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Hybrid Manufacturing Technologies developed a CNC-based hybrid tool solution, which can be integrated into almost any CNC metalworking machine. This combines conventional CNC technology and additive production processes with the ability to provide both machining and metal deposition tools on the same spindle. Read our cover story on page 11 to find out more about Beckhoff Automation’s PC-based control solution, and how its HMI solution allows the use of EtherCAT technology in the processing head.

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Do you have a blockchain strategy?

The other day I had some fun looking at Gartner’s top megatrends that will enable businesses to survive and thrive in the digital economy. I loved the Hype Cycle for Emerging Technologies. This is a fascinating graph of expectation against time that plots the technologies that are showing promise in delivering a high degree of competitive advantage in the next five to ten years. A new one that attracted my attention was 4D printing, where the fourth dimension is time. This will allow us to use advanced materials to print objects that then reshape themselves over time. Imagine furniture that can assemble itself, or pipes that can change their diameter in response to flow rate or fix themselves automatically if they crack or break. Another one was smart dust. This is made up of dust-size wireless microelectromechanical sensors (MEMS) with extraordinary capabilities that can detect everything from light to vibrations. It combines sensing, computing, wireless communication and autonomous power supply within a few millimetres. It is very hard to detect the presence of smart dust and even harder to get rid of if once deployed – the implications are a bit mindblowing. The Hype Cycle graph can be found at https://tinyurl.com/ybyshtc6.

But what really attracted my attention was the IoT technology, blockchain. This was originally created to back the digital currency, bitcoin. It’s an open ledger distributed across computers that can permanently record transactions between parties and verify them. This makes digital transactions secure.

It is based on a shared database that is spread across many computers rather than having a central database like in a bank. Transactions are securely encrypted and repeated in many copies of the ledger. Once data is written to this chain it is nearly impossible to change, making it a very secure system for storing digital information. Every point on the network stores the entire chain. This means the data being recorded is transparent to all nodes on the chain, and is encrypted so only those involved in a transaction have access to their digital record. The appeal of blockchain technology is that it creates trust in peer-to-peer transactions, with no need for intermediaries.

The three major advantages of blockchain are transparency, decentralisation and security. Everyone can see what’s happening on the chain at all times, and no one person can control a blockchain network. It also creates huge opportunities for data security. The only way to falsify a transaction is to change it on every node in the chain and in every block created since the initial validation. Blockchain can also be used to create smart contracts that carry out the terms of an agreement when specified conditions are met.

Blockchain has so far tended to be seen as just a financial instrument, but for manufacturers the possibilities are nearly endless and it is gaining ground in almost every sector. In the short term, the biggest application is in the supply chain, where it removes the need for the third parties previously required to bring trust to buyer-seller relationships; but its greatest application could well be in cybersecurity to provide an urgently needed way of making smart factories and other IoT networks secure.

In manufacturing, blockchain could be incredibly useful in asset management and minimising downtime. It could be deployed between ERP systems and parts suppliers, using the smart contract to program IoT machines to order replacement parts that arrive just in time for an engineer to install. Combined with predictive analytics, IoT-driven blockchain technology could become a failsafe way to keep factories running.

In one new application, Sterling Consolidated, a supplier of hydraulic and pneumatic seals, is launching a decentralised international marketplace for O-rings. The company has a highly fragmented structure with thousands of distributors but very few suppliers, and says that the O-ring industry lends itself perfectly to utilisation of the blockchain and smart contract technology. It can reduce financing costs and inventory carrying costs for the distributor and create better and faster service for customers.

In another, Air France-KLM is planning to apply blockchain technology to track workflows within its aircraft maintenance systems. Aviation engineers have already modelled an actual hydraulic system failure where it removes the way of making smart factories and other IoT networks secure.

NASA and ESA are also considering potential applications of blockchain for spacecraft missions. Artificial intelligence together with blockchain technologies could make sensor networks in space more efficient and responsive. They are researching how to make hardware in space smarter and more autonomous to improve the automation of space probes in deep space missions still further.

I think I’d better fasten my seatbelt.
Driving force for the future

Association Objectives

- Raise the professional standards of the pneumatics and hydraulic industries
- Stimulate and promote education and training in the fluid power industry
- Build synergistic rapport between companies within the industry
- To promote, collect, collate, distribute data, ideas and knowledge
- To encourage the growth of the membership base

For more information visit our website www.safpa.org.za or call +27 (0)11 888 7163

SAFPA membership certificate may be used to support tender applications, members are also welcome to use the SAFPA logo on all their advertising.
From the President’s desk

The SAFPA committee once again experienced a busy period during the last quarter, particularly in the field of education.

