

**What's New in**

# PROCESSING

**Instrumentation, Process Automation, Chemical, Electrical, Analytical**

## INDUSTRIAL WEIGHING SOLUTIONS.

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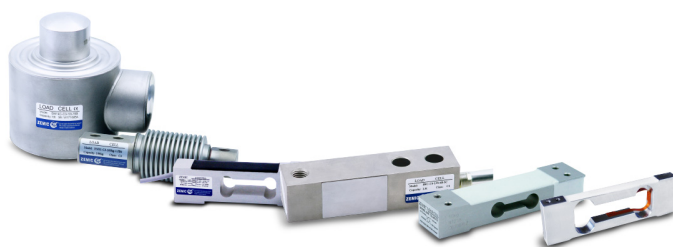


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**What's New in Publishing**  
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## Control Your Application Using Mass/Force



Load cells and force sensors have evolved greatly over time and enhanced most automation and processing projects. One of the most frequently asked questions we get is – “which load cell should I use for my application?”

**RICHTER SCALE** has been the South African home for Zemic load cells and force transducers since 2001.

We hold a large stock of these types of Zemic loadcells :

**Single Point load cells:** used in small to medium platform scales with platform sizes of 200x200mm up to 1200x1200 mm.

**Shear Beam load cells:** widely used in low profile scale and process applications, available in capacities from 100kg up to 50t!

**Dual Shear Beam load cells:** used in weighbridges, tank and hopper / bin applications.

**S-type load cells:** used in tension applications.

**Compression load cells:** used in weighbridges, large platform scales, tank and hopper scales.

**Ring Torsion load cells:** used in high accuracy hoppers, silo's, platforms and pallet scales.

**Onboard load cells:** used for onboard weighing systems on trucks, tractors and other vehicles.

**Weighpads:** portable weighpads for the weighing of vehicles and trucks and to measure the centre of gravity of planes.

**Specials:** all kind of special sensors

**Mounting accessories** for all types of load cells

The next most crucial aspect is using the loadcells correctly to get the most out of your project :

Some fundamental “Do’s and Don’ts” when using and installing load cells.

### Do’s

- Select the correct load cell for the job
- Ensure as high a live weight dead/weight ratio as possible
- Ensure mounting surfaces are flat and level and solid with no deflection or weakness.
- Use dummy cells or lifting bolts during installation
- Use overload protection if appropriate to the system
- Protect cables from mechanical damage (rats are very partial to load cell cable).
- Use flexible couplings and/or horizontal pipe work where possible
- Avoid differential heating of the cells
- Take into account the Centre of Gravity of the system
- Protect outside systems from lightning strikes
- Check the recommended torque on fixation in Nm for your load cell

## Don'ts

- Select load cells on a cost basis only
- Mount load cells so that disproportionate loading occurs
- Secure pipes or ladders into the ground if they are attached to the weigh system
- Weld in close proximity of cells
- Forget the effect of wind on outdoor vessels

We stock load cells in hundreds of different combinations with a choice of materials (alloy steel, aluminium, stainless steel), IP Rating (IP66, 67, 68, 69) and capacities (from a few hundred grams up to hundreds of tons).

All with factory direct guarantees which grey imports/copies will not offer you.

Once your loadcells are installed, instrumentation that is both powerful and expandable is the final piece of the puzzle in your application. Our indicator and transmitter units are all made in Europe with solid backups and spares.

**Our four most popular models for automation and process control are :**

### ECI indicator

- Panel mount
- Up to 800hz data output
- GResolver filtering for noising or unstable environments - unrivalled in the field
- Standard output : RS232
- Expandable Output options : RS485 modbus, ethernet, Profibus, Profinet, Devicenet, 0-10/4-20mA, relay control cards.
- Standard USB logging



### SMART 2 indicator

- Panel mount
- IP66
- Standard Output options : RS232, 0-10/4-20mA, 2 relays, Bluetooth or Wifi



### LCA-D indicator

- Wall mount
- IP66
- Standard Output options : RS232/RS485, 0-10/4-20mA, 2 relays.



### TR-3 transmitter

- No display
- Din Rail mount
- Standard Output options : 16 bit 0-10/4-20mA, 1 relays.
- Optional : RS232

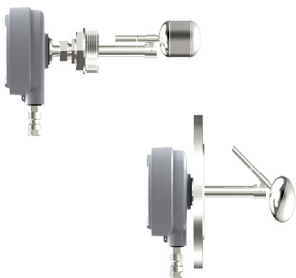
Our sales and advice team has a combined experienced in weighing and force measurement of almost 90 years. Let us help you choose which weighing components to use in your next system.

**Donovan Pye**

**Richter Scale**

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## New Float Switch Combines Simple Mounting And High Reliability



**A** SSTech has added a new horizontal design of float switch to its Jumo range that is simple to mount. Offering a high degree of reliability, the Jumo NESOS series includes devices for point level measurement such as floats and reed contact.

There are also types for level measurement such as float and reed chain. The device is particularly easy to mount and suits a wide range of industry applications.

Due to the horizontal design, the switch can be easily mounted onto the side walls of tanks and containers for measuring the respective point level (Min/Max level).

This measurement is independent of many media properties, pressure conditions and container geometries. It provides up to 2 switching contacts for redundant level measurement which does not require auxiliary power supply.

NESOS R40 LSH is available with a guide tube length of up to 1 meter. The device can be operated at temperatures from -52 to +240 °C and process pressures of up to 88 bar.

The device is available in protection classes IP65 to IP68 and optionally with ATEX as well as IECx approval for use in Zone 0, and can guarantee a particularly high level of process reliability.

A version with a temperature probe/switch is also part of the product range. As a result, no additional tank or container opening is required for temperature measurement.

The float switch is individually adaptable to many applications in the chemical and petrochemical industries as well as in mechanical engineering and container construction.

**Anastas Schnippenkotter**

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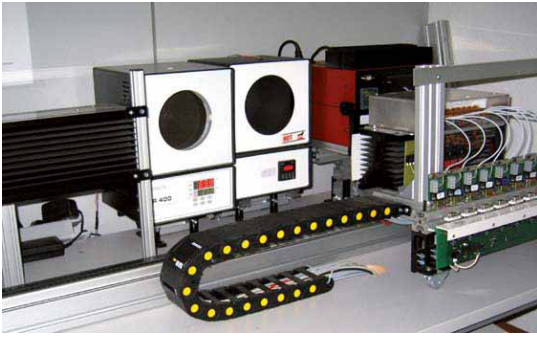
## How Are Infrared Cameras Calibrated, And How Does Ambient Temperature Affect Readings?



**Optris Calibration source  
BR400**



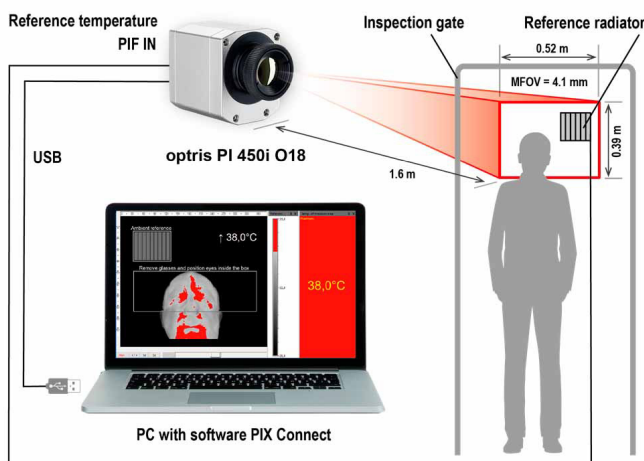
**Optris BR20AR ambient  
temperature referencing  
source**



**Automated calibration stations at Optris HQ, Germany**



**Optris CTlaser-PTB**



**Installation of PI450i and BR 20AR at inspection gate for  
individual fever screening**

Infrared thermometers are calibrated with the help of reference radiation sources, so-called black bodies. These radiant sources can produce different temperatures with high stability.

Knowing the exact value of the radiation temperature is essential for the calibration process. It can be measured by either using a contact thermometer (in combination with the determination of the emissivity) or a transfer standard infrared thermometer.

This value can then be used to determine the device constant for the initial calibration of the infrared sensors.

To conduct a post-calibration by customers or local calibration facilities, the calibration temperature should be near the temperatures which occur at the respective applications.

Instrotech, the local supplier of Optris products, makes use of a transfer standard radiation thermometer CTlaser-PTB to measure the radiation temperature of a reference source.

The CTlaser-PTB is based on the IR thermometer Optris CTlaser.

The CTlaser-PTB needs to be traceable to the international temperature scale from 1990 (ITS-90). Thus, it is calibrated by the PTB (German national metrology institute) regularly.

ITS-90 is a very good approximation of thermodynamic temperature.

It is based on 17 well-reproducible fixed values such as melting points of highly pure metals. Within the framework of ITS-90 the CTlaser-PTB is compared to national temperature standards from the PTB.

This comparison within a closed chain of comparative measurements with a known uncertainty in measurement takes place regularly.

Based on the CTlaser-PTB, Optris produces the CTlaser-DCI as a high-precision reference IR thermometer for its customers. The DCI units are produced with pre-selected components supporting high stability of measurement.

In combination with a dedicated calibration at several calibration points, the CTlaser-DCI achieves higher accuracy than units from series production.

The optics of an IR thermometer is described by the distance-to-spot ratio (D:S).

Depending on the quality of the optics a certain amount of radiation is also received from sources outside the specified measurement spot.

The maximum value here equals the radiation emitted by a hemispheric radiant source.

The respective signal change in correlation with a resize of the radiation source is described by the Size-of-source effect (SSE).

As a result of this correlation all manufacturers of IR thermometers use accurately defined geometries for the calibration of their units; meaning depending on the aperture



of the radiation source (A) a distance (a) between the IR thermometer and the reference source is defined.

Thus, the value specified in datasheets and technical documentation as measurement field is in general a certain defined percentage of this radiation maximum – values of 90 % or 95 % are common.

Optris has up-to-date in-house laboratories which fulfil the mandatory requirements for calibration stations.

When issuing calibration certificates, it is not only the laboratory temperature and humidity that is documented but also the measurement distance and source diameter (calibration geometry).

#### Calibration Source BR400 features:

- Radiator temperature up to 400 °C
- Excellent homogeneity, precision & long-term stability
- Compact and rugged design
- Perfect for calibrating and testing infrared sensors
- Scope of supply: Calibration source, power supply cable, calibration certificate, manual

#### Ambient Temperature Referencing Source BR20AR

To improve the specified camera accuracy of the PI 450i T010 camera a reference source with a high emissivity and a stable and known temperature must be positioned in the scene proximate to the subject to be scanned.

The BR 20AR Ambient referencing source is equipped with a temperature probe with +/- 0.1 °C accuracies.

By integrating this highly accurate reference signal to our PIX Connect software, we can reduce camera uncertainties resulting from device adjustment, ambient temperature drift and short term stability down to a system accuracy of +/- 0.5 °C.

#### Ambient Temperature Referencing Source BR20AR features:

- Reference radiator with high emissivity ideal for IR camera based fever screening applications
- Integrated 16-bit digital temperature sensor with 0.1 °C accuracy
- Mounting bracket – adjustable for either ceiling or wall mounting
- Plug-and-play installation with 20 m cable and PI 450i suitable PIF-connector.



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## Pressure Probes on Water Pipelines

Reliable pressure measurements in tough environments.



Water distribution systems form the backbone of modern civilisation. Huge volumes of water have to be able to travel the long distance between their source and the end consumer efficiently and reliably. Not only can leaks in the distribution system lead to the valuable liquid being lost – it can also alter the subsoil, necessitating costly repairs. Leak-tight pipelines are a key part of a functioning supply system that delivers value for money.



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Product: [bit.ly/2V1WZpA](https://bit.ly/2V1WZpA)

## Mobile Robots Streamline The Transport Of Medical Vials In A Cleanroom

Madrid-based company, Normon, has been manufacturing high-quality medicines for over 80 years, serving customers in the pharmaceutical and healthcare sectors throughout Europe and in the US.

The company prides itself in its advanced technology and innovation, and its ability to produce affordable medicines in a sustainable way.

### A solution for clean room environments

Normon was using automated guide vehicles (AGVs) within the production process. However, following a change in the environment in which the robots needed to be deployed, the company discovered that the AGVs were too large to be used in certain clean rooms.

Robots used in this environment must meet stringent requirements to prevent them from acting as a source of contamination.

A different type of robot would be required for the clean room application, as without robots, highly trained and qualified operators would have to transport the products within the clean rooms, instead of focusing on their own tasks.

Normon's Head Engineer, Jose María Urdillo, comments: "We were looking at the different solutions in the market and particularly interested in autonomous mobile robots (AMRs), but these were not able to meet our criteria."

"However, we then came across an impressive AMR produced by Omron, which was suitable for work in clean rooms."

The Omron LD mobile robot could be personalised to meet Normon's specific needs and was very easy to install in the plant. The whole implementation process took just three days and was carried out by Mipelsa, an integrator that specialises in the implementation and maintenance of electronic products, including those involved in industrial automation. Omron worked closely with the system integrator throughout the whole process.

The installation and start up in the Normon factory, was extremely fast, previously tested in the Mipelsa laboratory after building a similar work area, and it was here where a fine tuning to fulfil all the performance and safety requirements was done, highlighting that was very easy from the Normon point of view to make the commissioning in just one week working in production mode.

Normon was pleased with the help and advice provided by both Omron and Mipelsa, including a redesign of a tray holder to include a slight bend in one of the tubes holding the structure, which resulted in a more robust construction, this being the most relevant in the application to reduce the presence of



humans in an "A class" working area as specified by the FDA in their requirements.

No modifications in the environment were needed when integrating the robots, which were ready for trials within a week.

