POWERED BY FacilityConneX

KAYE
SUBSIDIARY OF AMPHENOL

Complete Cloud Monitoring Solution

LabWatch® IoT

CENTRALIZED MONITORING, ALARMING AND REPORTING SYSTEM

LabWatch IoT® delivers a complete cloud-based monitoring solution to protect your high-value assets

AT KAYE, WE UNDERSTAND THE UNIQUE REGULATORY REQUIREMENTS AND ARE FAMILIAR WITH KEY PROCESSES AND FACILITIES IN THE APPLIED INDUSTRIES. WITH OUR LONG BACKGROUND OF PRODUCING VALIDATION SYSTEMS, KAYE HAS DEVELOPED THE KAYE LABWATCH IOT CLOUD-BASED MONITORING SYSTEM. A WEB-BASED SOLUTION OF COMPLETE MONITORING, ALARMING AND REPORTING WITHOUT THE INTEGRATION OF SITE-BASED SERVERS.

A COMPLETE CLOUD SOLUTION

Introducing LabWatch IoT, the advanced operational intelligence based system designed for transforming your GxP data into real actionable knowledge. Know the status of your products, 24 hours a day, 7 days a week. This is the promise of IoT/IIoT. LabWatch IoT brings smart asset monitoring, advanced predictive intelligence, intelligent alarming/notification, and a warranty assurance. All available in a hosted cloud environment with no administration costs to you. Without expensive servers, or running IT costs, LabWatch IoT takes away the headache of implementing operating system software patches, data backups and installation of local monitoring software.Add to the point that all access to the LabWatch IoT can be performed through any standard web browser, on any platform – either desktop or mobile, you will find that the new LabWatch IoT monitoring system works for you. Integrating high quality sensors, latest wireless and wired technologies for communication, redundancy and networking abilities into an easy to use Data Management Solution. LabWatch IoT combines precision monitoring with effective alarming, flexible web-based reporting and secure data archiving using AWS cloud management. LabWatch IoT detects system excursions and can alarm personnel wherever they are, using email/SMS, web message boards on mobile based platforms. It documents all critical parameters of your facilities and processes without needing to generate stacks of paper. The cloud-based system creates a secure audit trail of events and alarms, actions taken by relevant personnel and provides ready access to the historical data. All user interactions are logged using electronic signatures, with the ability to have either sign only, or sign and verify confirmation on every validated entry.

REGULATORY COMPLIANCE

The extensive reporting capabilities of the LabWatch IoT system allows you to generate web based PDF reports in compliance with the FDA, GMP/GLP, AABB, JCAHO, AAALAC and other regulatory bodies. By maintaining a secure cloud archive of monitored values from your sensors, the system can readily provide the information you need for internal analysis and regulatory required documentation.

SCALABILITY AND FLEXIBILITY

Whether you're looking to monitor 5 or 2500+ inputs, LabWatch IoT can easily meet the task. Using powerful connectivity to the cloud, all data is triple checked for missing or redundant data. Redundancy starts of the sensor, is replicated at the tunnel, and finally stored in the secure cloud. Each point of possible network disconnect allows for storage of data, until the path is connected. LabWatch IoT uses store and forward logic to ensure that at no time will a network/sensor disconnect ever stop the data reaching the cloud. With sophisticated monitoring and reporting features, LabWatch IoT can be completely configured for each individual logging on to the service. Each view allows the user to move, add or delete validated report/view components on the screen. Each component represents different abilities to view the historical and alarm data – in function type, asset, time range and location. All data is time stamped as UTC and can therefore pull data in from all points of the globe and can be viewed either in the local time zone, or browsers' time zone. LabWatch IoT allows a single cloud installation to monitor multiple sites, over multiple time zones and provide localized monitoring and reporting for each of those sites. Users can be configured to only see the facilities that they are responsible for or be allowed to see the full global installation – you have control.

WIRED OR WIRELESS

- Easy upgrade from Netpac 1 systems – allowing onboard Data storage
- Distributed Measurement Hardware
- Redundant data storage – Loggers, Base Stations, VPN collector and cloud storage
- Web and mobile browser access – unlimited users
- Ease of use
- Alarm notification – Email/SMS, message boards and mobile Application (iOS/Android)
- Web based reporting functions
- Services – Specification development, Installation, IQ/OQ protocol development/executions, Training, Calibration Services, Technical Support

Robust & Scalable System Architecture

Using AWS GxP Cloud

SYSTEMS ARCHITECTURE

The Kaye LabWatch IoT system is built as a Cloud Architecture Model encompassing intelligence and redundancy at multiple levels in the system. Each of the elements in the architecture are robust, complete & independent sub systems. At the primary input of the system lie the extremely accurate calibrated sensor modules (temperature/humidity/CO_2 pressure/etc.). These sensor elements feed into the RF ValProbe data loggers or the Netpac II modules.

