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Dear Readers,

Sunny days are widely welcome in a context of emerging constraints related to the Ukrainian-Russian crisis in regard with rising prices in oil, gas, or alimentary goods such as oil again, or flour.

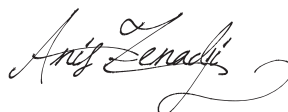
But sometimes threats and difficulties can be overcome to find out new opportunities. For example, in this Spring issue of IEN Europe, you will find out a piece on how a company chose augmented reality to deal with travel bans. Faced with the impossibility for its technicians to travel to customers' premises in other countries, Actini leveraged augmented reality to improve its agility and drive innovation. The firm deployed the remote support solution Vuforia Chalk from PTC to ensure its technicians could continue to work closely with customers.

The Sensor + Test section comes with two great pieces from Analog Devices and Pepperl+Fuchs. The first one diagnosed the fact that a better solution was needed to meet the demands of Industry 4.0, smart sensors, and reconfigurable factory floors. Coming with several graphs, this article claims that the solution is the IO-Link protocol which is a relatively new standard for industrial sensors that is showing an impressive growth trajectory.

The second one puts the light on undesirable machine conditions leading to critical downtimes and posing a risk to life and health. Pepperl+Fuchs offers vibration sensors for measuring these critical machine conditions to avoid this situation. Using these vibration sensors makes it easy to assess the machine and allows essential servicing to be planned.

Last, we invite you to take a look at our exclusive interview for Hannover Messe 2022, which leading theme is to ensure security of supply and growth in a changing world, while counteracting climate change. Numerous challenges are to come.

We wish you a pleasant and interesting reading



Editor for IEN Europe

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Red Lion Controls Acquires MB connect line GmbH

MB connect line's highly secured hardware and software solutions enhance Red Lion's modular and rugged industrial automation and networking technology. The acquisition expands Red Lion's portfolio by adding a full complement of products from an industry recognized leader in industrial cyber-security and offers customers a Remote Service Portal for remote monitoring and remote configuration. Customers will be able to meet the demands of industrial environments and strengthen their operational resiliency with secure remote access solutions. "Red Lion Controls and MB connect line are a powerful combination. With a shared focus on secure connectivity solutions, we will be better positioned to serve our customers seeking to strengthen their operational resiliency with the convergence of Information Technology and Operations Technology. Red Lion is very excited about starting this new chapter, supporting customers with a broader product offering and greater technical resources," stated Jack Lee, President of Red Lion Controls.



ADB Ventures Participates in Switchgear Company nuventura's

Nuventura is a developer of switchgear technologies that help eliminate Sulphur Hexafluoride (SF6) which is the world's strongest greenhouse gas. The company revealed that ADB Ventures (the Asian Development Bank's venture arm) participated in a second closing of nuventura's seed investment round in 2021. The collaboration with ADB will help nuventura make important steps toward the product's industrialization and expansion into Asian markets. Nuventura develops medium voltage (MV) gas-insulated switchgear (GIS), replacing SF6 with dry air. Through this patented technology, the company's goal is to help tackle annual SF6 emissions, equivalent to the yearly CO2 emissions produced by approximately 100 million cars. Nuventura makes it possible for established switchgear manufacturers to expand their own product portfolios with SF6-free GIS technologies by either selling key components to manufacturers which then get incorporated into their own switchgear designs, or licensing the full technology. The business model ensures that nuventura's customers gain access to state-of-the-art



GIS technologies while avoiding costly R&D expenses as a consequence of the further development of their own new GIS technologies.

Titan Enterprises Celebrates over 40 Years of Innovation

Titan Enterprises has been manufacturing optimized liquid flow metering solutions for more than 40 years. Trevor Forster, Managing Director of Titan Enterprises, founded the company in 1981 with the aim of producing modestly priced, high-quality, low flow measuring devices for OEM customers. He recognized from the outset that improvisation and creativity were the key to securing their footing in the market. R&D projects could be anything from testing new materials for longer life, chemical inertness, robustness, testing under high pressure or temperature or software development. The focus technology for Titan at present is their ultrasonic liquid flow measurement devices. Taking the Atrato® ultrasonic flowmeter product design understanding, they have pushed both electronics and physical design to improve the overall performance window. From an extensive pioneering work with a USA medical company to produce a disposable ultrasonic flowmeter that measures the volume of liquid manually injected into a patient, to recently launching their new software interface for the Atrato.



Sensata IQ, an IIoT Platform for Plant Wide Asset Monitoring

Sensata Technologies announced the new Sensata IQ platform, which makes it easy to deploy asset health monitoring to prevent unplanned downtime within manufacturing environments. Online asset monitoring systems have traditionally been expensive, complex, and required users to have deep domain expertise. As a result, many plants and factories end up monitoring only the most critical assets, leaving up to 85% of their plant floor unprotected and unmonitored. Sensata IQ offers an easy-to-install solution that enables factory managers and maintenance engineers to intuitively monitor all their assets from anywhere, including on a smartphone, PC, or tablet. The cloud-based platform uses artificial intelligence to process data from a broad portfolio of Sensata IoT devices and qualified third-party sensors to gain insights into the health of each asset. With Sensata IQ, plant managers get reliable and easy-to-understand alerts regarding their facility's equipment health before assets fail, thereby reducing unplanned downtime and optimizing maintenance strategies to minimize labor and parts expenses.



OMRON Brings Real Manufacturing Evolution to Factory Floors at Hannover Messe 2022

The company will demonstrate the future shape of “i-Automation” - OMRON’s manufacturing innovation concept - as the direction of manufacturing evolution for the next decade.

Automation beyond human abilities, advanced collaboration between people and machines and accelerating digital transformation at manufacturing sites will help manufacturers realize flexible, efficient, and sustainable production. Visit OMRON at Hannover Messe 2022 (30 May – 2 June) in hall 9, booth F24.

At its booth, with a new design to reflect a real factory floor, OMRON brings on-site innovation to life by embodying three pillars of the automation concept: intelligent, integrated, and interactive automation. Following OMRON’s mission, the company creates industrial automation solutions that improve lives and contribute to a better society.

“Currently, manufacturers around the world need to renew and evolve manufacturing toward the post-COVID world,” Fernando Colas, OMRON’s newly appointed CEO for the Industrial Automation Business in EMEA comments. “In addition to responding to technological innovations and changes in products and manufacturing methods, we must focus on SDGs (Sustainable Development Goals), the diversification of people’s values, and the wellbeing of working people.” Colas continues. OMRON’s booth at Hannover Messe will focus on enabling flexible manufacturing, as well ensuring workforce safety, product quality and sustainability.

Visitors can experience solutions based on robotics, machine vision, high-speed and high-precision control application technology, artificial intelligence, and data science, that innovate manufacturing sites so that people can focus on creative work. In addition, balancing productivity and energy efficiency, OMRON contributes to innovative manufacturing that meets the rapidly changing market needs while considering the global environment.

“At OMRON, we are also very excited to be part of the developments promoting sustainable mobility in Europe, especially in the field of electrification, fuel cell technology and ADAS (Advanced Driver Assistance Systems) solutions,” Dr Klaus Kluger, General Manager for Central Eastern Europe comments. “Visit us to discuss how innovative automation can be the cornerstone of future-oriented automotive manufacturing. You can also see our innovative automation technology in action in a real application for fuel cell production at the Dassault booth in hall 4, stand 34”.

Intelligent Cell Production Line

One example of innovative automation, shown for the first time at a European tradeshow, is OMRON’s new Intelligent Cell Production Line. It is one of the most innovative control, information, and manufacturing systems to support efficient and high-quality assembly and production. This concept has been tested and deployed at OMRON factories in Japan as well as in Shanghai, China as a system to achieve harmony between workers and machines.

Accelerated employee training and knowledge transfer, zero defect production and enhanced workflow efficiency are just three of the direct benefits that especially manufacturers with high-mix, low-volume (HMLV) operations, will glean from implementing this new line control approach.

Visit OMRON at Hannover Messe 2022 (30 May – 2 June) in hall 9, booth F24.



StorCentric to Showcase Award-Winning Nexsan Data Storage Solutions at NAB

StorCentric

StorCentric®, provider of a comprehensive portfolio of secure data management solutions, announced it will showcase its award-winning Nexsan data storage solutions for the media and entertainment (M&E) industry at the upcoming 2022 NAB Show, taking place April 23 - 27 (Las Vegas, Nevada). The BEAST Elite storage platform is a complete refresh of the BEAST platform that increases throughput and IOPs by 25% while maintaining the architecture's price/performance leadership. Connectivity has been tripled, providing twelve high speed Fibre Channel or iSCSI host ports, reducing the need for network switches. In addition, the E-Series P storage platform offers performance and robust connectivity options (FC, iSCSI) for seamless interoperability along with a robust qualified OS support matrix. The battle-tested E-Series P Storage Arrays give you the capacity and performance needed for your structured data workloads, along with the ultra-reliability Nexsan is long known for.

Rohde & Schwarz further improves R&S FSW with new Enhanced Dynamic Front End

The well-established R&S FSW signal and spectrum analyzer from **Rohde & Schwarz** has been the leading instrument for high-end measurements requiring extreme precision. Its new front end continues the path of innovation with unrivaled EVM measurement accuracy for wideband modulated signals in the mmWave range. This makes the solution ideal for testing any high-end communication component or systems, including 5G NR FR2 or IEEE 802.11ay / ad chipsets, amplifiers, user equipment and base stations. With the new Enhanced Dynamic Front End, the R&S FSW will continue to offer the most advanced and highest quality signal and spectrum analysis on the market. EVM measurements are currently in high demand for 5G base station and component development at FR2 frequencies as well as for high frequency satellite applications. The latest enhancements to the modified front end of the R&S FSW, as well as the microwave hardware optimized for frequencies above 26 GHz, provide excellent accuracy.



TESTA Reports on its Real Time Flowmeter

Benefiting from their flexibility, peristaltic pumps are used for a wide range of applications from simple solvent transfer to more complex flow chemistries and lab scale reactions. Carlo Dessy, Technical Director of **TESTA Analytical** commented "As simple and dependable as peristaltic pumps are, they do however come with drawbacks intrinsic to their design and principle of operation. The



flow rate of a peristaltic pump cannot be determined just by the physical dimensions of the peristaltic wheel and tubing and its speed of rotation. Other factors including the viscosity of the transported liquid, flow pulsations, back pressure and aging of the pump tubing are known to have a significant influence on obtained flow rate." Compact in size, and conveniently powered via a USB connection, the TESTA Analytical real time liquid flowmeter uses a thermal flow sensor that is extremely accurate, sensitive, and high-resolution, and also offers the advantage of being non-invasive. As the sensor does not interfere with the measurement it can operate over a wide dynamic range.