### Improved productivity

Omron's Project Manager, Miguel Ángel Esteban, says: "Since the first

implementations of Omron mobile robots in 2018 and 2019, Normon now operates one of the first and largest mobile robot fleets in Europe, with 18 mobile robots in service. According to Normon, the project was a huge success when the robots have demonstratively boosted production after one month in operation."

This proved to be the case - productivity improved significantly, as 111,000 vials could be transported in 40% less time than before, reducing the length of stay in the plant's "A class" area.

This means that the production process that previously took one and a half shifts can now be completed in less than a shift. The FDA regulations require no people to be present in an "A class" area, and this has been made possible thanks to Omron's mobile robots.

Following the introduction of the robots, employees can perform more specialised tasks and functions within the Clean Room, adding more value to their work and ultimately the company.

What is noteworthy about this specific project is that not one employee has been re-deployed or made redundant by the introduction of the Cobots in the "A Class" area of Normon.

As the Omron robots have exceeded Normon's expectations, additional future implementations are being planned.

Miguel Ángel Esteban concludes: "Intralogistics solutions such as this are key to meeting the needs of our pharmaceutical customers, especially in clean room environments."

With the newest additions to our mobile robot fleet, including mobile robots capable of transporting heavy loads, we can offer a solution to a wide range of applications."

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## An IR Thermometer That Takes Heat, Dust, Water ... And a 3-Meter Drop!



The Fluke 64 MAX IR thermometer has internal memory, unattended monitoring, improved accuracy, increased battery life, as well as the precision needed to do the job accurately.

Designed and tested to survive a 3-meter drop, this lightweight, compact infrared thermometer works in the harshest of environments and even when unattended.

Applications include industrial maintenance, electrical and HVAC industries.

### The Fluke 64 MAX IR features:

- Precise laser technology for more accurate and repeatable measurements
- Temperature accuracy of up to  $\geq 0^\circ\text{C}$ :  $\pm 1^\circ\text{C}$  or  $\pm 1\%$  of reading whichever is greater with 20:1 distance to spot ratio (64 MAX)
- Flashlight (64 MAX) and large, easy-to-read backlit LCD display for easy viewing even in dark environments
- IP54 rated for extra protection against airborne contaminants

- Set time and desired interval between measurements and Auto Capture will capture spot temperatures unattended (64 MAX)
- 99 data point logging (64 MAX)
- Displays the minimum, maximum or average temperature, or the difference between two measurements
- Hi and Lo alarms for rapid display of measurements outside set limits
- The 62 MAX+ has dual rotating lasers to help identify area to be measured. The measurement area is the spot between the dots (62 MAX and 64 MAX have 1).

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## TRI-CON TRIPLE OFFSET VALVES

**ZWICK**



Zwick Tri-Con valves are successfully used for isolation, on/off, control and ESD applications for industrial and exhaust gases, hydrocarbons, chemicals, liquids and steam with process temperatures up to  $815^\circ\text{C}$ . The Tri-Con valve is used extensively in the oil & gas, chemical, petro-chemical and power generation industries.

### Zwick Tri-Con provides:

- SIL 3 certification
- Sizes from 2" (50mm) to 88" (2250mm)
- Bi-directional operation
- Zero leakage sealing
- Non-rubbing - Self-centering disc
- Metal-to-metal seats
- Fire-safe certified sealing



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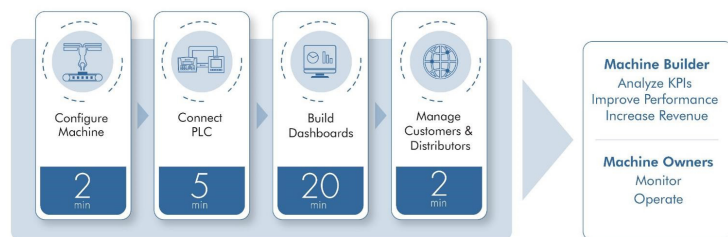
## UniCloud: The Complete, No-Code IIoT Cloud Platform Designed for Unitronics PLCs

Unitronics has come out with its very own cloud platform called UniCloud. With no Cloud expertise needed by users, UniCloud is said to be a smooth, pain-free entry into the world of IIoT. Designed for OEMs and machine builders, this new platform was made to help users work more efficiently on a scalable and secure platform.

UniCloud allows users to build customized dashboards, harvest, analyse, and leverage PLC application data to boost efficiency, troubleshoot problems, and implement preventative maintenance.

Some additional key benefits include:

### Setup in 30 Minutes – No Code Development



- Setup and commission your system via a simple drag & drop interface
- Build & customize your dashboards in a fast and easy way using UniCloud's Wizards
- Fully and seamlessly integrate with all Unitronics PLCs
- No-code means no need for programming, IT knowledge, or Cloud expertise
- UniCloud has built-in cloud infrastructure, interfaces, and functionality
- SaaS Platform —no need to install software components, database management services, or hardware

### Fast Commissioning & Raise Efficiency



- Create, assign roles, and personalize multi-lingual dashboards
- Fully customize branding via logo and colours
- Access, monitor, and troubleshoot machines securely from anywhere
- Manage operational data for performance analysis



- Determine KPI's using centralized and aggregated data
- Reduce operational and maintenance costs
- Predict failures and minimize unplanned slowdowns and shutdowns
- Generate revenue: analyse data to locate sales opportunities for complimentary products, consumables, and services

### Extend Your Reach:

- Utilize the built-in BI functionality to compare machine performance in selected geography or by specific customer
- Centralize management of your machines, PLCs, customers, distributors, and employees
- Assign permissions and dashboards based on your business needs
- Control machines and data flow centrally

UniCloud can be integrated with any of **Unitronics' PLCs** – meaning if you have one already, you can still integrate the platform without having to buy a new PLC.

However, if you're looking for an all-in-one PLC with the UniCloud built-in already, Unitronics has come out with a new **UniStream 'Cloud' series**.

It's a PLC series with built-in, no-cost cloud services. The UniStream Cloud PLC comes with an embedded start-up subscription at no extra charge and no monthly subscription fee.

You simply connect the PLC to UniCloud, design a no-code dashboard aided by the built-in setup assistant, and go live.

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# Suitable for universal use: the C60xx ultra-compact Industrial PCs



[www.beckhoff.com/c60xx](http://www.beckhoff.com/c60xx)

Powerful, flexible, and suitable for universal use: with the C60xx ultra-compact Industrial PC series, Beckhoff as a specialist in PC-based control technology offers a broad range of high-performance devices with low footprint and especially flexible installation. The range stretches from the compact C6015 IPC entry-level class with dimensions of just 82 x 82 x 40 mm through to the C6032 with Intel® Core™ i processors and a variety of modular interface and functional enhancements. Even for complex applications with the highest performance requirements, high-end computing power in an ultra-compact design can be combined with a very attractive pricing.



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New Automation Technology

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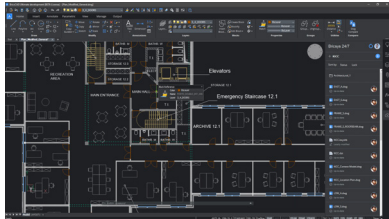
# Industrial PC's & Software...

## Replace your existing DWG-based CAD tools with an affordable, modern and compatible CAD solution

**B**ricsCAD does everything you do, every day, in a reliable and fast way. No re-learning needed. In this latest release, BricsCAD® V21 dramatically boosts CAD software performance and delivers extensive in-product collaboration capabilities.

**Which version of BricsCAD® is right for me?**

**BricsCAD® Lite is the best choice for 2D drafting work**



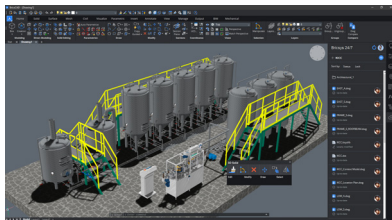
**BricsCAD® Lite** offers all the functionality of AutoCAD® LT, and more. The overall user experience is amazingly familiar.

Lite offers the power of A.I., via machine learning workflows that

let you get more work done, faster, and with more accuracy. And migration is easy too – your menus and other customizations move right over into BricsCAD!

BricsCAD® Lite lets you customize your drafting workflows, with the full power of LISP, built in. Most of your existing LISP routines will just load and run, 5 to 100x faster, thanks to the modern memory management of our Open LISP implementation.

**BricsCAD® Pro is the best choice for 3D work and 3rd party apps**



**BricsCAD® Pro** is the right choice for users who want more power and more innovation on their desk (or laptop), and for those that need access to the hundreds of 3rd party application programs, built on our

BRX API. BricsCAD® Pro integrates all the advanced parametric solid modeling features previously found in BricsCAD® Platinum, and much, much more!

It contains a powerful 3D constraint engine and automatic parameterization. Parametric components and arrays, coupled with our 3D Direct modeling engine, give you the ultimate design freedom.

The Pro edition also contains our civil modeling workflow, with automatic TIN surface generation, gradings, corridors, and alignments.

**BricsCAD® Mechanical is the best choice for MCAD**



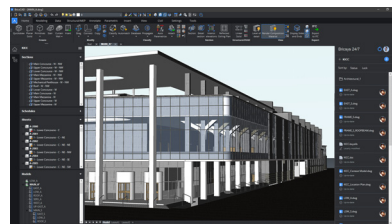
**BricsCAD® Mechanical** offers comprehensive mechanical design and documentation tools that work in BricsCAD's familiar user environment – and best of all, it is all in DWG!

You may have been told that the DWG format is not suitable for detailed, mechanical assembly design. That statement was made over 20 years ago. My, how times have changed!

Our optional Communicator for BricsCAD® module imports files from, and exports files to, industry-standard Mechanical CAD formats, including associated Product Manufacturing Information, or PMI.

BricsCAD's powerful Direct Modeler, based on ACIS, treats native and imported geometry the same way – for seamless editing of parts, assemblies and sheet metal components.

**BricsCAD BIM is the best choice for Architects and Structural Engineers**



**BricsCAD® BIM** is an alternative Building Information Modelling workflow that starts in 3D and stays in 3D.

It offers a design-to-documentation Building Information Modeling workflow that focuses on

“Design First”. BricsCAD® BIM leverages a familiar workflow, using DWGs and XREFs, to bring Building Information Modeling to everyone.

We respect your Art. You can begin capturing your designs in CAD-accurate solids, without the limitations of “family” based systems.

Then, leverage the power of A.I. and machine learning to classify your BIM's elements automatically.

This same AI power lets you build the Level of Development of your BIM in a continuous, consistent fashion. And you can create associative construction documentation, automatically, at any point in the BricsCAD® BIM workflow.

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# UniStream **Cloud** series - the First and **Only** PLC with built-in Cloud services.

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## Ultra-Compact Industrial PC And Multi-Touch Control Panel With Newly Developed HMI Solution For Machine Tools

**E**MAG GmbH & Co. KG, based in Salach, Germany, is a specialist for flexible production solutions and offers a broad spectrum of machine tools ranging from standardized machines to customized manufacturing systems.

Together with the new EDNA operating and networking concept, these now enable significantly more transparent and efficient processes. EDNA, the EMAG DNA, is a modular software ecosystem consisting of interconnected software and machine components.

In an interview with PC Control magazine, Rainer Seitz, Head of Software Development & IoT, explains the specific advantages of the system as a whole, along with the customized CP3921 Control Panel and the C6030 ultra-compact Industrial PC from Beckhoff.

**How long have you been using the C6030 ultra-compact Industrial PC and what was the key factor behind this decision?**

**Rainer Seitz:** We have been using this space-saving Industrial PC from Beckhoff since 2018 because it is a highly compact IPC which even fits into the control cabinet if it is retrofitted at a later date. The ability to connect any common fieldbus system via the real-time kernel and EtherCAT provides additional benefits.

The fact that we can design the factory-fitted basic image to match our requirements is another important aspect as this ensures seamless integration into our CI/CD pipeline. In practice, the C6030 has proven to be extremely robust and reliable.

**In this context, how important is the ability to create customer-specific designs and what experience is your experience with Beckhoff in this regard?**

**Rainer Seitz:** This option is essential especially given that the collaboration has proven to be uncomplicated and cooperative. In addition to technical support, transporting EMAG's EDNA brand is also important to us.

We always receive support for the design, advice and planning directly from Beckhoff such as regarding the choice of form factor and corporate design adaptations.

**What are the reasons for consistently using the customized CP3921 as your standard operator interface?**

**Rainer Seitz:** The EDNA panel is the central user interface for the machine tool. We have tailored both the equipment and the design to meet the standardization requirements for our current diverse range of panels.

This integrated approach to hardware and software has enabled us to develop a standardized panel design that is effective in every context and for a wide range of EMAG technologies and machine series.



*The customer-specific CP3921 Control Panel is precisely tailored to the requirements of the new EDNA operating and IoT concept from EMAG.*

*Picture: © EMAG*

The most important global and safety functions are integrated directly into the frame. We also implement specific requirements for modern software through the flexibility of multi-touch technology. As a result, we can simplify the operation of our machines, increase uniformity and also address individual requirements using a modular approach.

**When and which machines will this be implemented on and can it also be retrofitted on older systems?**

**Rainer Seitz:** Our new MIND L-1000 induction hardening machine is already equipped with the new panel and HMI. New hob cutters and turning machines are currently in development. For 2021, we aim to deliver all of our standard lathes IoT-ready and factory-fitted with an IPC as of about the middle of the year.

We are also in the process of equipping other machine types with the new panel and HMI. Retrofitting is also possible under specific conditions. However, we have to examine each individual case to address this.

**How important was the wide range of multi-touch panels and the corresponding Beckhoff expertise when selecting the HMI?**

**Rainer Seitz:** We place a lot of importance on the ability to examine both the development of the hardware and the HMI concepts interactively and cross-functionally given that both sides influence each other. The agile approach, which is already common practice in software development, has also been very successful in collaboration with Beckhoff.

**What special requirements were focal elements of the CP3921's customized design and what role does HMI design play on the whole?**

**Rainer Seitz:** The basic requirement was: simple and reduced to the essentials. The HMI hardware needs to provide a future-proof foundation for ongoing software innovations.