The loggers communicate data real time via a robust and reliable 2.4 GHz RF (Radio Frequency) Wireless network interconnected via the SmartMesh® technology to the base stations. The RF base stations have the ability to connect to up to 50 loggers and 16 such base stations can be connected to a LabWatch IoT system via an Ethernet network or USB. The RF second level of redundancy incase of a network or server failures and can store 30000 samples from each of the 50 loggers. The RF Base stations communicate to the LabWatch IoT system via the industry standard OPC Server.

The LabWatch IoT system can be a Wireless or a Wired System. The system architecture supports a Hybrid system with Wired and Wireless inputs based on the customer application or to add new Wired or Wireless points to an existing Wired/Wireless networks. In a Wired System the sensor modules are physically wired to a Netpac II series module. The Netpac modules are connected to the LabWatch system through an Ethernet port. The Netpac modules communicate to the Server via the Netpac OPC Driver loaded as part of the LabWatch IoT System.

LabWatch IoT resides completely in the cloud – all data is collected locally onsite through collector and is pushed to the cloud through a VPN tunnel PC. The VPN tunnel PC allows a secure connection through the site firewall, and ensures that no external accessibility of data or the internal network, can be achieved. The VPN tunnel also acts as a store and forward database (in the event that the Internet connection is lost). Also loaded onto the VPN PC, are any associated drivers that are required to communicate with the site hardware. The ability to load and connect to any OPC compatible driver, ensures that LabWatch IoT can communicate with all 3rd party sensors, therefore making the monitoring system a complete answer for facility monitoring applications.

Monitoring what matters most

WHERE WE MONITOR

- Warehouses
- Clean Rooms
- Blood Banks
- Pharmacies
- Cold Storage
- Animal Rooms
- Laboratories
- Workshops/Production Line

WHAT WE MONITOR

- Stability Chambers
- Freezers
- Refrigerators
- Incubators
- Cryogenic Freezers
- LN2 tanks
- Ovens
- Process parameter

SENSORS

- Temperature – RTDs, Thermocouples
- Humidity
- CO_2
- Pressure – Absolute, Differential
- Contacts – Door Switch, Relays
- Voltage/Current inputs
- Light – Visible, Ultraviolet
- Air Flows
- Particle counter

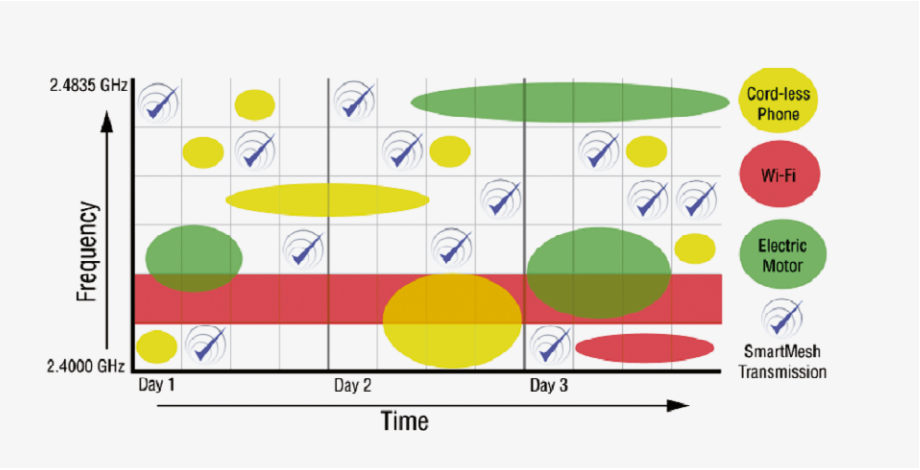
SYSTEM BENEFITS

- Operates in compliance with the FDA regulation 21 CFR Part 11 on Electronic Signatures and Records.
- Creates an audit trail of alarms and actions taken by the system and the people who log onto the system.
- Provides a complete history of alarms and data in one central location, automatically.
- Protects your time by avoiding nuisance alarms and guards your product investment by providing reliable alarm detection.
- Notifies an unlimited number of people to handle specific alarm conditions with a variety of notification methods: email, SMS and message boards.
- Lets you retrieve data easily for viewing, reporting, analysis, and regulatory inspection. Provides web based tools to review historical data and create the customized reports to suit management or client requirements.
- Provides secure cloud data storage via encryption of files to prevent tampering.
- Runs on any supported browser – Microsoft, Apple, iOS and Android

Monitor your Freezer Farms with confidence

RF ValProbe Wireless System

RF2 Base Station and Loggers



Frequency hopping ensures reliable transmission

SMARTMESH® TECHNOLOGY

Mesh networking technology is proven in many harsh environment applications. Its implementation in the Kaye product line allows up to 100 nodes to be connected in a seamless, reliable and self forming mesh network. The mesh technology permits nodes to communicate with the base station and each other, correcting for weak RF links and automatically adjusting to dynamic RF environment, e.g. a forklift truck driving into a warehouse blocking a signal. Interference from WiFi and other existing industrial RF networks is removed due to the frequency hopping features. No special knowledge or expertise is required to install or operate the Kaye RF ValProbe.