REDEL 2P series High Voltage



- 3 High Voltage configuration (2, 5 & 8 contacts)
- Test Voltage higher than 10 kV AC
- Compliant IEC 60601-1 (3rd Ed.)
 - Electrostatic discharge 15 kV
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Ensuring Security of Supply and Growth in a Dynamically Changing World

The topics to be discussed at this year's HANNOVER MESSE are more relevant than ever. Kay Petermann from IEN D-A-CH interviewed Dr. Jochen Köckler, Chairman of the Managing Board, Deutsche Messe AG, on the comeback of the fair as a live event.

Dr. Jochen Köckler is Chairman of the Managing Board of Deutsche Messe AG based in Hannover, Germany. He was appointed to the Board on April 1, 2012, and took over the chairmanship on July 1, 2017. Jochen Köckler also manages the global Industry, Energy & Logistics division within HANNOVER MESSE and its worldwide industry events as well as the business unit IT & Services and Finance & Legal.

After a two-year pandemic break, HANNOVER MESSE will take place again as a live event from May 30 to June 2. What can visitors expect and what is on offer for those who, for various reasons, cannot yet visit the trade fair again?

Dr. Jochen Köckler: The pandemic led us to focus more on the digitalization of our own products. We learned many lessons from last year's digital HANNOVER MESSE that we have built into the 2022 event. For example, our networking tool enables all trade fair participants to connect digitally in advance of the event, exchange ideas and arrange on-site or virtual appointments. We will livestream all forums, so visitors who cannot be there in person can still actively participate in the fair. We have also developed virtual guided tours for precisely this target group – digital visitors can experience the exhibits and highlights without being at the exhibition center.



Dr. Jochen Köckler, Chairman of the Managing Board of Deutsche Messe AG





The high level of internationality among visitors and exhibitors has always been one of the special, positive characteristics of HANNOVER MESSE. What is the status of exhibitors this year and what do you expect from visitors?

We will experience an international show again this year, both on the exhibitor and on the visitor side. We have received a large number of registrations from Italy, Turkey and, of course, Portugal. The USA and South Korea are also well represented, and we expect many exhibitors from France, Spain and Poland.

The lead theme of the fair is “Industrial Transformation”, which has been topical for the last few years but currently gained momentum from developments such as the unending pandemic, threats of disruption to industrial supply chains and the Ukraine war and associated threats. What impulses do you expect that can emanate from the trade fair and exhibitors in the field of industrial production?

In view of the current global political situation, the topics at HANNOVER MESSE are more relevant than ever. At the core, it is about ensuring security of supply and growth in a dynamically changing world – politically, ecologically and economically – and at the same time counteracting climate change. Innovative technologies will play a key role here.

What about decarbonization, hydrogen and the circular economy? These are also well-established, important topics for HANNOVER MESSE.

When it comes to CO₂-neutral production and energy security in Europe, renewable energies and green hydrogen play a key role. Many companies are already moving forward with concrete solutions, including corporations such as Bosch or Siemens, but also medium-sized companies. Due to the current energy crisis, the topic of hydrogen is becoming increasingly important at HANNOVER MESSE. We have offered the largest European platform for the hydrogen and fuel cell industry there for years. In Hannover, more than 200 companies present solutions for a sustainable energy supply using hydrogen from renewable energies, including Iberdrola, Saint Gobain, Emerson, ElringKlinger, Plug Power, Siemens, Phoenix Contact, Enapter, Bosch, Hexagon Purus, Nel Hydrogen, Hydrogenious, and GP Joule.

In view of the scarcity of raw materials, the topic of circular economy is also becoming increasingly important at HANNOVER MESSE.

In the past, the supporting program of the trade fair and the accompanying congress events were an important starting point for advancing topics and discussions. What can visitors expect this year, online and offline?

For the first time, we will stream all forums live so that all visitors, whether on site or digitally, can watch the individual lectures. The exhibition center features four stages. The Main Stage in the H’Up studio hosts economic policy discussions. The Industry 4.0 Stage in Hall 8 covers topics such as automation and sensor technology, cloud and infrastructure, data analysis and management, digital platforms, robotics, IT security, AI and machine learning, and the circular economy.

On the Energy 4.0 stage in Hall 12, experts discuss the latest trends and solutions for an energy-intelligent future. The tech transfer stage in Hall 2 fosters exchange between science, business and politics and highlights the latest projects in applied industrial research. The focus is on the direct exchange of information, successful technology transfer and discussing solutions to the challenges of tomorrow’s industry.

With the choice of Partner Country Portugal, the trade fair has again made an interesting choice. How many exhibitors from the partner country are expected to be there and which topics will be in the foreground?

At HANNOVER MESSE 2022, Portugal presents itself as an international technology partner and encourages investments from abroad. We can learn from Portugal in many areas. For example, around 80 percent of the electricity in Portugal already comes from renewable energies. The country is interesting for many international startups. In Hannover, more than 100 Portuguese exhibitors will present their technologies and processes in a central pavilion and in three thematic pavilions in the areas of Engineered Parts & Solutions, Energy Solutions and Digital Ecosystems.

Kay Petermann, IEN D-A-CH

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Implementing Small and Energy Efficient Industrial Field Sensors with IO-Link™

The IO-Link organization estimates that over 16 million IO-Link enabled nodes are being used in the field to date. That number is still growing.

Introduction

Historically, industrial sensors were and still are in many cases analog. They include a sensing element and some way to get the sensing data to a controller. Data was unidirectional analog. Then came binary sensors, which provided a digital on/off signal, and included a sensing element: inductive, capacitive, ultrasonic, photoelectric, etc. with a semiconductor switching element. The output could be: high-side (HS) switching (PNP) or low-side (LS) switching (NPN) or push-pull (PP). But data was still limited to unidirectional communication from the sensor to the master, had no error control, and still required a technician on the factory floor for tasks such as manual calibration.

A better solution was needed to meet the demands of “Industry 4.0”, smart sensors, and reconfigurable factory floors. The solution is the IO-Link protocol, a relatively new standard for industrial sensors that is showing a phenomenal growth trajectory.

IO-Link is a standardized technology (IEC 61131-9) that regulates how sensors and actuators in industrial systems interact with a controller. IO-Link is a point-to-point communication link with standardized con-

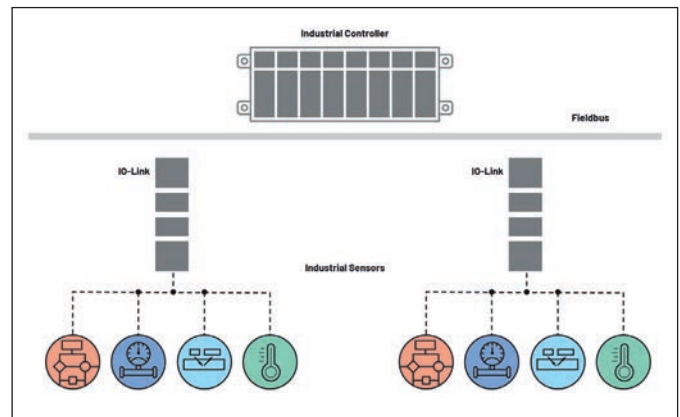


Figure 2: IO-Link protocol is used to connect intelligent edge devices to the factory network.

nectors, cables, and protocols. The IO-Link system is designed to work within the industry standard 3-wire sensor and actuator infrastructure and comprises an IO-Link Master and IO-Link Device products.

IO-Link communication is between one master and one device (sensor or actuator). Communication is binary (half-duplex) and is limited to a distance of 20m, using unshielded cables. Communication requires a 3-wire interface (L+, C/Q, and L-). The supply range in an IO-Link system is 20V to 30V for the master and 18 to 30V for the device (sensor or actuator).

Analog Devices’ IO-Link handbook¹ elaborates IO-Link advantages as follows:

“IO-Link is a technology that enables a traditional binary or analog sensor to become an intelligent sensor that no longer just gathers data but allows a user to remotely change its settings based on real-time feedback obtained on the health and status of other sensors on the line, as well as the manufacturing operation it needs to perform. IO-Link technology enables sensors to become interchangeable through a common physical interface that uses a protocol stack and an IO Device Description (IODD) file to enable a configurable sensor port. It is truly plug-and-play ready while providing the ability to reconfigure parameters on-the-fly.”

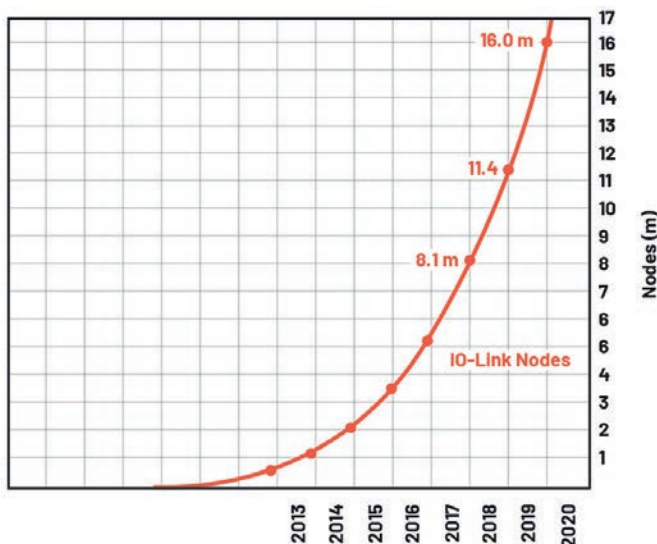


Figure 1: IO-Link protocol’s rapid growth as tracked by the IO-Link Consortium



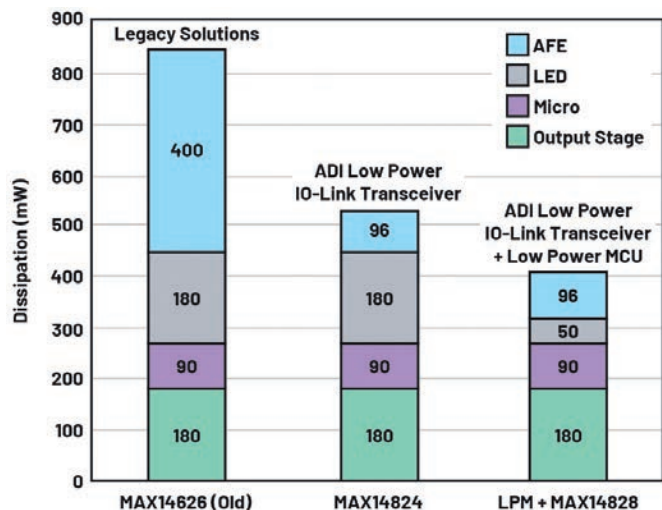


Figure 3: A hypothetical IO-Link industrial sensor power budget.