# Industrial PC's & Software ...



Since 2018, EMAG has utilized the C6030 ultra-compact Industrial PC in its machines. It also forms the computing foundation of the new EDNA concept as a labeled, customer-specific EDNA IoT core.

Picture: © EMAG

User Interface Design (UI) and User Experience Design (UX) were our top priority from the outset.

This means that the development processes focused on the needs of our target group. Alongside the product design, this is especially important with regard to software ergonomics. Our flexible concept and proprietary software extensions enable us to guide user groups through our applications spanning different technologies by utilizing recurring patterns.

**Why did you decide on the 21.5-inch widescreen format and, in particular, the portrait variant?**

**Rainer Seitz:** The high resolution along with sufficient size to enable comfortable navigation using the touchscreen even with gloves were the deciding factors.

In numerous concept variations and experiments, we decided on what might be the more exotic portrait format. In the upper half we focus on presenting and summarizing information, whereas the lower half is primarily designed for interaction and configuring various parameters.

In addition to these practical reasons for the user, the portrait format also perfectly communicates the core of our EMAG brand: "Think Vertical".

**What are the requirements regarding the robustness of the Control Panel?**

**Rainer Seitz:** We have maximum durability requirements because the machines sometimes operate under extremely harsh conditions. Failure would be extremely costly.

**What are the practical advantages of the EDNA concept for the machine tool industry?**

**Rainer Seitz:** EDNA will consistently reduce the amount of time that has to be spent on commissioning, setting up and operating the machines despite the fact that manufacturing processes are becoming more complex and the demands on flexibility are increasing. Numerous, minor data-driven software enhancements will also enable the machines to produce more parts in the same amount of time while also increasing quality.

**How important is Industrie 4.0 and IoT in the context of the EDNA concept?**

**Rainer Seitz:** They are focal aspects of all developments at EMAG and define the future for us. Our strategy is to become established in the market as a digital machine tool manufacturer by 2025. Specifically, our software products focus on the value of data, providing overarching analytics tools for our customers' production. Real-time data from the machines is combined and processed to provide useful information and recommendations for action.

This is about more than just passing on machine data. Rather, our Life Line products serve as a portal for data-driven services that generate valuable status messages and recommendations drawn from process knowledge and algorithms.

Developing suitable dashboards to clearly visualize the data for customers is an essential aspect of this strategy. Once again, the CP3921 offers great options for displaying these dashboards directly on the machine. This gives machine operators direct feedback regarding the status of the production and also the condition of the machine itself.

**You also offer the EDNA concept as a white label solution. Which customer group are you targeting with this?**

**Rainer Seitz:** The target group consists of all machine builders who want to benefit from an innovative and comprehensive ecosystem and enrich their machines with software-based value-added services.

**EDNA has already been recognized as an innovative concept. What awards have you received?**

**Rainer Seitz:** The overall hardware and software concept received the Red Dot Award 2020: best of the best and it was also nominated for the highest award, the Red Dot: Luminary. In addition, it received special mentions including the "German Design Award Special Mention" and the "UX Design Award Special Mention". As such, the combination of our software and Beckhoff hardware represents real added value for every user.

**Dane Potter**

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## Good Software Can Make A Difference

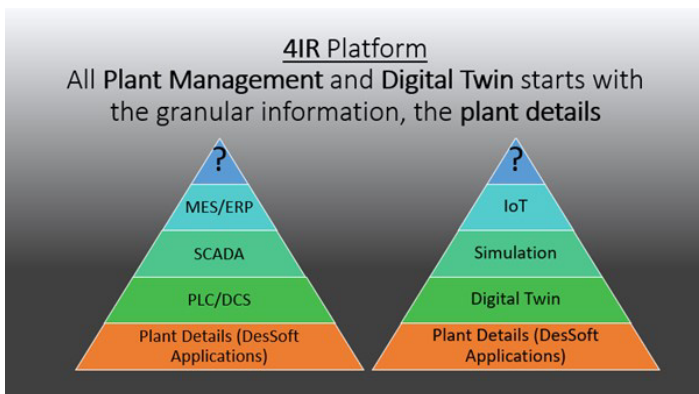
Author: Johan Hamman - DesSoft

Everybody is talking digital, everything must be digital, this is the buzz in the market. And if you cannot add to such a conversation, then it looks that you cannot contribute.

From an ISO certification perspective, it demands that there is digital information that are maintained and up to date, with proven procedures in place of how it is done. From an insurance perspective there is savings options when one can proof that one has good digital record of all equipment in the plant. That brings now good asset management control system into place.

We all know that any system is as good as the data that was fed into it and too much data is not necessarily workable information but an overwhelming sea of detail.

From a DesSoft perspective we are aware of all these challenges and although we do not have software solutions for all these challenges, are all in agreement that in a process environment the asset information starts with the granular details provided by the DesSoft software applications (see below).



When engineering design information is maintained correctly, it ensures that the latest asset and digital information is in place, which can then be used as a platform that will satisfy the ISO certifiers and the Insurance agent and whomever is auditing your digital information.

So, the practical question is “how can I be enabled to maintain all my information when there are regular plant changes?”.

For this DesSoft does have an answer as we have an intelligent red-lining functionality that will activate a Change Workflow where all relevant people can be notified when a red-line is done and therefore ensure that the correct procedures are followed, and engineering documentation and information is maintained.

When looking at the cost of building a process plant, then roughly calculated it worked out that 80% of the cost is for Civil, Mechanical and Process environment and 20% of the cost is for Electrical and Instrumentation environment.

But when looking at the engineering documentation that is submitted for the same plant, then roughly calculated 80% of the engineering documentation submitted is from the

Instrumentation and Electrical departments and 20% of the engineering documentation is from the Civil, Mechanical and Process departments.

Just think of all the control instrumentation and its wiring diagrams, its datasheets, equipment- and cable lists, PLC/DCS card channels and soft address information, etc. then suddenly it makes sense.

While the plant is running, there is also a huge difference in maintaining the plant between these departments. By its nature a change in Mechanical, Process or Electrical departments is well-planned and all are aware of such a maintenance event.

Within the Instrumentation and Control department these well-planned events are also there, but more often than the other departments there are unplanned events where a PLC card channel went dead, or a cable core is broken, or an instrument suddenly malfunctions.

This could be because of harsh plant conditions, or during plant cleaning process, or when big equipment was moved or installed, etc. In such an event, then there was no planned maintenance, and these changes are the problem ones to update engineering documentation.

This is the reason why so many Engineering departments confess that their documentation does not represent the plant.

This is where the DesSoft intelligent red-lining and Change Workflow can assist these departments which have most of the engineering documentation, to have a mechanism that will help ensure that these changes are documented.

This is also the reason to have all your engineering documentation in a digital format, and not only digital but rather intelligent to reduce human mistakes so that a change only needs to be done in one place and all relevant documentation is then up to date.

The obvious question arises “which software supplier and solution will cover the whole plant documentation needs?” Again, there is no easy answer as many companies have tried to have a “one-stop supplier”.

There are good suppliers that nearly cover all documentation and digital needs, but it is also true that no one supplier provides the best product in all categories or are most cost effective in all categories.

And with this said, there are a multitude of other IT related issues that can be mentioned about licensing, firewall access, etc. that make the choice even more complicated and a reason to standardize.

But very often these “IT issues” are only used as an excuse as these IT configurations are mostly done as a once off exercise, thus multiple suppliers can be used.

One mistake that I have seen a few times is that the department with the biggest budget, is the one that makes the decision on the software supplier. And in many of these cases the solution offered by the chosen supplier will be very effective in their domain, but sadly very often not so effective in the domains that have the most engineering documentation.

# Industrial PC's & Software...

Therefore, the solution must be to try to get the best product for each department's needs and then see how these products can integrate with each other. Get software that can share its information and suppliers that are willing to write integration tools so that all departments can work at optimum effectiveness.

The DesSoft applications can integrate to multiple 3<sup>rd</sup> party software vendors like Siemens, Allen Bradley, Schneider, Wonderware, Adroit, etc. with data sharing tools for both directions, to export and import into the software system.

To conclude, digital documentation is not a new thing, but has been around for many years. Thus, make sure that you have intelligent digital information and an effective tool that can

assist you in maintaining your engineering documentation for all departments - where the same information is used on multiple documents, and be able to do the change in one place and all these documents will reflect and create awareness of such changes.

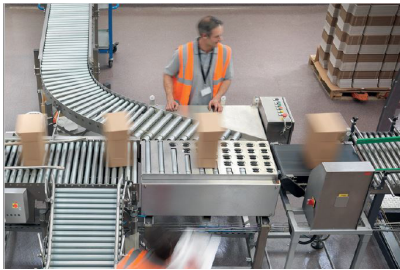
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## Your Smart SCADA Solution For Line Management And Lite Supervision



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**Maximum value and efficiency with EcoStruxure Machine SCADA Expert software**



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- Automatically generate reports compliant with CFR21 Part 11

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### Save money

- Track your data and understand your performance using embedded OEE templates
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- Pay only for what you need with our application size-based license pricing Connectivity and data management
- Realize the power of the IoT with EcoStruxure Machine SCADA Expert's extensive IT and OT driver library and data management capabilities (connection between ERP, MES, third-party historians, and the plant floor)
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- Monitor and control remotely your application with Mobile Access, using a tablet, smartphone or remote PC

### Enhanced User Experience and Seamless Integration with AVEVA Software

- Integration of Industrial Graphics Editor in the Software, provides unified look and feel and user experience for software users familiar with AVEVA InTouch HMI and AVEVA System Platform (a common extensive library of modern industrial graphics)
- Smart design & engineering: Edit and/or import Industrial Graphics and integrate them in your projects
- Situational awareness graphics library, included in the software, can contribute for improved operator efficiency
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## Ecosystem Of Industrial Automation

Today's ecosystem of industrial automation is characterised by many media disruptions during the processing and transfer of documentation.

It is essential to resolve these issues within the development process for machines and plant systems – via targeted collaboration among all stakeholders and systems.

Data created in the engineering process must be shared with everyone involved in the process.

The ideal goal: machine builders and system integrators, control cabinet manufacturers, component manufacturers and also the machine or plant system operator all work networked together.

Operators of production facilities, machine builders and system integrators, control cabinet manufacturers and component manufacturers all have one thing in common: they all work together along the value chain, from the planning through to operating a finished machine or plant system – and continuously exchange information in the process.

### The ecosystem of industrial automation

What does this process – the collaboration among the various process participants – look like today?

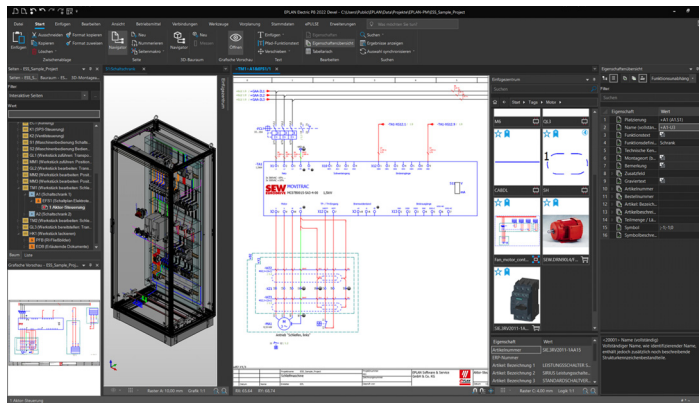
In the planning phase, the characteristics of the desired machine or plant system are described. If the company has particular supplier specifications, these are also detailed and then passed on to the operator, who takes the specifications into account when designing the machine or system.

The planning phase is followed by the preplanning process. Additional information such as devices, release lists from Excel, specifications in Word or preplanning tools such as Eplan Preplanning are taken into account and, in turn, are used by the basic engineering designers to prepare a quote, for instance.

In the case of more complex production lines, this is traditionally taken care of by a system integrator, who is also responsible for the detailed engineering and for generating electrical and fluid-power schematics.

### Data is enriched in the Eplan Project

The project created with systems of the Eplan Platform – Eplan Electric P8 or Eplan Fluid, for example – is now transferred to the control cabinet manufacturer. This manufacturer creates the virtual prototype of the switchgear system in the form of a



3D assembly of the control cabinet using Eplan Pro Panel. The control cabinet is then built, approved and commissioned by the operator. With the delivery of the switchgear system, the control cabinet manufacturer processes are complete.

The company hands over the Eplan Project, which has been enriched with data, back to the machine builder or system integrator, who then commissions the machine or plant system based on the final project data.

The project is then made available to the operator, who can access the current documentation, for instance using Eplan eView, in the event that servicing or maintenance becomes necessary, and who can digitally document any changes using the redlining

function as needed.

This process describes the daily work in this ecosystem of industrial automation. The challenge, however, is that all the data for an automation project is created and added at various stations along the value chain.

Often, all the project participants are working with partially inconsistent data, which ends up making the process even more time consuming and error prone.

For instance, the drive power of a motor is changed at some later point in a project, but this change isn't taken into account when the machine or plant system is commissioned. As a result, the documentation is not up to date.

### A "data container" as the central source of information

This is where Eplan comes in: the systems of the upcoming Eplan Platform 2022, in combination with the new Eplan eManage cloud service, network together machine builders and system integrators, control cabinet manufacturers, component manufacturers and the operators of machines or plant systems.

Eplan CEO Sebastian Seitz explains: "We connect companies with their clients and suppliers via the cloud, for easy and secure data sharing."

The Eplan Project as the central, digital model of an automation solution supplies all processes with the necessary data. What we're talking about is a sort of 'data container' that is fed from the systems of the Eplan Platform. This generates added value in the digitised collaboration of all participants – through secure data transfer and central access to the Eplan Project."



## Industrial PC's & Software ...

A new feature includes the connection to the cloud via Eplan ePulse, which also significantly facilitates mobile working in design and engineering.