RF SPECIFICATIONS & CERTIFICATIONS

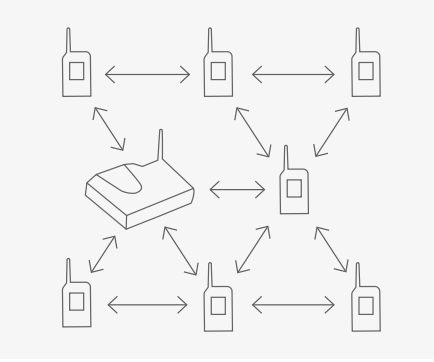
RF 2.4 GHz SmartMesh® Technology
Max number wireless nodes: 100
Range: approx 300 ft / 100m from one node to another Each node can act as a repeater RF Type Approval Certifications in: US, Canada, EU, India, China, Korea, Japan, Brazil, Argentina, Israel and others. Please contact factory for up-to-date country list.

INTERFERENCE

The SmartMesh technology combines frequency hopping with TDMA (Time Division Multiple Access). In addition the mesh protocol permits the system to learn about the RF environment and dynamically adjust the network parameters to best fit the current situation. The network provides an accurate time reference for the whole network, ensuring all loggers and the base station are time synchronized correctly. Each data sample is timestamped with this network time.

COEXISTENCE WITH OTHER RF SYSTEMS

The RF ValProbe complies with the IEEE 802.15.4, the preeminent RF sensor network standard. Features like frequency hopping, listen-before-you-talk and channel blacklisting prevents other RF networks being affected by the RF ValProbe. Nodes communicate with base station and each other.



Nodes communicate with base station and each other

Netpac II Wired System

Our Netpac II universal controllers and I/O products use Click&Go control logic, which includes our patented active monitoring technology and support for a versatile set of OT/IT protocols, to help you easily configure, deploy, and realize IIoT applications such as energy monitoring, facility monitoring, and machine OEM applications.

Netpac II system is a distributed, industrial I/O network providing the most cost-effective data collection available in the industry. It uses remote modules to condition, measure, linearize and transmit process variables to the LabWatch IoT Cloud. From the Cloud, you have the power of performing calculations, trending, archiving and reporting. Prepackaged, hardened for the real world and linked by company network to a GxP Cloud. Hardware configurations include a watertight NEMA 4 enclosure, as well as Netpac 1 upgrade NEMA 4 enclosures with 128 sensor inputs. Netpac nodes also can send outputs to the process from the Server.

NETPAC GENERAL SPECIFICATION

- Combines Smart/Intelligent Netpac CPU with independent I/O modules
- Supports up to 8 daisy chained I/O modules
- Separate T/C, AI, DI modules (8 inputs each)
- Onboard 4-port Ethernet switch for communications
- Data back-up storage 32 G SD Card 1M samples)
- Automatic Data recovery – 1 min.
- Internal 24V Power Supply
- Internal terminal connections for powered 4–20ma inputs

TYPICAL IO MODULES & SPECIFICATION

NP1262 T/C MODULE

8 T/C Inputs

Type T, J, K, E, B, N

Range: -200 to 1300C

Sampling: 12 ch/sec

Connectors: Max 14 AWG

16 bits A/D

Accuracy:

0.1% FSR @ 25C

0.3% FSR @ -10 to 60C

Wide operating

Temperature range:

-40 to 75°C (-40 to 167°F)

2 port Ethernet switches

NP1240 AI MODULE

8 AI Inputs

Voltage/Current

Jumper Selectable

0–10V, 4–20ma, 0–20ma

Built in resistor 120 Ω

16 bits A/D

Sampling: 12 ch/sec

Connectors: Max 14 AWG

Accuracy:

0.1% FSR @ 25C

0.3% FSR @ -10 to 60C

Wide operating

Temperature range:

-40 to 75°C (-40 to 167°F)

2 port Ethernet switches

Removable Connectors

NP1210 DI MODULE

Digital Inputs

Connector:

Screw-fastened Euroblock terminal

Counter Frequency: 250 Hz

Digital Filtering Time Interval:

Software configurable

Dry Contact

On: short to GND/Off: open

I/O Mode

DI or event counter

Points per COM

8 channels

Sensor Type

Dry contact

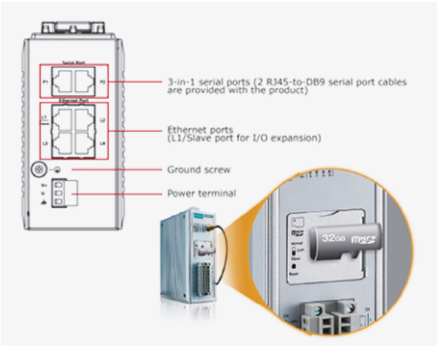
Wet contact (NPN or PNP)

Wet Contact (DI to COM)

On: 10 to 30 VDC/Off: 0 to 3 VDC

Netpac II for IoT

Nema 4 Cabinet for security



Local redundant data storage

Easy access to real-time and historical data

CUSTOMIZABLE VIEWS

The LabWatch IoT Cloud presents the user with an asset based tree structure. The tree structures can be modified to represent the logical grouping of assets or sensors. The user can segment by departments, groups or physical locations.

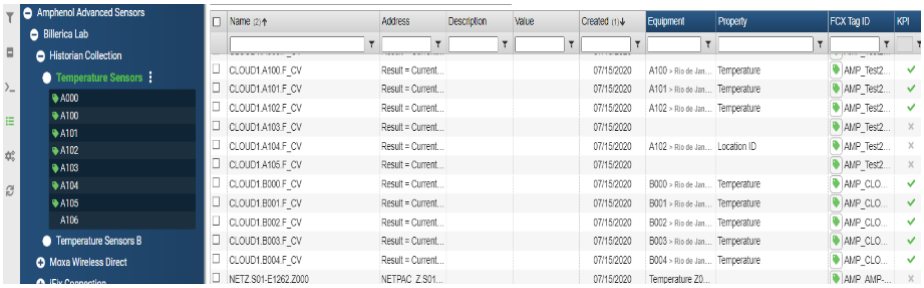
These Groupings also allow for customized access, alarm and historical data – all access is controlled by the System adminstrator.

Each Grouping can have a subset of data components that give different views of the live and historical data. Each component is validated, and can be added or removed from each Group based on requirement.

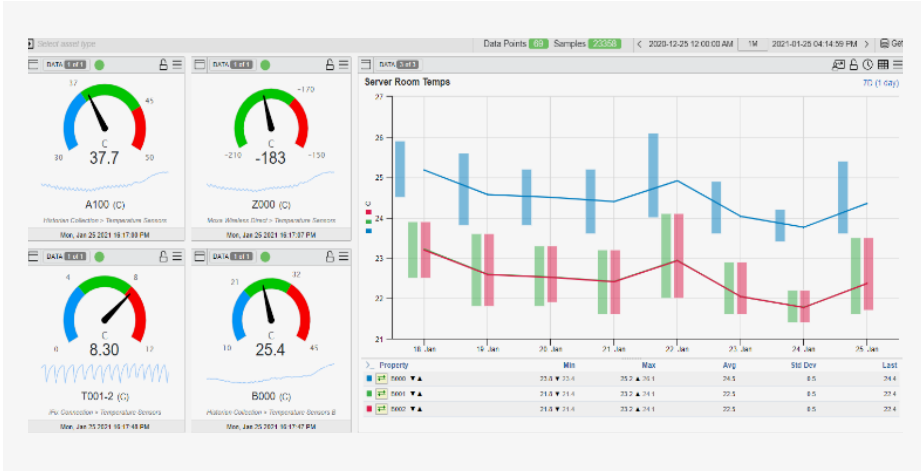
EASE OF ADDING NEW SENSORS

We understand our customer's need of changing and increasing infrastructure needs, so we have made it simple for the user to add/remove points and views from the system.

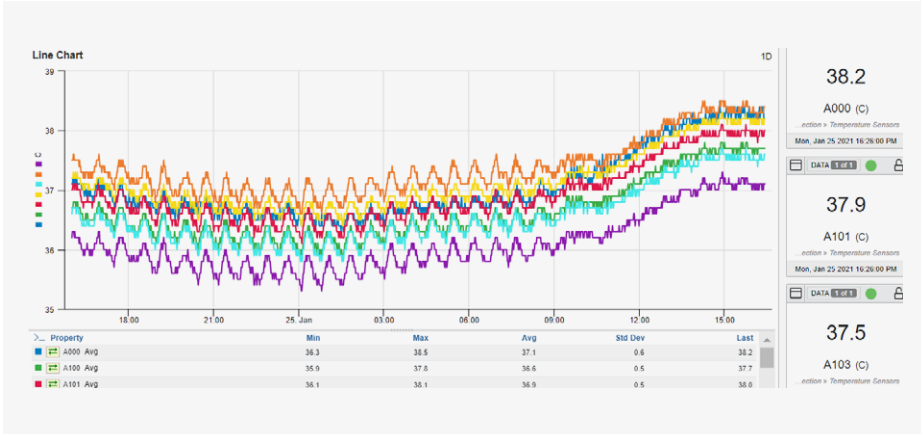
The user can purchase additional hardware from Kaye, and in a few simple steps, add the hardware to the LabWatch IoT system either by self configuration – or let Kaye perform the Cloud work remotely as part of a Service Contract.