Within the factory network hierarchy, the IO-Link protocol sits at the edge, which are typically sensors and actuators as shown in Figure 2. Many times, the edge devices communicate to a gateway that translates the IO-Link protocol to the fieldbus of choice.

For more information on how IO-Link enables next-generation manufacturing environments or Industrial IoT (as it is sometimes called), refer to a previous article that explains this in detail²

Designing IO-Link Sensors

Industrial field sensors must be rugged, small, and very energy efficient so that the heat dissipation is kept to a minimum. Most IO-Link sensors have the following components:

- Sensing element with the associated analog front end (AFE)
- A microcontroller that processes data, and in the case of an IO-Link sensor, also runs the lightweight protocol stack.
- An IO-Link transceiver that is the physical layer.
- Power supply and in many cases protection (TVS for surge, EFT/burst, ESD, etc.).

Heat Dissipation (Power Efficiency)

Once we understand the typical components, we can look at how a hypothetical sensor power is budgeted. See Figure 3. All of these numbers are estimates. They show that the transceiver (output stage) power consumption matters when budgeting the total system power consumption of a sensor.

Let's start at the left-most side, which specifies an older generation of IO-Link sensor. That way it becomes clearer how advances in technology in the microcontroller (MCU) and the output stage (i.e., the

References

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- <https://www.eletimes.com/io-link-enables-industrial-iiot>
- <https://www.maximintegrated.com/en/design/technical-documents/app-notes/6/6908.html>

transceiver) has contributed to the lowering of the total system power over the years.

Original or first generation IO-Link transceivers consumed 400mW or higher. The newest low-power Analog Devices IO-Link transceivers consume less than 100mW. Also, the MCUs have helped. A legacy MCU consumes as much as 180mW, but the newer low-power MCU can go down to 50mW.

A state-of-art IO-Link transceiver coupled with a low-power MCU can keep the total sensor power budget can be in the range of 400mW to 500mW.

Power dissipation is directly related to heat dissipation. The smaller the sensor the more stringent the power dissipation specification. By some estimates, an 8mm diameter (M8) enclosed cylindrical IO-Link sensor will specify a maximum power dissipation of 400mW and a 12mm diameter (M12) enclosed cylindrical IO-Link sensor will specify a maximum power dissipation of 600mW.

And the technology keeps getting better. One of the new IO-Link transceivers from Analog Devices, the MAX14827A, dissipates a remarkably low 70mW when driving a 100mA load. This is achieved by optimizing the technology to deliver a very low 2.3Ω (typ.) RON (on-resistance).

For sensors that use very low operating current, say 3 to 5mA, and require a 3.3V and/or a 5V supply; the regulated power can be sourced via an LDO. And indeed, Analog Devices' IO-Link transceivers have included an integrated LDO. But as the current demand increases to say 30mA, the LDO will soon become the dominant source of power/heat dissipation in the system. To compare at 30mA, the power consumption of an LDO can be as high as 600mW.

$$LDO\ Power\ @30mA = (24 - 3.3) \times 30mA = 621mW$$

In comparison, a DC-DC buck converter supplying a 30mA sensor with a 3V output voltage will dissipate just 90mW. Assuming the converter is 90% efficient (just 9mW power loss), the overall power consumption is just 90 + 9 = 99mW³.

Analog Devices' newest IO-Link transceivers have integrated a high-efficiency DC-DC regulator as shown in Figure 4.

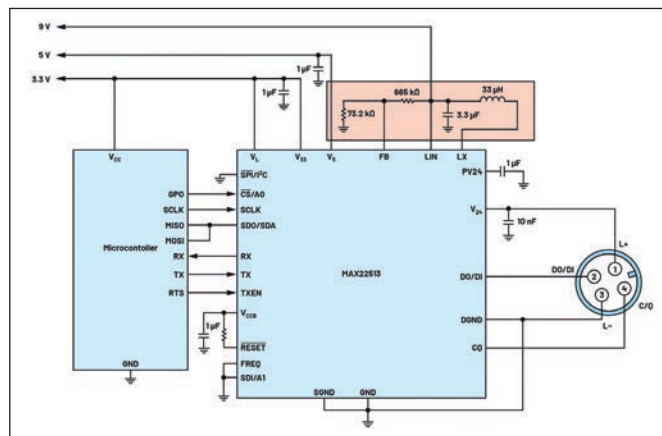


Figure 4: Analog Devices' newest IO-Link transceiver incorporates an integrated high efficiency DC-DC regulator.



Figure 5: Size is another big issue in the newest IO-Link sensor designs.

Size of IO-Link Sensor

After heat dissipation, size is the next biggest concern for all industrial sensors, and it applies as well to the new IO-Link sensors. Board space becomes increasingly at premium as we migrate to a smaller form-factor.

Figure 5 shows that for a 12mm diameter housing, the transceiver (in a wafer level package – WLP – package) and the DC-DC can sit side by side on a regular PCB which has 10.5mm width. There is still room for vias and wires on the same side. If the sensor housing is 6mm, then the PCB width is down to 4.5mm. Then the chips have to be mounted on both sides of the PCB even with small WLP packages.

To enable these sizes, the transceiver must be available in a wafer-level package (WLP) that allows for the smallest size. This size limitation is also one of the reasons we have integrated a DC-DC inside our newest IO-Link transceiver as shown before.

But most industrial sensors also must be designed to work in a rugged environment, which means they must incorporate protection circuitry such as TVS diodes, which are not shown in Figure 5. This is where it is important to pay attention to the Absolute Maximum Ratings specification for the IO-Link transceivers.

Let's elaborate: Why does 65V Absolute Maximum Ratings on the IOs reduce the size of the sensor subsystem? Typically, the sensor needs to survive surge pulses between the 4-pins: GND, C/Q, DI, DO. Analog Devices' IO-Link transceivers have a spec of 65V Absolute Maximum Ratings. If we take an example of a 1kV at 24V surge between C/Q and GND.

Voltage between C/Q and GND = TVS clamp voltage + TVS forward voltage
 With the higher Absolute Maximum Ratings specification, the designer can use a small TVS diode such as SMAJ33 whose clamp voltage is 60V at 24A, and TVS forward voltage is 1V at 24A.

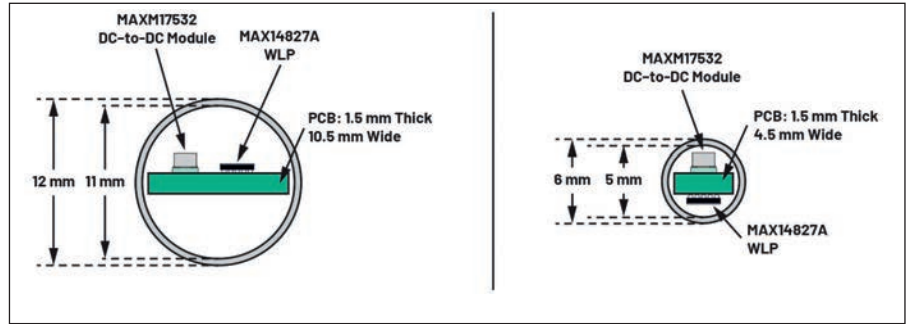
Voltage between C/Q and GND = 61V

This value above is within the Absolute Maximum Ratings specification of the Analog Devices transceiver.

However, if the Absolute Maximum Ratings specification is lower, typically in the industry it is around 45V, then a much larger TVS diode such as the SMCJ33 is required to clamp the voltage down to an acceptable level. This diode is more than 3x the size than the one required for the Analog Devices transceiver.

	IO-Link TRANSCIVER WITH ABSOLUTE MAXIMUM RATING 65V	IO-Link TRANSCIVER WITH ABSOLUTE MAXIMUM RATING 45V
Smallest TVS Diode	SMAJ33	SMCJ33
Max Voltage	61V	45V
Total PCB Area	40.5mm ²	144mm ²

Table 1: Advantages of 65V Absolute Maximum Rating on Sensor Size



First Generation	Second Generation	Third Generation
<ul style="list-style-type: none"> ▶ TQFN Package ▶ Integrated LDO Regulator 	<ul style="list-style-type: none"> ▶ WLP Package Option ▶ Integrated LDO Regulator ▶ Lowest Power (Low R_{ON}) ▶ 65 V Abs Max 	<ul style="list-style-type: none"> ▶ WLP Package Option ▶ Integrated DC-to-DC Module ▶ Lowest Power (Low R_{ON}) ▶ Integrated Protection

Figure 6: Progression of IO-Link transceiver technology

The size impact of a larger TVS diode in the overall sensor design is significant if the transceiver Absolute Maximum (Abs Max) ratings specification is lower. Table 1 shows an estimated difference in the PCB area. The assumption here is that the sensor must be able to withstand a high-level surge of ±1kV/24A.

The next generation of IO-Link transceivers have even improved upon this. The newer IO-Link transceivers from Analog Devices now feature an integrated protection on IO-Link line interface pins (V24, C/Q, DI, and GND). All pins feature integrated ±1.2kV/500Ω surge protection. In addition, all pins are also reverse-voltage protected, short-circuit protected and hot-plug protected.

Even with all the integrated protection features as well as the integrated DC-DC buck regulator, these devices are available in a tiny WLP package (4.1mm x 2.1mm); enabling a really small IO-Link sensor design.

Conclusion

Figure 6 shows a high-level progression of the IO-Link transceiver technology from Analog Devices.

The first-generation IO-Link transceiver technology came in easy-to-use TQFN packages with integrated LDOs that would meet the needs of a small sensor design. As power and size considerations mounted, the second-generation transceiver technology optimized power consumption by moving to a technology that gave us lower RON to further reduce power consumption and were made available in even smaller WLP packages.

The newest generation of transceivers recognize the need to integrate both the protection and a high-efficiency DC-DC buck regulator to further reduce the size and the heat dissipation of the sensor subsystem. As IO-Link technology gets deployed in even more industrial sensors, these device specifications are key to implement small, ruggedized, power-efficient sensors.

Suhel Dhanani, Director of Business Development for the Industrial & Healthcare Business Unit, Analog Devices

▶▶ 62311 at www.ien.eu



Industrial PC for Surveillance in Public Transport

Delivers 1080p real-time live display monitoring

ICP Deutschland. Intelligent monitoring functions in buses and subways can help reduce crime. Fare evasion can also be reduced through intelligent monitoring, which in turn increases operators' profits. Video evidence also contributes significantly to the prosecution of criminals. How can the MP1-D help analyze crime on public transit in major cities?

