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**WHAT'S NEW IN
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MAY 2015**

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ARE YOUR

COMPRESSED AIR COSTS

INFLATING YOUR OVERHEADS?   *Martin Bevis**

Most industrial manufacturers use compressed air as part of their process. While the cost of providing this service is not as high profile as refrigeration or the raising of steam, it represents yet another overhead to the business and if not managed correctly is probably the most inefficient use of electrical power on your site.

Consider this: Of the electrical power consumed by the air compressor motor, only approximately 10% of that energy is used to compress the air itself, while the remaining 90% is converted directly into heat.

There is nothing that can be done about the physics that leads to this situation; however, most of this heat can be recovered. While you would not have chosen to use electrical power to provide the equivalent heat energy, it represents the only sensible option to recover some of the dollars you have spent on the electrical power to generate that heat in the first place.

Consider further then, of the 10% of the energy that is usefully converted into compressed air, how much of this air is now wasted through leaks in the distribution system?

A leakage rate of 20% is not uncommon in industrial plants that have not been audited or don't have a regular maintenance regime. Therefore, at this rate of leakage, only 8% of the original electrical power input to the air compressor system has been converted to usable compressed air.

This situation can quickly swing even further out of balance if you are not considering each of the following areas in your general utilities audit.

Air leaks

A leak reduction program is the most cost-effective means of reducing compressed air costs. A 20% leakage rate means an additional 20% electrical energy is being consumed unnecessarily.

An easy starting point to establish if there is an air leak problem is to carry out the following check:

1. Switch on an air compressor when the site is unoccupied - there should be no legitimate air consumption on the plant.
2. Assuming the compressor is the onload/offload control type, when the system has reached normal operating pressure, record the time the compressor is actually on load over a period of approximately 15 minutes.
3. From this, calculate the compressor onload percentage by comparing the onload time with the offload time. You then multiply this figure by the capacity of the compressor that is running. This is the volume of compressed air that is being constantly wasted due to leaks.

Note that this does not tell you where you are losing the air, just that you have a problem.

Determining where the leaks are would require the engagement of a specialist company to survey the complete compressed air system or the hire of an ultrasonic leak detector to carry out the leak audit in-house. From the leak audit an action plan should be put together to fix the problem.

Examples of areas for attention include:
- filter bowls, where the drains may be stuck open;
- auto drains, stuck open;
- pneumatic quick-fit connectors;
- flexible PVC air lines;
- temporary air lines which have become permanent;
- incorrect fittings used, hoses are held fast with hose clips;
- compressed air used to cool motors or to provide control cabinet pressurisation etc.

Prior to purchasing additional compressors based on the underperformance of your existing compressed air plant, it is recommended that you carry out an air leak audit and action a repair program. You may find that you don't need that new air compressor after all.

Heat recovery

Before any heat recovery project is justified, the true air demand of the plant must be established - that is, all air leaks fixed. If this is not done beforehand then the project will be flawed due to the incorrect power consumption of the air compressor giving inflated heat recovery figures at the expense of wasted electrical power.

With air compressors there are two main options - utilise the hot air directly

Fluid power

Estimated diameter of leak in mm	Estimated leakage at 7 bar system pressure (l/sec)	Est. cost per kWh of electricity in $	Annual running hours of compressed air system	Annual cost of leak in $
0.5	0.2	0.15	8000	100
1.5	1.8	0.15	8000	900
3	7.1	0.15	8000	3550
6	28	0.15	8000	14000

Table 1: Indicative annual costs for air leaks.

from the machine or install additional heat exchange equipment and recover the heat from the compressor oil. If the hot air can be used all year round, such as in a process application, or as preheated air into a boiler burner air intake, this ensures that the heat is fully utilised and will give the best payback.

Factory space heating is another use but cannot generally be used all year round; and in the summer months the hot air would have to be ducted to the outside. This still offers a payback but not the best. Also, if you intend ducting hot air from a compressor an additional duct-mounted fan may be required as the compressor fan is only sized to transport the hot air a short distance away.

Recovery of heat from the hot oil heat exchanger is likely to offer more options as it can be used to generate a hot water stream that can be used in many applications such as domestic washing water, process hot water or as boiler hot well make-up.

Location of air compressors

Air compressors should be located in the coolest and cleanest area available. This is because the cooler the intake air is, the more efficient the compression. A drop in temperature of the intake air by 4°C will reduce the power consumption by 1%. The clean air input ensures the minimum of pressure drop across the intake air filter before it is changed under the service regime and therefore assists with the overall efficiency of the machine.

Air drying

The air should always be dried after compression and before delivery to the plant. The purpose of this is to remove the many litres of acidic water and oil that would end up in the compressed air system and ultimately into the pneumatic systems of the shopfloor equipment. Not only will this moisture corrode and damage the machinery pneumatics, but where there is venting of compressed air within machinery control panels the moisture in the air will condense and potentially damage any electrical equipment sharing the same panel.

After the compressor the air should always be fed into an air receiver with the infeed near to the bottom of the receiver and the outfeed near to the top. The receiver provides two functions - firstly it provides a reservoir of air to smooth out demand peaks but it also provides primary moisture removal prior to the air dryer itself.

The receiver should be fitted with an auto drain to regularly and consistently remove the accumulated moisture. The airline out of the receiver should be fitted with a coarse-type, auto-drained filter before the air reaches the dryer.

The two common choices for air drying are fridge drying or desiccant drying. A fridge dryer will dry the compressed air to a dewpoint of approx. 3-4°C. If the environment that the air is to be used in is colder than this, then a desiccant-type dryer is recommended as moisture will condense in the compressed air stream if it cools below the 3-4°C.

The desiccant type is more expensive to purchase and run so unless the superior drying effect is actually required then the fridge dryer is the best option. Typically a fridge dryer will add 3% to system running costs and a desiccant dryer between 8 and 15% dependent on the type. Due to the costs associated with desiccant drying, it would be wise to consider whether or not locally installed desiccant dryers can be used at low temperature points of use rather than for the complete site, where the fridge drying standard may suffice for most applications.

After the dryer a fine-type, auto-drained filter should be installed in the airline to provide a final clean-up for the compressed air delivered to site.

VFD control

More machines are now being offered with VFD control as a means of controlling the speed of the screw and hence matching the output accurately to the factory demand. These machines cost more but are a worthwhile investment as the air pressure control is superior to an onload/offload control machine, which can have benefits to shopfloor processes, and they are more energy efficient at part loadings.

The motor fitted to an onload/offload machine can still typically consume 20-25% of full load power when it is in offload mode or 'running light' - so these machines are not energy efficient when run at low loads.

If it is likely that the machine will always run at 100% then the extra cost of the VFD control will provide little benefit and the onload/offload type will be the best choice as it will always be running at maximum load and therefore maximum efficiency.

A combination of onload/offload machines for the base loading and a VFD machine for the topping up of the compressed air volume is not uncommon where there are multicompressor installations.

System air pressure	Pipe bores					
	15 mm	20 mm	25 mm	40 mm	50 mm	65 mm
400 kPa	15.4 litres per second	23	44	135	260	410
630 kPa	23.4 litres per second	35	65	200	390	620
800 kPa	29.3 litres per second	44	83	255	490	780

Table 2: Maximum recommended airflow rates in steel pipe.

System operating pressure

It is important to establish the lowest pressure that your compressed air system requires, as running it at an excessive pressure will increase your energy costs. A reduction in the generated pressure by just 100 kPa will reduce the power costs by 7%.

The excessive pressure settings may be required due to undersizing of the distribution system and a lack of attention to major pressure drops. In the case of the latter, the system design should be reviewed and modified so the energy savings from the reduced system pressure can be realised.

Compressed air pipework

The compressed air distribution system should be designed to minimise air pressure losses. If this is not the case then the compressors may have to be run at an elevated pressure to combat these losses.

Table 2 gives the maximum recommended airflow rates in a steel pipe distribution system at a range of system pressures and pipe bores. Exceeding these indicated volumes will cause undue pressure losses.

The ease of installation and lower costs of a plastic pipework air distribution system compared to a metal pipe system are also an attractive proposition. However, there are some safety points to be considered first with plastic pipework. Never use PVC pipework or fittings on a compressed air service, regardless of whether the pressure rating is suitable. PVC is too brittle to be safe for this high-pressure service and people have been injured by high velocity shards of shattered PVC when the line or fitting fails under the compressed air pressure.

When choosing a plastic piping system, check with the manufacturer that it is compatible with the type of oil being used in the air compressors on-site. There is a history of synthetic compressor oils degrading plastic pipework systems, ultimately leading to failure. Not all plastic pipework systems are suitable.

Incorrect applications for compressed air

There are applications on the shopfloor where compressed air is used as part of the process rather than to operate pneumatic valves or cylinders on production machinery. Such applications may include product cooling, product drying or air knives to remove water from product. In these cases the use of high-pressure air reduced in pressure to suit the process requirements is wasteful. These processes, if significant, should be reviewed to see if a low-pressure blower might provide a more economical solution to the air requirements than using compressed air.

System controls

Too often air compressors are left running over weekends or public holidays because it is nobody's responsibility to turn them off, and so air is being produced unnecessarily for long periods of time, wasting electricity and burning up the working life of the compressor.

If you cannot link the air compressors to your building management system (BMS) or control system, then install a digital 24-hour, 7-day timer to the compressors so they are shut off when not required. Air compressors are easy for an operator to start when the air is required again and distribution systems charge up quickly if

adequate capacity is installed. Your compressor supplier may even offer a dedicated equipment controller to achieve the same goal automatically.

Sometimes the air demand profile is significantly lower but still required at different times of the week, such as nights or on weekends - when base demand may be much lower when there are only a few people working. A small compressor devoted to this low-demand duty is worth consideration.

The installation of a flow meter linked to the BMS or a chart recorder will provide the information required to determine the low-demand profile and, more importantly, the extent of that demand, so the cost and benefits of an off-peak machine can be calculated.

Conclusion

Compressed air is the invisible piped service. You can't see it, nor can you smell it. On a busy factory floor you would be hard pressed to even hear it. But if your compressed air system is not correctly managed you will most certainly feel it.

It is a vital service to most plants and is expensive to generate. Careful design and regular attention to the system will ensure that your operating costs do not blow out.

*Martin Bevis is one of Wiley's Senior Process Engineers and has worked on a diverse range of food manufacturing projects in the United Kingdom, Europe and Australia.
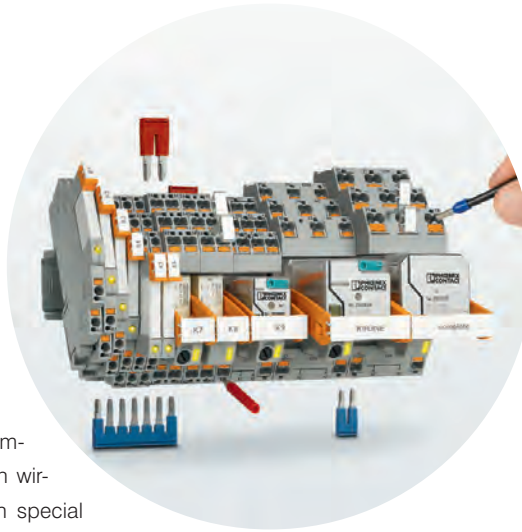
RELAY SYSTEM

Whether isolation, multiplication or amplification signals are required, the field of application of the RIFLINE industrial relay system ranges from coupling and timer relays to a replacement for small power contactors. The relay system with universal plug-in design supports quick, easy and error-free handling.

All standard relay applications can be accommodated, with easy handling due to the modern wiring and potential distribution concept. A plug-in special function module also allows easy extension to a timer relay.

The complete product range covers all standard relay applications in a reliable system for high machine and system availability. RIFLINE is available as a complete module or modular system.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au

HEAVY FUEL VISCOSITY METER

The Micro Motion Viscomaster is a heavy fuel viscosity meter (HVFM), the next generation of the Emerson Micro Motion 7829 Viscomaster direct insertion viscosity and density meter. Making use of the same rugged tuning fork design as its predecessors, the HFVM incorporates a robust low friction diamond-like carbon (DLC) coating that is designed for tackling the most demanding of process applications such as marine heavy fuel oil (HFO) combustion control, marine gas oil (MGO) viscosity control and land-based fired heaters.

The head-mounted transmitter is hazardous area approved and has the flexibility to connect to control systems via a wide range of digital and analog protocols. System integration and start-up commissioning costs are significantly reduced due to the support from 4-20 mA, HART, WirelessHART and RS485 Modbus communications. The HFVM accepts and processes external signals from other field instrumentation such as temperature and mass/volumetric flow devices, enabling the meter to calculate and output enhanced process measurements while minimising installation and cabling costs.

The Viscomaster HFVM is designed to help solve problems such as maximising engine power output irrespective of fuel quality variations, optimising HFO/MGO cut-over times and reducing fiscal exposure through improved NO_x/SO_x management.

The HFVM also incorporates a diagnostic capability called Known Density Verification that checks the meter for measurement alarm conditions, sensor integrity and the presence of coating, erosion or corrosion. This technology expands the diagnostic information available in critical viscosity and density measurement applications, which can result in significant maintenance cost and cycle time reductions.

Emerson Process Management
www.emersonprocess.com.au

BATCH RECIPE MANAGEMENT

Schneider Electric has released an updated version of its Wonderware Recipe Manager Plus software. Designed specifically for food and beverage and any other batch manufacturer, the updated software will speed up and optimise how recipes and recipe variations are adopted and how products are brought to market.

The product provides easy-to-use recipe formula management in a secure, web-based client/server environment. Flexible integration and connectivity enables formula parameter download to any automation system, making it easy to manage more product variations and streamline the process of introducing new products. It can be used on any automated production and packaging equipment and integrates seamlessly with existing automation systems, helping to unify and standardise the user experience and recipe data management.