Self Administration of assets and views



Validated graphical components – Build your own platform



Easy viewing of Data and Statistics

Historical Data & Audit Trail Storage & Analysis

HISTORICAL TRENDING

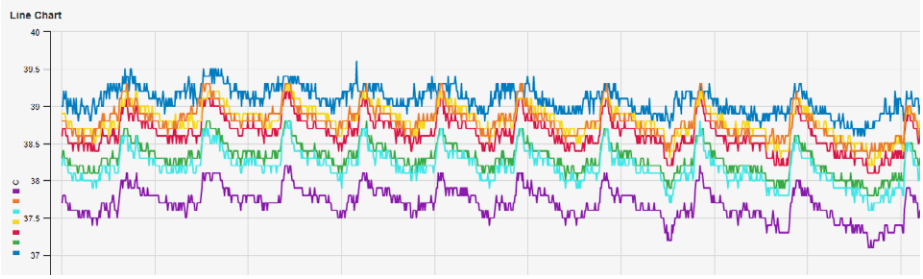
LabWatch IoT stores live data at regular intervals which can be used to display graphical process trends and components on the Cloud web browser. The user can view multiple parameters, components and assets on a historical screen for any time period selected. Move the cursor to any point on a graph/trend to display instantaneous, min/max/avg values – or any alarm parameters and notifications.

Historical trending provides the ability to pre-select assets, or groups of sensors – using the Validated Data Component allows easy configuration of specific views for each area. The historical graphing allows you to view the maximum amount of data stored for your system – the intelligent trending picks out the min/max points regardless of the time spans selected. The user has the abilty to export the data directly from the trend into readable formats for further analysis.

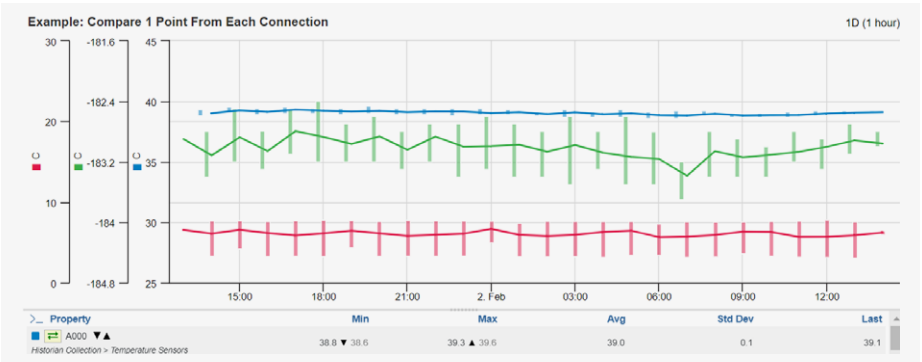
AUDIT TRAIL

The LabWatch IoT monitoring system creates an audit trail for every action executed. Examples of actions taken that are recorded include alarm acknowledgement, enable/disable alarms, limit/delay changes etc. To generate an accurate audit trail, each system user is required to follow the login procedure with a proper login name and password. The software provides a commenting feature to add comments into the audit trail to record events as part of the audit trail reports in the future. LabWatch IoT has intelligent filter and sort capability that allows the operator to quickly an easily retrieve audit information through asset locations, dates and many other fields.

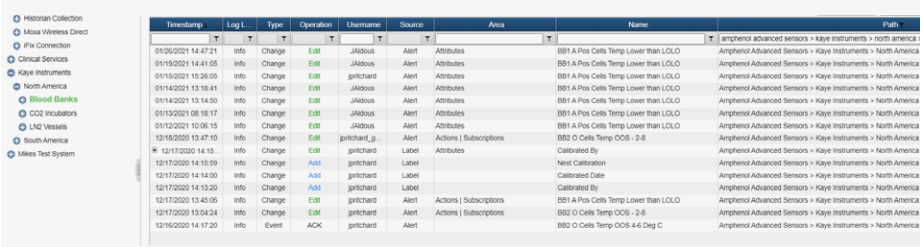
This makes retrieving data for regulatory inspection easy. For example, you can look at the events concerning any individual sensor by sorting by that sensor name.