For traffic surveillance, the MP1-D's rugged design provides 1080p real-time live display monitoring with hardware accelerated video decoding compression technology that enables

simultaneous live playback, recording and archiving.

Optional 5G Support

The MP1-D's optional 5G support provides low-latency network connectivity, turning the MP1 into an edge device, enabling faster interaction between individual vehicles and the control center without the need for servers in remote data centers. Live video transmissions and vehicle statistics can be sent in real time. The dispatch system can contact the MP1 system



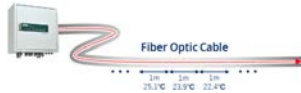
directly and request information such as live images from the vehicle.

The MP1-D can provide up to eight PoE connections, allowing high-resolution IP cameras and other sensors and peripheral security devices to be installed without a separate power supply. The overall system is also durable, robust and immune to vehicle vibration.

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FIBER OPTIC HEAT DETECTOR

Facility monitoring and fire detection solution



Yokogawa announces that VdS, a leading independent certification institution in Germany, has renewed the certification of the

Yokogawa DTSX1 Fiber Optic Heat Detector for European Standard EN 54-22 under approval No. G 220001. The EN 54-22 standard applies to resettable line-type heat detectors consisting of a sensing element using a fiber optic cable for use in fire detection and fire alarm systems installed in and around buildings and other civil engineering works. The DTSX1 is a temperature monitoring system that uses fiber optic cable as temperature sensors. It quickly and precisely detects high heat over a wide area, 24 hours a day, 365 days a year with no blind spots. Also, the ability to configure the alarm display and sound individually to suit any application enables rapid detection, localization, and identification of abnormalities. This prevents heat-induced equipment failures and abnormalities, as well as fire incidents that may result from them. Currently, several projects implementing the DTSX1 system are being carried out, through channel partners, for road tunnels in progress in the Netherlands and Germany. In a unique project in Turkey for the metro and high-speed train, which travels 240 km and passes through 15 tunnels, the DTSX1 fire detection system was installed. With the latest EN54-22 certification, the DTSX1 can be used as RLTHD (Resettable Line-Type Heat Detectors) in a wider range of fire detection applications.

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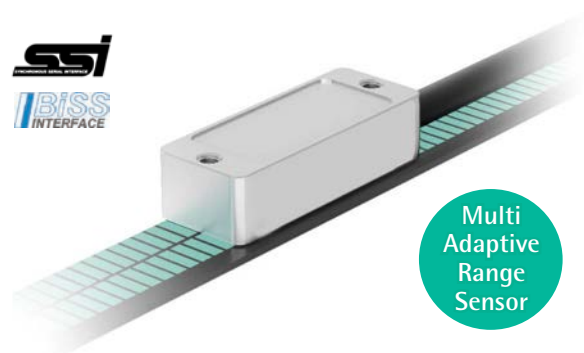


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Condition Monitoring Is Now Possible

Vibration sensors directly measure the machine condition, enabling the detection of imbalances, bearing damage, resonances, as well as having a sensor for every requirement, and last, functional safety, use in hazardous areas, and IO-Link.

Undesirable machine conditions lead to critical downtimes and can even pose a risk to life and health. Pepperl and Fuchs offers fitted vibration sensors for measuring these critical machine conditions and avoiding this situation. Using these vibration sensors makes it easy to assess the machine and allows essential servicing to be planned. The automation specialist offers an especially wide range of products, covering different measuring and frequency ranges, harsh environments with ATEX and safety requirements, and wide temperature ranges as standard. Versions that measure additional data such as temperature and bearing status parameters are also available. This means that users can obtain a wide variety of data with just one device, enabling conditions to be precisely monitored.

Vibration Behavior as an Indicator of Machine Quality

Whenever a machine ceases operation due to unexpected maintenance work and no longer performs its intended function, there are significant costs for the operator. For this reason, downtimes, the resulting economic losses, and the danger to life and health must be avoided as far as possible. To achieve this, the quality of the system must be reliably detected at all times to enable a planned servicing cycle to be initiated in time. The vibration sensors from Pepperl+Fuchs have been specially developed for this application, as they can detect misalignments, installation problems, loose parts, resonances, bearing damage, or imbalances, for example. The sensors work by measuring the vibration behavior of a machine. If predefined thresh-



Reliable condition monitoring

olds are exceeded, the vibration sensor uses a trend analysis to trigger a pre-alarm and main alarm.

Monitoring the Long-Term Change in Vibration Behavior

A vibration occurs whenever an amplitude value like velocity or acceleration changes cyclically over time. The cyclic change in the amplitude value corresponds to the frequency response, i.e., how the machine is vibrating. For example, this could be caused by an imbalance in a rotating shaft on a gear, which is reflected in the excitation frequency that stimulates the vibration sensor. The vibration sensors in the VIM series provide the measured value in terms of vibration velocity or vibration acceleration in a frequency range of 1 to 1000 Hz.

The sensors not only provide the current vibration values, but also provide prefiltered RMS values (root mean square values). This is also referred to as the root mean square value of the amplitude of a vibration which, in simple terms, is understood as the average value. Depending on the frequency range, determining the RMS value can take up to 12 seconds. This average is deliberately formed to avoid the vibration behavior of a machine tipping into critical condition within milliseconds. The main focus is on a long-term trend analysis, meaning that the RMS value of the vibration is the most important value, rather than the current underlying vibration velocity or vibration acceleration values. Short-term changes in amplitude are deliberately filtered out. For example, forklifts traveling in the vicinity of a



machine can lead to a change in the vibration value at the sensor, as vibrations are transmitted to the machine via the ground or building. This kind of impact should be filtered out, as to determine the real condition of a machine, only the long-term trend analysis created by forming the RMS value of the measured data is of interest.

A Broad Portfolio for All Circumstances

The Pepperl+Fuchs portfolio offers a variety of ideal solutions for almost every requirement, including versions that meet the needs of functional safety, explosion-protected areas, web-based remote servicing with IO-Link or standard sensors, internationally valid approvals, rugged housing materials for a wide range of applications, or a wide temperature range. In addition, versions for different frequency ranges, measured variables, and measuring ranges are also available. The portfolio is divided into three designs, each of which offer a wide range of certifications and functions:

- **VIM3 series:** The smallest, compact VIM3 analog series is suitable for applications up to SIL 1/PL c. The VIM3 series is also available as an IO-Link version.
- **VIM6 series:** The VIM6 series is especially suitable for high-temperature areas, being capable of withstanding temperatures ranging from $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$. The series is also approved for use in hazardous areas up to Zone 1/21.
- **VIM8 series:** This is the largest series and is approved up to SIL 2/PL d as standard. This version can also be used in Zone 1/21 hazardous areas.

Opening the Door to Digital Condition Monitoring with IO-Link

The VIM3 series is also available with IO-Link communication. This version combines the advantages of the vibration-based



VIM provides a range of measurement data from one device

description of the machine condition with the advantages of IO-Link. A major advantage of this system is that just one sensor can be used to read out four or even five different types of data. In addition to temperature, the sensor also measures vibration velocity (in mm/s rms), vibration acceleration (in both g rms and g peak), and the bearing status parameter for directly assessing ball bearings. A large number of configurable parameters are also available, allowing the sensor to be optimally adapted to suit the respective application. For example, this could involve the free definition of a switching signal, which can be used in parallel with IO-Link communication to provide a direct trigger for servicing the machine, allowing the entire communication topology to be bypassed. Another option is the implementation of additional counters or time measurements in the sensor to determine how long a machine can be operated above a critical vibration limit. This enables a condition-dependent servicing cycle to be immediately defined at sensor level, meaning costly monitoring of the limits in the machine control system is no longer necessary. In addition, unnecessary machine servicing based on suspicion alone is avoided, once again saving money.

Functional Safety

for Protecting Life and Health

Depending on the application, safely operating machines requires the system to be assessed according to the functional safety guidelines. This is the responsibility of the plant operator. Under certain circumstances, an external test facility must certify that the planned plant concept is considered sufficiently safe. This often requires detecting safety-critical conditions because if a rapidly rotating shaft breaks, for example, this can pose a risk to operating personnel. Large, heavy machinery such as centrifuges, pumps, and motors must be additionally protected against excessive vibration to avoid an accident occurring. Wear and friction during operation can cause transmission connections to loosen, fixtures to break, and ball bearings to be destroyed. If this risk is assessed in accordance with the existing standards, the required degree of functional safety can be achieved. This functional safety is a prerequisite for putting the machine into operation. The entire control chain (from the sensor to the control panel and motor) must function reliably. In this context, the VIM3 analog series provides a safety level up to SIL 1/PL c, while the VIM8 series provides up to SIL 2/PL d. From the user's perspective, this significantly reduces the amount of certification required, since the sensor is considered to be sufficiently safe.



VIM components



Markus Egerer, Product Manager at Pepper+Fuchs

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The Evolution of the Industrial Control Cabinet in the IIoT Era

Initially used to house a few relays, fuses, switchgear, and simple controllers, cabinets are experiencing transformational changes.

The humble control cabinet is a stalwart of any industrial machinery installation. With the advent of the IIoT, Industry 4.0 and other operational effectiveness improvements, control cabinets are the go-to locations for all the new automation components and systems. However, the machinery space required often exceeds that available. With floor space at a premium, this opens the door to several technological advancements to make the most of fixed cabinet space.

The changing world of industrial control

Modern manufacturing processes are becoming increasingly automated, with Operational Technology (OT) at the heart of this. Production processes routinely use real-time vision processing systems and machine learning neural networks to optimise throughput and asset utilisation. Robots and collaborative robot usage are also commonplace, increasing the technology needing deployment.

Factory floor space: a scarce resource

While the operational efficiency improvements of IIoT and OT can yield significant

benefits, they create implementation challenges for plant management. Floor space is always at a premium, with the priority on accommodating production assets. However, what about control equipment? Previously, each machinery item was typically allocated space for a single control cabinet. IIoT installations depend heavily on electronic systems, sensors and actuators. Cabinet and control panel designers now find themselves accommodating vision and image processing, predictive maintenance systems, networking switches and power supplies. Power conversion modules, motor drives, process logic controllers and electrical switchgear also need safely accommodating. A key trend currently gathering momentum is digital twins. Essentially, these replicate a physical production line. In addition to monitoring plant performance, they provide a digital platform for simulating and modelling different production techniques and scenarios.

More technology places further pressure on cabinet and panel space, highlighting the need for a structured approach.