### Cross-project collaboration via the cloud

Using the new Eplan eManage, projects can easily be uploaded to the cloud and managed and shared from there. More specifically, this brings together the worlds of on-premises software and the cloud. Clear access rights via role management ensure data security and provide flexibility for accessing projects.

Users of Eplan Electric P8 and Eplan Pro Panel can conveniently upload their projects to the cloud and transfer them to the Eplan Platform for further processing.

This is accomplished without the time-consuming sending of project data via email or using an FTP server. And the centralised, clear availability in the cloud also enables all project participants to search quickly for specific content.

With Eplan eView, all the changes in a project are centrally available.

The advantages are obvious: project documentation is always up to date – along the entire product life cycle and into operation and service scenarios. An important component of this method of working is device data, which is provided on the Eplan Data Portal.

Seitz says, "What matters here is the quality and depth of the data, something we are intensively advancing with the Data Standard."

Comprehensive, integrated and end-to-end digital data serves as a project accelerator. And don't forget, the data are consistent and the data transfer is secure.

### High-quality digital device data is a key factor in:

- Processing orders in shop floor management and deriving production orders.
- Controlling automated machine fleets (Rittal Automation Systems).
- Providing information to partially automated workstations (for instance, simplifying wiring processes with Eplan Smart Wiring).

Seitz continues: "With these optimised processes and increased efficiency, companies can optimise their machine and plant system design processes and sustainably increase the availability of their machines and plant systems."

Collaboration among all participants ultimately increases the quality of the data and thus the added value."

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## Go IIoT in 30 minutes.

## No-Code, IIoT Cloud Platform for OEMs and Machine Builders

UniCloud is specifically designed to enable OEMs and Machine Builders to get up and running with their IIoT cloud platform in less than 30 minutes.

Unitronics' goal is to enable its customers to enter the Cloud and take advantage of today's powerful IIoT technology, using a simple, no-code platform that could be rapidly implemented by the customer—eliminating the need to invest in programmers and cloud professionals.

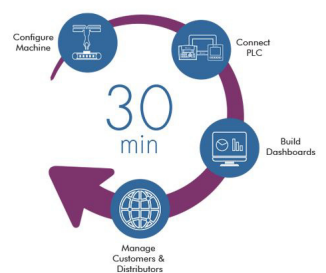
UniCloud is an end-to-end, scalable and secure IIoT platform. Unitronics PLCs and Routers securely connect machines to UniCloud's Software as a Service (SaaS), which stores the data generated by the machines. Users can then display, analyze, and monetize this data via fully customizable, personalized, and multi-lingual dashboards.

UniCloud supports any machine based on Unitronics UniStream, Vision, Samba, and Jazz controllers. Even older applications can go Cloud—without the need to change, update, or modify the existing project logic in any way.

UniCloud's no-code Dashboard Designer enables users to build dashboards with simple drag & drop elements, easy Widget Wizards for Gauges, Graphs, Charts, Tables, Maps, and more. The user selects exactly what their business requires and determines which machine data will be harvested, analyzed, displayed, and stored by UniCloud. The Machine Builder can then leverage this data to boost efficiency, troubleshoot problems, and implement preventative maintenance—reducing management overhead and leaving time to grow their business.

As part of Unitronics' UniCloud launch, they are offering an industry first: the UniStream Cloud series. These powerful PLCs come with an embedded UniCloud subscription—no need for any additional hardware or software and no need to pay any additional fee for cloud services subscription!

End-to-end, scalable and secure, UniCloud enables users to boost both new and existing applications into the age of IIoT—as-is, without changing any existing programming in the PLC project. When Cloud is this easy, there is no reason or excuse to miss out on the benefits of IIoT.



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## *Only The Best For Man's Best Friend - Measuring The Level Reliably In Small Dosing Vessels*



In the production of dog food pellets, the manufacturer struggled constantly with an unreliable measuring point. After several different measuring principles failed, a breakthrough was achieved with 80-GHz radar level measurement technology.

The dog is one of man's favourite companions. Many dog owners spare no effort in care and want only the very best for their pet.

Accordingly, a wide range of dog food is available, from puppy food to senior mixes, as well as products for stomach-sensitive and allergic animals. The product range and the variety of recipes has been growing for years.

The South African company RCL Foods knows exactly what dogs like to eat.

This leading African food producer, with over 20,000 employees in subsidiaries in South Africa, Swaziland, Namibia, Botswana and Zambia, not only produces various types of pet food, but has also developed and designed its own production equipment for just that purpose.

Yet adding essential oils and fats to the food products has proven to be a very difficult and complex process.

### **Step by step to the pellet**

The basic steps of the pet food process include sourcing raw materials, commingling via a dosing system that involves adding essential vitamins and nutrients, grinding to a specific specification and size, and then mixing.

In the next step, the pre-processed product is fed pneumatically via a conveyor line to the extrusion unit. Steam, water and other ingredients are added there to produce many different shapes, sizes and mixes of animal feed.

After extrusion, the product has to be dried according to moisture specifications. When the product leaves the dryer, it gets coated with essential fats and oils.

At this point in the process, however, there have always been difficulties until now.

Although this brand new, state-of-the-art facility was designed and built by the company's own engineering team, one measuring point did not provide readings reliable enough to ensure a smooth, continuous process.

The problem: When the product leaves the batch dryer, the food product is supplied with fats and oils. For this purpose a container for holding the dried pellets was installed. This in turn feeds a belt weigher, which is used to obtain an accurate flow rate for the addition of fats and oils.

It is absolutely necessary for the filling level in this storage container to be reliably measured in order to achieve an unvarying flow.

Only in this way can the belt weigher operate smoothly and stably.

The reason for this is that the four PID loops that control the addition of fats and oils cannot cope well with strongly fluctuating process variables.

### **A roundabout way to the goal**

At first glance, the measuring point does not appear to be especially problematic. The ambient temperature is moderate and the food pellets are actually easy to handle. From time to time light vibration occurs in the system, but that normally does not affect the measurement.

The real difficulty only becomes apparent when you take a closer look.

The size, composition and density of the individual pellets vary constantly. What is more, the level itself changes very quickly because the product flows so quickly. That's why reliable level measurement in the storage container was extremely difficult.

So the company tried out a whole range of different level sensors. First, they used a guided radar level gauge from another manufacturer. However, the return signal was always received with a delay, even when the signal damping parameter was set to zero.

The next measuring principle that was tried out was the laser "a measuring device that basically operates according to the same functional principle as an ultrasonic level sensor. This solution was not satisfactory either.

Dust always settled on the sensor immediately after the process started. This impaired the measurement within a very short time. Even regular cleaning of the sensor did not help.



### A breakthrough thanks to 80 GHz

RCL has been working with Vega for more than a decade and appreciates the excellent service provided by the local subsidiary of the Black Forest company. It also considers the dependability and high quality of Vega instruments unrivalled.

For that reason RCL placed great trust in the Vega team, but at first did not have high hopes that there could be a solution for this difficult measuring situation.

Vega proposed a trial run with VEGAPULS 69, a radar level transmitter that was still quite new at the time.

The higher, 80-GHz frequency considerably extended the spectrum of applications for radar level measurement technology.

An essential aspect of this success is the fact that the measuring instrument only requires an opening angle of 3° (previously 10°), which allows the measuring beam to glide right past internal fixtures or buildup on the vessel wall.

In practice, the significantly tighter focusing of the transmitted signal offers a whole range of advantages, the most important being that the actual measuring signal can be better separated from interference signals, allowing even the smallest reflection signals to be detected.

Nevertheless: RCL Foods was particularly concerned about the low height of the container (only 2 meters) and the effective measuring range, which at 1.5 meters was even smaller.

This is a problem that many users are familiar with, especially in applications with small apparatuses and vessels, for example in technical centres or pilot plants.

The blocking distance (dead band) of the sensor, the size and design of the antenna or the measurement uncertainty at the bottom of the vessel normally pose some difficulties when it comes to obtaining a reliable measuring signal.

Although VEGAPULS 69 has a measuring range of up to 120 metres, it also copes well with small distances, such as those in the storage container of the South African company.

By using a transmission frequency 3 times higher, the antenna can be 3 times smaller and still achieve nearly the same degree of signal focusing.

As a result, much smaller process fittings, e.g. with an antenna of only ¾-inch diameter, are possible. This corresponds to the size of a 1-euro coin. At the same time, this considerably reduces the interfering signals generated at close range.

Despite the considerably shorter wavelength of VEGAPULS 69, the sensor is non-sensitive to soiling and buildup. This is achieved primarily by an adaptation of the sensitivity in the area near the sensor.

Special processing of the reflections in the close range also makes it possible to reduce the influence of interference signals directly in front of the antenna system. Noise in the close range is thus reduced and signal sensitivity increased.

During installation it was necessary to use the existing mounting sockets, wherever possible without any modifications. This was not optimal, but due to the very good focusing of the sensor there were hardly any interfering reflections.

After installation, the instrument was quickly set up via Bluetooth and smartphone. The measurement engineering team was positively surprised by the high quality of the measuring signals.

Now, the level in the pellet container is reliably measured and can be kept constant. The continuous process of coating the food pellets now runs smoothly. Dust deposits from the dog food are also no problem for VEGAPULS 69.

According to the company, the sensor hasn't been touched since it was installed two years ago, neither for cleaning nor for maintenance. The level signal is reliable and accurate, ensuring production of a balanced dog food mix.

*Author: Dipl.-Ing. Sabine Mühlenkamp, specialized journalist for the chemical industry and general technology*

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## Robotics And The Potential For The Lights-Out Factory

The phrase 'lights out factory' is generally presented as something for manufacturers to aspire to. But is the concept – which essentially means manufacturing without humans – a realistic goal?

There are various fully "lights out" factories operating today in the world – such as the Foxconn plant in Shenzhen, China, which the World Economic Forum has recognised as a leader in the fourth industrial revolution, but such examples are few and far between. The concept is finding the most traction in situations where a lack of human interaction is a benefit.

This includes applications with a risk of contamination, such as food processing or specialist electronic component manufacturing. It may also include sectors where the product margins can be higher – such as pharmaceutical production – where a return on investment is more achievable.

These examples nearly all require a high-volume, low product-mix scenario to make them viable, and this is at odds with a broader move towards low-volume, high product-mix across manufacturing as businesses move towards creating greater choice for their customers.

The 100% automated, fully lights out factory is not a realistic goal for a large proportion of manufacturing businesses currently operating.

However, for all manufacturers, there is a point somewhere between zero and 100% automation where the greatest return on investment in automation technology can be found. But, beyond that point, it becomes unviable to continue automating.

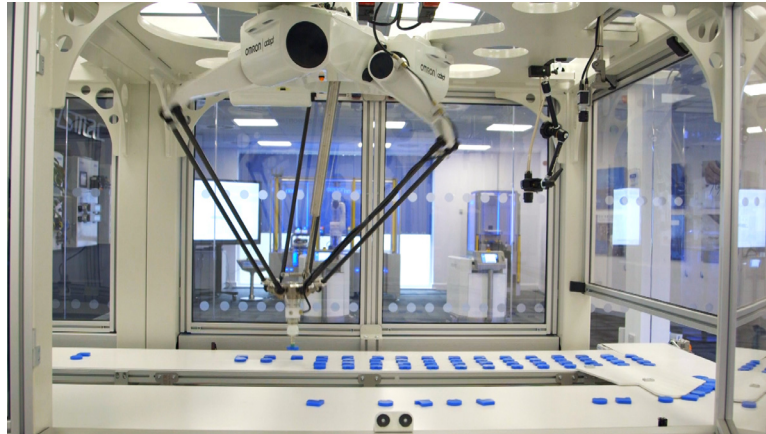
### Manufacturing needs people

A key reason why a fully lights out factory is not viable is that manufacturing needs people. As advanced as today's automation technologies are becoming, there are situations where human flexibility is still the best match to undertake complex processes – for example, where improvisation or complicated decision making is required to react to an unexpected event.

In the most basic of examples, let's consider a bottle filling line. If a bottle jams, it isn't easy to rectify using automation. However, for a human, this is a relatively straightforward issue to deal with.

A significant benefit of digitalisation is that it enables the collection of valuable process data that can be analysed to identify the root-causes of production problems. This can then inform the adaptation of lines and machinery to minimise, or even eliminate, machine stoppages.

Sticking with the bottle filling line scenario, it would be possible to redesign the filling machine's guides to eliminate the bottle jam. But, if a later batch of the supplier's bottles'



falls out of spec, the issue could reappear despite best efforts. It is possible to put in steps to measure the bottles before they are fed into the line, but then there could be a material issue that can cause another machine fault.

Essentially, you can keep adding steps to optimise a line but never truly guarantee that all

the potential problems are eliminated.

It is examples such as these that could mean that it is not practical to automate the last 10% of a production facility to achieve the fully lights out factory. Which also leads to the common trend of the manufacturing workforce shifting from traditional operational duties to supervisory roles.

### Proof of concept

A critical step for manufacturers is to identify to what extent and in which areas automation will offer them the best return-on-investment.

This can be quite a complex task, but many systems integrators and technology vendors can carry out analysis and develop a proof-of-concept – from single applications to entire facilities.

Omron, for example, has a dedicated proof-of-concept laboratory in Milton Keynes, and other high-tech facilities available across the globe.

These sites are often used to construct a prototype system to offer a physical demonstration as part of the proof-of-concept process.

### Enabling technologies

Ongoing advances in automation technology mean that manufacturers can move closer to full automation. Machine vision is a great example. The development of 3D vision systems means that more complex pick-and-place operations are now feasible.

Where previously items needed to be carefully presented to pick-and-place systems, vision technology can now readily identify objects randomly positioned in transport bins.

A fundamental enabler of the automated factory and critical to any lights out projects is robot technology. The movement of materials, sub-assemblies, and other items around and within the production process, also referred to as intra-logistics, would need to be a key consideration.

