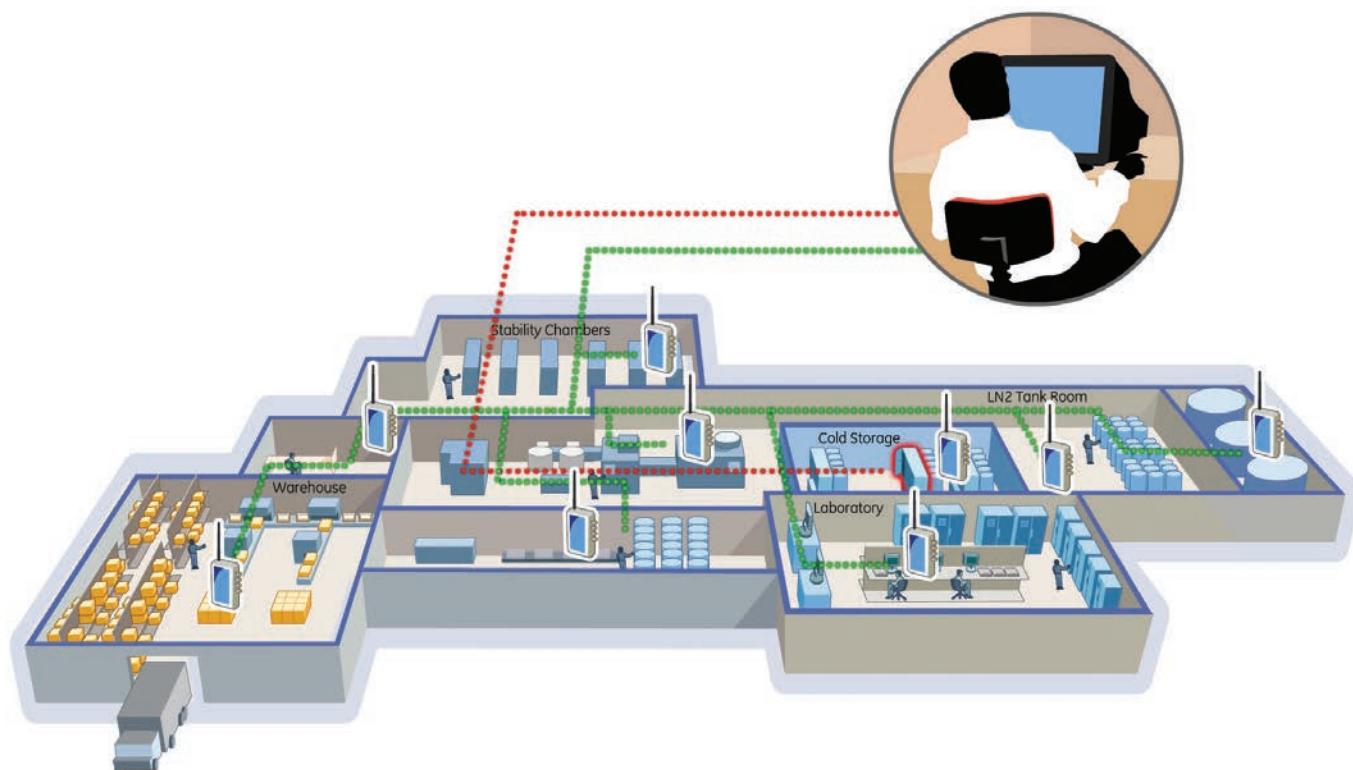# KAYE

Complete Monitoring Solution

LabWatch™

Centralized monitoring, alarming and reporting system

Kaye LabWatch delivers a complete monitoring solution to protect your high-value assets.

With the ever increasing regulatory demands on quality assurance and traceability in the relevant industries , people are looking for solution to help them facilitate and full-fill their daily responsibilities.

As Amphenol Kaye, we understand the unique regulatory requirements and familiar with key processes and facilities in the applied industries, and have developed the Kaye LabWatch Environment Monitoring System (EMS), a System monitoring, alarming and collecting data of critical parameters of your high-valued assets full-automatically.

A complete solution

Integrating high quality sensors, latest wireless and wired technologies for communication and networking abilities into an easy-to-use Information Management Solution, LabWatch combines precision monitoring with effective alarming, hassle-free reporting, and secure data archiving.

LabWatch detects system excursions and can alarm personnel wherever they are. It can document all critical parameters of your facilities, processes without generating stacks of paper, protect data with secure storage, create an audit trail of system events & alarms, and actions taken by the system operators and, provide ready access to historical data.