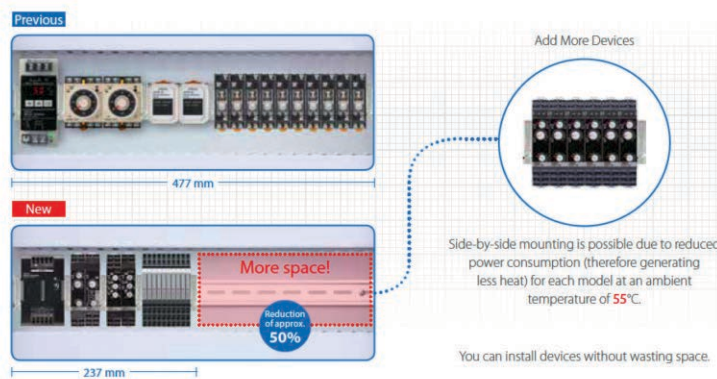
Control cabinet challenges

For industrial system architects, finding space for another item of control equipment is only one challenge. Designing a new panel requires a careful review of the types and numbers of devices to be included. Is there a logical grouping to them regarding their function or physical size? What about connectivity to other modules and controllers? Perhaps locating specific parts adjacent to each other is beneficial for reducing cabling complexity. Also, grouping devices of the same height profile helps optimise the available space.

Avoiding thermal management problems

While listing the controllers, modules, and devices, take note of the manufacturer's recommended minimum spacing distances, if quoted. A key reason for this is thermal management since heat dissipation becomes key within a tightly packed cabinet. Some units may generate more heat than others; even highly efficient power supplies, for example, might yield a few watts of heat. Several items producing small amounts of heat may create a hot spot, potentially impacting other equipment items.





Some control cabinets may require forced air cooling, further impacting space. Selecting control units specifically designed to minimise waste heat radiated and suitable for dense side-by-side mounting optimises space utilisation.

Cable management: avoid cable confusion

Cable accessibility, identification and routing are critical over a production asset's life cycle. Clear identification and convenient fixing methods will ensure rapid, efficient maintenance. Also, depending on cable diameter and type, minimum bending radii must be carefully considered - particularly important for optical cables. Routing low-voltage unshielded signal cables from an analogue sensor alongside high-power cables and motor drives, for example, may result in high-voltage transients becoming induced on the sensor inputs, causing erratic system behaviour. The recent rise in popularity of push-in cable terminations helps speed up cabling instal-

lation. Spring-loaded connectors provide a convenient, tool-free and reliable connection for solid conductors or pre-assembled cables with ferrules. Insertion forces are minimised, reducing cable stress, while maximising retention and pull-out avoidance.

Standards compliance: electrical and functional safety

Internationally recognised standards stipulate safe separation distances for high-voltage terminals, maximum leakage currents, and minimum electrical isolation voltages. For electrical circuits used in potential proximity to explosive or flammable substances, intrinsic protection regulations apply. These safety standards apply to a system as a whole, including software. Semiconductor devices used in industrial automation systems increasingly feature functional safety features. Examples of electromechanical protection devices include force guided relays.

Electromagnetic conformance and immunity (EMC/EMI)

The industrial domain is electrically noisy. High-frequency inverters, fast-switching motor drives, and high-power motors create an environment that dictates using equipment that meets relevant EMC & EMI standards. Standards such as IEC61000 and the EMC Directive 2014/30/EU also recommend minimum separation distances between network cables and power conductors. System architects and cabinet designers are advised to check the manufacturer product information and datasheets for compliance.

The future of industrial control cabinet and panel design

With many layout and design considerations, the panel builder's task is daunting. However, control cabinet suppliers now provide a comprehensive set of 3D planning tools, configurators and digital systems. 3D design resources, including 3D models of the many devices and systems placed in the cabinet, allow systems architects to visualise layout alternatives before selecting the optimum arrangement. Once a configuration is selected, the design application can model the thermal profile and electrical dimensioning. Architects can compile necessary documentation and standards compliance certifications with ease too.

Rodrigue Mao – head of product management, Distrelec

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Augmented Reality: From Alternative Solution to Competitive Advantage

How to deal with travel bans when business asks for on-site technicians to be present at customers' facilities abroad? Actini chose augmented reality and PTC's Vuforia® Chalk™ remote support solution.

Faced with the fact that its technicians were unable to travel to customers' premises in other countries, Actini leveraged augmented reality to improve its agility and drive innovation. The firm deployed the remote support solution Vuforia Chalk to ensure that its technicians could continue to work closely with customers while providing a high level of service. The aim now is to leverage this solution to develop new use cases.

The challenge:

Actini designs, manufactures and installs equipment for the agri-food and biopharma sectors. A world leader with a presence in 65 countries, the firm had to face up to the lockdown conditions imposed almost overnight by governments around the world as a result of the Covid-19 pandemic. An alternative approach had to be found quickly, because qualified technicians needed to be on site to install Actini's equipment and provide training in its use.

The solution:

Augmented reality: an effective alternative for on-site technicians

Equipment for the agri-food, cosmetics, pharma and biotech sectors

For more than 60 years, Actini has been a key player in the biotechnology and agri-food sectors thanks to its expertise in thermal transfer technologies as well as in a variety of other processes.

In the food sector, the firm also designs, manufactures, markets and installs pasteurisation and sterilisation equipment for treatment of liquid food products such as fruit purees and juices, milk and dairy products, vegetable ex-

tracts and egg products.

In the biopharmaceutical sector, it designs, manufactures, markets and installs effluent decontamination units mainly for the vaccine industry and high security research laboratories. Through its activities, Actini is an innovative French company with a resolutely international approach. The firm launched its efforts to win a share of foreign markets in 2004, when it opened an office in Thailand. It now has a presence in the USA, Canada, China and other countries.

Actini's main production facility is located at Évian in France. With the firm now conducting 90% of its business in more than 65 countries,

it is vital for Actini to maintain close relations with its customers and local representatives.

Custom-tailored equipment built with specific safety requirements in mind

Actini's Food and Pharma departments supply equipment for processing highly critical products which have to meet stringent requirements in terms of human and animal health as well as the environment. The safety challenges are therefore significant. The food products sector – for which Actini offers pasteurisation and sterilisation services – faces tough constraints related to heat-sensitive food products, active ingredients, and vegetable extracts.





The firm's customers also include vaccine manufacturers as well as highly secure laboratories which handle germs as dangerous as Ebola and Marburg virus.

To respond to the industrial challenges facing its customer base, Actini has tailor-made each time-specific piece of equipment based on treatment and security. This ability to develop unique equipment is one of Actini's key differentiators.

Maintaining operational efficiency

All equipment manufactured by Actini for sale to a customer undergoes two series of tests. Following completion of the equipment manufacturing process, the customer's teams attend factory acceptance testing (FAT) to verify that the equipment meets their specifications. A second series of tests is then carried out at the customer's premises, to validate receipt of the equipment and its connection to the site environment.

When travel came to a grinding halt because of Covid-19, Actini was faced with a major difficulty. The firm was no longer able to dispatch its technicians to customer sites, and neither were customers able to send their representatives to the Évian facility for factory acceptance tests. The situation was difficult, because the company was no longer able to conduct installation and commissioning activities at manufacturers' premises.

It was vital for Actini to find an alternative so-

lution to enable its technicians – who were no longer able to be physically present on site – to continue to provide preventive and corrective maintenance services for customers.

Augmented reality as remote customer support solution

For Actini, augmented reality (AR) rapidly emerged as the solution to the travel ban, enabling service for customers to be maintained, while also delivering a high level of satisfaction. Actini had already identified PTC's Vuforia Chalk solution before the health crisis. At the time, it had envisioned using the Chalk for maintenance and troubleshooting purposes. With this solution, an after-sales 4.0 approach became possible.

"Actini had already identified PTC's Vuforia Chalk solution before the health crisis. At the time, it had envisioned using Chalk for maintenance and troubleshooting purposes, as part of an after-sales 4.0 approach.

However, the travel ban forced Actini to expedite their rollout of Chalk to meet commitments to a customer who was scheduled to have machines installed during the second lockdown. The only option was to provide support remotely.

Actini benefited from the unique offer launched by PTC during the Covid-19 pandemic, aimed

at encouraging the use of augmented reality through its remote assistance solution. Keen to support companies during this difficult period, PTC offered Vuforia Chalk free of charge. The solution was an obvious choice: thanks to the fact that it is operational out-of-the-box, Actini was able to test it in advance. Other benefits included its compatibility with hands-free wearable devices from RealWear.

The solution's real-time audio/video sharing capability allows a technician wearing a hands-free headset to connect with customers and guide them through the testing process, irrespective of their location. Actini's technicians have the ability to annotate the customer's physical environment and easily guide them step by step on tasks to be carried out with little to no ambiguity. The technician is also able to use Vuforia Chalk from a mobile device, tablet or desktop.

The benefits of AR: operational efficiency, financial gains, brand image, and more. Vuforia Chalk has boosted Actini's operational efficiency while cutting travel costs and enabling the firm to demonstrate its responsiveness and agility.

Operational efficiency

Vuforia Chalk offers genuine interactivity. "This is particularly true during troubleshooting op-





erations, or during training, which can be tiresome and time-consuming without AR," says Alexandre Baud, Customer Service Manager at Actini. This capacity for remote intervention also leads to more efficient management of internal resources, with faster diagnostics and problem-solving, as well as time savings (particularly on travel) and increased availability.

Financial savings

In addition to providing effective customer support without sending technicians to the other end of the world, Vuforia Chalk delivers financial savings as well as substantial time savings. "Troubleshooting via Chalk gives a time saving of between 20% and 30% compared with a conventional video conference," says Alexandre Baud. The ability to identify the equipment in which a problem has been encountered, and point out the part to be repaired, while noting down practical information at the same time, removes many potential sources of ambiguity. Participants understand each other better, despite the language barrier, because they can see the same images at the same time.

Repeated travel by technical teams for the purpose of carrying out equipment integration and troubleshooting costs Actini 400,000 Euro per year. The use of augmented remote assistance allows the firm to reduce these costs.

Responsiveness and agility

Using the Vuforia Chalk solution also brings a competitive advantage in terms of the company's brand image, by once again demonstrating Actini's agility and innovation to its customers.

Before using the solution with a customer, Actini conducted a trial at its own premises. The test was passed with flying colours; Vuforia Chalk was able to function without issue, despite the low data rate of the connection available to transfer images and sound.

The solution is easy to use despite the state-of-the-art technology behind it. When customers need support or troubleshooting, Actini's specialists point out, in real-time, the action that needs to be carried out.

This ability to respond to needs in real time at any location also allows the firm to work just as closely with customers as a competitor located in the same geographical area as the customers themselves. Actini is able to carry out work anywhere, with unmatched response times.