The software is accessible through a web-based, secure, platform-neutral user interface on any computer, HMI workstation, operator panel or mobile device with a HTML5-compatible browser. It provides formula management, procedure management and execution functionality, as well as a rich user interface for all related recipe management, execution and system administration tasks, which improves the time to value for the investment. Role-based security, automatic item versioning, approvals, automatic change and execution history records and report views provide deep governance to ensure and document consistent product quality.

Schneider Electric Industry Business
www.schneider-electric.com

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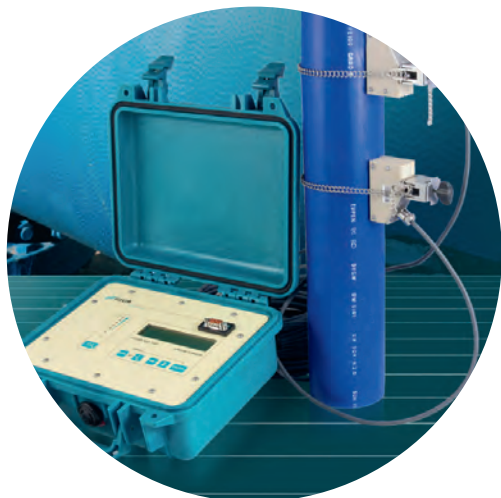
PORTABLE FLOW METER

The FLUXUS F401 is a single-channel portable flow meter for applications in the municipal water and wastewater sector, offering long-term stable and precise bidirectional flow measurements in remote areas.

The product is equipped with watertight IP68 transducers, with the flow transmitter residing inside an IP67 suitcase. Combining its internal battery capacity with an additional external battery case (IP67 protected), the unit offers continuous remote measurements outdoors for up to a week in duration.

As the measurement is carried out from the pipe wall, outside and without contact with the water column, there is no need to enter the piping system or to interrupt supply. Due to its matched transducer pairs and internal signal processing, the product is zero-point stable and recognises even small flow rates, making it a suitable measurement tool for leak detection.

The product can be used with pipe diameters from 25 mm to 3 m. Solid contents of up to 6% by volume, as well as old and rusty steel, badly manufactured GRP or even armoured concrete pipes (with lining and build-up inside the pipe), are not a challenge.

Flexim Instruments Asia Pte Ltd
www.flexim.com

VACUUM PUMPS

The GHS VSD$^+$ Series is a range of efficient, intelligent vacuum pumps with variable speed drives (VSD) from Atlas Copco. Based on the plug-and-play design principles of Atlas Copco compressors, the vacuum pumps have been designed to deliver peak performance at operating pressures commonly found in industrial applications.

The series offers energy savings of around 50%. A VSD and an innovative inlet control valve combine to produce an increase in efficiency to reduce lifecycle costs. The pumps are claimed to be quieter, with noise levels well below that of comparable technologies. The series also conforms to energy management and environmental commitments according to ISO 50001/14001 and offers a reduced environmental impact due to ultrahigh oil retention at all operating pressures - from ultimate pressure to atmospheric pressure.

Energy recovery leads to minimal hot air in the workplace - avoiding the usual problem of hot air in air-conditioned production environments - while the high oil retention means the quality of the exhausted air is optimal, which contributes to employee well-being. It also avoids oil spills on the factory floor, which commonly occur with conventional oil-lubricated pumps.

The series will be expanded to include sizes up to 2000 m³/h by mid 2015 and up to 4500 m³/h in early 2016.

Atlas Copco Compressors Australia
www.atlascopco.com.au

LED TOWER LIGHT

SmartLight is an all-LED tower light. It is a fully programmable, multipurpose light that offers three modes of operation: stack light, level indicator and run light. The SmartLight's modes of operation can be switched on-demand, based on programmed conditions to provide process feedback such as cell operation status, tank fill levels or operator progress along an assembly line, or even to alarm unsafe conditions. To further enhance the functionality, SmartLights have an option for a 95 dB buzzer.

The SmartLight is available in three models; 1-, 3- and 5-segment with a buzzer option for each model type. Each segment of a SmartLight consists of multiple LEDs and can be programmed for user-selectable colours and brightness levels.

SmartLight utilises IO-Link technology, making it adaptable to any major network or fieldbus such as EtherNet/IP, DeviceNet, Profinet, Profibus, EtherCAT, CC-Link IE or CC-Link. All configuration and programming for the SmartLight is done in the controller or the PLC. Balluff offers add-on instructions or function blocks for ease of programming the SmartLight. It also uses a standard M12 sensor cable for connection.

Balluff Pty Ltd
www.balluff.com.au

Diagnostics and Verification in a Heartbeat

Our new generation of Proline flowmeters – across all measuring principles – is fitted with Heartbeat Technology™.

What is it?

Heartbeat Technology provides continuous or on-demand diagnostics, monitoring and verification to ensure your flowmeter is functioning correctly, independent of process and ambient conditions. This unparalleled self-monitoring capability offers complete flexibility to plan proof-testing and other maintenance with minimal effort and exposure of personnel.

Heartbeat Technology is easy to use and can be activated at the touch of a button without interrupting the process. It's accessible via the local display, the web server or system integration interfaces, thus needing no on-site presence. Seamless and traceable verification results are permanently stored and can be retrieved at any time.

The reliability of your measurement is ensured in three ways:

1. Diagnostics

Diagnostics is based on the continuous testing of a device's health during ongoing operation. You are immediately warned if the device has reached a critical condition, enabling you to take quick and appropriate action. These messages are interpreted in accordance with NAMUR NE 107 and are displayed by the device as a diagnostic event. This also includes direct instructions on what to do next, ensuring that the process can be up and running again quickly in the case of a shutdown to prevent unnecessary maintenance measures.

2. Monitoring

Condition monitoring is recommended for applications with demanding operating conditions or where the device is subject to wear, for example from corrosion or abrasion. Condition monitoring recognises if the measuring performance or the integrity of the device is impaired. It also recognises trends in the secondary measured values and can evaluate the relationships between individual parameters, reducing the risks of an unexpected failure. Condition monitoring also makes it possible to display temporary, process-specific faults that neither calibration nor verification can detect, since they only take a snapshot of the device status.

3. Verification

Verification can be used to take an immediate snapshot of the device status, to demonstrate that the flowmeter meets specific technical requirements. A verification report can then be produced, including a qualitative assessment of the checked parameters. It can be implemented either as quality documentation (for compliance with ISO 9001) or, in safety-related applications, as documentation of the proof test (for functional safety – SIL).

How does it work?

The diagnostic test functionality is embedded in the electronic modules, in the form of an internal reference system. This means the traditional method of verification with traceable, external measuring instruments is no longer necessary. Often the intervals between labour-intensive recalibrations can be extended. There is also the option to integrate the process into a higher-level control system or asset management system. All of this saves time and costs, while virtually eliminating the possibility of interference due to incorrect handling.

For more information on Hearbeat Technology visit, **www.au.endress.com/flow**

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EMBEDDED COMPUTER

The MXE-200/200i series is an ultracompact fanless embedded platform, based on Intel Atom SoC E3845/E3826 processors.

ADLINK Technology Inc
http://bit.ly/1Q7D4Jh

REMOTE VISUAL INSPECTION SYSTEM

The high-pressure CRS series offers users a sensor for cylinders with an operating pressure rating of 3000 psi.

TechRentals
http://bit.ly/1Ei381c

COLOUR SENSOR RANGE

German manufacturer Micro-Epsilon offers high-quality colour sensors using the latest optical fibre technology.

Bestech Australia Pty Ltd
http://bit.ly/1yIXX7Z

COMPACT DIGITAL I/O

The fully potted IP67 TBEN-S series digital I/O modules are only 3.2 x 14.2 cm and allow assembly directly on the machine.

Turck Australia Pty Ltd
http://bit.ly/1yIYiYe

THERMAL IMAGING SYSTEM
FOR BOILERS AND FURNACES

The BoilerSpection infrared thermal imaging system from LumaSense Technologies is designed to assist with the detection and removal of the ash and slag on boiler tubes that reduces efficiency - without the necessity of shutting down the furnace. Other applications include combustion tuning and management of fuel switching.

The uncooled microbolometer infrared detector operates at a wavelength of 3.9 μm, allowing measurement and imaging through flame, and has a measurement range of 400-1600°C. The product is available as a permanently mounted system, with automatic retraction of the stainless steel lens with borescope optics if air or power is disrupted. Up to 24 cameras can be connected to a single control room server via the camera's ethernet output and the software features alarms, automated image analysis, regions of interest and auto archiving.

A portable version of the system is also offered, featuring a variety of lens options (straight or angled with different lengths and fields of view) and a wireless display with DVR capture to SD memory card. A comprehensive options list caters for the majority of installations; additionally, mounting options can be customised.

W&B Instruments Pty Ltd
www.wandbinstruments.com.au

PRESSURE
CONTROLLERS

PACE 5000 and 6000 pneumatic pressure controllers/indicators are high-precision modular instrumentation from GE Measurement & Control. They employ full digital control to provide high control stability and high slew rate, with a modular design.

The controllers/indicators are based on the Druck DPI 520 platform and incorporate piezoresistive devices to offer improvements in overall precision, long-term measurement stability and control performance. Designed primarily for rack systems, they are also suitable as a benchtop instrument and can be integrated into automated processes.

Multiple units can be combined in the same system to provide a range of pressure calibration capability from 70 mbar to 210 bar.

Due to the modular design, if a controller/indicator needs calibration, it is only necessary to remove the modular component, rather than send away the complete instrument. A replacement modular component can be fitted in the meantime so that downtime is reduced. Modularity also means that calibration laboratories can carry fewer instruments and instrument components, reducing the cost of ownership.

A simple icon menu allows easy and intuitive set-up of controller parameters and it provides comprehensive connectivity, via RS232, IEEE or CANbus. The devices have been designed to communicate with Druck 4Sight software, providing control in a fully integrated pressure loop, giving automated calibration of pressure transducers and transmitters. The software can prepare reports and provide calibration certificates from its database, utilising readout data from connected calibration equipment and test devices.
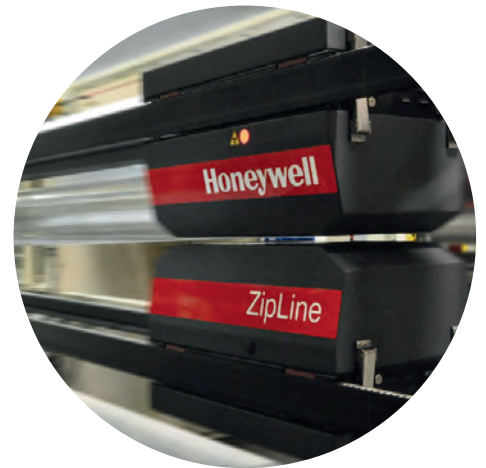
Thermo Fisher Scientific
www.thermofisher.com.au

EMBEDDED SYSTEM

The Sintrones SBOX-2600 Series is an ultraslim embedded box system with the Intel Celeron 2980U or Core i7 4650U, which helps to reduce power consumption with space efficiency. The 4th generation Intel Celeron 2980U is said to enhance the value of the series, with higher performance when compared with the Atom E3845. It also provides support for 4K2K resolution displays and optional RAID 0, 1, 5 for storage solutions.

The fanless embedded system is capable of noiseless operation and offers high performance, with a wide range operating temperature of -30°C to 60°C. The series is designed with 9-32 VDC power input and avoids damage caused by incorrect charging current, with overcurrent protection, overvoltage protection and reverse polarity protection. It is suitable for industrial controllers, panel systems and industrial automation.

Backplane Systems Technology Pty Ltd
www.backplane.com.au

HIGH-PRESSURE INDUCTIVE SENSORS

In response to a growing need for sensors that can withstand high-pressure applications, Turck is introducing high-pressure inductive sensors in its CRS series. The sensors offer users a sensor for cylinders with an operating pressure rating of 3000 psi. The series come with embedded LEDs, providing a easily visible indication of the sensor's status.

The product offering comes equipped with a 7/8″ male connector, measures 12.7 mm in diameter and comes in a stainless steel smooth barrel housing with a special high pressure sealing ceramic active face, which allows it to withstand high pressure and demanding applications. Six probe lengths are available varying from 23.2 to 95.9 mm, with other lengths available upon request to allow users to choose the length that will fit their application needs.

The series is IP67 rated and has an operating range of -25°C to 70°C. Being equipped with 2-wire AC/DC allows for easy adaptation to existing systems, while a 3-wire PNP version is also available.

Turck Australia Pty Ltd
www.turck.com.au

FLAT SHEET PROFILE MEASUREMENT

Honeywell Process Solutions has launched its next-generation scanning measurement technology designed to provide faster, lower cost measurement for continuous web solution (CWS) applications such as plastics, films, non-wovens and other flat sheet applications.

Honeywell's ZipLine Scanning Measurement Device is a self-contained scanning measurement device that provides high-speed measurement of flat sheets without the cost, size and complexity of traditional scanners. ZipLine combines Honeywell's sensor designs with a flat sheet scanning system that is easier to install and has a lower total cost of ownership than traditional scanner designs.

The ZipLine scanner is much smaller with flexible mounting options but uses the same high-performance sensors as Honeywell's traditional flat sheet scanners. ZipLine has 90% fewer parts, which, along with simplified installation and high-performance measurements, contributes to a low cost of ownership.

ZipLine replaces the rigid O-frame structure of traditional scanners with tensioned stainless steel cables that support intelligent, self-driven measurement modules. Tensioned cables are also used to supply power and secondary support to the measurement modules. A secure Wi-Fi network provides communication between the modules and the support system, and an onboard compressor provides air to the sensor.

These features eliminate the need for a moving power track to manage cables and hoses. ZipLine measurement modules are capable of scanning at high speeds - up to 400 mm/s - and deliver high-resolution basis weight profiles. Flexible measurement modules can be removed for periodic repairs along with easy accessibility to the ZipLine's measurement support processor to allow simplified maintenance.