Regulatory compliance

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

Scalability & Flexibility

Whether you are looking for monitoring 5 or 2500+ inputs, on a stand alone Computer or on a networked Enterprise system spread globally, LabWatch provides the building blocks to meet your specific needs. LabWatch provides the flexibility for you to build up your own system or get a turnkey end to end solution from Amphenol Sensing.

Monitor
Alarm
Secure
Report
Access
Visibility

With sophisticated monitoring and reporting features, Kaye LabWatch has been being proved as an effective turnkey solution satisfy all critical monitoring needs within your whole business process, from warehouse, laboratory, production, storage to distribution. The system provides a cost effective way to view and collect real time data for regulatory compliant monitoring of your valuable inventory. Critical environmental information is provided to assure that your equipment is operating within defined conditions, thereby protecting your assets and providing a ready trail of compliance.

Wired/Wireless

- Distributed Measurement Hardware
- Redundant Data Storage - Loggers, Base stations, Servers (Fault Tolerant)
- Remote Access - Web Access/View Nodes
- Ease of Use
- Alarm Notification - Phone, Email, SMS, APP and Alarm Beacon visual and audible
- Reporting Features
- Services - Specification development, Installation, IQ/OQ protocol development/execution, Training, Calibration Services, Technical Support

# Robust & Scalable System Architecture

Systems Architecture

The Kaye LabWatch system is built as an Enterprise 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 modules. The battery operated RF Loggers store and forward the real time data from the sensor elements at programmed interval to the RF Base Stations. Up to 30000 samples can be stored on these loggers and can be retrieved incase of a power and/or network failure on the base stations or RF transmission issues.

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 system via an Ethernet network or USB. The RF Base stations provide the 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 Server via the industry standard OPC Server.

The LabWatch 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 module. The Netpac modules are connected to the LabWatch system through an Ethernet. The Netpac modules communicate to the Server via a Netpac OPC Driver loaded as part of the LabWatch System.

LabWatch is a complete application residing on the LabWatch Server (typically a Windows Server) and consists of multiple software modules like the GE Digital SCADA, Win 911 for alarming, Drivers for communicating with RF Base stations and Netpacs and the User Application Software. All the data from the sensor modules, application configuration information, audit trail, security information is stored on the LabWatch Server. User can access the LabWatch system remotely via a Terminal Client or View Node or the Web Client depending on the Server Configuration. A redundant Server can also be configured to act as a backup in case of the primary server failure. The LabWatch application is configured to archive all the information and data at periodic intervals to the IT specified backup location.
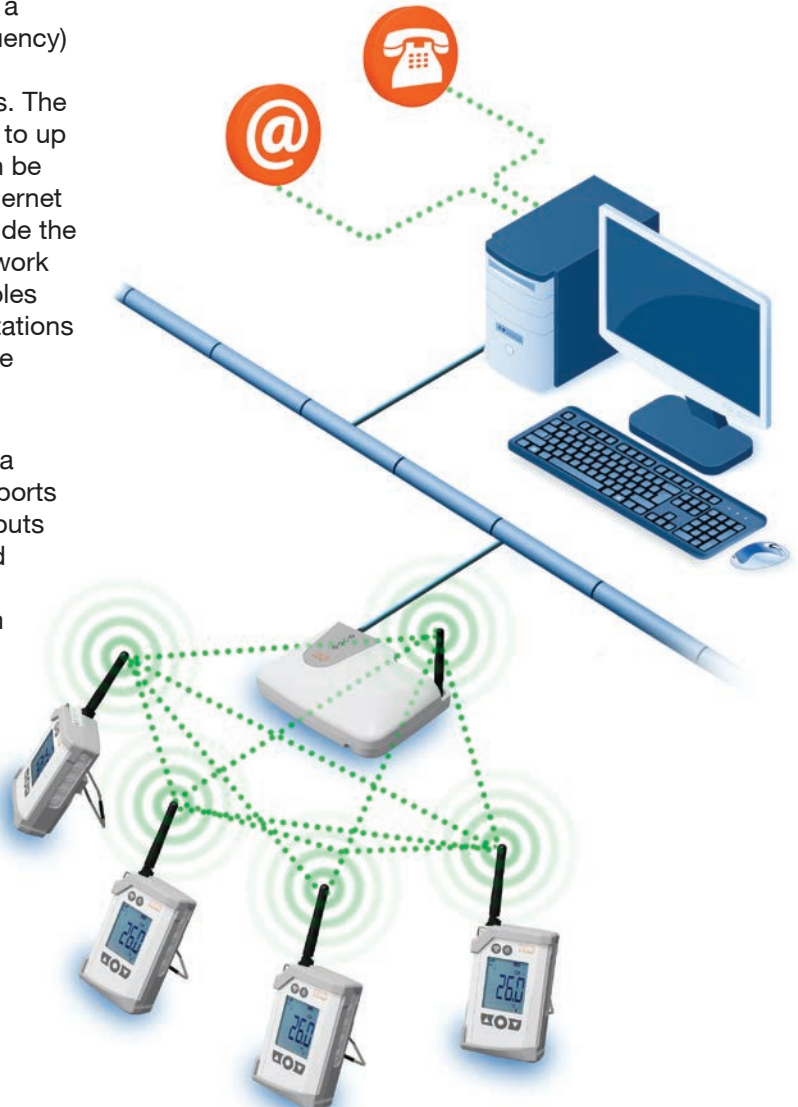
Monitoring what matters most