New use cases

Despite the fact that the Vuforia Chalk solution and augmented reality have provided tremendous assistance during the health crisis, Actini is not about to completely overturn its customer relations. Technicians will continue to travel to customers' premises, as international exchanges return to normal. The com-

pany is convinced that physical proximity is a key component of customer relations. In fact, Actini continued to send out its technicians to work with customers during the pandemic whenever possible. Actini is keen to capitalise on its experience with Vuforia Chalk, however, and is seriously considering developing new use cases. The solution is perfectly adapted to projects of a low level of criticality, particularly troubleshooting phases. The benefits of Vuforia Chalk are unmatched in terms of responsiveness and interactivity. "We aim to incorporate AR systematically into the way we handle support requests," explains Alexandre Baud.

Thanks to its ability to ensure seamless mutual understanding, AR will also be used for acceptance and installation of laboratory units. "Actini is in contact with lab specialists. During troubleshooting sessions, we will be able to show them what they need to assemble or disassemble. They simply have to observe our actions to understand what has to be done. The solution is genuinely suitable for a very wide range of possible applications," adds Alexandre Baud. It will also be useful to equip representatives already present in customers' countries with the solution, and with RealWear assisted reality devices, "so that they can be our eyes and ears," continues Alexandre Baud.

The software can additionally be used for external communications, allowing virtual tours of the factory, highlighting the different phases of equipment manufacturing.

Internally, the use of augmented reality is also a key factor in employee retention. "For our employees – who have an average age of 34 – it's a real opportunity to work with cutting-edge technology on a day-to-day basis," concludes Alexandre Baud.

The health crisis, which could have had an adverse impact on Actini, actually turned into a great opportunity. Thanks to Vuforia Chalk and augmented reality, the firm was able to avoid having technicians travel to customers' premises, while maintaining high levels of service quality. The experience also revealed that AR offers unexpected benefits for competitive differentiation and employee experiences.

Actini is now aiming to develop new use cases to enable their employees and customers to benefit fully from this remote support technology.

►► 62304 at www.ien.eu



1200W AC/DC Power Supply

Comes with adjustable 'near to zero' output voltage and current for conduction cooling applications

Powerbox (PRBX) has announced the release of the 1200W rated OFI1200A AC/DC power supply for industrial applications. Optimized for conduction cooling, the OFI1200A offers high performance levels across a baseplate temperature range of -40 to +95°C without the use of a fan. The power supply operates with a wide universal input range from 85 to 305VAC with power factor correction (PFC). Covering a large range of applications, its output voltage and current can be adjusted from near zero to the maximum allowed for each model.

Optimal heat transfer

The PRBX OFI1200A has been designed to guarantee optimal heat transfer from the dissipating components to the baseplate, delivering a high level of performance within an operating temperature of -40 to +95 degree centigrade at baseplate. Depending on the assembly method and the overall cooling conditions, a derating may apply as specified in the technical documentation.

The OFI1200A is available in three versions of single output DC voltage, 12V/84A, 28V/43A and 48V/25A. Using a high efficiency topology, the typical efficiency for the 48V output unit at 230VAC input is an excellent 92%.

Adjusting the output voltage and/or current from the maximum allowed to near zero

To make it possible for customers to precisely adjust the voltage and current to their application, the OFI1200A offers two analog inputs, VTRM and ITRM. Using those functions, the output voltage and current can be adjusted from near zero up to the maximum specified per model.

The extended trimming and control function simplifies the utilization of the power supply in constant voltage (CV) or constant current (CC) mode, without adding external circuitry.

For applications requiring redundancy or higher power, it is possible to connect up to nine units in parallel, delivering a total power level of up to 9,720W in conduction cooling mode.

For safety, the OFI1200A has an IN/OUT isolation of 3,000VAC and IN/FG of 2,000VAC. Output isolation to FG is 500VAC. The power supply includes over current protection with auto recovery, over voltage and over temperature protection.

Easy access to auxiliary functions via on board connectors, namely: Remote Control, Output Voltage Sensing, Power Good, VTRM, ITRM

The OFI1200A has passed shock and vibration testing as specified in MIL-STD-810H. In that respect the products have been tested to levels far above normal operating conditions and are designed to sustain high, 20G



level shocks.

In its open frame format, the OFI1200A measures 142 x 39 x 260mm (5.59 x 1.54 x 10.36 inches) and weighs 1.2kg max. An optional metal cover is available, adding just 1mm to the height and 200 grams to the weight (Option-N).

The OFI1200A series has a full three-year warranty and conforms to the European RoHS, REACH and Low Voltage Directives. The product carries the CE, UKCA and cURus markings.

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ODVA Accelerates Innovation at its 21st Annual Meeting of Members

ODVA held its 21st Annual Meeting of Members in San Diego, California, USA on March 10, 2022. With over 85 industry professionals from 30 companies in attendance, the meeting capped a week of technical sessions.

ODVA held its 21st Annual Meeting of Members in San Diego, California, USA on March 10, 2022. With over 85 industry professionals from 30 companies in attendance, highlights of the Annual Meeting included a keynote on the future of the field instrumentation layer in process automation by Paul R. Maurath, PhD, Technical Director Process Automation, The Procter & Gamble Company; perspectives from the ARC Advisory Group analyst Harry Forbes on the next decade of industrial automation; and an update from the organization's leadership on both the accomplishments and future initiatives for ODVA as a whole. The ability to meet in person, with appropriate safety precautions, helped to accelerate the diffusion of new ideas as well as to drive progress on existing initiatives to further enhance EtherNet/IP.

The Annual Meeting capped a week of technical sessions offered through ODVA's 2022 Industry Conference. The latest developments in ODVA technologies and applications were highlighted at the conference, including IEC61784-3 Edition

4 certification of CIP Safety™, xDSTM device description development, Single Pair Ethernet and Ethernet-APL advancements, TSN for EtherNet/IP preparation, continued CIP Security™ expansion with the CIPTM Authorization Profile, and CIP to OPC UA Cloud connectivity progress.

ODVA will announce the dates and location for its 2023 Industry Conference & 22nd Annual Meeting in Q4 2022

ODVA has been continuously improving the EtherNet/IP network to stay ahead of critical trends such as Industry 4.0, IIoT, safety, security, and interoperability. Recent achievements include the extension of EtherNet/IP networks to in-cabinet resource-constrained devices such as contactors and push buttons. To align, CIP Security has also been streamlined for resource-constrained devices as an essential step in securing the edge. Additionally, CIP Security has been updated to support user level authentication with a narrow trust domain by user and role. ODVA has also launched a joint working group with the OPC



Foundation to develop an OPC UA companion specification to the Common Industrial Protocol (CIP). Furthermore, EtherNet/IP networks can now support the Ethernet-APL physical layer for process automation. To give end users the greatest flexibility with their installations, ODVA has also entered into separate agreements to further integrate FDT and FDI technologies into EtherNet/IP. Additional device description work on the next generation xDS for CIP devices continues to move forward as well.

With the start of ODVA's 22nd term, the expansion of the EtherNet/IP technology ecosystem will continue through both innovation and key partnerships to improve the experience of end users as well as to prepare for a future driven by Industry 4.0 and IIoT, said Dr. Al Beydoun, President and Executive Director at ODVA. ODVA's distinguished leadership team has been critical to the accelerated growth and expansion of EtherNet/IP to meet the needs of industry, and the organization thanks them for their stewardship.

To download the technical papers and presentations from ODVA's Industry Conference and Annual Meetings, please visit: <https://www.odva.org/news-events/industry-conference/library-of-proceedings/>.

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HMI Solutions for Extreme Environments

Input systems that are used in highly specialized HMI applications under harsh environmental conditions require extensive experience in development and design.

Schurter. Freezing cold, summer heat or thunderstorms - in extreme weather conditions, many input systems quickly reach their limits. Increased protection against vandalism also plays an important role in the use of robust input systems. In addition, the high demands on hygiene pose a further requirement. Therefore, input systems that are used in highly specialized HMI applications under harsh environmental conditions require extensive experience in development and design. Applications in demanding environments always require special solutions. Input systems are used with appropriately qualified materials that guarantee maximum reliability in order to meet all requirements. These input systems are manufactured using state-of-the-art production technology and meet the highest industrial and medical standards.

Robust and durable for harsh environments

Touch panels have proven their importance as an interface between man and machine in many applications for years. For new developments in the industrial sector, they are the most important operating concept. For extreme requirements, robust and durable input systems are used. When selecting the appropriate touch technology and developing and designing such HMI touch panels, the required specifications of the application must be taken into account.



Increased requirements

In addition to a visually appealing and easy-to-install design, the requirements for touch panels in industry are above all durability and robustness. Industrial applications demand scratch-resistant and mirror-free surfaces. They also have to withstand high stresses caused by water jets, steam and dirt in order to maintain tightness against aggressive harmful gases. The complete surface of the input system must be resistant to oil, solvents and aggressive chemicals and meet the IP67 protection class. In addition, perfect operation with gloves must be

Model **GY** series

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Model GY series are absolute type, high accuracy and non-contact linear sensors employing magnetostrictive phenomena. Compact, mini series, GYcRS series which enables alarm, velocity output, Electronic all-in-one GYSE series, φ25x22.5mm profile GYKM series, GYDC-05 controller presenting 1μm resolution, all our line-up can answer to your requirements in variety.

Main Specifications		Typical Applications	
Stroke	max 7500mm	<ul style="list-style-type: none"> • as positioning sensor for advanced industrial machinery. • as displacement transducer that can be installed inside hydraulic/pneumatic cylinders. • as a high linearity liquid level detector for a wide range of applications. 	
Linearity	less than 0.025%FS		
Resolution	less than 0.005%FS		
Output	Analog/digital		
Allowable pressure	max 350bar(probe)		

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HMI solution for harsh environments

guaranteed. A continuously closed front structure without soiled edges is required. This design facilitates cleaning of the touch panels, which is of great importance in the food industry, for example. In process visualisation, a reflection-free surface with optimal image brilliance and sharpness is primarily required. All components of the input system must meet EMC conformity. In the field of medical technology, special challenges arise for the operating units with regard to lighting options, salt water resistance, EMC shielding, antimicrobial surfaces and chemical resistance. Outdoor applications require sunlight-readable touch displays with increased UV resistance and weather-resistant materials. The input systems must withstand extreme temperature changes and the influence of humidity and water. An extended temperature range of -40 to +85°C is required.

Customized for all extremes

To meet these diverse specifications, an HMI touch panel design that meets the individual requirements is crucial.