Comparison trending – View your historical data



Intelligent charts allow fast analysis of information



Audit logs are simple to search – and to create reports

Alarming – Get notified instantly

DEPEND ON LABWATCH® TO ALERT YOU OF TRUE ALARMS

The goal of LabWatch is to detect environmental excursions the moment they occur and notify the appropriate personnel for corrective response. Using high-quality industrial sensors, high-accuracy measurement electronics, and 2-point sensor calibration, the system provides reliable, accurate and repeatable results. LabWatch continuously scans all inputs and notifies the user only when genuine alarms occur.

MODIFY ALARM LIMITS TO SUIT YOUR OPERATING CRITERIA

Different levels of alarming in the LabWatch system allow you to customize alarm detection to suit your operating requirements. Individual alarm delays for each limit setting help prevent unnecessary alarm notification. For example, LabWatch detects a temperature that has exceeded a preset limit. The system monitors the excursion and recognizes it as a valid alarm only when the temperature remains above the limit for the duration of the delay. Nuisance alarm conditions and the resulting “false alarm” calls are avoided.

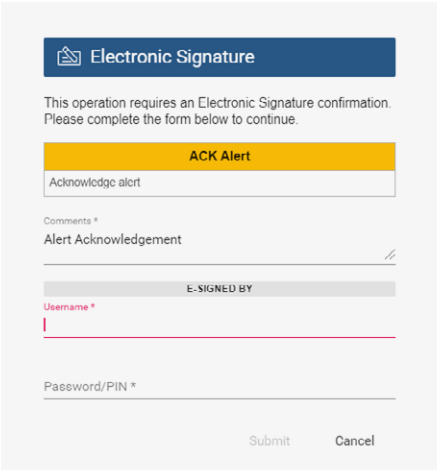
VERIFY CORRECTIVE ACTIONS

With proper security access, adjustments can easily be made to limits and delays and all modifications are documented with the LabWatch system. The system documents who made the change and records the new value and the old value (to meet 21 CFR Part 11 regulations) and any comments describing corrective actions taken. These comments, including the name of the users, are logged directly to the audit file.

SECURITY

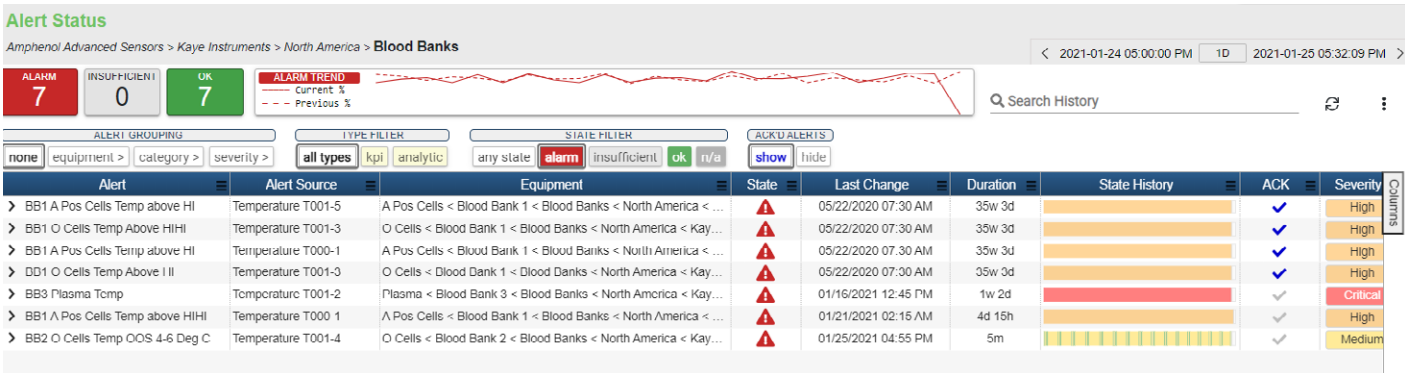
A system administrator grants access priviliges and maintains an operator registry. Users can either use a Cloud based user / password combination – or connection to your companys network, using SAML / SSO email address. Both login variants have the the option of MFA (Multi Factor Authentication), this will allow a PIN code to be sent to the users mobile phone, for secondary confirmation of logging into the system. The use of SAML / SSO uses all the existing features of Windows security such as password aging, complexity and minimum character length.

LabWatch IoT uses unique SSO IDs for access



Electronic Signature access required for actions

Historical Alarm Analysis – all in one convenient component



Select a Report to Suit your needs

LABWATCH IOT SYSTEM COMES WITH A VALIDATED REPORTING AND ANALYSIS INTERFACE. WITH A BROWSER BASED SELECTION OF CUSTOMIZABLE REPORT TEMPLATES, THE REPORT INTERFACE IS SIMPLE TO USE.