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: pagers, phone, fax, workstation, and audio alarms.

- Lets you retrieve data easily for viewing, reporting, analysis, and regulatory inspection. Provides tools to review historical data and create the customized reports to suit management or client requirements.

- Provides secure data storage via encryption of files to prevent tampering.

- Runs on reliable, up-to-date industry software- Windows 7/10, Windows server 2008R2, 2012R2, 2016 and GE Digital Proficy iFix HMI/SCADA.

RF ValProbe Wireless System

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.
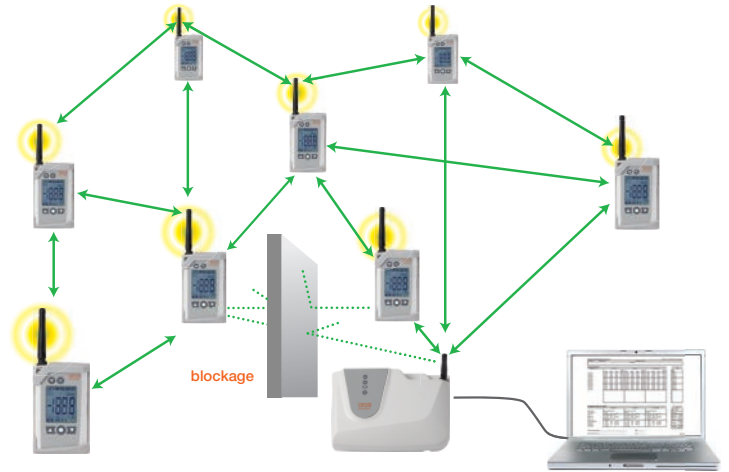
Nodes communicate with base station and each other

RF Specifications & Certifications

RF 2.4GHz 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.
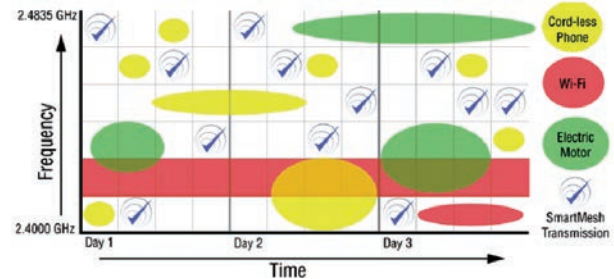
Coexistence with Other RF Systems

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.

Netpac Wired System

Our Netpac 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 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 Server. From the Server, you have the power of performing calculations, trending, archiving and reporting. Prepackaged, hardened for the real world and linked by company network to a host computer.

Hardware configurations include NEMA 2 and watertight NEMA 4 enclosures as well as standard rack mounting. Netpac nodes also can send outputs to the process from the Server.
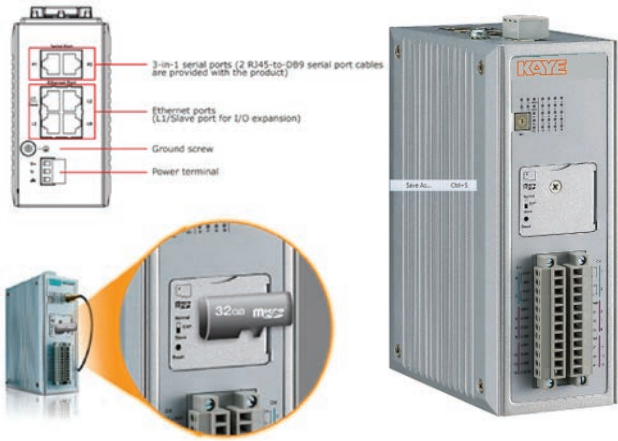
Typical IO Modules & Specification

