communication.

Cloud dashboards, history and alerts

The E-IOT cloud brings measurements from individual devices into a common monitoring environment. Operators can review temperature trends, compare cabinets and relate changes to door activity or other recorded events.

Configured thresholds and delay periods can generate notifications when readings move outside the permitted range. A delay can help distinguish a brief excursion during normal use from a sustained condition requiring attention.

Alert timing depends on the measurement interval, transmission schedule and network availability. Device-status and missing-report monitoring can provide additional visibility when a sensor stops communicating.

Independent monitoring and maintenance support

The sensor-based approach can provide an observation layer alongside the refrigerator's existing controller, without requiring changes to its temperature setpoint or control logic.

Historical readings can help maintenance teams investigate slow temperature recovery, repeated excursions, prolonged door openings, or changes in lighting behavior. These observations support service decisions and help operators assess whether corrective action restored normal conditions.

The modular architecture allows a deployment to begin with a single connected refrigerator and expand to a larger fleet using direct cellular devices, NeoMesh networks or a combination of both.

Typical applications

- Beverage coolers and refrigerated retail displays.
- Supermarket and convenience-store refrigerator monitoring.
- Restaurant, café and hospitality refrigeration.
- Distributed refrigerator fleets at customer premises.
- Multi-point temperature monitoring within cabinets.
- Door-open and lighting-status supervision.
- Temperature-excursion alerts and maintenance investigation.