DAILY REPORTS

Daily Reports summarize the hourly average, maximum and minimum values of selected sensors over a 24-hour period. The report can be automatically generated for the previous day's data, or manually generated to select any previous date for data display.

HISTORICAL ALARM REPORTS

The selectable Alarm History report help retrieve historical alarm data for any sensor or asset location over a defined period of time. Quickly report on any out of specification asset, and follow the audit information.

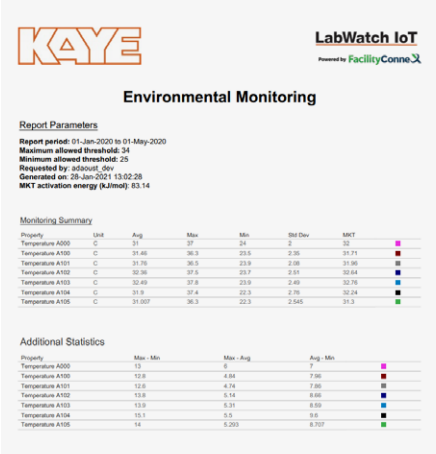
HISTORICAL DATA REPORTS

LabWatch IoT provides a variety of historical data reports to help retrieve validated data for sensors or assets over a defined period of time. The types of reports available are Min/Max/Avg (interval statistics), Value Reports and Period Summary reports.

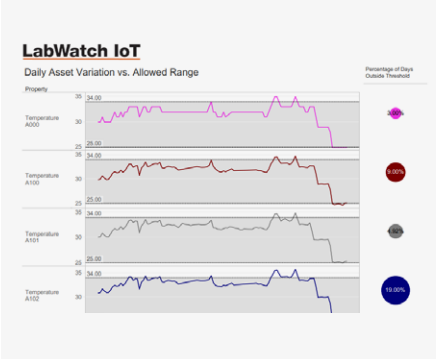
Values Report includes all values for selected sensors at specified intervals over a period of time. You can also filter sensor values by defining upper and lower limits. Included in the report are values that exceed the specified upper limit and those that fall below the specified lower limit. Period Summary Reports provide the Minimum, Maximum & Average for each sensor tag over a defined period of time.

MEAN KINETIC TEMPERATURE REPORT

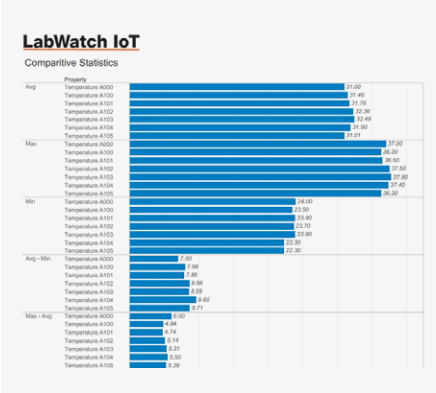
Mean Kinetic Temperature (MKT) is the isothermal temperature that corresponds to the kinetic effect of a time temperature distribution. The MKT calculation produces a single value that characterizes the effect of fluctuating temperature on long-term product storage by weighting higher temperatures more heavily than lower ones. This is appropriate because at higher temperatures, product degradation occurs at an accelerated rate. Generating MKT reports with the LabWatch system is very simple. The system extracts data from the historical data files, performs an MKT calculation and reports the result to each selected temperature point on an MKT report. This report can also be formatted to display trends.



Min/Max/AVG with MKT reports

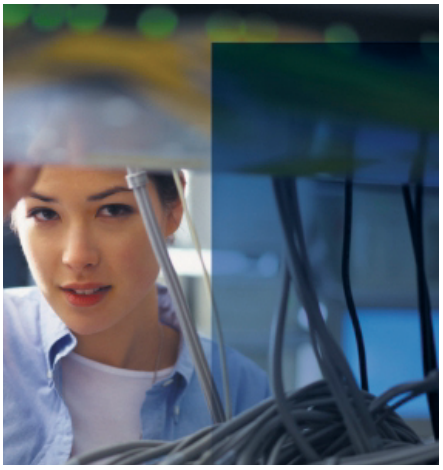


Out of Tolerance Reports



Statistical Comparison Reports

Service and Support



The success of the **LabWatch IoT** system extends far beyond hardware and software installation. Our application engineers take responsibility for the entire project, from initial specification through system validation, providing accountability at each step along the way to a complete turnkey solution.

To ensure your complete satisfaction, Kaye has developed extensive Installation and Operational Qualification protocols for validating the LabWatch system. Depending on your company's resources, the protocols can be purchased and executed by Kaye or, you can decide to purchase the protocols and use your own personnel to execute it.