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

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

Redundancy Function

- Data is collected from I/O Modules by Netpac CPU
- Data is transmitted to iFix for real-time and historical storage
- Data is also written to local 32 GB SD card (FIFO 1M samples)
- If communications with Server is lost data continues to be stored to SD card
- When communications re-established CPU automatically detects and retrieves buffered data from SD card and forwards to file to fill in missing data

Easy access to real-time and historical data

Customizable Views

The LabWatch Software is provided with the default column view. The user can segment the views by departments, groups ,etc. The software also provides the flexibility for the customers to get customized floor plans including importing of different picture file formats as the background. The alarms are also combined by the groups & floor plans. User configurable groups and screen views allows users to easily segregate inputs by buildings, departments, or any desired groupings. Software also allows use of customized floor plans or digital photos to enhance viewing experience. Security features can control access to views via groups / departments or qualifications.

Ease of adding new sensors

We understand our customer's need of changing and increasing infrastructure needs. We have made it simple for the customers to add additional points to the system. The user can buy the hardware from Amphenol Sensing and in a few simple steps add the hardware to the LabWatch system and configure the hardware.

Historical Data & Audit Trail Storage & Analysis

Historical Trending

LabWatch stores live data at regular intervals which can be used to display graphical process trends. The user can view multiple parameters on a historical screen for any time period selected. Move the cursor to any point on a graph to display the instantaneous value or zoom in or out to get a historical overview of the min./max./avg. of the entire process.

Historical trending provides user the ability to pre-select a group of sensors and create a template for the group and trend. The historical graph allows you to view up to 5000 points of data at a time which could be up to 1 year and also scroll between multiple years of data. The user has the ability export the data from the graph to a csv file or printer for further analysis.

Audit Trail

The LabWatch 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 has a powerful filter and sort capability that allows the operator to quickly and easily sort the audit trail by date or any text string. 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.
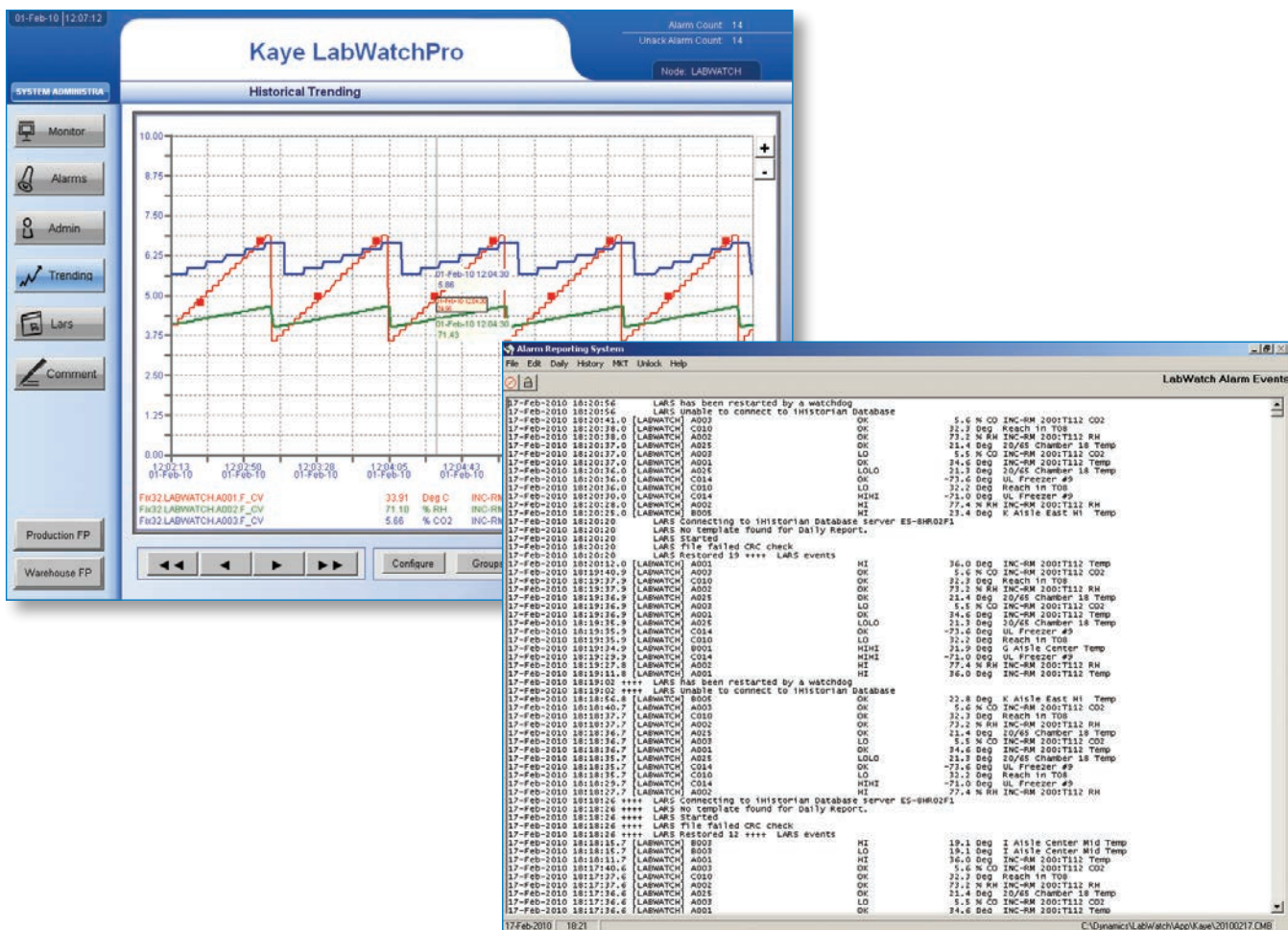
Alarming - Get notified instantly