Economy
Continuing with the theme of the economy reported on during the first quarter edition of Motion Control, it is evident that there is more optimism amongst our member companies. Further statistical information released by several bureaux indicates growth numbers in several of the sectors where fluid power products are used. There has been a marked improvement in the local mining sector, and manufacturing and engineering are recovering.

The IMF released figures for international market growth recently and there is sustainable improvement globally. This is positive for our market sector and we have entered a period of modest improvement. Worldwide there will be increased demand for resources which will drive the local economy to higher levels. The IMF also adjusted South Africa’s growth prospects upwards above those expected during the last quarter of 2017.

The fluid power industry normally lags the market by a few months, and there are signs of an improved market during the second quarter of the year. Projects previously put on ice are being dusted off and given the go ahead. Locally, the recruitment of staff has increased.

Education
Previously we reported on our challenge in securing a pipeline of students wishing to enrol for studies in our industry. We urge our member companies to identify possible recruits and guide them in the direction of fluid power. There is a lack of qualified professionals and a shortage of young apprentices. Our industry is experiencing a wide age gap between our current business owners and senior management and new apprentices coming in. Skills transfer takes many years to transfer to the next generation.

Threats facing local companies
At SAFPA we have been sensitised to the fact that several OEMs are choosing to purchase complete engineering solutions offshore. These systems are being imported from low cost producing countries and it has become a concern to SAFPA. The imports are predominantly in the hydraulic sphere but there is information that this is occurring in the pneumatic sector as well.

SAFPA technical evening
At a recent SAFPA technical evening Walter Zimmerman gave an interesting and detailed presentation on his recently published book, Introduction to Hydraulics. This training manual is suited to the newcomer to the fluid power industry, but also caters for technicians and engineers who require a knowledge and understanding of maintaining and applying hydraulic components, circuits and the principles on which they are based.
Yaskawa among Top 100 Global Innovators

Yaskawa is on the list of Top 100 Global Innovators for the third time in a row. Every year this coveted report recognises the world’s most innovative companies. The award was initiated by the Thomson Reuters media group in 2011. The selection criteria for a place among the top 100 most innovative companies in the world are global reach, the number of patents applied for and the sustained impact of inventions on shaping the future.

Founded more than 100 years ago, Yaskawa is a pioneer in the fields of drive technology, industrial automation and robotics. Then as now, the focus is directed primarily at solutions for tomorrow’s industry. “We invest heavily in areas associated with Industry 4.0 and sustainable energy use,” explains Manfred Stern, CEO and president for Yaskawa Europe and corporate vice-president of Yaskawa Electric, on the occasion of the award. “Many projects are currently being conducted in this area throughout all the company’s divisions, and this has been seen by Thomson Reuters and recognised by the award.”

With its i3-Mechatronics solution concept, Yaskawa is spanning a bridge between traditional mechatronics and digital technologies’ i3 stands for integrated – intelligent – innovative. i3 mechatronics is increasing productivity and quality by enabling the generation of machine and process data.

For more information contact Kurt Rosenberg, Yaskawa Southern Africa, +27 (0)11 608 3182, kurt@yaskawa.za.com, www.yaskawa.za.com

SICK launches new premises

Sensor and automation specialist, SICK Automation Southern Africa recently held the official opening of its custom designed, state-of-the-art premises in Lanseria Corporate Estate. CEO, Luxy Moodley described the progress of this three-year project, a result of the company’s rapid growth since it set up in South Africa in 2010. “Our new premises are a symbol of our long-term commitment to southern Africa. We are here to stay and we will use South Africa as a hub,” she said.

Investment in training and competency is a priority for SICK and the company will now be able to offer comprehensive in-house training.

Michael Muller, senior vice president and chairman of global business centre systems went on to describe how the family-owned company has evolved into a leading producer of sensors and sensor solutions, with a presence in 32 countries and global revenue of R20 billion. He emphasised the importance of digitalisation and the contribution that SICK sensor intelligence is making in the evolution towards Industry 4.0.