The choice is yours. What better way to ensure your system is operating correctly than to have Kaye verify and document the proper installation and operation of the system?
After developing the validation protocols and executing the procedure, you can be assured that Kaye will provide on-going support as necessary. With Kaye, you can rely on the availability of unlimited after-sales support by telephone.

SERVICES OFFERED INCLUDE:

- **Needs evaluation** — Kaye engineers will meet with you, review your needs and suggest the optimum solution for reliable monitoring of your site.
- **System specification** — a complete description of what's included in the system from start to finish.
- **Installation** — our specialists will install or contract the installation of the system — you decide what suits your needs.
- **System start-up and training** — on installation, our experts train your personnel on the LabWatch system.
- **Validation protocol development** — we provide validation protocols ready for execution as well as validation services, upon system installation. You approve the protocols before validation services are scheduled.
- **After-sales service** — as with any service offered by Kaye, we provide full support for your system after installation. Unlimited telephone support is always available from Kaye at no charge.

The Installation and Operational Qualification Protocol documents define a set of procedures to ensure that the LabWatch system and its associated components are properly installed and operated according to Kaye recommendations and adequately documented and controlled according to cGMP requirements. **Topics covered include:**

INSTALLATION QUALIFICATION PROTOCOL

- Master Equipment File
- Software Version Verification
- Critical Equipment Installation Verification
- Power and Fusing Verification
- Wiring/Cabling Verification
- Hardware Configuration Verification
- Software Configuration Verification

OPERATIONAL QUALIFICATION PROTOCOL

- Input/Output Verification
- Data Processing Verification
- Operator Interface Testing
- Alarm Testing
- Historical Display Verification
- Report Verification
- System Security Testing
- Loss of Power Testing
- Duplicate User Account Verification
- Audit Trail Verification
- Data Redundancy Testing

IQ/OQ Validation Documentation Sets

LabWatch Specifications

Operating Systems	LabWatch IoT VPN connector PC requires Microsoft Windows 7 or better
Web browser	Any Browser with Internet access to the Kaye LabWatch IoT Cloud
Compatibility Interfaces with any hardware which is supports industrial standard communication protocol such as, OPC, MODBUS	

GENERAL SPECIFICATIONS

Inputs Voltage	0–10V
	Currents 4–20mA, 0–20mA
	Thermocouples T, J, K, E, B, N
	Dry Contact Open/Closed
Input Capacity	From 8 to 64 inputs per node: NEMA4 enclosure
Outputs	Contact out, 2A at 26 VDC, 1A at 120 VAC
	Analogue out 0 to 10VDC, 0 to 5VDC, 4 to 20mA, 1 to 5mA
Environmental	Temperature: 0 to 60°C; Humidity: 0 to 95% non-condensing
Communications	TCP/IP over corporate LAN to VPN/Cloud connection

NETPAC II WIRED FIELD MODULES SENSORS

Thermocouples	J, K, T: Specs for type T: Stranded, 22 AWG , Accuracy ± 0.1°C at 40°C, ± 0.25°C
	at 121°C; Variation within group (type) ± 0.03°C at 40°C, ± 0.05°C at 121°C
Humidity	Accuracy: 1% or 2%
Other Sensors	Light (visible & UV), pressure (absolute and differential), flow, CO_2, door switches

RF VALPROBE WIRELESS FIELD MODULES

Temperature	Sensor range: -196 to +200°C (Accuracy of 0.1°C from 0 to 60°C)
	Maximum cable length of external sensor is 30 feet/9 meters
Relative Humidity	Sensor range: 0 to 100% RH (Accuracy of 2% from 10 to 90% at 25°C)
Auxiliary Inputs	Contact Dry (50V maximum)
	Voltage 0–10 VDC (Accuracy of 0.5% Full Scale)
	Current 4–20 mA (Accuracy of 0.5% Full Scale)
Input Capacity	1 x Temperature + 1 x RH
	1 x Temperature + 1 x RH + 0–10VDC/4–20mA + Contact
	5 x Temperature (3-wire or 4-wire 100Ω RTD)
Environmental	Body: -40 to 60°C, 0% to 95% RH non-condensing
	External Temperature Probe: -196 to +200°C
	Logger Dimensions: 2.5 in x 5 in x 1.25 in (64 mm x 127 mm x 32 mm)
	Base Station Dimensions: 7.5 in x 5 in x 1.75 in (190 mm x 127 mm x 45 mm)
Battery Life	8000 hours at 1 minute sample rate
RF Base Station	Max number of nodes: 100
Connection	Ethernet or USB 2.0
RF Specifications	2.4 GHz SmartMesh® Technology
	Range is approximately 300 feet/90 meters from one node to another
	Each node acts as a repeater
Logger Storage	Up to 10.000 data samples

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AAS-BRK-01001-C