Honeywell Process Solutions
www.honeywell.com

Upgraded bearings double the service life of vibrating screens

Maintenance represents a significant proportion of overall operating costs in the mining and quarrying sector. As a result, mining and quarrying organisations are now increasingly looking to contain and reduce costs on machinery such as vibrating screens in order to sustain profitability, primarily through improvements in machine performance, reliability and efficiency.

In many instances, the key to achieving these goals lies not just in the performance of large machinery, but also in the smaller components, including bearings and seals. If these essential but frequently overlooked components fail to function, then overall system failure and downtime is inevitable. Heavy loads and harsh environmental factors place extreme demands on vibrating screens and their moving components. As a result, frequent and/ or unexpected component failures can lead to costly maintenance situations, with unplanned downtime and loss of valuable productivity.

A major copper mine in Arizona was experiencing a series of costly bearing failures on the vibrating screens operating at its crusher plant. The failures were occurring every 5000 to 6000 hours due to a lack of (or ineffective) lubrication or contamination, and they had become so routine that the mine was scheduling a replacement or rebuild of each bearing assembly in the screen every 7500 hours as part of a time-based preventive maintenance plan.

During 2011, as SKF was preparing to launch its Upgraded SKF Explorer bearing, it offered WS Tyler - a long-time user of SKF Explorer bearings for vibratory applications - some prototypes for testing. WS Tyler chose to install the prototype Upgraded SKF Explorer bearings in an F-Class screen that was destined for use in the Arizona copper mine, which was experiencing costly bearing failures.

Upgraded SKF Explorer bearing steel is manufactured with a patented heat treatment to increase the material hardness and provide a refined microstructure while maintaining a high level of ductility. The result is increased service life, reduced internal wear and a high level of fracture resistance in poorly lubricated and highly contaminated application conditions.

SKF Explorer spherical roller bearings bring the benefits of the enhanced bearings to vibrating screens, resulting in lower maintenance and repair costs, reduced downtime and improved safety. SKF offers a full range of SKF Explorer spherical roller bearings for vibrating screens, all with the hardened two-piece outer ring guided cages, C4 radial internal clearance, and reduced bore and outside diameter tolerances. The SKF Explorer VA406 spherical roller bearings with PTFE-coated bore provides additional benefits in vibrating screen applications because the PTFE coating eliminates fretting corrosion between the shaft and the bearings. All standard spherical roller bearings, spherical roller thrust bearings and CARB bearings now benefit from the upgraded manufacturing process in bearing steel that increase bearing life and reliability, especially under poor application conditions.

After using Upgraded SKF Explorer for over 15,000 hours - double the length of the existing time-based maintenance schedule - the mine was able to modify and extend its time-based preventive maintenance plan to a period of three years. This has resulted in maintenance parts cost avoidance savings of US$23,660 per machine, plus no production loss at a cost of over US$15,000 per hour.

Lyndell Fuller, General Manager, Haver & Tyler Grand Canyon, a partnership with WS Tyler, oversaw the installation of the F-Class screen, equipped with the prototype Upgraded SKF Explorer bearings, at the mine's crusher plant in 2011. "The mine is very pleased with the support our partnership with SKF gave them in helping to solve this critical bearing and lubrication issue," Fuller said.

"The F-Class vibrating screens featuring the Upgraded SKF Explorer bearings have been tested and are proven to offer nearly double the service life in poor lubrication conditions and twice the service life in contaminated conditions," said Keith Meyers, global industry manager, mining mineral processing and cement, SKF. "The operation of the F-Class with Upgraded SKF Explorer bearings at the Arizona copper mine matches these results."

SKF Australia
www.skf.com.au

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hazardous area HMI panels

red lion

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operating temp.

high shock &
vibration proof

outdoor models
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IEC. **IECEx**

Red Lion's Award-Winning Graphite HMI platform is now IECEx certified for hazardous area installations.

The Graphite series provides a rugged HMI solution to combine a range of versatile plug-in I/O & communication modules with drag-and-drop protocol conversion, data logging and web-based monitoring and control.

Sizes range from 7 to 15 inches on your choice of standard or widescreen displays. Sunlight-visible UV-resistant displays are available on the 7 and 10 inch models for outdoor use if required.

CONNECT, MONITOR & CONTROL

SINGLE LOOP CONTROLLER

The West KS 94 single loop controller has been designed with reliable and robust control algorithms to ensure stable process conditions. It comes with self-tuning function to enable short startup times and is suitable for not only slow thermal processes, but also pressure and flow applications with short reaction times.

The KS 94 with universal input is configurable for on/off control, PID control and motorised valve control. The output function can be configured for delta/star/off, position control, split-range control and numerous 3-point combinations of switching and continuous control.

With the measuring and control functions being configurable within wide limits, the controllers can be used for a large range of applications.

The universal input allows for mA, V, thermocouple, etc, and Profibus-DP, Interbus and an RS485 interface are available. The front panel is spray-water proof with a protection level of IP65.

Automated Control Pty Ltd
www.automatedcontrol.com.au

SMART pH SENSORS

A significant issue in the operation of in-line process analytical measurement systems is in not knowing when pH sensors will require maintenance or if a sensor is going to fail unexpectedly.

ISM is a digital platform for analytical sensors that increases process reliability, simplifies sensor handling and reduces maintenance. At its core, the product features a series of algorithms that continuously monitor a sensor's health and provide diagnostic tools that predict when maintenance will be required and when a sensor will reach the end of its reliable lifetime.
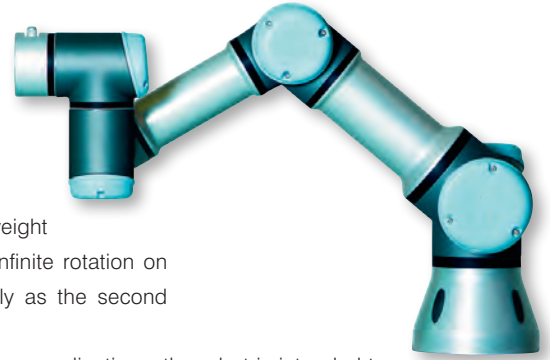
Updated ISM algorithms allow pH sensors to actually learn from the conditions in a process. 'Sensors That Learn' is said to deliver more accurate sensor health diagnostics, quicker than previous versions, and to enhance the consistency of sensor lifetime information.

iSense software is a support and maintenance tool for ISM sensors. When a sensor is connected to a PC running the software, all relevant data is displayed on the software's iMonitor screen using simple colour coding, allowing at-a-glance evaluation of the probe. Should the diagnostics recommend that the sensor needs servicing or calibration, iSense guides operators step by step to a successful end result. The latest version offers features such as transferring learned data on applications between sensors to provide high assurance of sensor performance from first installation.

For the pharmaceutical industry, a version of iSense is available that is compliant with 21 CFR Part 11, which enhances the security of eDocumentation.

Mettler Toledo
www.mt.com

ENERGY ANALYTICS SOFTWARE

Schneider Electric has launched Performance Analytics, a suite of functionality within its Struxure-Ware Resource Advisor software platform. This functionality builds on Resource Advisor's capabilities, including the ability to monitor energy and carbon markets, manage key sustainability metrics and report results to stakeholders on more than 400 types of resource streams, including utility and facility data, weather data, and water and energy usage.

To become more sustainable and efficient, companies must understand how their facilities consume resources on a site-by-site basis in enough detail to find inefficiencies and fix them. But they also need a simple way to look across the enterprise, in order to prioritise efforts, measure results, report to their stakeholders and compare themselves to their peers. Performance Analytics now allows Resource Advisor users to collect, visualise and analyse near-real-time interval data from a variety of sources, in context of this enterprise-wide view of their data.

Performance Analytics allows for data collection and integration from multiple sources, simplifying visualisation and analysis of interval data, while reducing the cost of data acquisition. Leveraging Schneider Electric's membership with the Green Button Association, Schneider Electric can collect data straight from the utility, bypassing the need for on-site meters and software. Schneider Electric can also tap into existing utility relationships to obtain interval data, or data can be obtained from a variety of meter, submeter or BMS data, which may exist on-site or can be installed.

Schneider Electric Industry Business
www.schneider-electric.com

TABLETOP ROBOT

The UR3 is a tabletop robot with a payload of 3 kg and a weight of 11 kg. It allows for 360° rotation on all wrist joints and infinite rotation on the end joint, and has the capabilities to function efficiently as the second member of a two-man team or as a standalone operator.

From pick-and-place and assembly to polish, glue and screw applications, the robot is intended to enable manufacturers to maintain uniform product output. For example, it can pick up screws, mount and tighten them while applying the correct torque.

Additionally, the unit can be deployed in confined workspaces where the construction of large safety guarding is not feasible. Likewise, it can be tasked to operate in environments with toxic or hazardous materials.

The robot has 15 adjustable safety settings. One of these is the force-sensing feature that enables the unit to limit the force on impact if it encounters an obstruction. As a default setting the robot is able to sense a force of 150 N, but it can be programmed to cease all movements if it encounters a force as low as 50 N along its path of motion.

The robot features 0.1 mm repeatability and can follow the outline of a surface by 'feel' rather than through the programming of precise movements and coordinates, which otherwise would require more than 100 data points programmed into the application.

Universal Robots
www.universal-robots.com
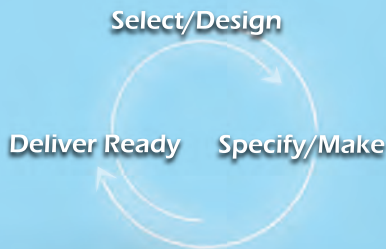
CMMS VS EAM:
WHAT IS THE DIFFERENCE?

PART 1 *Dave Bertolini and Anders Lif**

Computerised maintenance management systems (CMMS) and enterprise asset management (EAM) applications can both be used in the industrial maintenance space. One might say that the relationship between the two is rather like that between a square and a rectangle - every EAM application can be used as a CMMS, but not every CMMS can be used as, or has the broad functionality of, an EAM application.

A CMMS is essentially about managing the maintenance work necessary to sustain an asset, whereas EAM has more to do with managing the asset over its lifecycle to minimise cost and risk while maximising return.

But how exactly do CMMS applications and EAM applications provide value? How do you know if your company ought to implement one versus the other?

CMMS

A CMMS may be thought of as a tool that allows us to communicate about maintenance activities in the same way, using the same words, every time. It provides documentation of that communication through work orders so essential maintenance activities don't get forgotten. CMMSs are in fact designed to do a lot of other things for us, such as collecting material and labour costs and serving as a repository for all of our maintenance information.

There are definite problems that a CMMS can solve. Without a work order process that is used for every job, we have no documentation of what our most problematic pieces of equipment are. But once a company implements a CMMS and takes on the attitude that 'the work order is king, and nothing happens without a work order', that problem is solved.

Complete visibility into what work is being performed on which pieces of equipment can help us achieve things like preventive maintenance (PM) and predictive maintenance (PdM), and can even help with repair-or-replace decisions as problems become more recurrent and expensive to solve. But technicians can be resistant to the idea of recording any and all work in the CMMS. Why? Often, it is because they think the CMMS is being used to monitor their activities and ensure they are doing their jobs.

A better way to think about the CMMS and work orders is that it is a way to prove maintenance value to the organisation. In effect, any time maintenance is doing work outside of the work order system, regardless of whether you are using CMMS or EAM, you are doing work for free. Every maintenance organisation feels they are understaffed, but few are able to accurately document what their true workload is. If they could, it would help them identify the appropriate staffing level.

Documenting and managing work is one way to look at CMMS. Documenting and managing equipment is another.

of discipline across a maintenance organisation. If there is a CMMS work order system in place, it enables standardised, repeatable and sometimes predictable processes that prevents work from being missed or forgotten, documents problems so they can be fixed and ensures that the usage of labour and parts or materials are recorded.

Many CMMSs are in fact capable of facilitating much more than work orders and maintenance inventory management. But even though a CMMS offers more advanced functionality, it often goes unused since it is considered a 'maintenance program'.

The difference

Some may say that there is not a whole lot of difference between a CMMS and EAM. EAM certainly offers a broader spectrum of functionality. And the delineation between the two may be drawn at purchasing functionality. Most CMMS applications have purchasing functionality, but it is often not used. A company using a CMMS will often integrate it point-to-point with a purchasing system, or the two functions may be handled in entirely separate applications. On the other hand, EAM applications have extensive purchasing, planning and financial functionality that the application is, to a certain extent, built around.

Many CMMS packages will also start to look kind of similar to an EAM application because they allow you to manage projects. Some CMMS applications even have a project module that integrates and uses work orders and builds parent-child work orders - all aimed at shutdowns and other maintenance events. It could be that this functionality is not strong enough or it is just not something those running the CMMS are aware of. Because it seems the natural tendency is to use Microsoft Project, or Primavera, we induce problems by doing things outside of the work order system. Again, CMMS is seen as having to do with work orders and maintenance, and a company choosing CMMS over EAM may not be looking for that additional functionality.

The choice between CMMS and EAM can also be influenced by the size of the maintenance organisation and where, within the company, the software decision is made. When a software project is driven by the maintenance department, they are typically selecting a CMMS, because they are not normally directly involved in selecting more enterprise-level systems or applications. Furthermore, a small to medium-sized maintenance organisation with 75 or fewer maintenance technicians will typically migrate to a CMMS. Once you have

Consider the problem faced by a company with a three-shift operation, with every shift spending 20 minutes doing a quick repair on the same piece of equipment. If that quick 20-minute job is not being captured by a work order within the CMMS, what you have is an invisible problem, because communication from shift to shift isn't taking place. What that means is that, in a manufacturing environment, the line can be down for 20 minutes every shift, every day, for years, which really amounts to 60 minutes per day, up to 365 days per year. That is a tremendous waste. A CMMS can help identify and ultimately eliminate that waste, provided it is documented.

