CD310 MARCH 2017



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Feature Story

Fully Charged

Winter is almost over. The weather may or may not agree, but based on the calendar, it's true. Over the next several months, as summer nears, the temperatures will begin to climb and rivers, lakes, oceans and streams will start to warm. If this season is similar to those over the last several years, those temperatures are likely to be among the highest ever measured.

As climates have changed the amount of ice that forms on lakes has dissipated throughout the winter months. The lack of ice has meant warmer waters. In some parts of the world that's been a welcome change, but it won't be welcome forever if it seriously begins to disrupt the ecosystem.

In the pages ahead you'll read more about this topic as well as others relating to keeping your assets safe and your auditors happy.

Thanks for reading, and I hope you enjoy the March issue of Dickson Insights.



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Each day inside Dickson offers a new challenge, and with that new challenge a new opportunity. As Dickson grows, so will you. Come have fun with us, even on Mondays.

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- **D** dicksondata.com/careers
- in linkedin.com/company/dickson_2
- glassdoor.com



When we look out the window, often times it's to answer one of the day's first questions. Is it flip flop weather or is it sweater weather? Thanks to IBM and big data the question may expand for asthmatics to "What kind of inhaler do I need today?"

That's a question the data company is looking to help solve by comparing weather data to usage data that's stored in what are called 'Smart Inhalers.' According to Fast Company, this will hopefully help patients take back their lives.

"The ultimate goal for the partnership is to demarcate the patients that are at higher risk of an asthma attack, and make recommendations that might help. These might include nudging a patient to notify their physician to potentially increase the medication amount, or take an emergency inhaler once they leave the house if there's a lot of pollen in the air."

Smart Inhalers are pretty remarkable devices on their own. They allow for users, doctors and researchers to learn more about the disease through "objective and accurate medication monitoring and reminders." Each inhaler connects via bluetooth to both mobile devices and an in home hub in order to translate collected data to a cloud based data collection system. The system allows users to track medication use and receive medication reminders. The data that is then collected is easily manipulated via web connected devices and touchscreen interfaces.

That information is going to be fed through Watson's cloud-based app for analysis. Watson is a technology platform that practices machine learning in order to find key insights in expansive and disorganized data. According to IBM, 80% of all data today is unstructured including

things like the news, research reports, social media posts and enterprise system data. You can learn more about Watson and how it (or is it a he?) processes information and answers questions on the organization's website or on our blog at blog. dicksondata.com (Search "asthma").

There's a long way to go before the hoped for solutions are ready, but this is just another example of technology and temperature coming together to address an ongoing problem. These results could change the lives of asthmatics everywhere. Those are results that are sure to be a breath of fresh air.

Have something personal you'd like to add to the conversation? Send your thoughts to jeff@dicksondata.com for a chance to be featured in a future blog or article in our magazine.



DicksonOne

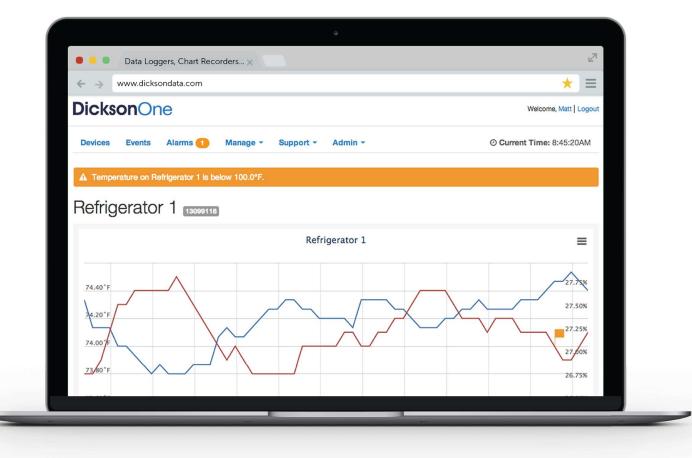


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We've re-thought temperature and humidity monitoring making it easier, scaleable, and cost effective.

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Secure

We utilize bank-grade security and Amazon Web Services for unparalleled reliability.