The highlight of the morning was Justice Malala’s highly entertaining and cutting-edge insight into South African politics, the

Sun Hydraulics acquires Faster Group

Sun has entered into a definitive agreement to acquire the shares of Faster Group for R6.3 billion. Faster is a leading global manufacturer of quick-release hydraulic coupling solutions. Its primary markets include agriculture, construction equipment and general industrial applications. Headquartered in Milan, Italy, Faster has manufacturing operations co-located with its headquarters, as well as in Toledo, Ohio and Pune, India. Additionally, the company has sales offices in Shanghai, China; São Paulo, Brazil and Langenfeld, Germany.

Wolfgang Dangel, Sun’s president and chief executive officer, commented, “The acquisition of Faster is in alignment with our Vision 2025, advancing Sun Hydraulics as a global technology leader in the industrial goods sector while maintaining superior profitability and financial strength. Faster further diversifies Sun more deeply into the growing global agriculture market. The business also broadens our global footprint, advancing our ‘in the region, for the region’ initiative.”

He added, “We see a tremendous amount of synergy with both our hydraulics and electronics segments, including opportunities to introduce our respective products to each other’s customer bases as well as leveraging technologies and expanding utilisation of existing manufacturing capacity.”

For more information contact Fritz Kern, Axiom Hydraulics, +27 (0)11 334 3068, fritz@axiom.org.za, www.axiomsa.co.za
Actom remanufactures critical components

Actom Turbo Machines recently manufactured high precision impellers and pinions for a large 190 kg/h 20 bar pressure integrally geared multi-stage centrifugal compressor to replace these components after they had been destroyed when the compressor failed. The refurbishment of the 2500 kW 11 kV 2-pole AC induction motor that drives the compressor was assigned to Marthinusen & Coutts. The compressor is used for direct supply of nitrogen to two of Air Products Vanderbijlpark’s largest customers in the Vaal Triangle. The project was completed with an extremely tight timeframe of three months.

Tolerances between the various components had to be strictly adhered to, these being especially critical as the compressor is a four-stage high-speed unit operating at speeds of between 20 and 33 000 rpm. Both the first- and second-stage impellers and pinions had to be replaced by newly manufactured units. These were manufactured to a tolerance of 0.02 mm. All the rotating components, comprising the gear set, impellers and pinions, were balanced in accordance with the international ISO 1940 specification.

Further critical procedures comprised laser alignment and fault-finding on all pipe stresses before making ready for commissioning, followed by a startup procedure – critical to protect the machine against possible damage during the run-in period. This was concluded by running a surge curve to confirm that the unit was operating optimally. The work performed on the motor consisted of a modification to the rotor to reduce the excessive vibration that the unit experienced.

For more information contact Richard Botton, Marthinusen & Coutts, +27 (0)11 607 1700, richardb@mandc.co.za, www.mandc.co.za

Green energy stores of the future

Former South African mines could find a new lease of life – with old mine shafts turned into hi-tech green energy stores. Energy startup, Gravitricity has just received a R12 million grant from Innovate UK, the British government’s innovation agency, for its plan to harness the power of gravity to store renewable energy. South Africa has been identified as an ideal country to roll out the green energy stores. The technology uses a massive weight suspended in a mine shaft to capture green power and then release it in seconds. If Gravitricity’s plan succeeds, its technology could breathe new life into former mining communities.

Gravitricity will start building a scale demonstrator later this year and will install a full-scale prototype by 2020. “Gravitricity uses a heavy weight of 2000 tons suspended in a deep shaft by cables attached to winches,” explains managing director, Charlie Blair. “When there is excess electricity, for example on a windy day, the weight is winched to the top of the shaft ready to generate power. This weight can then be released when required and the winches become generators, producing either a large burst of electricity quickly, or releasing it more slowly depending on what is needed.”

Unlike batteries, the system can operate for decades without any degradation or reduction in performance. The startup plans to build models from 1 to 20 MW, and estimates each energy storage system will last up to 50 years.

For more information contact Neil Davidson, Gravitricity, +44 75 4573 5402, neil@neildavidson.org, www.gravitricity.com

Konecranes completes major challenge

Konecranes recently completed a major refurbishment of a 16.8 ton digester jib at Mondi in Richards Bay well ahead of schedule. The entire job comprising removal, design, reverse engineer, paint, re-assemble, install, wiring and final commissioning took 52 working days from date of project start to completion. In October last year the Richards Bay team undertook the challenging removal of the crane. The jib sat 80 metres high on top of the digester and a 440 ton mobile crane with luffing booms was used to remove it, together with another 220 ton mobile crane. The removal took about seven days due to weather problems, including strong winds. Because of the serious structural damage the jib was condemned by the Konecranes service team on site.