Lost productivity is one problem a CMMS can solve. Another is undocumented use of maintenance inventory, including parts and consumables. Many small to medium-sized organisations don't man their storerooms, so often someone will grab a part with the intention of documenting what they took later. But often they fail or forget to document what they used and where they used it. The inventory system thinks those items are still on the shelf, causing shortages (stock-outs) that can in turn lead to downtime when a necessary part is not available. Through the reinforcement of processes, procedures and documentation, one can create a culture
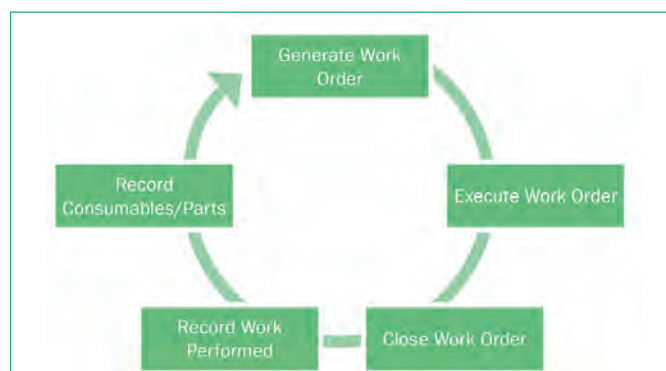

Figure 1: A CMMS tends to focus on maintenance management. It can also extend into inventory management and other disciplines, but is most often implemented for and used by maintenance personnel.
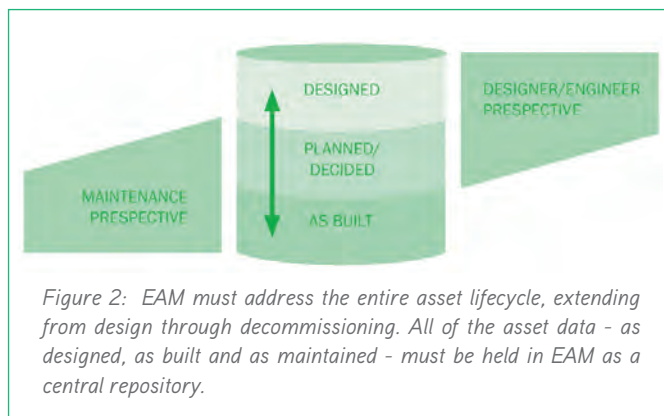
Figure 2: EAM must address the entire asset lifecycle, extending from design through decommissioning. All of the asset data - as designed, as built and as maintained - must be held in EAM as a central repository.

more than 75 maintenance technicians, they tend to migrate to an EAM application. As a company has more maintenance technicians, human resources and other roles to integrate with the maintenance workforce, EAM probably becomes more desirable. Moreover, a company whose entire operation centres to a large degree around maintaining, sustaining and operating assets will want technicians, and even contractors working with them, to be managed directly in, and from, their enterprise systems.

To most organisations, that level of sophistication in a system is exotic. And what happens, unfortunately, is that many organisations implementing CMMS or EAM may be advised to look at a full cradle-to-grave asset lifecycle management approach. But they balk, insisting, 'We just want to concentrate on getting the assets in there and making sure our PMs are getting done.' So they really pass up an opportunity to select an application capable of broader asset management duties or even, if a more powerful application is selected, lay the requisite groundwork during implementation to use the functionality. Most selection and implementation teams are under pressure to quickly get assets into the system and keep the PM program rolling. Once they accomplish that initial implementation goal, they never make time to go back and do more to, or with, the system. So whoever is helping them implement must drive them to try to embrace all of the capabilities of that system. Typically, CMMS applications may be used at only 50% or less of the total system capabilities. EAM is very much the same way. In relation to EAM, it is considered more cost driven because there is a lot more asset information, and a lot more work. As a result, people may say to themselves, 'I don't have the time, the money or the resources to do this fully. I will do it over time.' But they never get back in there.

EAM

In contrast to a CMMS, EAM is an enterprise-wide application that can function just like an enterprise resource planning (ERP) application for an asset-intensive business - from the general ledger through to purchasing, projects, engineering and individual work orders. Or, as is the case with IFS applications, it can be implemented to include as much enterprise functionality as is required and integrated through application programming interfaces (APIs) with other enterprise systems.

While a CMMS is designed, in its purest form, to manage the maintenance work so as to improve asset reliability, EAM is designed to allow the executive level to maximise the productive value of the asset, which of course means they need full visibility into maintenance costs. At the same time, they need visibility into the cost to initially construct the asset, the cost of replacement or lifecycle extensions, the cost of maintenance contractors and of

course the human costs associated with salaries, benefits and more. They also need to evaluate risks presented by the asset, so asset integrity management and risk management is of critical importance - particularly for companies where asset failure can result not only in lost productivity but safety breaches or environmental impacts.

At a base level, EAM must deliver the core requirements not just of maintenance management, but asset management. Those requirements are spelled out in ISO 55000, ISO 55001 and ISO 55002. ISO 55000 includes an overview of asset management, ISO 55001 is a requirements specification for an integrated asset management system and ISO 5502 offers guidance for implementation.

While ISO 55000 does not specifically address software, it does require that all asset data, across the lifecycle of the asset and across organisational boundaries, be contained in the same database and, therefore, the same system. What does that mean? It means EAM must support the planning and engineering stage of the asset, including plant design. It must encompass the construction of the asset - so powerful project, document and contract management functionality is required. And it must support operation of the asset and even eventual decommissioning and replacement.

This is a demanding requirement that a CMMS alone cannot likely meet, and, frankly, neither can most EAM applications that may not address the entire asset lifecycle. And whether or not a company considers adopting the ISO standard, if they are committed to complete visibility and control over their assets, they still need that full lifecycle support.
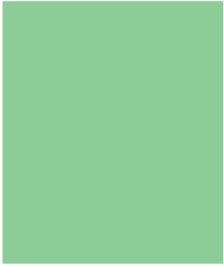
In Part 2

In Part 2 of this article we will examine the capabilities of enterprise asset management systems in more detail, including asset lifecycle management and advanced project management, as well as looking at the desired future state for a company implementing EAM.

*Dave Bertolini is Managing Principal with People and Processes. Certified as a Master Instructor and seminar leader, he has been involved with over 300 improvement initiatives and CMMS implementations, utilising 38 different software packages. He is the author of the book CMMS Explained.
Anders Lif is Global Director, Product & Industry Marketing, IFS World Operations. He is responsible for the successful roll out of all IFS products to the market and coordinates IFS global industry directors. He has held senior positions within IFS since 1998.*

IFS Australia
www.ifsworld.com/au

RELAYS FOR INDUCTIVE AND CAPACITIVE LOADS

The Termseries range includes both electro-mechanical and solid-state relays equipped with one or two changeover contacts. Among the latest models are the 16 A HC and 16 A HCP units. These variants are equipped with relays that feature a contact arrangement and contact material designed specifically for industrial loads, extending the service life of the units by eliminating sparking during switch-on and switch-off.

Both the 16 A HC and 16 A HCP models can safely switch industrial loads of up to 16 A. The 16 A HC unit is a high-current, no-contact model. It is deployed to switch inductive loads such as solenoid valves, power contactors and motors. The 16 A HC is made using AgSnO contacts and features a large contact clearance. As contact is avoided, the 16 A HC is resistant to both loss of contact material as well as welding.
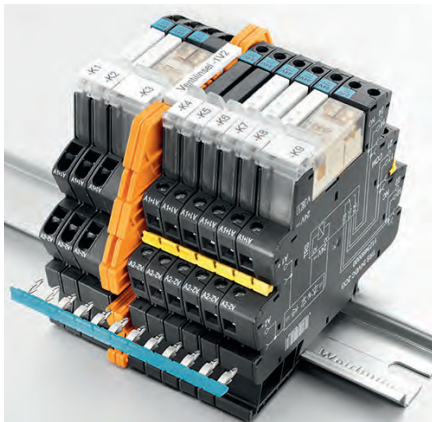
The contacts in the 16 A HCP are also made from AgSnO but with an advanced tungsten contact. It is suitable for capacitive loads where high in-rush currents occur such as LED drivers, light strips and switched-mode power supplies. For user convenience, both the 16 A HC and 16 A HCP are available with 24 VDC and multiple voltage input of 24-230 VAC/DC.

The DIN rail units have a slim 6.4 or 12.8 mm wide design. Both units have a distinctive status display due to the integrated fibre-optic technology that illuminates the ejector and ensures the safe removal of the switching element.

Weidmuller Pty Ltd
www.weidmuller.com.au

HELICAL VALVE ACTUATORS

The RFS CQ range is a fully concentric balanced design based on a helical mechanism, transforming the linear motion of the piston into a quarter-turn rotation of the valve stem to operate a comprehensive range of valve types.

The actuator is a balanced and self-contained solution which is suitable for both hydraulic and pneumatic applications. The product can be used in harsh environmental conditions where functional integrity and safety is required and where space is limited, and in applications where a conventional scotch yoke actuator cannot fit.

The versatile mechanism allows the use of many cylinders for each mechanism size. The range features different actuator builds for many different applications. The design allows for complete customisation of the torque profile to meet custom requirements.

Rotork Australia
www.rotork.com

UNMANAGED SWITCHES

Antaira Technologies' LNP-1002G-SFP and LNP-1002G-SFP-24 are 10-port industrial PoE+ gigabit unmanaged ethernet switches with 48-55 VDC power input (LNP-1002G-SFP) and 12-36 VDC low-voltage power input (LNP-1002G-SFP-24). Each unit is designed with eight Gigabit Ethernet ports that are IEEE 8023.at compliant (PoE+) on ports 1-8 (data and power output maximum 30 W/port) and are compatible with IEEE 802.3af PoE. The unit also has two fibre dual-rate (100/1000) SFP slots. The series support MDI/MDI-X functions and 9.6 kb jumbo frames.

The series provides high EFT, surge (2000 VDC) and ESD (6000 VDC) protection to prevent any unregulated voltage and offers a power redundancy feature using a dual-power input design with reverse polarity protection. There is also a built-in relay warning function to alert maintainers when power failures occur.

The products are IP30 rated, compact and fanless, as well as DIN-rail and wall mountable. Each series is built to withstand industrial networking hazards like shock, drop, vibration, electromagnetic interference (EMI) and temperature extremes. They are available in versions with a standard -10°C to 70°C operating temperature range or an extended operating temperature range of -40°C to 75°C.

Antaira Technologies
www.antaira.com.tw

COMPACT THERMAL CAMERA

The FLIR C2 is a full-featured, pocket-sized thermal camera. With its compact, sleek design, the device fits comfortably into any pocket, so professionals can keep it handy while still carrying other tools and equipment. The product has a simple-to-use touch screen with auto orientation. It is built tough in a rugged casing.

The unit is powered by FLIR's Lepton micro thermal detector, which captures and displays subtle thermal patterns and small temperature differences using 4800 pixels of resolution. The wide-angle, fixed-focus lens is suitable for viewing and analysing large areas. It has a built-in work light and flash to help illuminate poorly lit areas.

Featuring FLIR's MSX real-time image enhancement, the camera creates thermal images with enhanced clarity and readability. MSX automatically embosses edge detail captured by an on-board visible camera onto the thermal image. Numbers, letters, textures and other features become recognisable without compromising the thermal image. The extra illumination of the work light also helps ensure that a brighter visible photo is captured along with the thermal image.

With quick point-and-shoot operation, the product stores radiometric thermal and visible JPEG images with the push of a button. The images can later be downloaded with FLIR Tools - free software that allows users to adjust thermal image levels, isolate and add temperature measurements, change colour palettes and create reports.

FLIR Systems Australia Pty Ltd
www.flir.com.au

First on-site SEM-based minerals analysis system in Australia

AXT has announced the installation of a TESCAN TIMA automated mineralogy system at Northparkes Mines. The copper and gold mine is located near the town of Parkes in central-west NSW and is owned by China Molybdenum Co Ltd (CMOC). This installation is particularly significant as it is the first mine site installation of an automated SEM-based minerals analysis system in Australia.

TESCAN is a Czech company based in Brno, focused on the development and production of scanning electron microscopes, focused ion beams (FIBs) and related accessories. The company is responsible for significant developments, including the world's first fully integrated Xe plasma source FIB and the Raman integrated scanning electron (RISE) microscope in conjunction with WITec.

AXT is an Australian supplier of technology equipment for the mining, materials, life science and non-destructive testing markets. It is also TESCAN's agent in Australia and New Zealand, supplying ongoing product and software support for TESCAN's systems.

The addition of the TESCAN TIMA to Northparkes' analytical capabilities adds high-resolution automated mineralogy capabilities for advanced characterisation of process plant and geological samples to the mine's on-site assay and metallurgical laboratory offerings. The automated data from the TIMA will be utilised in both a process plant and ore characterisation sense. In terms of production control and optimisation, the information from the TIMA will be integrated with plant control variables to allow troubleshooting and optimisation of concentrator performance, resulting in improved production efficiency. TIMA data will be used to support metallurgical optimisation projects, identify opportunities for improvement and justify plant changes. The instrument will also be used to support mining operations including resource model validation and optimisation.

TESCAN TIMA's business development manager, Paul Gottlieb, said, "This installation is a major advance, as it takes the technology from the laboratory to the mine site. The TIMA data can be analysed much more rapidly, resulting in faster fine-tuning of plant performance and increased productivity."

Roslyn Dalton, manager ore processing department, Northparkes Mines, commented, "Our principal goal is to increase our processing production efficiency, and we have a clear vision of how the TIMA will help us achieve that. The benefits expected from the TIMA will apply to all areas of our business, including exploration, underground development and production, ore process control and marketing - all linking together to achieve our goal of greater efficiency. In particular, the TIMA will be a good fit for our existing metallurgical applications. The TIMA offering is developing and expanding and we are excited to be a part of that, including having user input into future software development."

AXT's managing director, Richard Trett, said of the installation, "I have every confidence that the vision shown by Northparkes Mines will establish the economic benefit of on-site mineralogy and prove a pivotal step in the modernisation of the Australian mining industry."