Anywhere

Wherever you are, access your data anywhere, anytime, 24/7.



Infinite

Securely store all your data in the cloud, whether you're recording for days, months, or years.



Automated

Devices send all collected data to the DicksonOne servers automatically, so you don't have to.



On Your Time

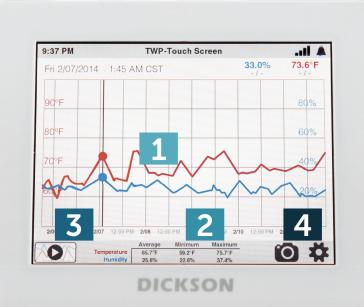
Create customizable reports delivered exactly when you want them.



Immediate

Receive real-time email, text, or phone call alarms when excursions occur.

Stay Connected. Wherever You Are.



THE GRAPH

We updated the user-interface, and made it easy to view and manage your data.

YOUR CHANNELS

The touchscreen automatically calculates and updates summary data for the selected time range

MONITORING

Pushing the play button brings you back to the most recent readings, updating the view in real-time.

SETTINGS

Easily adjust sample rates, set alarms, and connect to DicksonOne.

The Touchscreen

The Touchscreen gives you the option to connect directly to DicksonOne. You get all of your data at your fingertips, and now you can access it anywhere too. Just connect your device to your local WiFi network or plug it into an Ethernet port, log into DicksonOne, and boom, complete data control.



DicksonOne Enabled • Capacitive LCD Touchscreen Replaceable Sensors • WiFi, Ethernet, and USB Connectivity

Email us at support@dicksonone.com | Talk to a specialist at 800.452.4626 | Sign up for a webinar at dicksonone.com

Dickson One

Touchscreen

MODEL	REMOTE PROBE	PRICE
TSB	USB Download	\$424
TWE	DicksonOne Wifi/Ethernet Connection and Download	\$524
TWP	DicksonOne Download and Power over Ethernet	\$599



Dickson One

Display Logger

 MODEL
 REMOTE PROBE
 PRICE

 DWE
 DicksonOne Wifi/Ethernet Connection and Download at \$350

Starting at \$350



DicksonOne Software

One of the most common pain points when discussing monitoring is the retrieval of data. DicksonOne loggers send data to the cloud automatically, freeing up resources to do what they do best.

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Try to imagine having a glass of ice water on the hottest day of the year.

The glass sweats in your hand as you try your best to remain hydrated in the heat. Before you're able to finish your drink the ice has fully melted and the water is already starting to warm. Yuck.

Here's the obvious point of the exercise. The amount of time it takes your drink to heat depends on the ambient temperature and the amount of ice that the glass contained. What may be equally obvious, but far less often considered, is that the same idea can exist on a much larger scale. Say, for example, the temperature of our lakes and oceans on Earth.

The temperature at ground level is rising. We've covered that from both sides of the global warming conversation on our blog before. What we haven't talked about in detail is how that's impacting the surrounding environment. Minnesota Public Radio brought the conversation to the forefront earlier this month when Dan Kraker of Duluth, MN

talked about the temperature of Lake Superior throughout the 2016 season. In late August the average surface temperature for the entire lake nearly hit 69°.

That's a spring day in most places around the country, but, according to his report, this summer has ranked as the second hottest on record for the lake's surface temperature, only beaten by the 2010 season. Kraker's article explains this in more detail.

"In Lake Superior, researchers at the University of Minnesota Duluth have found that summer surface water temperatures have increased by 5 degrees over the past 30 years. That's twice as fast as the air temperature has increased, and some of the most rapid change observed on the planet."

This takes us back to our initial exercise. You see, Lake Superior is like an Elephant. It never forgets. At least, that's what Jay Austin, a physicist with the Large Lakes Observatory at UMD, alluded to when Kraker asked him about the subject.

"We use the term facetiously of course, but the lake has a memory. In that, summer water temperatures reflect what happened the previous winter."

In other words, the amount of ice cover that the lake generates in the winter impacts its temperature in the following season. That makes sense, sure, but it may not often considered by the general public. NASA scientists, however, have been paying attention to ice levels for so long that the rapid melt they see along the arctic circle is no longer a surprise. So says Walt Meier, a sea ice scientist at NASA's Goddard Space Flight Center, in a piece from Gizmodo.