Robust and durable outdoor HMI solution

Industrial applications

Capacitive PCAP touch technology is a mature technology designed to meet industrial requirements comprehensively. Capacitive multi-touch film sensors are laminated optically which is highly transparent behind printed front glasses. Glass-based sensors are bonded with special materials. Robustness against mechanical stress is guaranteed by the selection of hardened glasses. In combination with a laminated glass panel laminated on the back, vandal-proof touch panels for public applications can be realized. For touch panels in hazardous areas, special sensors have been developed for use behind 10 mm thick front glass. For use in food production, splinter-free front materials are used. In addition to PMMA, polymer composite materials are available as unbreakable front material with extreme impact resistance with IK 10 specification. Furthermore, for such applications, the front glasses are laminated with a shatter-proof film. EMC conformity is fully guaranteed by the use of pre-qualified controller systems in accordance with the industry standard. The front glass is integrated all around by means of a chemical-resistant gap encapsulation. Front glasses with an anti-glare surface reduce reflections and are resistant to mechanical and chemical influences. Operating temperatures from -40 to +85°C are made possible by the selection of qualified materials.

Medical applications

PCAP technology is qualified for medical applications and meets the requirements for water and saltwater resistance, EMC immunity, glove operability, antimicrobial surfaces and chemical resistance. For optimal visualisation of the screen content, the display is integrated with optical bonding. The integration of the PCAP sensors behind a printed cover glass enables an attractive design in customised colours, a variety of backlighting options and an easy-to-clean, closed surface. The structure of the cover glass is optimally adapted to requirements such as antireflection, antimicrobial effect, pleasant haptics or dirt repellency. Antimicrobial and antiviral mechanisms based on silver ion particles are coated onto the surface of the cover glass in a special process. This coating is stable over the entire lifetime of the application.



The front-integrated cover glass is sealed around the circumference with a chemical-resistant gap seal. In addition to the sensor, the most important component of a PCAP system for medical applications is a functionally reliable touch controller. EMC influences occurring in the environment of the application, e.g. in HF surgical devices, are reliably eliminated by special firmware algorithms. For applications in radiation-critical areas, such as MRI devices, an additional metal mesh foil is integrated into the sensor structure to shield the radiation. Furthermore, resistive touchscreen solutions in special designs such as glassfilm-glass (GFG) or low reflection (LR - sunlight readable) and as resistive multitouch are used for mobile medical devices for outdoor use.

A combination with capacitive switch elements (CapKeys) such as buttons, sliders and wheels or haptic membrane switches can be realized with all touch technologies.

For example, the combination or use of membrane switches in medical applications enables solutions with backlighting or in night design without glare or overdriving of the lighting. Furthermore, key point and key surface illumination as well as symbol printing in the so-called disappearing effect (black panel) are available. EMC shielding is integrated by means of an additionally printed foil that is laminated into the layer structure of the keypad and contacted to the electronics. The design and integration of chemically resistant membrane switches is carried out without soiled edges and facilitates the cleaning of the application.

Outdoor applications

For extreme outdoor applications, resistive GFG (glass-film-glass) touch screen technology is used in addition to specially developed PCAP sensors. Reliable function in snow and ice as well as daily sunlight UV radiation can be realized with this technology. In combination with the Low Reflective (LR) design, the reflection rate is minimized to 1.5%. This makes the display content of the application optimally readable even in direct sunlight. If the application requires multi-touch functionality, the resistive multitouch (RMT) design is available. This RMT can be shielded with a metal mesh film on the front for medical applications.

Optical bonding advantages

An optically highly transparent bonding (optical bonding) of the displays with the front glass and sensor results in excellent readability by preventing reflections and increases the mechanical robustness of the panel. By using this technique, an improvement in the viewing angle based on reduction of the reflections is being created, which is particularly used in medical applications. Optical bonding increases the shock resistance and vibration resistance of the touch panel. The filling of the air gap prevents condensation and the penetration of dirt and dust particles. UV-stable optical bonding materials are used. The constant distance in the structure also improves the touch performance of the PCAP sensors. Optical bonding is carried out in liquid or dry bonding processes. Qualified, UV-resistant and silicone-free materials are available according to the requirements of the application.

The right HMI solution for demanding applications with extreme operating conditions

Especially for applications with extreme operating conditions, the re-



Outdoor HMI solution

alization of an optimal solution requires a high degree of know-how and experience. All specifications and their special requirements in the application must be verified and qualified. Based on our know-how, we find the optimal solution even for the most demanding applications and areas. With our experience, we develop and design the perfect input system together with you, for use under harsh and demanding conditions.

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Communication Solutions for Battery Energy Storage Systems

Battery Energy Storage Systems (BESS) require communication capabilities to connect to batteries and peripheral components, communicate with the power grid, monitor systems remotely and much more.

HMS Industrial Networks. Battery Energy Storage Systems (BESS) may be one of the keys to solve the energy crisis and make the world more sustainable. Since green energy sources such as wind and solar are not always available, large battery parks can make it possible to store the energy to use when there is less sun or wind.

BESS need to communicate

Battery Energy Storage Systems are made up of battery cells which are combined into battery packs which can then be combined into containers which in turn can make up battery parks the size of several football fields. The systems can use new or recycled batteries and combine many different components. However, these large battery parks need a lot of communication capabilities in order to work. HMS now presents a comprehensive package of communication solutions catered for this application area.



Error prevention and networking of CAN-based devices

Error prevention and networking of CAN-based devices

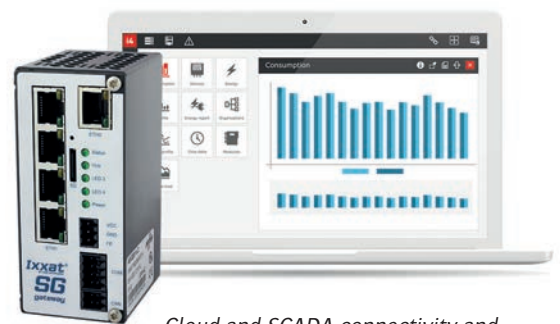
Since the battery market has been spearheaded by the car industry, CAN is the communication standard of choice in many systems. Here, HMS offers an extensive portfolio of communication solutions via the Ixxat brand – for PC connection, networking, line extension, galvanic isolation and more. In networking, the protection of components is crucial, both from external sources (like lightning strikes) and from system-related issues (AC/DC noise). Device protection is a must to avoid damage.

Networking gateways

Battery Energy Storage Systems often combine a variety of different equipment from different industries within a single application – batteries, BMS, PLCs, fire detection units or air conditioning. To combine different equipment, it is necessary to interconnect various protocols and network standards. CAN, Modbus, BACnet, KNX and other protocols can be easily linked via intelligent gateways from HMS, which handle the all-important data exchange while also enabling centralized control. In addition, these gateways can selectively filter, map and, if necessary, manipulate the data in order to realize the best possible data exchange.

Cloud/SCADA connectivity and remote access

Intelligent networking is also required in order to connect to cloud solutions or SCADA systems. This connection can be made by us-



Cloud and SCADA connectivity and remote access

ing SG (Smart Grid) gateways from HMS that support both energy and industrial fieldbus protocols, as well as protocols required for cloud connection. The SG gateways enable centralized control as well as remote access for predictive maintenance, logging or data visualization using the i4SCADA® solution from the HMS-owned company WEBfactory®. The SG gateways also provide robust cybersecurity features, such as firewall, OpenVPN®, TLS encryption and user management. These protective measures are indispensable to protect against cyber-attacks.

“We see a rapidly growing demand for communication solutions in Battery Energy Storage Systems as society as a whole is turning to more sustainable energy sources such as wind and solar,” says Alexander Hess, General Manager at HMS Business Unit Ixxat. “Communication is needed to get BESS systems to work and HMS offers an extensive portfolio of industrial communication solutions to solve the communication issues at hand in these systems.”

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Industry 4.0 Panel PCs

Noya Bilgisayar presents its EPC series available in 5 different display sizes and 3 different CPU options

Noya Bilgisayar, a 28-years-old Turkish IPC manufacturer based in Istanbul, presents its new Panel PC series launched in March 2019. Until then thousands of units from this new Panel PCs have been deployed on digital transformation and Industry 4.0 projects of Turkey's biggest factories in various sectors, enabling Noya to become Turkey's first Panel PC manufacturer. When the first EPC model EPC-415 has been announced in March 2019, only 2 models were

available. Today, EPC Series Panel PC family comprises 5 different display sizes and 3 different CPU options to provide a wide range of hardware solution to Industry 4.0, IoT, Digital Transformation and Smart Factory applications.

Wide Range of Display Size and CPU Options

EPC Series Panel PC product family is offering 10.1", 15", 18.5", 15.6" and 21.5" display sizes to cover most of the applications on fields that require different data content on displays. In addition to display size options, EPC series has Intel Celeron J1900 embedded processor for entry level applications and Intel's 8th Generation Mobile Core Processors i3-8145U and i5-8265U for projects which demand high processor performance. These comprehensive options of EPC series provide a reliable and cost-effective hardware solution for all performance levels.

High Sensitivity and Durable PCAP Touch Screen

Each EPC Series Panel PC is equipped with specially designed Projected Capacitive Touch Sensor, having 4 mm total thickness to provide high durability and sensitivity during operation.



All Projected Capacitive sensors of EPC Series come with glove support to ensure seamless and secure touch screen experience at all environments. The design concept of display frame for each EPC Panel PC has a zero-bezel surface which provides real IP65 sealing level from front with its CNC-based silicone adhesive application process instead of dual sided adhesive tape. Zero bezel surface also provides easy cleaning of display surface which is important in dust intensive environments.

Rich I/O for Flexibility and Functionality

All EPC models has various I/O ports including 4xRS232, 1xRS485, 2xGigabit LANs, 2x USB 2.0, 4x USB 3.0, and digital I/O varying on different models as standard feature to support various applications and flexibility on deployments. A remote ON/OFF switch is also providing easy operation in case device is panel mounted on a housing.

Stylish and Rugged Aluminum Chassis

While EPC-4XX/5XX series have aluminum die cast chassis, EPC-6XX/7XX series has unique aluminum extrusion chassis with an esthetic

design and rugged structure. Robust chassis of EPC series ensure seamless operation on harsh industrial environments without any interruption.

Easy Integration with Flexible Mounting Options

Besides the enhanced design and technical features, each EPC Panel PC offers flexible mounting and stand options to support different applications at field. Special panel mount fixtures which design for EPC Series

and a silicon gasket around front frame provide a secure and sealed panel mount option on any customized housings. In addition, optional desk-top stand, kiosk type floor stand and wall mount bracket provide easy integration in any location.

Tested and Certified for Reliability and Safety

The EPC Series Panel PCs have been tested by independent laboratories within the scope of relevant EMC and LVD Directives to deliver compliance with the harmonized standards of the European Union. Besides of laboratory tests, Noya has a 100% Burn-in test procedure for all EPC Series product before shipment to minimize the failure rate during deployments.