Automated process mineralogy was developed in Australia, and TIMA is a new generation of the technology. It uses a scanning electron microscope (SEM) with highly integrated energy-dispersive X-ray analysis (EDX) system to perform full spectrum analyses at very fast speeds. This enables fully automated data collection, resulting in fast, accurate and reliable results. TIMA is able to characterise mineral abundance, size-by-size liberation, mineral association and grain size automatically on multiple samples.

This will be the third TESCAN TIMA installation in Australia since last November. The other TIMA systems are installed at CSIRO Minerals in Perth and at Curtin University, also in Perth. AXT provides service and support for all these installations as well as other TESCAN installations around the country.

AXT Pty Ltd
www.axt.com.au

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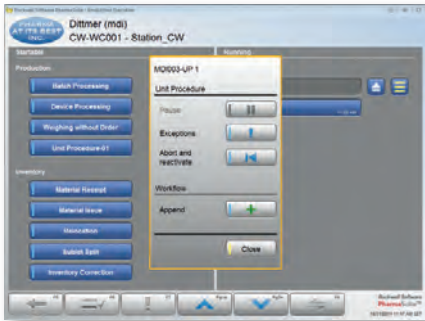
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MES FOR MEDICAL DEVICE MANUFACTURERS

The PharmaSuite v7.0 software extends its batch track-and-trace capabilities into the discrete environment. This provides hybrid capabilities for the growing market of combination products that require both batch and discrete-assembly processes, such as medical devices that are combined or coated with a pharmaceutical ingredient during production.

To help make high-throughput production operations more efficient, the PharmaSuite v7.0 release includes streamlined usability patterns at the workstation level. This allows assemblers to quickly identify the correct components and view assembly instructions with the scan of a barcode.

The software also includes order management and electronic device history record (eDHR) support to ensure the assembly process for every medical device is tracked and documented. Rework and repair capabilities also help streamline tasks for any devices requiring such work.

Dashboard filter capabilities allow end users to filter product criteria by 20 different attributes, including exceptions, orders and batches, to customise the dashboard to their specific roles. Quality assurance personnel, for example, can use the filter to instantly sort through thousands of devices and view only those with exceptions. Once created, the customised filters can be saved and stored for future use.

Rockwell Automation Australia
www.rockwellautomation.com.au

PLUGGABLE TERMINALS

Phoenix Contact's Combi range now includes PT 2.5-HEXA multiconductor terminals with up to six contact points. For example, these can be configured as three push-in contacts for internal wiring and three PIN contacts for pluggable external wiring. This flexible concept facilitates fast starting up of modular system sections, as well as fast replacement of system components during servicing.
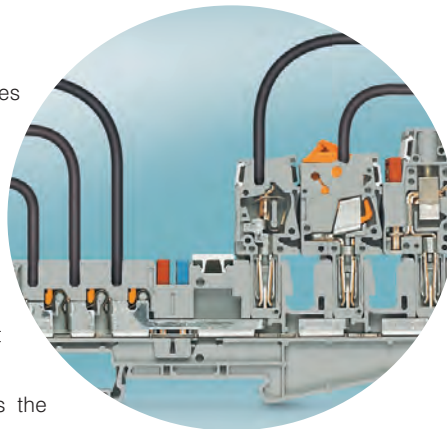
The high count of contact points makes the terminals suitable as compact, pluggable marshalling distributors. Large, identically contoured labelling surfaces with end mounting facilitate easy-to-read matrix labelling. The components are safe due to the touch-proof design of both the terminal and the plug connectors. A double pluggable bridge shaft additionally facilitates simple voltage distribution and marshalling.

With the universal Combi plug zone, a range of different types of plug connectors can be used. Individual coding increases the wiring safety and reliability as it helps to avoid erroneous plugging. A range of optional snap-on accessories, such as connector catch mechanisms, strain relief elements and shield connections, ensures the wiring process is versatile.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au

MODBUS INDICATORS AND PICK-TO-LIGHT SENSORS

Banner Engineering has introduced its K50 Modbus Series, comprising multicolour indicators and pick-to-light sensors. Designed with the Modbus RTU protocol, the series enables flexible communication and simplified setup of a single device or multipoint applications.

Modbus RTU reduces wiring requirements by using double-ended cabling and tee connectors. This minimises system programming and installation complexities, allowing operators to get their lighting systems up and running quickly and easy.

The compact K50 Modbus multicolour indicators are offered in several package types, including standard dome, daylight visible, beacon (perimeter) and beacon (perimeter and centre). With configurable flashing and strobe function options, the indicators offer flexible performance for diverse requirements. High-intensity models are also available to satisfy outdoor applications.
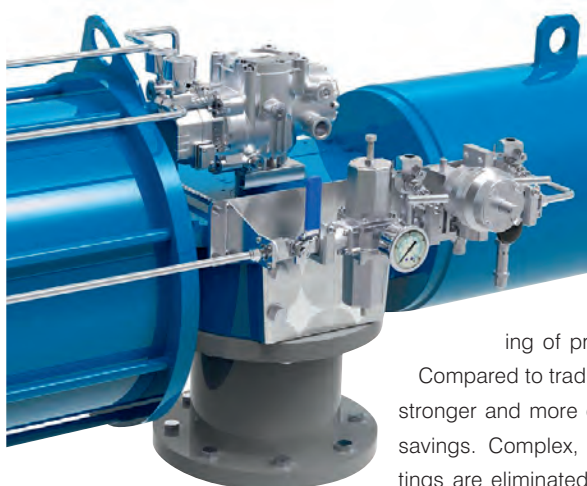
For error-proofing and parts-verification applications, the K50 Modbus pick-to-light sensors feature an illuminated dome for easy-to-see job light status. The sensor is available in polarised retroreflective or fixed field models. Users can also select from standard function configurations or customise the device to fit their specific application.

For performance in harsh environments, the multicolour indicators feature rugged IP67/IP69K construction and the pick-to-light sensors are rated to IP67 with fully encapsulated construction.

Micromax Pty Ltd
www.micromaxsa.com.au

PNEUMATIC ACTUATOR CONTROL ASSEMBLIES

Rotork Midland SMART-LOC is a high-integrity modular concept for pneumatic actuator control assemblies. Constructed in 316L stainless steel, the SMART-LOC system is suitable for the control and sequencing of process valve actuators in oil and gas applications.

Compared to traditional fabricated panel-mounted assemblies, SMART-LOC offers a lighter, stronger and more compact alternative, together with significant capital and operating cost savings. Complex, labour-intensive arrangements using panels, pipes and additional fittings are eliminated and replaced with a fully assembled and tested interface block, ready to be fitted directly to the actuator. Delivering best-in-class flow characteristics, the units will interface with all types of pneumatic actuators. A range of field-proven components - valves (spool, poppet or direct mounting) and filter regulators - connected in series on the interface are tailored to meet the requirements of individual projects, ranging from standard shut-off circuits to intricate control circuits. The SMART-LOC clamping system for individual components incorporates static O-rings for higher integrity and long-term reliability. No design work is required from the contractor and all components are kept in stock, resulting in short lead times. With ATEX approval, SMART-LOC components are suitable for hazardous areas and industrial use. The integral SMART-LOC clamping system also simplifies field maintenance, enabling individual components to be simply and swiftly unclamped and replaced.

Rotork Australia
www.rotork.com

New automated packaging for Country Chef

European packaging machinery supplier Cama Group recently opened an Australian office to service the local market. Cama designs and develops packaging machines and robotic systems for use in food and non-food industries, and covers the primary and secondary packaging processes. The Cama Group is headquartered in Italy, with subsidiaries in France, the United Kingdom, Germany, Thailand, the United States, China and now Australia.

At a time when the local manufacturing industry is facing unprecedented challenges, the foresight of Cama to invest in Australia and to lead the way for European packaging suppliers demonstrates its innovation and commitment to the market here.

According to Cameron Traum, general manager, Cama Australia, "Cama understands the importance of direct contact with our clients, and we want to make sure our service standards are the best in market. The only way to make sure we can do that is by investing in the market and being here in Australia."

One of Cama's Australian customers, Country Chef, recently upgraded its slicing and flow wrap machines but needed an advanced end-of-line packaging solution to exploit and leverage the new efficiency and speed gains. Replacing a labour-intensive manual operation with a machine like the IF316 provides small businesses with greater efficiencies and, in this case, allows Country Chef to compete more readily on a national level, supplying the biggest retailers.

Cama's IF316 is a compact machine which includes a compact former, a loading system with delta robot and a closing system with a two interpolated axis robot incorporating a specific lidding tool. The machine is set up for the secondary packaging of flow-packed snack bars but can be adapted to pack other kinds of products, and can be easily integrated in a packaging line just before the palletising station.

The IF316 has been built by Cama according to its cabinet-free design concept, offering a reduced footprint by integrating the electrical and pneumatic component control cabinets into the machine pedestals' angles. Such compactness helps to minimise cabling and makes it easier to place the utility devices right where they are needed, with further benefits in terms of accessibility for maintenance tasks.

The automation system on the IF316 has been designed and built using Rockwell Automation components. An Allen Bradley 1756-L72S GuardLogix controller manages the machine's functions by synchronising the three phases of the packaging process.

Using RSLogix programming software Cama configured a 10-axis motion system, managed by Allen-Bradley Kinetix drives. Synchronisation among the drives has been programmed using a virtual axis master. An Allen-Bradley PanelView Plus operator panel has been selected for visualisation tasks and is configured through FactoryTalk View software. Flexible I/O and EtherNet/IP connectivity complete the automation architecture on the machine.

"Rockwell Automation is recognised all over the world as a leading automation, motion and safety supplier to the packaging industry, so it makes sense that Cama uses a company that can offer us the same levels of supplies and services that we offer to our customers," said Traum.

"While the local market is very mature and robust, companies are still actively seeking ways to improve efficiency and reliability in manufacturing and they understand the need to invest in technology to remain competitive."

Cama's value proposition is its well-known brand and reputation, together with its experience and range of secondary packaging solutions. This is further enhanced by Cama's new Australian presence, allowing customers to deal with a local office in a local time zone.

According to Traum, "The key is being here and offering the service from the first contact. We make sure that everything we do is best in the market, including our speed of response and service with attention to detail.

"The reaction to our local presence - having our own spare parts and service established within Australia - has been overwhelming. We are involved in significant projects in the market, so it looks as though we will exceed all our expectations in terms of involvement in the market and returns in the first 12 months."

Rockwell Automation Australia
www.rockwellautomation.com.au

MACHINERY HEALTH MONITORING

Emerson Process Management has expanded the protection of critical assets to include basic prediction capabilities with only minimal time and wiring investments. These basic prediction capabilities for the CSI 6500 protection system will be available in version 5.61 of AMS Suite: Machinery Health Manager.

Using a simple Ethernet connection from the CSI 6500, users receive periodic parameter trends and spectrum/waveform data delivered on specific intervals. This data is particularly useful for determining the health of sleeve bearings on turbo machinery. This automated process for acquiring prediction data eliminates the need to connect to buffered outputs on the protection system and reduces the risk of inadvertently causing a machine trip. In addition, waveform data from the protection system is now incorporated onto the circular polar plots available in AMS Machinery Manager v5.61, facilitating diagnosis of developing valve faults in reciprocating compressors.

Emerson's AMS Machinery Manager integrates data from route-based, online and wireless vibration solutions, as well as third-party oil and infrared analysis data, to provide a complete picture of machinery health.

Emerson Process Management
www.emersonprocess.com.au

TEMPERATURE TRANSMITTER

The STS TS100 is a precision temperature transmitter suitable for the temperature monitoring of pressurised media in cooling or heating systems.

Offering customised matching of the measuring range to the output, the product incorporates a PT100 measuring element and offers either a 4-wire unamplified output or conventional configurations of 0-20 mA, 4-20 mA, 0-5 VDC or 0-10 VDC.

The device can be customised to suit application requirements due to its modular sensor structure (any process and electrical connections can be combined).

With a temperature measuring range of -50°C to 150°C, the product is manufactured from stainless steel and features proof pressure of 850 bar.

Automated Control Pty Ltd
www.automatedcontrol.com.au

KEEPING COMPUTING SYSTEMS IN
FOOD PLANTS CLEAN

Computers in food plants have to be cleanable so they don't add any contamination load to the end products. So they must be able to withstand the cleaning and sanitation regimes of the plant.

The food industry relies heavily on computer-based control systems and human-machine interfaces (HMIs) to automate and control manufacturing and other processes and also to communicate with human operators. These computers are frequently out in the plant itself and so must be able to withstand the plant environment and be able to be kept clean so they do not contribute any contamination potential to the foods or beverages.

This means that the equipment will be periodically subjected to high-pressure washdown and exposed to cleaning and sanitising solutions to protect against biological contamination of the end product.

Sealed computer or sealed enclosure?

The deployment of computer equipment in such washdown environments presents a particular set of options and trade-offs to the system designer. One key issue is whether to specify a sealed, industrially hardened computer that's ready to deploy in a washdown environment or to specify an appropriately sealed industrial enclosure into which a more general-purpose computer can be placed. Either approach can perform admirably when it comes to the basics of routine operation: meeting the process's sanitation requirements while protecting electronic equipment from water sprays and temperature extremes. Over the long term, however, the choice between the two is an investment decision that must balance life-cycle costs, operational continuity and the accelerating pace of information technology.

Equipment protection in industrial environments

The IP (International Protection Code and Ingress Protection Code) rating for equipment or enclosures gives a quantifiable measure of protection against intrusion by either solids or liquids. The IP Code, specified in Australian Standard AS60529 and also EN60529 and IEC 60529, consists of two numbers and an optional letter, such as IP67. The larger each digit, the greater the protection.

The first digit represents the level of protection against solid objects. It ranges from 0, which means no protection, through protection against large objects such as hands (1) to total protection against dust ingress (6).