"A decade ago, (last) year's sea ice extent would have set a new record low and by a fair amount. Now, we're kind of used to these low levels of sea ice – it's the new normal."

From a global standpoint rising temperatures has meant the melting of polar ice and rising sea levels. From a local level in Duluth, less ice means warmer water and better business, for now.

"Less ice cover could be a major boon for the Great Lakes shipping industry. Record ice cover in 2014 delayed the start of the shipping season and damaged ships trying to plow through thick ice sheets. In Lake Superior, warmer surface water could also result in a more productive fishery for species like salmon and brook trout," said Cory Goldsworthy, Lake Superior area fisheries supervisor for the Minnesota Department of Natural Resources.

Kraker also reminds us that warmer water could also have a negative impact on the local fish. The rise in temperatures could make the waters more comfortable for non-native species like alewife that will feast on the young of other native species. The short term gain, just became a risk for long term loss.

Regardless of if you're pulling for the short term gain or fearful for the long term loss over the next twelve months, one thing in this conversation remains factual: The ice is melting and the water is starting to warm.

Have something personal you'd like to add to the conversation? Send your thoughts to jeff@dicksondata.com for a chance to be featured in a future blog or article in our magazine.

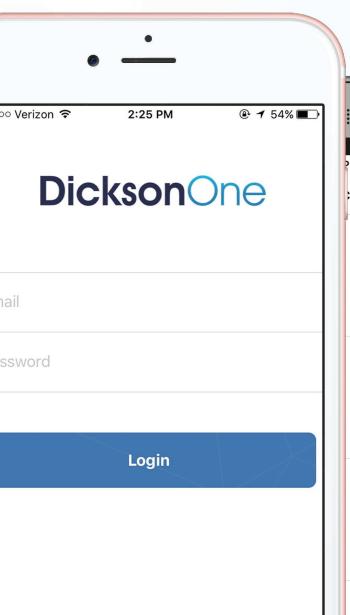


DID YOU KNOW?

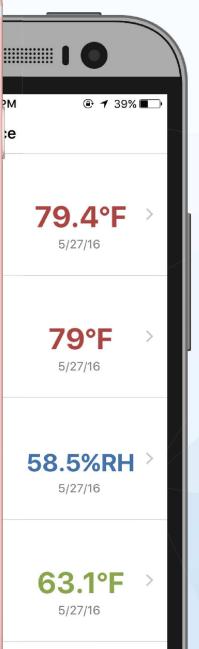
Lake Superior is the largest freshwater lake in the world, one inch of surface water is equal to 553 billion gallons. Superior is the coldest, deepest, and highest in elevation of any of the Great Lakes.

THE DICKSONONE

MOBILE APP



12



MILLIONS OF DATA POINTS RIGHT IN YOUR POCKET

Instant access to all data logger and location information in the cloud.

Anytime. Anywhere.



DID YOU KNOW?



Calibration Services SETTING THE STANDARD

Calibrations are essential to all devices that measure a variable. However, we often get the questions, "Why isn't it accurate already?" "Isn't it made to be accurate?" The answers are: it is, and yes. However, while our devices are accurate without calibrations, we can't be positive they are accurate to a specific measurable degree (and thus can't prove their accuracy) unless we perform a calibration.

HOW CALIBRATION WORKS **STEP TWO STEP FOUR STEP ONE** STEP THREE

CALIBRATION OPTIONS

What works for my company?

1-POINT **NIST**

- One specific temperature point calibration
- Good if your temperature varies by little
- Choice to specify the temperature point to best reflect your application

Example: A calibration lab determines that a device is reading 26°F when it should be reading 24°F. So, the calibration lab adjusts the device two degrees, so that it now reads 24°F. A 1-point NIST assures accuracy at this specific point.

3-POINT **NIST**

- Three-point (high, middle, and low) temperature point calibration
- Grants a larger proof of accuracy
- Choice to specify the temperature point to best reflect your application

EPLACEABLE SENSORS



ALL YOUR CALIBRATION DATA. RIGHT ON THE SENSOR.