Traditionally this would have involved forklift trucks. But in today's modern factory, mobile robots can automate those tasks, managed by a supervisory control system that ensures materials are delivered to machines, that work in progress is transferred between production systems, and that finished goods are taken back to the warehouse.

Mobile robots can carry significant loads and work seamlessly with each other and humans when they are occupying the same space.

When it comes to automating traditionally human-operated tasks, where a degree of dexterity is required, cobots, or collaborative robots, offer a good solution. Despite the name suggesting otherwise, they can also be a valuable addition to the “lights out” scenario.

While the collaborative aspect here would not be so important, cobots are designed to carry out more complex tasks, so they lend themselves to replacing manual assembly or processing tasks.

They are simple to programme, particularly when compared to more traditional industrial robots. If you have a high-mix environment with many products and tasks, the cost of reprogramming an industrial robot tends to outweigh its viability.

This makes a cobot simple to re-deploy for different tasks, which is a particular advantage in high product-mix scenarios.

Where high-speed repeatability is the goal, industrial robots – such as delta robots – are ideal. In this category, advances in tooling are opening new applications.

An example would be the automated packing of fruit. It has always been a difficult due to the need for delicate handling. But development in gripper designs have meant that automating soft fruit packing with industrial robots has become a practical option.

Recent developments in robotics have identified innovative ways of deploying the technology.

Omron's MoMa is a hybrid concept that combines a mobile robot, a collaborative robot, and a vision system, opening a whole new range of possible functions.

The combination of mobility and dexterity means that tasks previously hard to automate – like dealing with a jam in a bottle filling line – are now much easier to tackle, taking a step closer to enabling the lights out factory.

## The factory of the future

Will a “lights out factory” be the norm in the future? While they are a rarity today, as automation technology continues to advance, it’s clear that fully lights out operation will become more viable for a growing number of manufacturers in the years to come.

Where today a manufacturer may not be able to justify automating the final 10% of their production process, that figure will shrink to 5% and then 2% and may eventually reach 0%.

What is important is that manufacturers fully understand where automation can best deliver value to their business today. And this is something that technology vendors and systems integrators are well equipped to support.

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## Extended Range Of Locally Available Valves



Allmech has decided to extend the range of Runxin softener and filter valves it stocks to accommodate projects with budget constraints as well as smaller plants that need to minimise installation costs.

"These valves are ideal for residential softeners, smaller boiler softeners, ion exchange systems and for RO pre-treatment softeners," explains Lynette Morrey, Business Development Administrator at Allmech. "Stocking these items will help us to serve a greater segment of the market. We're now able to offer products for smaller applications, a cost-effective option for cash-constrained customers, as well as continuing to offer top-spec Runxin products to larger operators."

### The new additions to the Runxin line include:

- **F65P1 Auto Softener Valve:** These can handle a flow rate of up to 2000 litres per hour. Ideal for domestic use. Time setting controls when the softener regenerates.
- **F63P3 Auto Softener Valve:** An automatic softener valve ideal for industrial use for plants with a flow rate requirement of 4000 litres/hour. Can be set to regenerate based on water volume.
- **F71P1 Automatic Filter Valves:** With a maximum flow rate of 2000litres/hour. Ideal for domestic applications and smaller sites. Handles a maximum flow rate of 4000 litres/hour.

Morrey says all of these valves are easy to programme and use, with simple, user-friendly displays. "As with all the Runxin valves we stock, Allmech offers reasonably priced repairs and replacement spares," she adds. "We also choose Runxin because of the valves' longer service life – some of our valves have run for more than 10 years with no maintenance required."

All Runxin valves are made from durable and flame-retardant materials, ensuring they are impact and heat resistant. Their ceramic core components are wear and corrosion resistant, increasing their longevity.

"The ceramic ball valve range is also chemical resistant, which saves on replacement of expensive brass fittings," says Morrey. "All Runxin valves carry a one-year manufacturer's warranty, giving you peace of mind. We provide additional technical backup assistance, a repair centre and test facilities from the Allmech premises in Benoni, ensuring you have our full support when installing a Runxin valve."

### Other useful features include:

- **No power outage worries:** The last setting is saved automatically in the valve so that when the power is restored it continues the normal cycle from where it left off. All the user needs to do is reset the time.
- **Automatic display lock:** If there is no further programming within one minute, the display automatically locks to prevent unintended operation.
- **Patented interlocking function:** If there are multiple valves in the system, only one valve will stay in rinse or regeneration status while the other is operational.
- **Adjustable parameters:** All parameters can be adjusted based on your needs during operation according to water quality and usage.

All the Runxin valve manuals are also easily downloaded from the Allmech website for customer convenience.

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## OMRON joins The Valuable 500, a global initiative to promote disability inclusion

The Valuable 500 was launched at the World Economic Forum's Annual Summit in Davos in January 2019. It aims to get leaders of multinational companies to join in the movement to bring about changes in business, society, and economy so that persons with disabilities can play an active role and realize their true potential value.

Ever since the 1972 opening of OMRON Taiyo Co., Ltd., the first welfare factory in Japan that employs persons with disabilities, OMRON has led Japanese society in promoting employment of workers with untapped talent.

True to the spirit of the OMRON Principles, the company will leverage its diverse workforce, including those with disabilities, to drive the development of the business and create innovation, thus continuing to contribute to a better and more

affluent society where people shine.

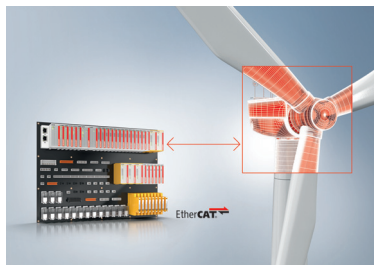
Initiatives for expanding opportunities of persons with disabilities include:

- Employing persons with mental disabilities
- Promoting employment of persons with disabilities
- Developing Technologies for Improving Accessibility for Persons with Disabilities

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## EtherCAT Plug-In Modules Minimize Space Requirements And Wiring Effort In Wind Turbines



At this year's Husum Wind, Beckhoff will be demonstrating its many years of know-how and its broad product range for the wind power industry. Among the highlights is a control cabinet optimized in terms of space

requirements and wiring effort, which is only possible using the EtherCAT plug-in modules from the EJ series.

In the displayed control cabinet, the I/O level is realized with the EtherCAT plug-in modules and a highly compact, application-specific signal distribution board with a wiring level from stock and pre-assembled cables.

The EtherCAT plug-in modules are based electronically on the well-known EtherCAT I/O Terminals and offer the same broad variety of signals.

Their electromechanical design enables them to be plugged directly into an application-specific signal distribution board which distributes the signals and the power supply to individual application-specific connectors, in order to connect the controller to further system modules.

Elaborate manual wiring of single wires is replaced by simply plugging in prefabricated cable harnesses.

Many of the other components that would otherwise be installed separately in the control cabinet are housed as compact plug-in modules on the board, e.g. relays, fuses or surge voltage protection equipment.

This means that the space requirement in the control cabinet is significantly reduced, particularly in series production with mid to high quantities, also lowering costs. Another crucial advantage is the minimized risk of incorrect wiring.

With its broad portfolio of PC-based control technology Beckhoff is also appearing at this year's Husum Wind as a long-standing automation partner of the wind power industry.

The focus will be on the ongoing integration of all plant and system functions: everything from operational management to pitch control; converter, gear unit, and brake control; wind farm networking; and hydrogen technology as a bridging technology to energy storage.

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## Specialist Instrumentation For Specialised Applications



Over 30 years of experience in the design and development of high-quality instrumentation for process industries puts Val.co at the forefront to supply specialist liquid level, flow, pressure and temperature instrumentation to industrial sectors from agriculture to water treatment.

Val.co's ability to design instrumentation and supply prototypes at relatively short notice in order to meet specific customer requirements, is a flexibility that is an integral part of the Val.co Centre of Competence operations.

"Val.co is renowned for its focus on customer satisfaction and the supply of highly accurate, precision and reliable instrumentation" said Jan Grobler, Managing Director of GHM Messtechnik in South Africa.

"We have already supplied level transmitters to the South African mining industry for mining oil level applications. I believe that many other process industries such as HVAC, petrochem, oil and gas can also benefit, not only from the performance of the Val.co instrumentation, but also from its cost effectiveness" said Grobler.

The company's Centre of Core Competence based in Milan, was established to develop and design precise and robust instrumentation that will operate under the most demanding of conditions and they carry approved construction certification for explosive-proof ATEX Exd-Exi a, EAC and RINA for naval applications.

The Centre of Competence is geared towards using the latest technology to extend the expertise of temperature sensors and electronics, thereby expanding the specialised instrumentation offering of industrial sensors across all applications.

### Level Sensors and Switches

The Val.co range of continuous level sensors and level switches offer float, conductive, capacitive, optical control and measurement technology in single and multiple unit formations with up to six independent contacts. Level sensors with current

or voltage output can be programmed for customised executions that the customer specifies.

"The range of level sensors can be applied across all industries where level measurement is a critical function.

In continuous operation they are temperature resistance up to +1050°C. It is a quality range and competitively priced" Grobler added.

The level sensors supply accurate monitoring controls of water, oils, gas oils, gasolines, solvents, milk, beverages, solids, powders and granules.

The Val.co range includes: small float switches, Linear-LC, limit level switch for side installation, multipoint and simple of double contact limit level switches.

The proven reed designed meters are constructed from brass and stainless steel and plastic (Polypropylene, PVC, PVDF) and can be vertically or horizontally mounted.

For vertical installation the level control, with the dimension and number of contacts required, is mounted vertically in the tank and secured by means of the process connection, threaded or flanged.

The change in liquid level moves the float which actuates the reed contact, housed and sealed inside the guide rod, activating the signal corresponding to the set level.

In the case of horizontal mounting, the level control is installed on the wall of the tank at the height of the level to be monitored.

In this way more levels are able to be monitored by the installation of the proper number of level switches.

The level control can operate as a device with contact NC or NO, as a function of the position.

### Flow and Pressure Sensors and Switches

Val.co's flow switches use piston or paddle control technology with magnetic contact whilst visual indicators and signal processors control and measure particles with piston, membrane, bourdon tube and piezoresistive technologies.

All instrumentation devices are compliant with quality systems and are SGS UNI EN ISO 9001 certified.

They carry the CE product certification and CESI certification for explosion proof performance.

Grobler concluded, "Val.co instrumentation gives the South African process sectors the latest in measuring and monitoring technologies enabling these industries to embrace smart factory and Industry 4.0 and 4.1 advances.

If it is a specialised application that requires a high level of accuracy and precision, then we have the specialist instrumentation to perform these functions".

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## Electronic Transformer For Special Requirements

The Jumo IPC 300 electronic transformer with amplitude control in the performance range of up to 40 kW was developed for the control of heating loads that previously required an additional transformer for power control.

With the integrated amplitude control, the mains current and the mains voltage of the Jumo IPC 300 are proportional to the required power of the heating element.

The acquisition of additional compensation equipment is therefore no longer necessary.

In addition, the power converter reduces malfunctions such as flicker or harmonics so that it contributes to higher plant availability.

Consistent energy demand decreases reactive power and reduces current peaks. In this way, energy costs are reduced.

The integrated resistance limitation protects against overheating in the upper temperature range and extends the service life of molybdenum disilicide heating elements.

Low maintenance requirements combined with longer operating times reduce the operating costs.

An external current sensor monitors residual currents and detects housing shorts in the heating elements.

Heating elements with large temperature coefficients change their heat output very strongly relative to their operating temperature.

The power controller of the IPC 300 detects this and compensates for the error.

Other strong advantages of the Jumo IPC 300 include easy operation, configuration and start-up.

The compact device has a plain text display and keypad. By using the USB interface, the parameters can be easily transferred via the setup program.

A voltage supply is not required. As a result, the transformer is the right solution for mechanical and plant engineering, the process industry and furnace construction.



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## Ultra Tough pH and ORP Sensors



The ULTRA TOUGH series of pH & ORP sensors are made with the very toughest materials and latest technology for exceptional performance in highly aggressive environments. Most importantly they provide

accurate and stable measurement at extreme temperatures, and across a wide pH range. This range is available in 3 different body styles: fully submersible, inline sanitary or hot tap and inline twist lock, suiting a wide range of installations.

### Break Resistant Glass

The ULTRA TOUGH series features our unique break resistant glass which is highly resistant to impact and high velocity solids. Not only will the glass resist abrasion in process, but its incredible strength means that build-up of solids can be removed through aggressive cleaning without fear of breakage.

### Anti-Fouling

Fouling is a common problem with most brands of sensors. Turtle Tough utilise a large open geometry design with coat resistant materials.

Our ability to withstand high velocity allows the sensor to be placed in high flow areas to keep the sensor clean and maintain optimal performance of the sensor within the sensibilities of a standard cleaning regime.

### Solid State Reference

At the heart of our TOUGH range is a polypropylene solid-state reference system. Polypropylene has high chemical resistance and is very economical for industrial applications with temperatures up to 105°C.

Unlike conventional sensors, our solid state reference is formulated with specific salt mixtures, to provide extreme performance in a wide variety of applications. The non-porous attributes of this component make it extremely resistant to process contamination providing long life under harsh chemical conditions.

### Customise For Your Process

Our ULTRA TOUGH sensors are available with the following options that allow you to configure the sensor for your application:

- Triple junction
- Extreme dehydration resistant
- Extreme cold resistant
- Organic media resistant
- Sodium resistant
- Zinc resistant
- High HF resistant
- High temperature resistant
- Extreme waterproofing and cable protection

### Direct Smart Sensor Technology (DSS)

Smart Sensors have revolutionised the way our customers manage and maintain sensors. Unlike most other smart sensors, Turtle Tough DSS Sensors directly output a digital MODBUS RTU signal that is universally accepted. This allows the sensor to be directly connected to your industrial network without the need for proprietary hardware (ie such as an analyser).