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 privileges and maintains an operator registry. Users are assigned individual ID and password combinations that permit system operation and provide access to system features dependent on security level. LabWatch allows use of the existing network security rules thereby alleviating maintenance of multiple login names and passwords. All the existing features of MS Windows security such as password aging and minimum character length can be used with the LabWatch system.

Select a Report to Suit your needs

The LabWatch System comes with a built in Reporting and Analysis Software Package. With a simple to use interface, LARS (LabWatch™ Alarm Report System) allows you to create a variety of standard and custom reports from secure encrypted files.

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 provides historical Alarm Reports from daily, encrypted files. You can quickly report on high or low alarm events or chamber-specific descriptions over a defined period of time.

Historical Data Reports - LARS provide a variety of historical data reports to help retrieve historical data for any sensor input over a defined period of time. The types of Historical Data reports available are Min/Max/Avg reports, Values reports and Period Summary reports

Min/Max/Avg Reports provide the minimum, maximum, and average values for selected sensors at specified intervals over a defined period of time. These can be used to produce daily or weekly reports
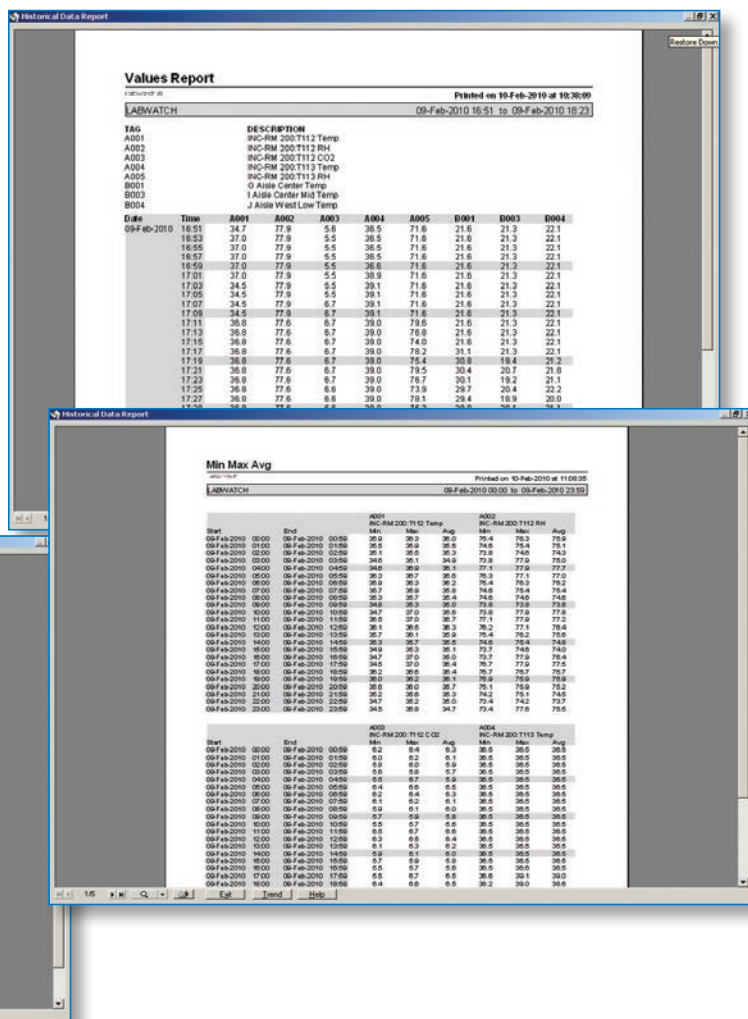
Values Report includes all values for selected sensors at specified intervals over a period of time. You can also filter sensor values by defining upper and lower limits. Included in the report are values that exceed the specified upper limit and those that fall below the specified lower limit.