Now, you have the option to calibrate the sensor as opposed to the unit. Think of it like this: the Replaceable Sensor takes an environmental reading, and the data logger or chart recorder records that environmental reading. By splitting up the sensor from the data logger and chart recorder, we've created a plug and play device, that will keep you in compliance, but save you time and resources.

Replaceable sensors allow for:













TEMPERATURE MAPPING 101

Temperature mapping your facility, warehouse, or refrigerator is a daunting task. We know, we've done it a lot. Dickson can help keep your business fully compliant in audits, streamline your business operations, and protect sensitive products with our temperature mapping services.

WAREHOUSE **TIPS**

Warehouses are one of the most common areas that need the service of temperature mapping. We've included a few tips to get your process started.

Note the location of HVAC outputs, and then place a temperature monitor near units.

Place your loggers in problem spots such as exits, ceilings, heaters, etc.

Label all loggers with a unique ID and record the location along with a date.

Know how much distance you should put between loggers.



Getting Started

Whether you're being audited or just want information on what's happening in your facility, then a mapping report can be an asset to your company. Once the mapping has ascertained where the points of temperature variation lie within a temperature control system, then monitoring can be installed so that owners and users can prove their adherence to the related health and safety standards.



Some industries are required to have documented evidence that environments are under state of control. Let Dickson's skilled professionals get you up to date.

Want more information? **Contact a specialist today.** (630)-923-6565

Validation Services

SOLUTIONS TO SUIT YOU

If you're in the quality assurance business like us, validation is a term you hear every day. "Validation" falls under the umbrella of terms businesses use to discuss the quality of their product, facility, or service. For those not well-versed in the world of quality assurance, hearing "validation" can send you running to hide under your desk. It's a word that can scare you into a frightful Google search, an emergency call to someone in your quality department, or worse, it can scare you into ignoring it.



PERFORMANCE QUALIFICATION



TESTS

VERIFICATION OF CORRECT

ENSURES
CORRECT PERFORMA

VERIFIES

SYSTEM MEETS CUSTOMER
INTENDED PURPOSE

OQ PERATION

OPERATIONAL QUALIFICATION



TESTS

VERIFICATION OF CORRE
EQUIPMENT OPERATION

▼ ENSURES
CORRECT OPERAT

VERIFIES
SYSTEM MEETS CLAIMS

IQ

INSTALLATION QUALIFICATION



VERIFICATION OF CORRECT FOLIPMENT INSTALLATION

ENSURES
CORRECT INSTALLAT
OF SYSTEM PER SPEC

✓ ESTABLISHESBASELINE FOR EQUIPMENT

VALIDATION VOCAB

If you are reading this, you may be familiar with Medical Device and Life Sciences specific acronyms for example IQ, OQ, and PQ. For those who are new to the specific world of Validation Services, we'll try to help with some of the important terminology.



Dickson offers validation services for our DicksonOne or Dicksonware software, and temperature controlled equipment like refrigerators, stability chambers, freezers, walk-in chambers, and more.

Is your company ready for a quotation or need more information?

Contact a specialist today.

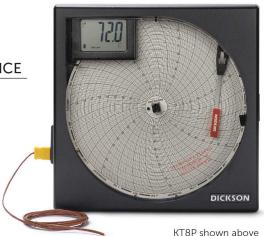
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Want a physical readout right where you are monitoring? Our Chart Recorders have you covered. For ninety years we've built the best chart recorders in the business. Check out our models below.

8 and 6 Inch Models

MODEL	FEATURES	STARTING PRIC
KT6P	6 Inch Temperature	\$369
KT8P	8 Inch Temperature	\$419
TH6P	6 Inch Temperature and Humidity	\$489
TH8P	8 Inch Temperature and Humidity	\$489



4 and 3 Inch Models

18

MODEL	FEATURES	STARTING PRICE
SL4350	4 Inch	\$239
SL4100	4 Inch	\$239
SC3	3 Inch	\$239



SL4350 (top) and SC367 shown above

DATA LOGGERS

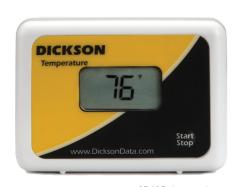
For data loggers, information (temperature/humidity measurement and date and time) are stored as information. That data is stored in the device for later download (via software) onto a computer, or sent to a cloud application or server for remote access.