Noya Bilgisayar continues its operations in its 2,000 m2 facilities including offices, warehouse, assembly, test and technical service departments in Istanbul, Turkey. All these departments carry out their processes on their integrated ERP software platform. The ISO9001:2015 strengthened infrastructure is aimed to ensure products and services are always delivered to customers with consistent quality.

►► 62283 at www.ien.eu



LABEL PRINTER

Print Pre-sized Labels from your Phone



Brady Corporation's new M211 Label Printer is a lightweight, sturdy and wearable device that prints both presized and continuous labels to identify cables and components. It can create even complex labels that

can all be designed, printed and previewed from the phone. The M211 can easily be clipped to any belt. It connects seamlessly to smartphones via Bluetooth and is driven by Brady's Express Labels App. The app allows to quickly design, preview and print labels and to integrate data from spreadsheets. Designs can be saved and shared, either in the field or at the office. The M211 has the ability to print on both continuous and presized labels. Brady offers M211 users 90+ different label cartridges to choose from. These include general purpose and dedicated labels, designed for reliability in specific applications. Brady has technical data sheets with label test results that evaluate adhesion to various types of flat and curved surfaces, and label print resistance to humidity, abrasion, heat, cold, weathering and other influences. The new M211 Label Printer prints up to 300 labels on a single battery charge. Yet the system weighs only 0.5 kg, and has a compact design to make it extremely wearable. Next to its ability to survive almost any job site, the M211 features 'drop-lock-print' label cartridges designed for swift 'on-the-job' consumable switching.

▶▶ 62295 at www.ien.eu

ADVANCED SILICON CARBIDE (SiC) CHIP

Enhanced features for highest system efficiency



Infineon Technologies AG introduces a new CoolSiC™ technology: the CoolSiC™ MOSFET 1200 V M1H. The advanced silicon carbide (SiC) chip will be implemented in a widely extended portfolio using the popular Easy module family, along with discrete packages using .XT interconnect technology. The M1H chip offers high flexibility and is suitable for solar energy systems, such as inverters, that have to meet peak

demand. The chip is also ideal for applications such as fast EV charging, energy storage systems and other industrial applications. The latest advancements of the CoolSiC base technology enable a significantly larger gate operation window that improves the on-resistance for a given die size. Simultaneously, the larger gate operation window provides a high robustness against driver- and layout-related voltage peaks at the gate, without any restrictions even at higher switching frequencies. Along with the M1H chip technology also the related housings have been adopted in technology and package variants to enable higher power densities and more options for design engineers to improve on application performance.

▶▶ 62307 at www.ien.eu

WEATHER HAZARD INFORMATION SYSTEM

For winter road maintenance



Vaisala announced the launch of Vaisala Wx Horizon Premium, the latest subscription tier of its weather hazard information system for winter road maintenance organizations.

Vaisala's new Ground Cast Sensor is automatically integrated to Wx Horizon Premium which fuses local observation data with two of Vaisala's industry-leading modelling systems: its best-in-class road weather model and a weather forecasting system that improves global weather forecasts specifically designed for use in transportation. Wx Horizon Premium and Ground Cast Sensor enable decision-makers to plan, mobilize, treat, and monitor the effectiveness of winter maintenance actions with confidence. Wx Horizon Premium brings affordable, proactive winter treatment planning to all, enabling 72-hour pavement forecast along with 10-day atmospheric forecasting; built-in alerting and automated notification services remove the burden of continuous monitoring; user-defined virtual forecast points matched to operational needs; and seamless integration with Vaisala's road sensors. The new Ground Cast Sensor makes additional world-class observations more feasible and enables enhanced point forecasts as part of the Wx Horizon Premium subscription. It is an easy way to get key road weather measurements from critical locations that have not been covered before.

▶▶ 62291 at www.ien.eu

LARGE OPTICAL WINDOWS

For military sensing applications



For over 50 years, **Optical Surfaces Ltd** has been working with materials including fused silica, BK-7 and Germanium to produce defence grade windows up to 600mm in diameter. Large diameter optical windows for defence applications

are typically used to provide environmental protection for sensitive internal sensing systems. To transmit light with minimal disruption, these large diameter optical windows must exhibit low surface roughness, minimal transmitted wavefront errors, and high transmission at the desired operational wavelength range. Benefiting from an ultra-stable production environment and proprietary polishing technique, the large diameter optical windows have typical wavefront error of up to $\lambda/20$ p-v, surface roughness of less than 10 Å rms and surface finish of 40/20 to 10/5 scratch / dig. Dr Aris Kouris, Sales Director of Optical Surfaces Ltd commented "To enable us to quality test large diameter optical windows - we developed a 600mm Fizeau interferometer. This is a capability that only a few optical testing and manufacturing centres around the world possess. Housed in an ultra-stable testing environment, this interferometric set-up allows direct qualification of large diameter optical windows by testing them directly over their complete aperture without the need to use time-consuming combination methods".

▶▶ 62298 at www.ien.eu



LONG-WAVE INFRARED (LWIR) CAMERAS

Proposed with CameraLink™ or GigE interfaces



Ceres V 640 and Ceres V 1280 have been announced by **Xenics** as new high-performance solutions for long-wave infrared (LWIR) cameras. The Ceres V family complements the previously introduced

Ceres T family expanding the possible options for thermal imaging and thermographic applications, such as process monitoring, industrial machine vision and medical applications. These high-performance cameras also fit scientific uses. In addition, the full LWIR industrial camera comes with SXGA resolution (1280x1024 pixels). The Ceres V product family is based on 12 μ m pitch uncooled microbolometer sensors. It is proposed with CameraLink™ or GigE. Compatibility is also ensured from a control/command and electrical interface perspective with Ceres T products. These products are also GenICam™ compliant which makes them very easy to use in industrial environments. Users will benefit from the flexibility of Ceres V and will be able to change optics according to their needs among 5 Horizontal Field of View (HFoV) possibilities: 12°, 16°, 25°, 48° or 71°. Xenics' user-friendly Xeneth GUI and its GenICam™ SDK complete the offer so that customers can spare time in integrating the camera and really focus on their added values: data analysis and process monitoring.

▶▶ 62302 at www.ien.eu

CHERRY-PICKING FROM ACOUSTIX RACKS

Quickly unlock the 96 tubes in a rack



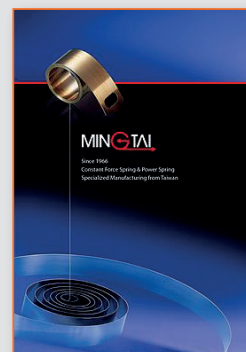
Acoustix is a small sample tube with a screw cap which has been widely adopted for storage of novel compounds in solution held in compound storage facilities. However, many automated tube selectors struggle to effectively handle Acoustix tubes because of their small size and that they are locked into racks that are suspended upside down in the Labcyte® Echo® acoustic dispenser. The Acoustix adaptor for Mohawk reduces the effective height of the Mohawk tube selector lid by introducing a clear acrylic plate at a lower height which easily prevents Acoustix tubes from exiting the inverted rack. This both simplifies and improves the speed of Acoustix tube picking on the Mohawk. In addition, as Acoustix tubes "lock" into their racks, **Ziath** developed a "release plate" that can quickly and easily unlock all ninety-six tubes in a rack, ready for picking. Using a new Acoustix software plug-in, in combination with the new adapter and release plate, fast and easy single tube cherry-picking and reformatting from Acoustix racks with automatic confirmation of pick list integrity is now possible. Designed to enable picking of frozen or thawed sample tubes from 96-position racks, the Mohawk semi-automated needs no set up or calibration. Tubes can be picked from a single rack, or a picklist can be set up to select tubes across multiple racks. Pick list operations are normally started from reading the 1D code on a rack placed onto the Mohawk, but manual selection is also possible.

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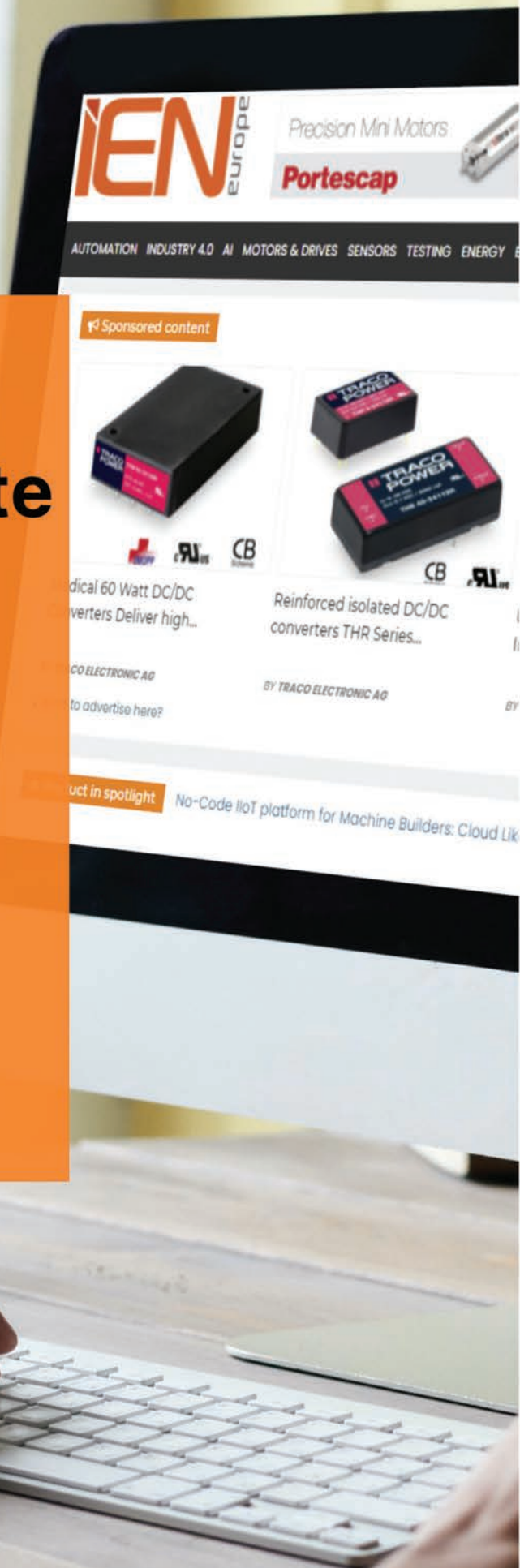
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Turn data into actionable insights

Increase availability, improve quality, and enhance energy management with easy to implement IIoT solutions from Emerson. From measuring critical parameters in your production process, to detecting leaks, to improving predictive maintenance, intelligent pneumatics – such as the AVENTICS™ AF2 series flow sensor – provide actionable insights that enhance decision-making and help optimize the performance of your manufacturing operations.



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