Turtle Tough also provide state-of-the-art controllers should you require a sophisticated turnkey control solution. Turtle Tough DSS sensors also keep a complete history of performance and diagnostics onboard, providing you with the ability to clean and calibrate sensors offline, by hot swapping sensors.

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## A True All-Rounder: Precision Pressure Transmitter

Jumo Taros S47 P is used for acquiring relative and absolute pressures in liquid and gaseous media. Its excellent active temperature compensation ensures precise pressure measurements and therefore increased process reliability over a wide temperature range.

The robust construction enables protection types up to IP69 allowing use in all areas, regardless of the environmental influences. Default measuring ranges for the Jumo Taros lie between 0 to 100 bar relative pressure and 0 to 40 bar absolute pressure.

The medium temperature can be between -40 and +125 °C. It can even be 140 °C for a maximum of one hour per day. Linearity and long-term stability are both very low at 0.1%. The overall accuracy at 20 °C is at most 0.25% of the measuring span.

The zero point correction can easily be carried out with a magnet. This way, the pressure transmitter delivers reliable measured values over a long time. A wide range of process connections are available for the compact design of the Taros.

Cable fittings M12 x 1 round plugs, line sockets, or terminal cases are available as electrical connections.

One area in which the precision transmitter is used is mechanical and plant engineering. It is also suitable for pumps and sterilizers. Test equipment construction, calibration technology, and laboratories are also area in which the Jumo Taros S47 P has application.



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## Get The Full Value From Your Factory Floor Data With Data Sciences

Industry 4.0 and IIoT have been buzz words for several years and these concepts are actually implemented on more and more machines.

A huge amount of data becomes available: machine data, data of the production process and data regarding the manufactured product. Big Data has entered the factory floor.

Data is easily collected and stored, but in most cases the data pipeline stops here and there is hardly any value extracted from the data.

The data pipeline is often not completed in a proper way so that the right person(s) can easily exploit the value inside the data.

It is a challenge to extract the value from the huge stream of data and not to drown in the flood. Only collecting and storing of data is not enough to monetize the investments in the Industry 4.0 and IIoT infrastructure.

Getting the maximum value out of the data and keeping an overview of data streams goes beyond standard statistical methods and tooling.

Manual analysis and creation of dashboards and reports are not sufficient. The dashboards become too complicated and are not showing the right information at the right time, in the right way, to be able to see at a glance what is going on and to be able to act.

The routines implemented in a normal machine controller to observe the production process and to detect errors can detect present deviations and problems but are not suitable to predict future problems.

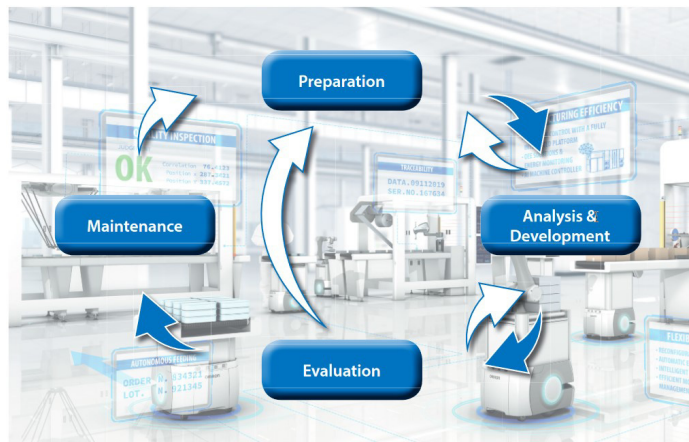
Machine controllers are not suitable to combine all available information and to perform advanced analytics on it.

Most organizations understand the roles and functions of Information Technology (IT), but in the context of its relationship to Operational Technology (OT), it is probably worth expanding.

In simple business terms, IT refers to the application of network, storage, and compute resources toward the generation, management, storage, and delivery of data throughout and between organizations.

Compared with IT, OT is unique in that related hardware and software is historically designed to do specific things: control heat, monitor mechanical performance, trigger emergency shutdowns to name a few examples.

Typically, this is done through industrial control systems (ICS) and supervisory control and data acquisition (SCADA).



While IT and OT have historically made up separate aspects of modern organizations, a phenomenon known as IT-OT convergence is changing that.

Because IoT technology is taking assets not typically connected to the internet — such as assembly line machinery — and bringing them online, enterprises now have the opportunity to create new efficiencies by applying the

intelligence of IT to the physical assets of OT systems. (<https://www.coolfiresolutions.com/blog/difference-between-it-ot/>)

### Transforming data into information

The valuable information needs to be extracted from the data and presented to the right audience, at the right time and in the right way.

The key is to put enough effort into the transformation process of the data into useful information.

This should be done in close collaboration between data scientists, who know how to tame the data, and domain experts of the manufacturing process, who know the story behind the data.

Once data is transformed into information, a solution can be developed that brings value in the long run.

Industrial Data Science is a very fairly discipline and there is no one-size-fits-all solution as of yet. Each solution and application need tailored data analysis and modelling to obtain the maximum result.

Data Scientists at Omron follow a standard approach (Fig. 2) to obtain the best project results and to manage the expectations. The approach is based on the CRISP-DM model. CRISP-DM is the acronym for Cross-Industry Standard Process for Data Mining and is widely used.

It is challenging to use the potential of (big) data. Just collecting it and simply displaying some graphs is not sufficient as demonstrated in this paper.

The valuable information needs to be extracted from the data and presented to the right audience, at the right time and in the right way.

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## Maintaining Backup Battery Systems for Maximum Usage and Reliability

Standby battery backup systems play a critical role in keeping essential operations functional in the event of a utility outage.

Facilities like data centers, hospitals, airports, utilities, oil and gas facilities, and railways can't operate without 100 percent backup power reliability.

Even standard commercial and manufacturing facilities have backup power systems for their emergency systems, alarms and controls, emergency lighting, steam and for control systems.

Most backup power systems use an uninterruptable power supply (UPS) and a string of batteries.

The UPS backs up the digital control system (DCS) to keep control of plant operations until systems can be safely shut down or until the auxiliary generator kicks on.

Although most batteries used in modern day UPS systems are "maintenance free," they are still susceptible to deterioration from corrosion, internal shorts, sulphation, dry-out, and seal failure.

This article outlines best practices for keeping these "battery banks" at optimum performance, so that if an outage does occur, the backup is ready.

### Top two indicators of battery health

#### 1. Internal battery resistance

Internal resistance is a life-span test, not a capacity test. Battery resistance stays relatively flat up until the end of life draws near.

At that point, internal resistance increases and battery capacity decreases. Measuring and tracking this value helps identify when a battery needs replacing.

Only use a specialized battery tester designed to measure battery resistance while the battery is in service. Read the voltage drop on the load current (conductance) or the AC impedance. Both results will be in ohmic values.

A single ohmic measurement is of little value without context. Best practice requires measuring ohmic values over months and years, each time comparing them to previous values on record to create a base line.

#### 2. Discharge testing

Discharge testing is the ultimate way to discover the true available capacity of a battery but can be complicated to



perform. In discharge testing, a battery is connected to a load and discharged over a specified period.

During this test period, current is regulated, and a constant known current is drawn while voltage is measured periodically.

Details of the discharge current, the specified time period for discharge testing, and the capacity of the battery in ampere hours can be calculated and compared to the manufacturers' specification.

For example, a 12V 100-amp hour battery may require a discharge current of 12A for an eight-hour period.

A 12V battery would be discharged when the terminal voltage is 10.5V.

Batteries cannot support critical loads during and immediately after a discharge test. Transfer critical loads to a different battery bank until well after the test is complete and then reconnect a temporary comparably sized load to the batteries under test.

In addition, before conducting the test, prepare a cooling system to compensate for a rise in ambient temperature.

When large batteries discharge, they release a significant amount of energy expended as heat.

Healthy batteries should maintain a capacity above 90% of the manufacturer's rating; most manufacturers recommend replacing the battery if it falls below 80%.

When conducting battery tests, look for these indicators of failure:

- Drop in capacity of more than 10% compared to the baseline or previous measurement
- 20% or more increase in impedance compared to baseline or previous
- Sustained high temperatures, compared to baseline and manufacturer's specs
- Degradation in plate condition

### How to conduct standard battery tests

#### 1. Float voltage

- Isolate the battery or batteries from the charging system and the load.
- Measure the individual cell voltage or string using a digital multimeter or battery analyzer such as on a monthly basis.



## 2. Charger output

- Measure the charger output voltage at the charger output terminals using a digital multimeter or battery analyzer such as the Fluke 500 Series Battery Analyzer on a monthly basis.
- Observe the output current shown on the charger current meter or use an appropriate dc current clamp meter. Measure monthly.

## 3. DC float current

- Refer to manufacturer's specifications for approximate values for expected float currents.
- Use an appropriate dc current clamp meter to measure expected float current on a monthly basis.

## 4. Internal ohmic values

- Use a battery analyzer such as the Fluke 500 Series to measure the individual battery ohmic values on a quarterly basis.
- Establish reference values and maintain in the battery database.

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Product: [bit.ly/3yGJwSJ](https://bit.ly/3yGJwSJ)

# New Sensing Technology Detects Difficult Targets And Reduces The Need For Complex Installation Design



Omron has launched a new E3AS-HL CMOS Laser Sensor<sup>\*1</sup> with industry-first<sup>\*2</sup> sensing technology that significantly improves detection capability. Reliable detection of difficult-to-detect targets helps eliminate the need for time-consuming installation design and adjustment at equipment commissioning.

Detection using conventional reflective photoelectric sensors is affected by the target colour, material, or surface, and human experience and skills are required to design and adjust the sensor installation for each target.

This issue often arises in the automotive and food industries where various targets with complex shapes and glossy surfaces are detected.

The new E3AS-HL CMOS Laser Sensor can reliably detect targets that cannot be detected with reflective photoelectric sensors.

Its industry-first sensing algorithm reaches high-speed sampling at 10,000 times per second and OMRON's unique accumulation processing increases sensitivity by amplifying the slightest amount of light bounced off the target.

The manufacturing technology adjusts the receiver lens position in the sensor to the micro meter<sup>\*3</sup> level, enabling reliable detection of any target colour material, and shape.

These technologies allow the E3AS-HL Sensor to reliably detect curved and irregular shaped glossy automotive parts and multi-coloured and glossy food and packages.

The E3AS-HL Sensor can be used where reflective photoelectric sensors were used and helps significantly reduce the time required to adjust the sensor installation position and angle and the threshold values.

### Key Features:

- Reliable detection of difficult objects reduces equipment design and commissioning time
- Increased equipment design flexibility reduces design time
- Antifouling coating on sensing surface ensures stable operation even in harsh environments (Patent Pending<sup>\*4</sup>)
- OLED display and teaching enable easy, quick, and optimal setting.

(\*1) CMOS laser sensor is a type of reflective photoelectric sensor. It uses the triangulation principle and has a laser emitter and CMOS image sensor receiver.

(\*2) Industry-first Laser Class 1 CMOS laser sensor equipped with an FPGA. Based on OMRON investigation in September 2020.

(\*3) Micrometer is one thousandth of a millimeter. 1 micrometer = 0.01 millimeter

(\*4) "Patent pending" means that OMRON applied for a patent in Japan, and "Patented" means that OMRON obtained a patent in Japan. (As of August 2019)

### Laetitia de Jager

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## Highest Quality Products For Your Fluid System Needs



**F**luid Systems Africa supplies a comprehensive range of the highest quality, lowest cost products for your fluid systems. A complete basket of products assists you in reducing procurement costs and time, while maintaining the highest levels of quality and safety in your facility.

Our customers include the chemical/petrochemical industry, oil & gas, pharmaceutical, energy generation, general industry, gas production and storage, food and beverage manufacturing and more. We cover the entire African Continent with distributors in most locations, and we are distributors in Africa for the following products and brands:

### Universal Analyzers – AMETEK

Universal Analyzers produces gas sample extraction, transport, and conditioning systems for CEMS (Continuous Emissions Monitoring Systems) and process measurement. As part of the AMETEK Thermal Process Management business unit we can now coordinate the interface between the sample probe, the heated sample line, the sample gas cooler and the balance of conditioning components so that all required connections are provided in a single package.

We can simplify your emissions and process gas sample measurements from the extraction point to the analyzer. The Universal Analyzers Model 1221 Distillation Sample Probe is a unique self-cleaning and temperature stabilized primary sample conditioning system for demanding on-line gas analysis applications. It is a direct replacement for the Fluid Data Reflux Sampler used for PyGas Sampling.

### Dekoron Unitherm Heat Traced Tubing

Dekoron Unitherm is the inventor of pre-insulated and heat traced tubing for heavy industry. With over 50 years' experience and more than 100 million feet of product installed, and unlike other manufacturers, Dekoron Unitherm only makes pre-insulated, and heat traced tubing and pipe. This allows us to dedicate all our resources to designing and building state of the art materials for all your industrial applications.

Dekoron Unitherm offers a complete range of products to meet the needs of the Oil & Gas, Power and Food & Pharmaceutical industries. Applications include: steam and condensate delivery, process analysis, emissions monitoring, flexible loading and unloading hoses and process transport piping systems.

### Classic Filters

Classic Filters are a UK based manufacturer with a global distributor network specialising in particulate & coalescing filter housings and elements. Thanks to our highly experienced team of engineers, we have developed some of the most efficient, low-cost filters, producing unparalleled flow rates and extremely low pressure drops.

Whether you need a filter element that's interchangeable with other manufacturers' filter housings, or whether you need a completely tailored, custombuilt solution, we can deliver. What's more, we can deliver quickly. We appreciate the disruption and inconvenience that replacing a filter can cause, which is why we manufacture and deliver our products in super-quick time, to help minimize the impact that this has on your business.

### Advanced Pressure Technology (Aptech)

Advanced Pressure Technology is a manufacturer of gas handling components – primarily pressure regulators and valves. AP Tech's forte are products that deliver specialty gases for high-purity applications. Starting from the source vessel to point of use and into the process tool or equipment itself, AP Tech products are known to deliver gases with uncompromising quality, performance and reliability.