Compact

SP125 Temperature Logger. Accuracy ±1.2°F, ±0.67°C. Range -10 to 176°F, -23 to 80°C.	\$119
SP175 Temperature Logger with Thermocouple Probe. Accuracy $\pm 1.8^{\circ}$ F, $\pm 0.1^{\circ}$ C. Range -300 to 2000°F, -30 to 50°C. A203 Probe required for +500°F	\$229
TP125 Temperature and Humidity Logger. Accuracy $\pm 0.8^{\circ}$ F, $\pm 0.45^{\circ}$ C. Range -10 to 176°F, -23 to 80°C.	\$199
SK550 Temperature. Pack of twelve. Accuracy $\pm 1.8^{\circ}$ F, $\pm 1^{\circ}$ C. Range -4 to 158°F, -20 to 70°C.	\$699
TK550 Temperature & Humidity. Pack of twelve. Accuracy ± 1.8 °F, ± 1 °C. Ranges -4 to +158°F, -20 to +70°C.	\$999



SP125 shown above



SP425 shown above

Display

SM300 Temperature Logger. Accuracy $\pm 1.2^{\circ}$ F, $\pm 0.67^{\circ}$ C. Range -10 to 176°F, -23 to 80°C.	\$249	TM320 Temperature & Humidity. Accuracy $\pm 1.8^{\circ}$ F, $\pm 1^{\circ}$ C. Ranges -4 to +158°F, -20 to +70°C.	\$299
SM320 Temperature Logger with Thermocouple Probe. Accuracy ±1.8°F, ±0.1°C. Range -300 to 2000°F, -30 to 50°C. A203 Probe required for +500°F	\$299	TM325 Temperature and Humidity Logger. Accuracy $\pm 0.8^{\circ}$ F, $\pm 0.45^{\circ}$ C. Range -10 to 176°F, -23 to 80°C.	\$399
SM325 Temperature and Humidity Logger. Accuracy $\pm 0.8^{\circ}$ F, $\pm 0.45^{\circ}$ C. Range -10 to 176°F, -23 to 80°C.	\$399	SP425 Temperature. Accuracy ±1.8°F, ±1°C. Range -4 to 158°F, -20 to 70°C. TP425	\$159
SM420 Temperature. Accuracy $\pm 1.8^{\circ}$ F, $\pm 1^{\circ}$ C. Range -4 to 158°F, -20 to 70°C.	\$499	Temperature & Humidity. Pack of twelve. Accuracy $\pm 1.8^{\circ}$ F, $\pm 1^{\circ}$ C. Ranges -4 to +158°F, -20 to +70°C.	\$249

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High Temp Solutions

INDICATORS

HT 300 Waterproof, High Temperature Data Logger HACCP and FDA Compliant, USB Download, IP68 Rating. Temperature Range -40° to 257°F (-40° to 125°C).

\$349

> HT350 High Temperature Process Logger HACCP Compliant, K-Thermocouple Probe, USB Download, and a large temperature range. Temperature Range -40° to 257°F

\$349



Instant Data Solutions

INDICATORS

TC700/TH700 Touchscreen Handheld Indicator

Instant temperature or temperature/humidity data No-slip silicone cover. Battery powered.

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FULLY CHARGED

A look at the batteries that are on the road to powering the future.

TIMELINE of TESLA

1888

Nikola Tesla patents powertrain design built around AC induction motor.

2003

Tesla Motors is incorporated in July of 2003

2008

Roadster launched with 0-60 mph acceleration in 3.7 seconds with lithium battery

2012

The world's first premium electric sedan is launched -Model S

2014

Announcement of Battery Swap Pilot Progeam and new battery Gigafactory

2014

Tesla shares some patents to openly promote electric car development.