The second digit in the code represents protection against liquid ingress. Once again, 0 implies no protection. Numbers 1 to 6 give increasing protection from falling drops of water through sprays up to high-pressure water jets.

A rating of 6 will cover you for ratings 1 to 5 for both solid and liquid protection. Liquid protection ratings of 7 and 8, however, are separate. These digits give a measure of protection against immersion but do not imply spray protection as well.

There may be additional letters after the two digits. These letters can be appended to classify the level of protection against access to hazardous parts by humans. For example: A - back of the hand, B - finger etc.

Possibly the best advice is to buy a copy of the standard, decide what level of protection you, your equipment and enclosures need and then purchase equipment with the appropriate IP rating.

The National Electrical Manufacturers Association (NEMA) in the USA has also developed classifications to make it possible to specify enclosure requirements. While similar to the IP rating, the two methodologies are not directly interchangeable. The NEMA enclosure classification of specific relevance to washdown environments is 4X. The operative descriptors for NEMA 4X are protection against hose-directed water and resistance to corrosion. Corrosion resistance normally dictates stainless steel construction.

NSF International has also codified the essential characteristics of enclosures used in washdown environments in its NSF/ANSI (American National Standards Institute) standard 169 covering 'Special Purpose Food Equipment and Devices'.

Essential aspects relevant to the enclosure's ability to be thoroughly cleaned (and not harbour microbial contaminants) include lift-off hinges with removable pins; leg stands or easily cleaned casters with a minimum 150 mm unobstructed clearance; sloped surfaces to facilitate runoff; welded and deburred joints and seams; easily cleanable fasteners, including slot-head quarter-turn latches; and no exposed threads, projecting screws or studs.

Adequate thermal management is another fundamental design consideration - whether a sealed industrial computer assembly is used or whether the enclosure and computer are specified separately. After water, excessive heat in particular is a computer's worst enemy. Some sealed industrial computers are designed to work without active cooling; this is intended to improve system reliability because no moving parts are involved, but may limit the unit's ability to dissipate heat at higher ambient temperatures. Other industrial computer assemblies employ the same cooling technologies as standalone enclosures, including fans and heat exchangers, air conditioners and vortex coolers. Heaters, too, sometimes are dictated in order to deal with refrigerated processes and to avoid condensation within the enclosure.

Further information can be appended that relates to the protection of the device: H - high-voltage device, M - device moving during water test etc.

The standard does not specify standards of protection against risks of explosion or conditions such as moisture (produced, for example, by condensation), corrosive vapours, fungus or vermin.

IP69K and the food processing industry

The IP Code does not cover enclosures that are subjected to high-temperature and high-pressure washdowns such as those found in the food industry. The Germans issued standard DIN 40050-9, which extends the IEC 60529 rating system with the IP69K rating. Initially developed for road vehicles, especially those like cement mixers that need intensive cleaning, IP69K is particularly useful in the food industry.

The IP69K test involves close range, low volume and very high pressure - similar to that experienced in the food and beverage industry.

Products rated to IP69K must be able to withstand high pressure and steam cleaning. The test specifies a spray nozzle that is fed with 80°C water at 80-100 bar and a flow rate of 14-16 L/min. The nozzle is held 10-15 cm from the tested device at angles of 0°, 30°, 60° and 90° for 30 seconds each while the test device sits on a turntable that rotates once every 12 seconds.

What happens when the computer fails?

From a design and nominal performance perspective, there's generally little to differentiate an industrial IP66 computer from a general-purpose computer in a separately specified IP66 enclosure. In general, the higher initial purchase price of the industrial computer will offset the costs of a less expensive, general-purpose computer and enclosure. If specified properly, either option will capably perform the task at hand.

While an industrially hardened computer should last longer, hardware failures do happen and these computers are often relatively inflexible when it comes to repair, and their sealed design may require a visit from the supplier's service technician.

If, however, a non-industrial computer kept in an IP66-rated enclosure fails, repairs are usually simpler or a backup computer more economically maintained in inventory.

Significantly in these days of fast technology improvements, by decoupling the protection element from the computer users can more simply and economically take advantage of advances in computing and software technology.

HANDHELD CONTROLLERS

Jay Electronique has added the Beta 2 button and Beta 6 button control units to its IECEx range. They are approved for use in potentially explosive gas atmospheres classified zone 0, 1 and 2 or dust classified zones 20, 21 and 22. The models inherit all existing features of the SAFIR family, such as a backlit, anti-reflection, LCD display able to indicate the battery charge level; the behaviour of the radio link; the name of the equipment being controlled remotely; and feedback from the equipment such as weight of load, overload, limit switches, alarms or fault diagnostics. Navigation menus allow users to configure the application, integrate a large number of functions or monitor a specific part of the equipment. Further customisation of logos and pictograms which appear on the screen is available utilising the iDialog software supplied with each unit.

The emergency stop function is certified SIL 3 per EN 61508 or PLe per EN 13849, while the standard function buttons are certified to SIL 2 according to EN61508 or PLd according to EN13849. Other options are available to enhance the safety of those applications that require it, such as infrared startup, action zone limitation or validation buttons. Access to the radio remote control and other functions can be limited to authorised operators by password.

Control Logic Pty Ltd
www.control-logic.com.au

HDMI QUAD SCREEN SPLITTER

The SPLITMUX-HD-4RT HDMI quad-screen multi-viewer allows users to simultaneously display HDMI/DVI video from four different sources on a single monitor. The device provides quad picture, picture-in-picture, full screen, and custom display modes. The SPLITMUX supports digital HDMI devices, such as DVD/Blu-ray players, satellite receivers and HDTV tuners. DVI signals can be connected by using optional DVI to HDMI cables.

With support for HDTV resolutions up to 1080p and computer resolutions to 1920x1200, and 60 frames per second (fps) in all four quadrants the SPLITMUX multi-viewer provides crisp, clean, fluid, real-time video performance. Audio output can be switched independently from the video allowing the audio from one source to be played over all connected HDMI sources.

The device can be controlled through an ethernet connection, via an RS232 serial port, by using the front panel buttons and the on-screen display (OSD) or via an IR remote control unit. The ethernet connection allows the use of a web browser to communicate with a built-in web server.

Interworld Electronics and Computer Industries
www.ieci.com.au

PULSATION DAMPENER

Flowrox has launched the Expulse, designed to assist during pump and dampener maintenance by reducing the noise and vibration associated with traditional methods which could lead to pipe damage, breakage and a loss of revenue. The product has been designed for use by companies in the oil and gas, mining, metallurgy and other industries where pipes and valves are used to move materials or fluids using pressure. Traditional pulsating pump dampeners are known to produce unbalanced shaking that can result in failure or operational drawbacks, which in turn require additional add-ons and devices to counter these challenges. Flowrox has designed a pulsation dampener system which quiets noise while settling pressure peaks and ensuring a continuous fluid flow.

One of the product's features is its ability to reduce energy consumption by up to 10%, largely as a result of its absorption of up to 90% of pulsations. In addition, the device's reduction in the hammering of the pipeline and pump can lead to extended operational lifetime for the pump bearing and gearbox - two critical components in pipeline operations that face wear and tear in high-performance environments. The flexible pulsation dampener also prevents the collection of sediment, particles or residue due to its built-in self-cleaning operation.

Flowrox Pty Ltd
www.flowrox.com/contact_us/countries/5_4_australia

DCS MINERAL LIBRARY UPDATE

ABB has introduced System 800xA Minerals Library Release 5.1/5, offering enhanced control, routing, yard and port functionalities. A suite of object-oriented software control modules, the update makes it possible to design process control and power applications in an efficient and fully parameterised manner.

The release features yard and port objects for dynamic position visualisation and collision protection of stackers, reclaimers, ship loaders and unloaders, as well as a recipe control module to handle proportion and ratio control requirements with as many components as needed.

Enhanced group and subgroup functions enable easy, seamless engineering, operation and maintenance of functional groups even when distributed in different process controllers, such as with long belt conveyors, high-level automation with department or process area start/stop concepts.

Standardised modules are available for challenging situations where a drive, motor, valve or actuator is controlled by more than one functional group, and maintenance and error control options for analog and digital signals have been improved.

ABB Australia Pty Ltd
www.abbaustralia.com.au

ETHERNET SWITCHES

The Hirschmann Octopus OS30/34 switch is designed to deliver maximum network availability under extreme environmental conditions. The ruggedised switch has been specifically designed for transportation, manufacturing and machine building settings.

The Octopus switch series features gigabit ports for connecting high-speed backbones and gigabit end devices, while its Power over Ethernet (PoE) support reduces cabling. Additionally, a bypass relay - according to the IEC 61375 standard for Ethernet in trains - extends the redundancy mechanisms and broadens the functional range of the Octopus series.

Two customisable housings area available for the Octopus switch: the mid-sized Octopus allows for a maximum of 20 ports, including four gigabit ports and up to 15 PoE ports. The full-sized Octopus adds eight additional Fast Ethernet ports for a total of 28 ports per Octopus.

The Octopus OS30/34 is available either with Layer 3 software, including routing functionalities, or with Layer 2 software for switching. With configurable features in two different housings, engineers and installers now have increased access to high-speed uplink ports and gigabit ports for local devices powered through PoE, including digital video recorders and wireless local area network (WLAN) access points.
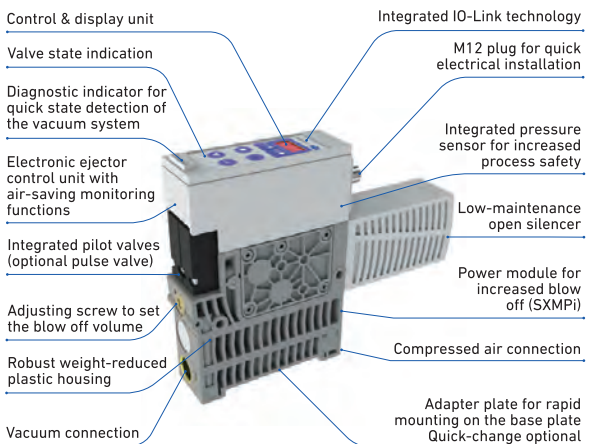
The Octopus switch also gives the option of fibre or copper cabling, and offers high vibration resistance and broad protection to electrostatic discharges. With an IP67 rating, the switch meets the requirements of routing functions in waterproof and dust-tight housings for mounting outside of cabinets and operates at temperatures ranging from -40 to +70°C.

Belden Australia Pty Ltd
www.belden.com

DIGITAL RATIO PYROMETER

IMPAC Infrared, a division of LumaSense Technologies, has launched a digital ratio (two-colour) pyrometer with integral thermal imaging.

The product allows not only a reading of one spot but also a display of the temperature distribution around and relative to the spot of interest. The analog video signal can be read by a PC via a USB interface using the LumaSense InfraWin software to display the relative thermal image, in addition to providing data logging and analysis.

The ISR 6-TI Advanced model features a measurement range of 700-1800°C, with adjustable focus from 210-5000 mm and spot sizes down to 1.1 mm. It offers both analog and digital outputs, a 'dirty window' warning and a maximum value storage that can be reset via an external contact. Other features include integral auto calibration of the thermal image relative to the two-colour pyrometer mode measurement; a fast response time of 2 ms; an LED display; single- and two-colour operating modes; and high accuracy and resolution.

Applications include heat treating, induction heating, glass gob temperature measurement, steel manufacturing and silicon processing for the solar industry.

W&B Instruments Pty Ltd
www.wandbinstruments.com.au

POWER SUPPLIES

The PULS PIANO series of DIN rail power supplies are compact, industrial-grade power supplies that focus on the essential features needed in today's industrial applications.

Three models currently make up the PIANO series: the 5 A PIC120.241C, the 5 A PIC120.242C and the 10 A PIC240.241C. All models take a 220-240 VAC input and have an adjustable 24-28 VDC output. The PIC120.241C and PIC240.241C also have a DC-OK relay contact that can be used to monitor the output to help prevent long downtimes.

The mechanically robust housing is made of a high-grade, reinforced moulded material, which permits the units to be used in ambient temperatures up to 70°C. Other features include the ability to deliver full power up to 55°C without temperature derating and a high MTBF. The products are compact, with the 5 A units being 39 mm wide and the 10 A units 49 mm wide.

Control Logic Pty Ltd
www.control-logic.com.au

INCLINOMETER

The Camille Bauer KINAX N702 inclinometer has an IP67 INOX AiSi 316Ti stainless steel housing. It is hermetically sealed and designed for 'fit and forget' applications, including submersible pumps (to 30 m) and marine use (INOX AiSi 316Ti is resistant to seawater).

It has an operating temperature range of -30°C to +70°C and is tolerant of high vibration (40 m/s² form 10 to 500 Hz, according to IEC 60068-2-6). The measurement basis is an oil-damped magnetic pendulum and Hall effect angular displacement sensor (-180° to +179.99°).

The product is HART 20 mA bus compatible and is therefore also suitable for legacy control systems. Parametrisation is achieved via standard HART programmers. Clockwise or anticlockwise rotation and angular limits can be programmed. The supply voltage range is 8-33 V.

Power Parameters Pty Ltd
www.parameters.com.au

IECEX APPROVED RADIO CONTROLLERS

The SAFIR range of radio remote controls from Jay Electronique has now gained IECEx approvals for the Moka handheld control and the Alto transceiver. This now gives further flexibility to the range, allowing use in potentially explosive gas atmospheres classified zone 0, 1, 2, or dust classified zones 20, 21, 22. They could also be utilised in mining applications requiring the IECEx certification.

The updated models inherit all existing features of the SAFIR family such as a backlit, anti-reflection, LCD display able to indicate the battery charge level, the behaviour of the radio link, the name of the equipment being controlled remotely - as well as feedback from the equipment such as weight of load, overload, limit switches, alarms or fault diagnostics. Navigation menus also allow users to configure the application, integrate a large number of functions or monitor a specific part of the equipment. Further customisation of logos and pictograms which appear on the screen is also available utilising the iDialog software supplied with each unit.