Period Summary Reports provide the Minimum, Maximum & Average for each sensor tag over a defined period of time.
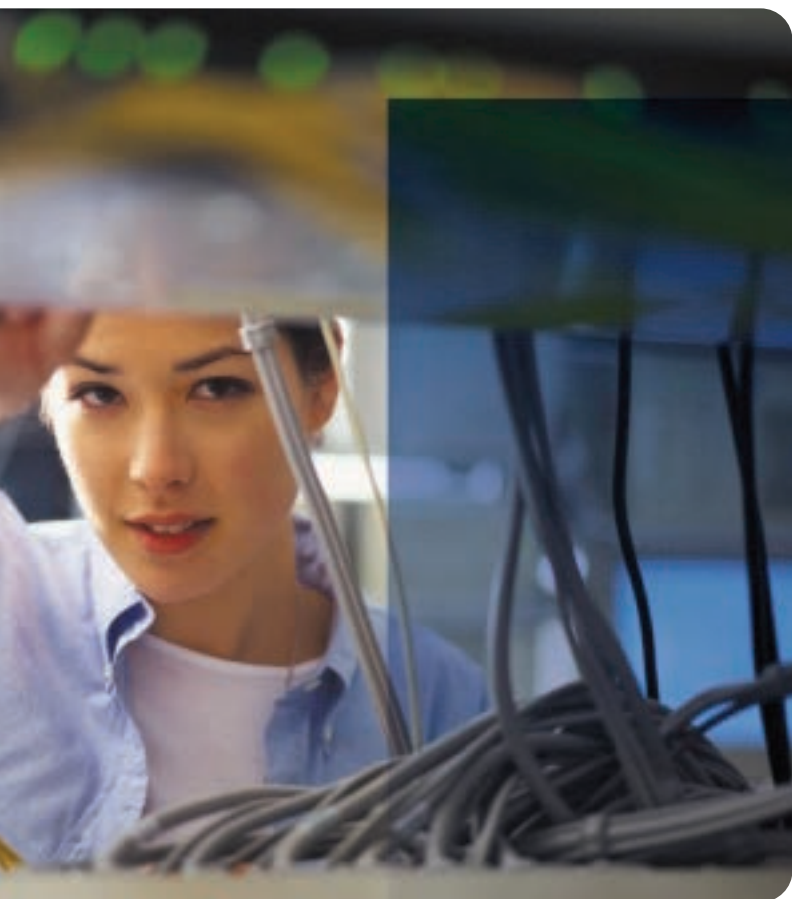
Mean Kinetic Temperature Report

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

Service and Support

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 developmen**t — 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 success of the **LabWatch** 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.

	Installation Qualification Protocol	Operational Qualification Protocol
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:	• Master Equipment File • Software Availability Verification • Software Version Verification • Critical Equipment Installation Verification • Power and Fusing Verification • Wiring/Cabling Verification • Hardware Configuration Verification • Software Configuration Verification	• Input/Output Verification • Data Processing Verification • Operator Interface Testing • Alarm Testing • Phone Dialer Verification • Historical Display Verification • Report Verification • System Security Testing • Loss of Power Testing • Duplicate User Account Verification • Audit Trail Verification

Kaye LabWatch Specifications

General specifications	
Operating Systems	Microsoft Windows 7/10, Server 2008R2, 2012R2 and 2016.
Software	GE Digital Proficy iFix HMI/SCADA
Compatibility	Interfaces with any hardware which is supports industrial standard communication protocol such as, OPC, MODBUS

Netpac Wired Field Modules	
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: NENA2 or 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 for greater distances

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: -22 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 USB2.0
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

www.kayeinstruments.com