A wide range of gas delivery products are available to address almost every application. From the challenges of a corrosive gas source panel to the fine control required at point of use for process, AP Tech products deliver high performance under pressure.

### Aplisens Process Instrumentation

The Aplsens company was founded in 1992 with the main factory and headquarters located in Warsaw. From the beginning we have concentrated on high quality process instrumentation including electronic pressure and differential pressure measurement technology such as differential pressure transmitters, hydrostatic level probes, level transmitters, valves digital indicators, power supplies, separators, and gauges.

Our mission statement has always been high quality, high flexibility, and total support to our customers. The constant development, high-tech production and ISO 9001 management system are the best warranty of quality of our products.

### Medenus Gas Pressure Regulation

Since 1972, Medenus have been at your disposal as specialists for gas pressure regulators, safety shut-off valves, safety relief valves and cellular gas filters and more. Applications such as Hydrogen generation and handling, Industrial burners/furnaces, gas trains, gas engines, steel and aluminium production, food & beverage, glass, pharmaceutical and chemical plants. Instrument valves, fittings tubing and accessories.

We offer a comprehensive range of TUV, DNV, ASME, ISO and PED approved instrumentation products including double ferrule compression fittings and tubing, valves, PED approved relief valves and accessories.

**Stuart Harvey**  
**Fluid Systems Africa**  
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**stuart@fluidsystemsafrika.co.za**  
**www.fluidsystemsafrika.co.za**

## Multi-Application Guided Wave Radar Level Transmitters



**K**obold's NGR is a robust, maintenance-free level sensor that uses TDR technology (time domain reflectometry) for the precise level measurement and monitoring of oil- and water-based liquids, grinding and hydraulic oils as well as mixtures with cleaning, degreasing and care products. The NGR can also work in deposit-forming and foaming liquids.

The NGR's guided radar uses time-of-flight technology to measure electromagnetic pulses. The time difference between the sent pulse and the reflected pulse is used to calculate the level, both as a continuous value (analogue output) and a free position switching point (switching output).

The flexible probe can be changed or cut, allowing the sensor to be integrated quickly into any application. The NGR sensor's intuitive setup uses four buttons and a display to ensure quick and easy adaptation to the application.

The NGR operates on a modular sensor concept, adaptable for every application and suitable for almost every liquid. The measuring principle is independent of the medium's density, temperature, pressure, humidity and conductivity.

### Kobold NGR key features:

- Measures liquids
- Temperature range: -20°C...+100°C
- Pressure range: -1...+10 bar
- Output: 4-20 mA/0 – 10 bar switching output PNP or NPN
- Probe length: max. 2000mm for monoprobe and coaxial tube max. 4000mm for wire rope.

### Instrotech

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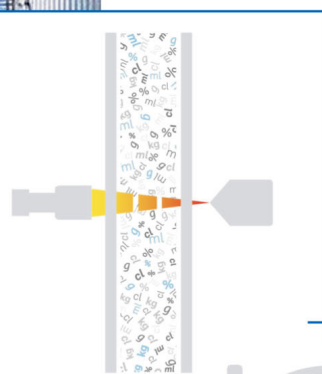
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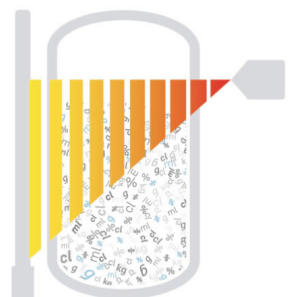
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## Load Cells and Weigh Modules

VPG (VISHAY) Transducers Technical Note

### WIND FORCES

The effects of wind are very important in selecting the right load cell capacity and determining the correct mounting device to use in outdoor applications. In analysis, it must be assumed that the wind can (and does) blow from any horizontal direction.

The Figure shows the effects of wind force on a vertical tank. Note that not only is there force distribution against the tank on the windward side, but also a "suction" distribution on the leeward side.

These forces tend to be cumulative and can tip the vessel over in the direction of the wind.

On the sides of the tank, the forces are equal in magnitude but opposite in direction, resulting in no effect on the overall stability of the vessel.

#### Air Velocities of Wind

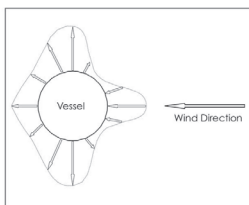
The maximum air velocity of wind is depending on the geographical place and height and the local situations (buildings, open field, sea, etc.).

A National Meteorological Institute can provide more statistical data to determine how air velocity should be taken into account.

#### Calculation of Wind force

The installation is mostly affected by horizontal forces, acting in the direction of the wind. These forces can be calculated by:

$$F = 0.63 * cd * A * v^2$$



Description	Beaufort	km/h	mi/h	m/s
Normal wind	4	19.8 - 28.8	12.4 - 18.0	5.5 - 8.0
Strong normal wind	5	30.6 - 37.8	19.1 - 23.6	8.5 - 10.5
Strong wind	6	39.6 - 48.6	24.8 - 30.4	11.0 - 13.5
Very Strong	7	50.4 - 59.4	31.5 - 37.1	14.0 - 16.5
Stormy	8	61.2 - 72.0	38.3 - 45.0	17.0 - 20.0
Storm	9	73.8 - 84.6	46.1 - 52.9	20.5 - 23.5
Heavy storm	10	86.4 - 99.0	54.0 - 61.9	24.0 - 27.5
Very heavy storm	11	100.8 - 113.4	63.0 - 70.9	28.0 - 31.5
Hurricane	12	115.2 - 180.0	72.0 -	32.0 - 50.0

Calculation of wind force

where,

$cd$  = Drag coefficient, for an upright circle cylinder this coefficient equals 0.8

$A$  = Exposed , equals the height of the vessel\* bore of the vessel (m<sup>2</sup>)

$h$  = Height of the vessel (m)

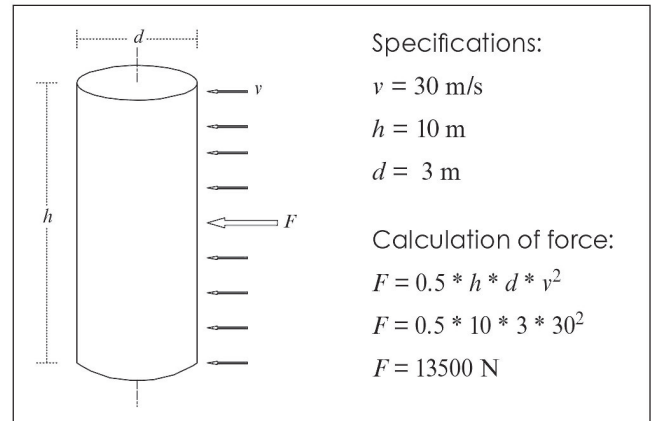
$d$  = Bore of the vessel (m)

$v$  = Air velocity of wind (m/s)

$F$  = Force generated by the wind (N)

Hence, for upright cylindrical vessels, the following formula can be used:

$$F = 0.5 * A * v^2 = 0.5 * h * d * v^2$$



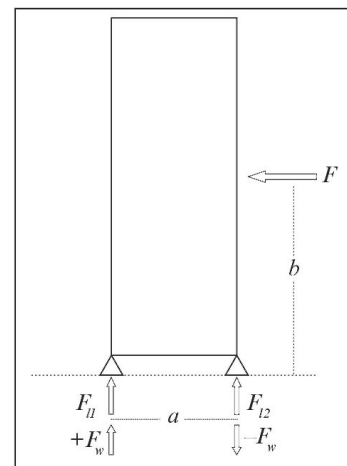
Cylindrical vessels wind force calculation

#### Conclusion

- The installation should be protected against capsizing.
- Wind force should be taken into account during load cell capacity selection.
- As the wind does not always blow exactly horizontally, a vertical component could cause a measuring error, by an arbitrary zero shift. Errors bigger than 1% of the net weight can only be expected with very strong wind >7 Beaufort.

#### The Effect on Load Cell Capacity and Mounts

The effect of the wind force on the load cells is different from that to the vessel. The wind force causes a capsizing moment, which will be counteracted by the reactive moment of the load cells.



Effect on load cell capacity and mounts

$F1$  = Force on the load cell

$Fw$  = Force caused by wind force

$a$  = Distance between load cells

$F * b = Fw * a$

$F = (Fw * b) / a$

Which will cause an increase  $Fw$  of  $F1$  and a decrease in  $Fw$  of  $F2$ .

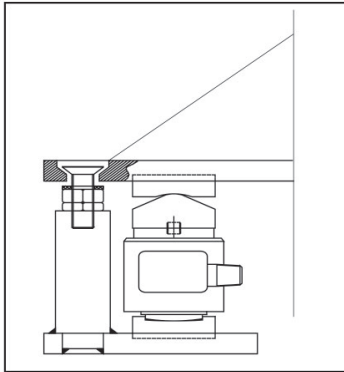
# Industrial Weighing & Loadcells ...

Using a calculated wind force of 13500 N and a value for b which is approximately half the height of the vessel, Fw can be calculated by:

$$F_w = (F * b) / a = (13500 * 5) / 3 = 22500 \text{ N}$$

## Conclusion

- In the case of an empty vessel, uplift protection should be considered if the tare weight of the vessel on each load cell is smaller or equal to 2250 kg.
- In the case of a fully loaded vessel, 2250 kg should be added to the calculated load cell capacity to provide the load cells from being overloaded.
- It is common practice to multiply the calculated wind force on a load cell with a safety factor of two (2) or three (3).



If the mount does not offer uplift protection, one may be established externally as per the drawing opposite. The uplift protection should be adjusted with a clearance of at least 1 mm and requires regular inspection of this clearance.

*External uplift protection*

## Load Cell Capacity Selection

The selection of which capacity to use in a weighing application should be based on the following factors:

- Determine the maximum weight of the applied load, or "Live Load".
- Calculate the weight, "tare", of the construction, or "Dead Load".
- Determine the number of load cells to be used in the structure (N).
- Check the possible presence of unequal loading conditions (factor fa). This factor is an allowance for low tare estimates and unequal load distribution. Standard: fa = 1.3.
- Check on extra factors like vibration, shock, etc. (factor fb). This factor is a dynamic load factor; for static weighing fb = 1.
- Calculate Fw (in Newton!, not in kg). The individual minimum load cell capacity can be calculated by:

$$F_w + (f_a * f_b * (\text{LiveLoad} + \text{DeadLoad})) / N$$

## Accuracy

The specifications illustrated on the load cell datasheet should be the basis for calculating the accuracy of a non-approved weighing system.

The accuracy of a weighing system which must be approved by the "Weights and Measures" has to meet a relevant OIML recommendation. For example, non-automatic weighing systems have to meet OIML R 76-1 edition 1992 (E).

Instrotech represents VPG (Vishay) Transducers, combining fifty years of load cell manufacturing with fifty years of application know-how.

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## WEIGHING & CONTROL CC

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## APPLIED WEIGHING INTELLIGENT JUNCTION

Monitoring load cell weighing systems for error or fault conditions



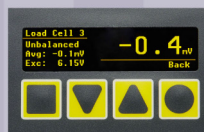
Can be used in place of a standard junction box and does not require an external power supply.



The bright OLED graphical display shows the millivolt output from each load cell, with the facility to view individual load cell outputs, average load cell outputs and excitation voltage.



Up to 4 load cells can be individually monitored per junction box. Fault conditions are displayed on the front screen and a 'healthy' volts free relay contact is available for external connections.



www.dcweighing.co.za  
 www.dclabour.co.za  
 Tel: +27 78 831 1199

Unit 2, 23 Dakota Crescent, Airport Park, Germiston

## The Intelligent Load Cell Junction Box – Total Peace of Mind

The Intelligent Load Cell Junction Box will help guard a weighing system from performing incorrectly and giving a wrong weight. Incorrect weighing will cause any number of manufacturing problems, including lost profits.

A weighing system that is not performing correctly is usually caused by either:

- A faulty or damaged load cell
- An imbalance of the weighing system where the weight isn't seen equally by all the load cells
- Load cell cable break

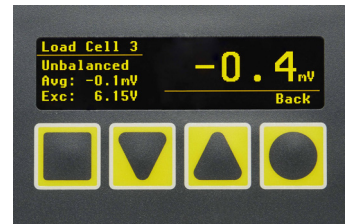
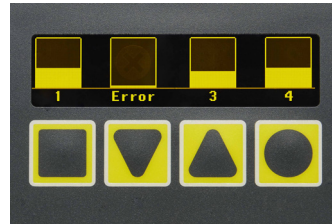
A standard load cell junction box simply terminates 3 or 4 load cell cables in to one signal cable. The AW190 Intelligent Junction Box Unique to Applied Weighing – does so much more:

- No external power supply needed
- Up to 4 load cells can be monitored per junction box
- Faults are displayed and reported via a 'healthy' volt free relay contact and CAN Bus output
- Monitors alerts when load cells are out of pre-configured range
- Out of balance
- Avoid inaccurate weighing which can cause potential over fill or running out of material

Daisy chain up to 8 junction boxes to monitor up to 32 load cells and send just one cable back to weight instrumentation. The AW190 can give a relay output that can be used as an alarm to other types of control instrumentation.

Used in conjunction with Applied Weighing's Target 260 Amplifier Status 290 Weight Indicator / Controller and AW 560 Weight Indicator / Controller individual load cell faults and locations can easily be seen on the weight instrumentation displays.

The AW190 can also be used in conjunction with the Teleonix 2 remote monitoring system. The Teleonix 2 web page will display the individual load cell status and will alert the user to any load cell faults. An email is issued instantly highlighting the fault and identity of the load cell that requires attention.