Safety is at the heart of the SAFIR product range with the emergency stop function certified SIL 3 per EN 61508 or PLe per EN 13849 and the standard function buttons, certified to SIL 2 according to EN61508 or PLd according to EN13849. Other options are available to enhance the safety of those applications that require it, such as infrared start-up, action zone limitation or validation buttons. Access to the remote control and certain functions can also be limited by password.

Control Logic Pty Ltd
www.control-logic.com.au

LASER SENSORS

Banner Engineering has expanded its L-GAGE LE family of laser sensors with the LE250 and LE550 dual discrete laser sensors. They are designed with the same robust housing, intuitive interface and linear array technology as the company's analog models.

The sensors feature two independently configurable discrete outputs, which can be set up as switch points or sensing windows for simple part detection and feedback on position. For example, by utilising two overlapping windows, operators can indicate if the target is correctly positioned, too close, too far away or not present.

With a wide 100 to 1000 mm operating range and larger spot size, the LE550 is a detection solution for diverse measurement applications, including roll diameter, loop control, thickness measurement and positioning.

Alternatively, the LE250 is optimised for higher measurement precision and provides a submillimetre inspection solution for measurements ranging from 100 to 400 mm. The product also features a smaller spot size of approximately 1 mm, which provides consistent detection of smaller features and measurements across targets of varying colours, including multicoloured packaging.

The laser sensors have a two-line, eight-character display, allowing for easy readability, quick adjustments and simple menu navigation. The visible red, Class 2 laser beam and small spot size ensure quick setup and alignment. The sensors are ready to measure out of the box and, with multiple mounting bracket options available, can easily be installed in a wide range of applications.

Micromax Pty Ltd
www.micromaxsa.com.au

ENTRY-LEVEL ETHERNET SWITCH

The Hirschmann GREYHOUND switch is designed for industrial environments that need cost-effective, entry-level devices with rugged features to handle demanding applications. The switch is available in two basic versions, with configurable options: a version with 16 Fast Ethernet TX ports and a version with eight Fast Ethernet TX ports, plus eight Fast Ethernet small form-factor pluggable ports. Four optional Gigabit Ethernet combination ports are also available in either
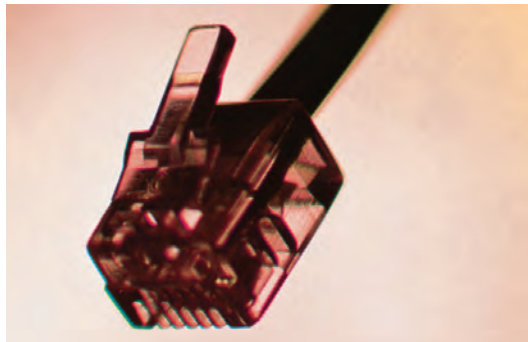
configuration. The ruggedised switches have been specially designed to handle demanding electrical power generation and distribution applications, including new installations and retrofits of existing substations. The device also performs well in transportation and industrial automation applications, such as railroad optical networks and traffic surveillance on highways. For enhanced network protection and uptime, GREY-HOUND also offers advanced features through Hirschmann's operating system, HiOS. The software feature range includes network management, diagnostics and filter functions, as well as comprehensive security mechanisms.

Belden Australia Pty Ltd
www.belden.com

BLOWERS FOR WASTEWATER PLANTS

The TurboMax turbo blower is claimed to provide energy savings of 20-40% in the most energy-intensive process at a wastewater treatment plant. It is also compact, lightweight and has minimal installation requirements.

TurboMax turbo blowers emit low noise and virtually no vibration. They are said to be durable, reliable and require minimum maintenance - apart from monthly checks and cleaning of filters, they require no attention and no dedicated personnel.

The TurboMAX turbo blower features oil-free lubrication, with a permanent magnet synchronous motor with bump-type, airfoil bearings. It is a fully integrated system, with air cooled up to 112.5 kW and closed loop liquid cooled from 150 to 600 kW, as well as a non-proprietary VFD.

Rated for 55°C ambient air conditions, the package noise is contained at 75 dBA (free field) with virtually no package vibration.

There is no need for SCADA on smaller plants due to an included control system, and SCADA communication is possible using the Modbus protocol.

Hurll Nu-Way Pty Ltd
www.hnw.com.au

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PUMP SYSTEMS:
HIDDEN COSTS AND OPPORTUNITIES

Glenn Johnson, Editor

One of the greatest challenges and concerns in the 21st century is to ensure sustainable development. The needs of current and future generations cannot be met unless we change the way we use energy. There are plenty of good ways to reduce energy consumption every day, and some solutions are more effective than others, but there is an energy solution we could implement right now that would have huge impact.

Hidden underground and inside buildings, pumps are often unseen energy users, many of which needlessly waste energy. Estimates vary, but most sources have estimated that 10-20% of electrical energy is consumed by pumps globally, and in many industrial environments, pumping can consume anywhere from 25 to 50% of the plant's electrical energy. By replacing or upgrading pump systems with modern technology, huge reductions in CO_2 emissions and operational costs can be achieved.

Today, an increasing number of companies and organisations are concerned about the environmental impact of their businesses. For many, socially responsible behaviour has become an integral part of operational strategy. This has resulted in a number of initiatives, but the question must be asked: why don't we focus on the area where the single biggest savings can be obtained?

Putting pumps on the agenda can help you minimise your company's carbon footprint and offer significant economic savings.

Savings opportunity

In fact, pumps and other motor-driven applications offer an ap-proximately five-times larger savings opportunity when compared to the potential of other more well-known energy users such as lighting. So optimising pumps makes sense - not just in terms of becoming greener, but also because of the financial benefits.

Technical staff and system engineers might maintain pumps, but as pumps are a part of your company's technical installations, it most likely also makes them a responsibility of your chief operating officer or chief accountant. Unfortunately, pumps have no novelty value. We have used them for decades and decades but they are taken for granted by most people. And for that reason they are today overlooked by most businesses in the debate about energy efficiency, carbon footprints and corporate social responsibility - all this despite the impressive evolution of technology, which means pumps should come under mandatory consideration by all businesses.

It has been estimated that two-thirds of all pumps installed today are inefficient and use up to 60% too much energy. Most of those currently installed are larger than necessary for the job at hand and, in addition, the majority of the motors that are chosen to drive them are inefficient and often run continuously at their maximum speed regardless of actual requirements. In reality, most pump motors only have to run at full speed 5% of the time. This leads to massive energy wastage all day, every day.

Over the years the pump industry has changed greatly, and the pumps we have today are far more efficient than ever before. This is partly due to intelligent, variable speed motor technology, which is used to make the pumps run, and also due to advancements in the technology of the pumps themselves. Replacing pump systems can make an immediate difference and in many cases return on

ered it should be possible to get a prioritised list of the installed pumps, identifying energy usage and CO_2 emissions, running costs and potential ROI for upgrades or replacement.

As is almost always the case with energy-efficiency initiatives, the initial investment in time and effort is returned many times over by the energy and cost savings created.

Lifecycle costs

One important consideration is the pump's life-cycle cost (LCC).

Many organisations only consider the initial purchase and installation cost of a system. It is in the interest of the plant designer or manager to evaluate the LCC of different solutions before installing major new equipment or carrying out a major overhaul. This evaluation will identify the most financially attractive alternative.

There are two reasons why existing systems provide a greater opportunity for savings through the use of LCC methods than new systems:

1. For each pump system built each year, there are at least 20 times as many pump systems in the installed base.
2. Of these existing pump systems, many have pumps or controls that are not optimised due to pumping tasks changing over time.

Some studies have shown that 30 to 50% of the energy consumed by pump systems could be saved through equipment or control system changes.

Pumping systems often have a lifespan of 15 to 20 years. Some cost elements will be incurred at the outset and others may be incurred at different times throughout the lives of the different solutions being evaluated.

Life-cycle costs can be broken down into eight elements:

- Initial costs, purchase price
- Installation and commissioning cost
- Energy costs
- Operational costs
- Maintenance and repair costs
- Downtime costs
- Environmental costs
- Decommissioning/disposal costs

A detailed analysis of these cost elements is beyond the scope of this article, but energy consumption is often one of the larger cost elements and may dominate the LCC, especially if pumps run more than 2000 hours per year. Energy consumption is calculated by gathering data on the pattern of the system output. If output is steady, or essentially so, the calculation is simple. If the output varies over time, then a time-based usage pattern needs to be established. It is common to find that power consumption can be up to 85% of a pump's total LCC, while the initial purchase price may only be 5%, and maintenance only 10%.

Replacing pump systems with new systems with variable speed drives, suitably sized to support the actual pumping requirements, can make an immediate difference; and in many cases, return on investment will be reached within just a few years, after which the new system results in pure savings.

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It should also be remembered that pumps become even less efficient as they age and are subject to wear and tear, so in some cases, replacing old pumps with modern efficient ones, rather than repairing or upgrading - although initially more expensive - will usually lead to lower costs in the long run.

Knowing what you have

The first step in deciding what to do with your pump systems is to perform an energy check of your pumps and their energy use. Firstly, you should contact your maintenance or facility manager and ask:

- Who is in charge of our pump installations?
- What is our annual electricity consumption?

Next, the information for the energy check needs to be collected, such as:

- How many pumps are installed?
- How old are the pumps and what type are they?
- How do the pumps operate?
- What is the pump service history?

For most sites, the best way to go about this is to engage an external organisation to perform an energy check, in which their experts conduct an on-site assessment. With the information gath-

PANEL METER

London Electronics has released a compact, low-cost and easy-to-use panel meter, which can be configured with a USB connection. Being graphical, it allows users to create a digital and bar graph representation of the measurement. The front panel is a sealed to IP65, making it suitable for installation in wet areas.

All configuration settings can be saved to a file, which also stores the meter's serial number. The Model N21 accepts 24 VDC, 24 VAC, 110 VAC or 230 VAC power as standard and has the capability to give a 24 VDC output at up to 30 mA to power a 4-20 mA loop.

A configurable alarm relay is also provided and the N21 and the units of measure can be customised to suit requirements. The Model N21 accepts the following input signal ranges: -70 to +70 mV (for DC shunt signal measurement); -12 to +12 V (for 0-10 V process signals), -24 to +24 mA (for 4-20 mA process signals); -200 to +850°C (PT100, 2- and 3-wire); -50 to 1200°C (Type J); and -50 to 1370°C (Type K).

The input signal can be averaged over a chosen time span from 0.5 to 20 s. The alarm relay is rated 250 VAC 0.5 A, resistive load. It can also have a programmable delay of 0-3600 s to prevent nuisance alarming caused by short-term variations.

AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au

ON-SITE NITROGEN GENERATION

Atlas Copco Compressors Australia is releasing the NGP+, an improved on-site nitrogen generator with PSA technology. This generator can be plugged into an existing compressed air network and produces nitrogen with purities of up to 99.999%. Combining the NGP+ with Atlas Copco's latest compressors, an on-site nitrogen installation can offer significant benefits compared to buying nitrogen in bulk or cylinders.

On-site nitrogen generators offer a more sustainable and cost-efficient solution than gas delivered in cylinders or bulk liquid, which require transport, handling and administration. In the atmosphere around us there is approximately 78% nitrogen and extracting the nitrogen is not as complex as it may seem. A nitrogen generator such as the NGP+ simply plugs into an existing compressed air installation and offers an independent, reliable and flexible supply of nitrogen.

The NGP+ works with PSA (pressure swing adsorption) technology: carbon molecular sieves (CMS) that adsorb oxygen molecules from compressed air. By using the highest quality CMS and perfect tuning to the compressed air network, the NGP+ adsorbs more oxygen for the same input of compressed air. Its sensors and monitoring features are said to ensure reliability, optimal performance and energy efficiency. The NGP+ also comes with extensive features to easily adjust the nitrogen purity and pressure as well as remote monitoring. The NGP+ is available in flows from 1.6 to 172 L/s.

Atlas Copco Compressors Australia
www.atlascopco.com.au

VALVE TERMINAL

The Clean Design valve terminal MPA-C meets the requirements for protection class IP69K and CRC4, the highest corrosion resistance class available in products from Festo. This makes it suitable for both centralised and decentralised installations.

The use of FDA compliant housing and NSF-H1-Fett, complemented by a redundant seal system, allow problem-free cleaning with high-pressure jets or foam and enables valve terminals to be installed in locations with harsh environmental conditions.

The valve terminal allows users and designers to create decentralised installations without a control cabinet in harsh and intensively cleaned environments in the food and beverage industry. It can be installed close to the application, thus saving space.

The fact that no control cabinet is required reduces the need for tubing. This enables quick and simple installation, plus rapid access for servicing or maintenance work. Shorter tubing lengths mean that cycle rates can be increased. If, for example, the tubing length is reduced from 5 to 1 m, the cycle time is halved.

The valve terminal is not only adaptable to a machine design but also offers flexible configuration: whether with an electrical interface on the front or reverse; with multipin, fieldbus or ethernet via the communication interface CTEU/CTEL; with or without manual override; with 1-32 pressure zones; and with a freely configurable working port.

Festo Pty Ltd
www.festo.com.au

PHOTOELECTRIC SENSORS

The Balluff BOS 5K photoelectric sensor family is now available with a mini-laser sensor as a diffuse sensor with background suppression, a retro-reflective sensor and a through-beam sensor.

The mini laser is suitable for situations where a small yet powerful cost-effective sensor is needed. The class 1 laser requires no additional protective measures. Its fine laser beam can be seen easily over large distances, is easy to set up and makes large sensing distances possible, achieving a high function reserve.

Suitable for the packaging industry, automation and assembly applications, it is recommended for precise scanning, such as detecting small parts. A high switching frequency makes the sensor also suitable for high-speed processes in industrial automation.

Balluff Pty Ltd
www.balluff.com.au

SUPPLY CHAIN MANAGEMENT SYSTEM

With consumers' expectations increasing due to the widespread use of technology and the internet, today's businesses need flexible and cost-effective solutions to not only keep up, but be competitive into the future.