2016

Tesla unveils plans for future mass market of the Model 3 Tesla Motors, as many of us are aware, is an automaker that specializes in electric cars. Their innovations have put a charge into the industry. What they're attempting to do next would supercharge it. They want to be able to produce 500,000 electric vehicles annually by 2018, a date that was moved up from the original goal of 2020. That's a huge increase considering they announced in 2015 that they were only producing 104,000 vehicles annually.

Tesla is also planning to create a 100-kilowatt hour (kWh) battery pack that will extend the range of their Model S electric sedan from their current range of approximately 265 miles to over 300.

How are they planning to do this? Well, for one thing, they're going to need batteries—lots of batteries. To hit such an audacious goal, Tesla would need to increase their lithiumion battery supply until it matched the current production of lithium-ion batteries worldwide.

Once that problem is addressed, Tesla has an even more sizable concern. Should they one day desire to replace all of the vehicles sold annually with electric cars, there were 17 million of them in 2015. Tesla would need access to 1,750 GWh worth of batteries. That kind of wattage would require a 3500% increase in the worldwide production of batteries.

That's why Tesla is taking battery making into their own hands. In 2014 Tesla Motors broke ground on what they're calling the Gigafactory—a lithium-ion battery factory in Nevada. Once built, the Gigafactory will become the single largest building in the world. That building will produce approximately 35 gigawatts annually.

Tesla's success, and their plans for expansion and disruption, will hinge on their relationship with the lithium-ion batteries they require. If Tesla achieves their goals, that relationship will become increasingly symbiotic. To keep up with demand and competition, both ends of the relationship will need to offer the utmost in efficiency and performance.

For consumers, though, the real question isn't how will the cars will be made, it's how realistic of an option electric cars are for drivers across the country. Right now, Tesla's lithium-ion batteries perform to varying levels depending on a range of factors—including temperature. Take the Model S, for example. Starting from San Diego, the Model S battery can make it 206 miles—all the way to Carpinteria, California. That's with the AC on,

Tesla's success, and their plans for expansion and disruption, will hinge on their relationship with the lithium-ion batteries they require.

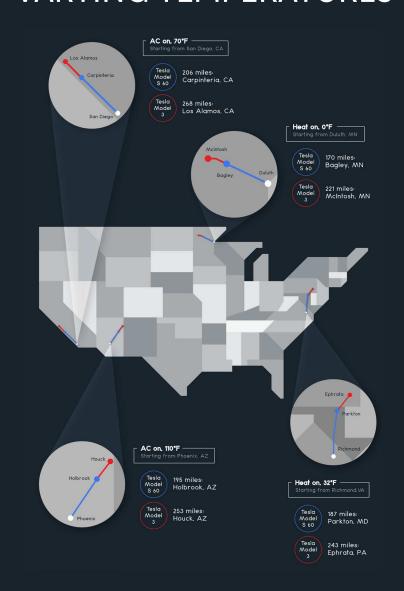
and with the temperature outside around 70 degrees.

That performance can shift drastically in other parts of the country. If you were in Duluth, Minnesota, and driving with the heat on in near zero degree conditions, the Model S would only make it 170 miles. Similarly, a trip from Phoenix at 110 degrees, with the AC cranked, would only be able to make a trip 195 miles down the road to Holbrook, Arizona. The same issues, of course, exist regardless of the environmental conditions. With such varying performance, electric cars could still be difficult for many consumers to feel comfortable relying on. Those are the kinds of concerns that can impact adoption.

There is a lot of growth that will continue to consume
Tesla in the years to come, but standardizing, enhancing, and innovating is going to remain key for their growth into the future. It's going to be about reliability and consistency. Only then will they be able to truly electrify the industry.

Have something personal you'd like to add to the conversation? Send your thoughts to jeff@dicksondata.com for a chance to be featured in a future blog or article in our magazine.

HOW TESLA'S CAR BATTERIES PERFORM IN VARYING TEMPERATURES





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Points that Matter



Dickson is planning a user meet up for this upcoming spring. Go to blog.dicksondata.com and Search "Meet Up" for more information or email Scott at Scott@DicksonData.com to learn more.

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