### Features:

- Easy monitoring of individual load cell conditions to identify a potential problem.
- Monitor up to 32 load cells with no external power supply required.
- Monitors for Load cell out of range, out of balance and cable break faults.
- 'Healthy' relay output identifies load cell faults.
- Robust design for harsh industrial applications, sealing rating up to IP65.
- DIN rail or stainless steel (IP66) enclosure versions are available.
- Bright OLED display for easy viewing in all lighting conditions.
- CAN BUS for interfacing to weight indicators in our range.

**Jose Da Costa**

**DC Weighing and Control cc**

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# Industrial Weighing & Loadcells ...

## Speeding Up Automated Manufacturing With Extremely Fast Weighing Transmitter



**P**roduction industries demand faster machines that provide more real-time control over high-speed industrial Ethernet networks.

Smart automation technologies fulfill this

demand and provide cost savings, secure processes and high throughput.

METTLER TOLEDO's IND360 boosts machine productivity by delivering precise and accurate weight to an automation network at 960 cycles per second to vastly improve weight-based control algorithms.

Advanced condition monitoring, heartbeat, and Smart5™ NAMUR NE107 prioritized alarming ensures that quality is never jeopardized due to undetected errors.

### Boost productivity with faster weighing performance

Faster weight processing with IND360 makes PLC/DCS operation more efficient by allowing users to cyclically select and consume seven floating-point variables and scale status over PROFINET, EtherNet/IP and ProfibusDP all in real time.

Faster PLC control allows significant increases in machine speed and throughput without sacrificing quality. Many control variables are available for every range of application.

### Smartest way to integrate weighing

IND360 works with all strain gauge scales and smart devices like high-precision bench scales, floor scales, POWERCELL® weigh modules, and scales that facilitate weighing from 11 grams to 1000 tons.

Easy configuration through a local or remote web interface enables automatic scale adjustment. A complete system is setup up in minutes; "setup-cloning" expedites integration of multiple devices used in a ring topology.

### One solution for a multitude of workplaces

IND360 is available as a transmitter or an application controller with built-in control functions with local discrete I/O and analog output, making it one of the most versatile products for most weighing processes. All functions may also be controlled by the PLC or DCS for full flexibility.

### Global compliance

Global approvals, which enable cross-border consistency, include OIML, NTEP, CPA (metrology); FCC, CE (EMC); IEC/EN61010, UL (safety).

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SCAN ME

## Choosing Pulse Valves That Improve Dust Collector Performance

Michael Russo, Product Marketing Manager, Dust Collector Systems at Emerson

Pulse valves with high peak pressure and quick valve response time can boost overall dust collector system efficiency, which is critical for effectively removing dusty particles from process environments.

Dusty particles are found in nearly all process facilities, either as products, such as seasoning or medical formulations, or byproducts, such as limestone dust. Whether in the food and beverage, pharmaceutical or aggregate industry, they move through a plant during production, where they can enter the surrounding environment and coat equipment, collect on the floor or hover in the air. When hard-to-contain dusty particles accumulate in this way, they can contaminate or damage equipment or lead to slip and fall injuries, inhalation exposure and even explosions if the material is combustible. To prevent safety risks and equipment damage, many processing facilities rely on dust collector systems to remove particles from the working environment.

In order to effectively remove a full range of particulates, from sugars to rocks, dust collector systems must operate efficiently. Like any other machine on the plant floor, dust collector efficiency is determined by the performance of the components that comprise it, and certain components make a bigger impact than others. One critical component that directly affects dust collector performance is the pulse valve.

### The role of the pulse valve

To understand exactly what a pulse valve does, it's helpful to consider how reverse pulse jet dust collectors work. When a dust collector is in operation, it draws dusty particles onto its filters. As particulates accumulate, they compress into cakes. When cakes become thick and dense, they block filters, reducing the dust collector's efficiency. In order to continue removing dust particles from filters, a line of pulse valves, in turn, periodically emit a blast of compressed air that sends a shockwave through the filters. When the shockwave hits dust cakes, it causes them to crumble off filters and collect in the hopper.



*The efficiency of dust collector systems, like the ones found at this furniture plant, depends on the quality and performance of their pulse valves.*

Pulse valves, then, are the critical components that deliver the blasts of compressed air that continually clear filters and free them up to collect more particulates.

Some dust collector systems may have a few pulse valves, while others may have more than 50; the number depends on the size of the collector, and the frequency of compressed air activation depends on the needs of the application.

### Peak pressure and valve response time determine efficiency

While the number of pulse valves and frequency of activation can certainly affect dust collector efficiency, it's *how* pulse valves deliver that blast of air that really matters. This is determined by a pulse valve's peak pressure and valve response time. Peak pressure is the force that affects the air blast's speed and power. Valve response time is the time it takes the pulse valve to open and close, which controls the duration of the air blast and influences peak pressure.

If a pulse valve provides inadequate peak pressure and slow valve response time, the force of the compressed air and resulting shockwave will be too weak to completely break up cakes and will leave residue on the filters. Saturated filters are not as efficient as clear filters, and the dust collector system must work harder to compensate. This inefficiency increases the frequency of filter replacement and can prematurely wear system components, raising maintenance costs and creating downtime. Yet, if a pulse valve provides too much peak pressure and a slow valve response time, the overpowering strength and duration of the shockwave can destroy more than dust cakes — it can damage filters. This, again, increases filter replacement, downtime and related maintenance costs.

Pulse valves that provide optimal peak pressure and have a quick valve response time issue the precisely controlled burst of compressed air that is required to effectively remove dust cakes, which improves overall dust collector system efficiency,



*The ASCO™ Series 353 Pulse Valve has a one-piece diaphragm design and patented quick-mount clamp connection.*



*The ASCO™ Series 335B Tank System is designed for use in dust collector applications requiring highest peak pressure and more effective filter cleaning.*



extends component and filter life and lowers maintenance costs. The design of a pulse valve can affect peak pressure and quick valve response time. While most conventional pulse valves use closing springs, some new pulse valve designs use a one-piece diaphragm. The single-piece design permits airflow to travel beneath the diaphragm instead of over a wall, allowing it to flow faster and more freely. This new design offers a response time of 8 to 14 milliseconds and provides a 14% increase in peak pressure over legacy pulse valves.

#### The additional benefits pulse valves offer

In addition to improving dust collector performance, pulse valves can increase efficiency in other ways, too. One way is by using less compressed air. Compressed air can be quite expensive for processing facilities, and plants that have multiple dust collector systems may use a lot of it. The length of time the valve is open determines how much compressed air is used. Pulse valves with quick valve response time use less compressed air than pulse valves with slow valve response time. In a dust collector with 40 pulse valves, the high flow and fast valve response time of single-piece diaphragm designs use about 15% less compressed air than pulse valves with standard designs.

While all processing facilities have the opportunity to minimize compressed air use, the opportunity to see substantial energy savings grows the more pulse valves a plant has. Online valve manufacturer tools or consulting services can help calculate a processing facility's approximate compressed air savings.

Another way the one-piece diaphragm design improves efficiency is by streamlining installation and maintenance. It is in any OEM or plant manager's best interest to keep time required for installation and maintenance as short as possible to minimize downtime and costs. A valve's connection and part count determine how quickly and easily it can be installed and maintained. Certain connections may require special tools or additional sealing, and high part counts take more time to disassemble and reassemble. Even if it's planned, downtime can add up quickly in facilities with large dust collector systems and hundreds of pulse valves.

Conventional pulse valves have threaded or dresser connections, which require a wrench for tightening, and a spring-loaded diaphragm that may contain washers, islets and rivets that must be installed and serviced. Springless, one-piece diaphragm designs have only one part to service and feature a quick-mount clamp connection that quickly, easily and securely connects to pipework, reducing installation time by 60% compared to threaded and dresser connections.

In addition to minimizing *planned* downtime, pulse valves can minimize *unplanned* downtime. For facilities that operate in locations subject to extremely low temperatures, some pulse valves fail when it gets too cold. Pulse valves with a wide temperature-performance range offer reliable, long-term dust collector operation even during the coldest days. There are now pulse valves with operating ranges from -40 F (-40 C) to 284 F (140 C).

#### Selecting pulse valves that make a difference

In processing facilities, dust collector systems must reliably operate to remove particulates before they collect and become safety hazards or damage equipment. Pulse valves are a key component that can improve dust collector system performance and efficiency, as well as that of the plant at large. By knowing what to look for, OEMs, engineers or purchasing managers can choose pulse valves that improve dust collector system performance, extend component and system life, reduce air consumption and streamline installation and maintenance.

To access these benefits, it's important to work with a supplier who offers a comprehensive range of dust collector solutions, including monitoring and diagnostic options, that meet all approvals, ratings and certifications. Suppliers who offer technical support, quick shipments and short lead times can provide recommendations, troubleshoot issues, answer questions and help OEMs keep processes moving. Through the right partnership, OEMs can provide their customers with greater value, and facilities can enjoy greater efficiency and a cleaner, safer work environment.

**Giles Wilcox**

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## Universal And Precise Conductivity Sensor With Maximum Chemical Resistance To Highly Oxidizing Media



The SE 656N toroidal conductivity sensor is a sturdy and corrosion-resistant sensor that, thanks to its high chemical resistance and durability when exposed to aggressive media, is particularly suitable for applications in the chemical industry.

A combination of a large sensor opening and dirt-repellent material prevents blockages and deposits in media with a high pollution degree.

The inductive measuring principle enables full galvanic isolation of the measurement from the medium.

The sensor is an all-rounder, suitable for a multitude of applications with a range covering six decades.

Equipped with Memosens protocol as a digital version, it offers considerable process and data security, and ensures reliable data recording.

### Applications

Concentration measurement, in particular of highly oxidizing acids and bases, online quality monitoring of chemical products in tanks and pipes, phase separation of product mixtures, paper manufacturing (high fiber concentration), heavily soiled media and wastewater, fouling media.

### Facts and Features

- Process-wetted material: PFA
- Sturdy design
- Resistant to contamination and fouling
- Range of six decades
- Inductive measuring principle, full galvanic isolation of sensor coils from process medium
- Digital with Memosens protocol.

**Henning Springer - Mecosa (Pty) Ltd**

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**measure@mecosa.co.za**

**www.mecosa.co.za**

## Kinetrol Extends its Actuator Product Range with the Addition of the Model 60



Kinetrol Limited, the UK manufacturer of quarter-turn pneumatic actuators, has further increased its product portfolio with the introduction of the Model 60.

The new unit, which joins the wide range of actuators already manufactured by Kinetrol, increases the company's torque output coverage to over 40,000 Nm (350,000 lbf.in) to include 16" engineered ball valve and

new end-stop design, extends the actuator's life, reduces its energy consumption and maximises its operating speed.

As with their existing actuator range, the new Model 60 benefits from Kinetrol's popular modular concept of control accessories. This allows the customer to choose from a range of options such as the AP (pneumatic), EL (electropneumatic) and DP3 positioners, safe and hazardous area limit switch boxes and the company's distinctive clock-type spring failsafe packs.

The new unit is subjected to rigorous quality and test procedures and carries a guarantee for up to 1 million cycles'.

Compared to traditional actuator types of this size, Kinetrol's Model 60's output torque, in double acting applications, is uniform across its operating cycle, facilitating more optimal sizing and providing a very compact solution.

In addition, Kinetrol's spring design, for single acting applications, results in much lower torque output losses - further enhancing compactness and eliminating spring fatigue failure.

A technical data sheet for the new Model 60 is available on the company website.

2m butterfly valve applications.

The Model 60 is currently the largest actuator in the Kinetrol collection, adding to the sixteen units already available, starting at 0.1 Nm.

The unit is a single vane actuator, giving 'direct drive' rotary control. The one moving part construction minimises side loading, eliminates axial loading and increases life expectancy.

The Model 60 also utilises Kinetrol's preloaded, double-opposed, polyurethane lip seal and air consumption reducing/energy absorbent side plate technologies. This, coupled with a

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## Point And Shoot Laser Distance Meter



The Fluke 417D is an accurate, durable, point and shoot laser distance meter, designed for indoor and outdoor, dusty and wet conditions.

The easy, one-button operation means users can minimize time taken by measuring, while the Fluke brand assures the quality and reliability of measurements taken.

And, with simple function buttons, three different measurement tasks can be completed quickly and easily.

The extra bright laser is clearly visible, so the target point can always be seen, even if the target object is in a hard-to-reach spot, or at a long distance.

The 417D has a large 2-line illuminated LCD screen and three-buttons for easy-to-use one-handed measurements.

### 417d's Features And Benefits:

- Measures up to 40 m (accuracy of 2 mm)
- 1 button instant distance measurement
- Quick calculation of area (square meters)
- Continuous measurement capable
- Battery life 3 000 measurements and improved by 'auto shut-off'
- 1-meter drop tested
- IP54 dust and water resistant
- 3-year warranty

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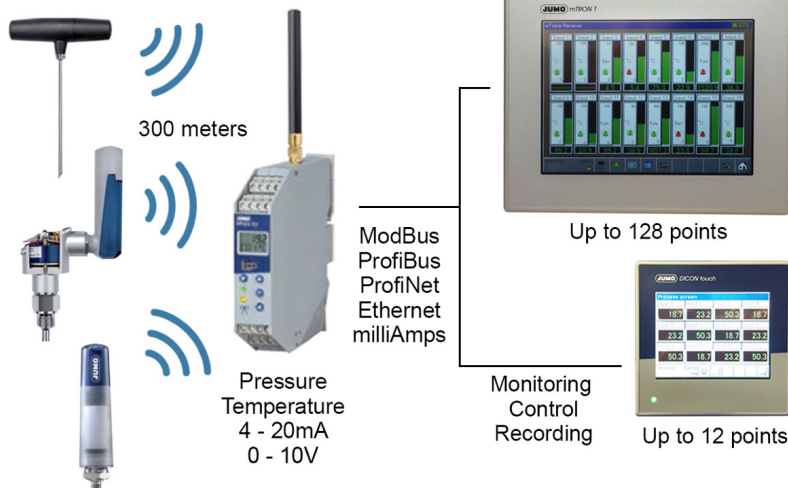


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