The StorageQ supply chain management system has been developed with today's market in mind using the latest technologies to be easy to use, and to be enabling for supply chain staff by providing accurate, easily accessible stock information; reducing admin tasks by removing redundant paper flows and data entry; providing detailed reporting and real-time dashboards; and easily integrating with warehouse equipment and other IT systems.

By reducing admin and empowering decision-makers with key information there is significant return on investment, as well as cost savings to be generated through implementing StorageQ. Being available both in the cloud and on-premise provides flexibility and applicability in all supply chains as many businesses would rather leave the handling of IT infrastructure to someone else so they can focus on what they do best.

The Inventory On Demand (IOD) module gives the ability to control inventory at its source. IOD allows for forecasting on a per product basis as to what the volumes will be for a given time frame and where those volumes are located. Orders can then be expedited to meet demand and allocated to a location to be shipped directly from the supplier or manufacturer.

StorageQ is developed, supported and owned by the Australian-based OnQ Software that also provides expert technical support.

OnQ Software Pty Ltd
*www.onqsoft.com.au*

RESOLVER FEEDBACK CARD

Advanced Micro Controls has released a resolver feedback option module for Allen-Bradley PowerFlex 750-Series AC drives. The easily programmed RD750 resolver feedback card plugs directly into PowerFlex 750 drives in the same manner that factory I/O does.

The option is suitable for users who would like to upgrade from PowerFlex 700 drives but do not want to replace their resolver-equipped motors. The module offers a range of diagnostic data and is field configurable using onboard DIP switches.

To optimise performance and simplify troubleshooting, critical information such as card-to-drive communication, card-to-resolver connection and parameter faults are all provided visually by means of two bi-colour LEDs. In total, over 16 different status reports are available.

The resolver feedback option module features a single-channel resolver interface and is compatible with a variety of resolvers.

Automated Control Pty Ltd
www.automatedcontrol.com.au
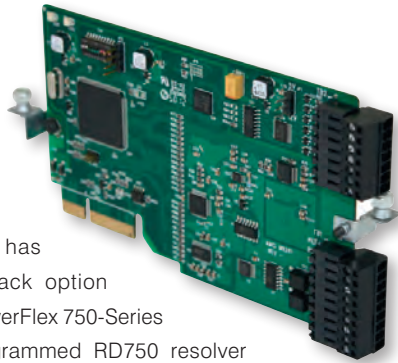
WIRELESS VIBRATION TRANSMITTER

Emerson Process Management has introduced updated spectral resolution options for the CSI 9420 wireless vibration transmitter that reduce bandwidth requirements and improve power module life. Data log and configuration capabilities have been added to streamline user interaction with multiple transmitters on a single gateway. These enhancements are delivered via the release of AMS Suite: Machinery Health Manager version 5.61, Emerson's asset management software.

AMS Machinery Manager offers 'spectrum on alert' for a more efficient means of acquiring diagnostic information. Analytical data is acquired only when there is a condition alert on the machine. Additionally, users can adjust the amount of resolution captured, further reducing the bandwidth used and power required to operate the transmitter.

A data log capability delivers the operational history of each transmitter, allowing users to identify performance issues in the field from AMS Suite.

Emerson's AMS Suite: Machinery Health Manager integrates data from route-based, online and wireless vibration solutions as well as third-party oil and infrared analysis data to provide a complete picture of machinery health.

Emerson Process Management
www.emersonprocess.com.au

SHAFT ALIGNMENT SYSTEM

The Pruftechnik Rotalign Pro Ex is designed to be used for horizontal and vertical machine alignment, soft foot measurement and coupled/uncoupled shaft alignment. It is available to rent from TechRentals. The unit is intrinsically safe, meaning work can be carried out without the need of a hot work permit. Its shockproof body and IP67-rated rubber components make it industrial strength and suitable for the harsh environments encountered in machinery maintenance.

Additionally, this laser shaft alignment system will handle machine train alignment for up to six devices, with accuracy greater than that of the smallest shim size. The Rotalign Pro Ex is simple to use and provides fast and precise results, requiring only a quarter-turn shaft rotation from any position.

TechRentals
www.techrentals.com.au

Heat exchanger cuts production time for Tahi Honey

Cooling viscous food products is not a simple task and Tahi Honey of Whangarei, NZ, wanted to cool its pure high-grade active Manuka honey to low temperatures.

Knox Henderson, operations manager for Tahi Honey, explained: "Tahi Honey has grown exponentially over the last year, so the need to increase throughput was a priority. In the past we had relied on ambient cooling methods to cream our honey, but this is a time-consuming method suitable only for small batch productions. We approached GEA to help us out in regard to creating a cooling unit that could reduce the temperature of honey by 22°C in order to cream it. This needed to be done as we were doing the final stage of filtering so that the honey was going into the creaming tank at the correct temperature. We also needed the unit to be portable, which presented an additional challenge."

In this application the challenge of cooling such a viscous product required a different approach, and the newly available HRS Rotex rotating scraped surface heat exchanger provided a perfect solution. Design features in the Rotex such as the helicoidally shaped spiral blade mounted on the scraper bar make it suitable for heating and cooling difficult and viscous food products, helping to reduce pressure drop and pumping power required, at the same time increasing heat transfer coefficients and overall heat exchanger performance. The compact nature of the HRS Rotex also allowed the small skid-mounted system, supplied by GEA Process Engineering NZ, to be portable and easily manoeuvrable.

Commenting on the experiences in cooling the high-grade Manuka honey with the HRS Rotex, Henderson said: "What we received has more than met our requirements and performed better than the figures quoted. The HRS Rotex has no trouble with the viscosity of Manuka honey even at low temperatures and can reduce 40+ degrees honey to well below 20°C while handling a throughput of at least 500 kg/h. With the HRS equipment now in place, we have decreased our production time by 4 days!"

Chris Little, general manager for HRS Australia & New Zealand, said: "HRS is delighted to have collaborated with Tahi Honey and GEA on an interesting and challenging project, and we see this system as another step forward in the Southern Hemisphere food market for HRS and our partners.

"HRS always offers the optimum heat exchanger solution to any heat transfer application and in this instance our exciting new Rotating Scraped Surface Heat Exchanger was clearly the best and most efficient option offering a host of advantages over old plate heat exchanger technology. The flow rate required for Tahi only required our R1 mono tube Rotex; we are looking forward to the next project, which will require our R3 multitube Rotex SSHE, performing a much larger duty in a single compact unit."

HRS Heat Exchangers Australia New Zealand
www.hrs-heatexchangers.com

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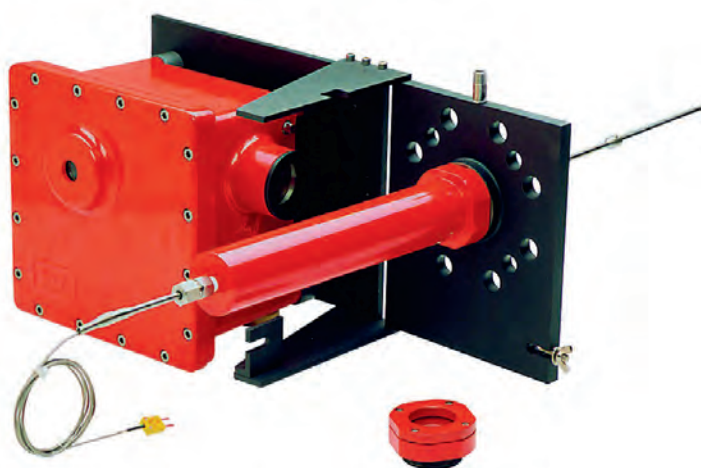
INFRARED PYROMETER

E²T, a division of LumaSense Technologies, has launched an infrared pyrometer for sulfur reactors and other high-temperature furnaces with a temperature range of 350-2000°C.

The PULSAR 4 features single-channel measurement for gas or refractory measurements and a two-channel version with simultaneous measurements of refractory and gas temperatures, with the additional feature of a SMART flame measurement algorithm.

Other features include explosion-proof certifications (IECEx, ATEX, FM and others), versatile power supply options (24 VDC and 240 VAC), analog and digital outputs, and an operating temperature of up to 60°C ambient without cooling and up to 93°C with an optional cooling base.

Additional features include instant or average readings and separate-channel analog outputs with alarm relay set points. Applications include refineries, gas plants and petrochemical installations.

W&B Instruments Pty Ltd
www.wandbinstruments.com.au

PROCESS VALVE ACTUATORS

Designed for quarter-turn, rotary or linear operation, Rotork CMA actuators perform numerous process control valve, metering pump and damper applications demanding precise position control and continuous modulation. Explosion-proof certification to international standards is available for hazardous area applications.

Local controls now offer manual operation at the valve, combined with an LCD display of valve position which also incorporates critical and non-critical fault symbols. Control selection knobs enable selection of local, stop or remote operation and open or close input commands in the local control mode. Each mode can be locked in place to prevent unauthorised operation. The LCD display shows the valve position as a precise percentage of total valve travel.

For fail-to-position performance, a reserve power pack provides the actuator with the ability to perform a predetermined action on power failure, while the power pack also preserves position indication on the LCD display. On restoration of mains power, the power pack is recharged. Action on power loss is easily configured with the standard CMA HMI interface as part of the user-friendly actuator set-up menu, utilising a 6-segment LCD display and push-button configuration.

The maintenance-free CMA drive train can be mounted in any orientation. Accepting an industry-standard 4-20 mA control signal, the CMA provides accurate, repeatable and backlash-free positional control. Resolution is 0.2% on linear and quarter-turn applications, 2° on the multiturn models. Network compatibility encompasses Rotork Pakscan, HART, Profibus, Modbus, DeviceNet and Foundation Fieldbus.

Rotork Australia
www.rotork.com

ETHERNET/IP BUS COUPLER

The Lumberg Automation LioN-Link EtherNet/IP bus coupler is designed to make updates easy as a result of its flexible interface with industrial networks running EtherNet/IP protocols.

The single input/output (I/O) module supports diverse field wiring designs, numerous configuration options and long-distance connections. Its standardised wiring components provide flexibility for harsh industrial environments.

The LioN-Link system provides simplified connection options between the entire fieldbus system and the fieldbus-independent I/O modules, which are lightweight and use limited space. Software is integrated into each bus coupler, allowing communications with the web server as well as access to real-time data and diagnostics across the entire manufacturing process.

Each bus coupler connects up to 30 I/O modules distributed through two lines, with a maximum of 15 devices per line. The lines can extend up to 100 m.

Belden Australia Pty Ltd
www.belden.com
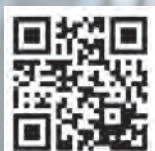
AS I SEE IT

VISIBILITY IS EVERYTHING

I'm sure many of us would agree that the most valuable commodity in the world today is information. After all, the world has developed a vast and expansive communications network for the sole purpose of the trading in and accessing of information. You guessed it, it's the internet!

By now, many of us have heard of the Internet of Things and the principle of networking any number of devices and systems to assist us in our everyday lives. The same thing is happening in the world of processing and heavy industry in general. As we compete for each hard-earned dollar in the global marketplace, more than ever before companies are looking internally for ways to dilute their product costs and increase profit margins. One of the key areas of focus should be their energy costs.

This leads me to the concept of 'pervasive sensing', referring to the ability to measure and detect anywhere and everywhere within your plant. The ability to access the right information required to empower people in the organisation to make educated decisions about how to run and improve your process. I hear you saying, though, that this sounds like a costly exercise - and that adding measurement points to your existing system means huge capital outlay. Extra cabling, extra racking or trenching, not to mention the extra I/O modules and cabinets. Don't do it this way, is all I can say.

With today's wireless field instrumentation technologies, you no longer need to incur these expenses to implement new measurements in the field. WirelessHART is a robust, self-organising, self-healing meshing technology for wireless battery-powered field instruments which eliminates the need for cabling, trenching and, for the most part, extra I/O for your control system. And when I say reliable, I am talking signal reliability of over 99%.

Did you know that there are companies out there that are already doing this today? Major food and beverage manufacturers in the Asia-Pacific region implementing extra wireless measurement points to gauge and balance water usage, raw materials per batch and even to bolster safety systems. Mine sites doing mass balances on their utilities used on site to curb losses due to leaks or wastage. Major refineries utilising remote monitoring to optimise their steam systems and curb previously unseen losses. We are now even seeing major new plant developments making allowances for and designing in these pervasive sensing measurements to ensure they have maximum visibility of their energy consumption on site.

They have all seen the benefit these new wireless technologies can add. It is now more cost effective than ever to deploy new measurements in your plant or process. Energy consumption is one area where genuine savings can be, and are being, realised. However, if you think laterally and apply the technology correctly, you can address areas like safety, asset reliability (imagine smart, self-diagnosing pumps for instance) or environmental compliance - to name just a few.

So I guess the way I see it is this: if you or your company are not actively investigating or implementing these technologies and strategies, then now is the time to start. Other companies are already doing this and realising the savings. If they happen to be a direct competitor, they may just be gaining the upper hand in the marketplace.

Steffen Terreblanche has 20 years' experience in instrumentation, working as a service technician within the food and beverage, metals and mining and oil and gas industries. Steffen joined Emerson Process Management in 2010 as a sales engineer and has recently taken on the role of National Wireless Specialist.

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John McGuire, Global Industry Director, Aurecon

Smarter analytics — predictive asset optimisation and your industry
Joanna Batstone, VP and Lab Director, IBM Research-Australia + CTO, IBM ANZ

IoT and Industry — perfect match or perfect storm?
Michael Freyny, Executive General Manager - Digital Factory/Process Industries and Drives, Siemens

Future Networks Forum:

What does the future hold for industrial communications in the era of IoT, big data, cybersecurity and the cloud? Featuring experts from:

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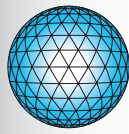
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