“The whole project ran smoothly despite the often adverse weather conditions,” said John MacDonald, service director at Konecranes. “We have an excellent crew, led by Ferdi Pieterse, which made this possible. They put the Konecranes name on the top of the leader board by showing that we can handle any size job in Richards Bay.” The digester jib was handed over on 30 January 2018, exactly a month ahead of schedule.

For more information contact Ferdi Pieterse, Konecranes, +27 (0)35 789 0815, ferdi.pieterse@konecranes.com, www.konecranes.co.za
SEW-Eurodrive at bauma CONEXPO Africa

SEW-Eurodrive South Africa had a major presence at bauma CONEXPO Africa 2018, with products ranging from the new ECDriveS 24 V drive system for light-load conveyor technology, to its latest DRN series of IE3-compliant motors, and the customised LTP-B Eco Drive for pump and fan control in a range of niche sectors from HVAC to underground mining.

National sales manager Norman Maleka commented: “Our aim was to offer complete solutions, as opposed to simply being a component supplier.” He added that bauma CONEXPO Africa 2018 was an ideal platform to target potential end-users of its diverse product range, in a wide variety of industrial sectors.

The ECDriveS is the latest innovation from the drive and automation technology leader, comprising a modular driven roller and gearmotor and boasting a 20% higher power rating and overload capacity. End-users for the new drive system range from OEMs to system integrators and packing houses and even automotive manufacturers.

The latest DRN series of IE3-compliant motors was also displayed as part of the OEM’s Total Solutions approach. “Not only do we keep our customers up to date about all of the benefits of our latest innovations, we also advise on application-specific requirements,” added Maleka.

The customised LTP-B Eco Drive for pump and fan control in a range of niche sectors from HVAC to underground mining was also on display, setting new benchmarks in terms of quality, cost-effectiveness, and energy saving.

For more information contact Jana Klut, SEW-Eurodrive, +27 (0)11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za

New valve distributorship for BMG

BMG has recently been appointed by SAFi Thermoplastic Valve Solutions as sole distributors of SAFi thermoplastic industrial valves in sub-Saharan Africa. “BMG’s strategy to enhance its fluid technology division, incorporates the introduction of new products, with the latest developments in design technologies, materials and coatings, that meet exact market demand,” explains national product manager Willie Lamprecht. “Extreme care is taken in premium brand selection, to ensure product reliability, standardisation, flexibility, low maintenance and extended service life.”

New to BMG’s extensive valves portfolio, are SAFi thermoplastic industrial valves, designed to handle corrosive and abrasive materials in demanding industries, including chemical and petrochemical plants, mining, water treatment, transport and logistics, marine, food production, energy and agriculture. The SAFi range, which conforms to stringent international quality specifications, incorporates ball, butterfly, diaphragm and non-return valves, as well as strainers and tank fittings – all manufactured from high quality non-corrosive materials.

SAFi’s lightweight polymer materials are integrated with a robust valve design for reliable performance, easy installation and low maintenance, reduced operational costs and extended service life. These materials all have features for high corrosion and abrasion resistance. BMG specialists recommend SAFi thermoplastic ball valves for use in on/off regulation applications. These thermoplastic ball valves are maintenance-free and have the ability to close faster, also ensuring extended service life.

Typical applications for SAFi products in the mining sector are in heap leaching, electrowinning, solvent extraction and acid plants.

For more information contact Lauren Holloway, BMG, +27(0)11 620 7597, laurenh@bmgworld.net, www.bmgworld.net

Appointments

Hydraulic and Automation Warehouse (HAW) has appointed Jean Beckley as Johannesburg branch manager.

BMG has appointed Gavin Kirstein as Tsubaki product manager.

BMG has appointed Darryn Wright as marketing manager.

Dosco Precision Hydraulics has appointed Riaan Gronum as sales representative, Northern Cape.

Dosco Precision Hydraulics has appointed Christo Coetzer as sales representative for KwaZulu-Natal, East London and Port Elizabeth.
The Bosch Group is strengthening its business in Africa and further expanding its industrial technology portfolio on the continent. In 2017, the company and its 770 associates generated sales of R1.2 billion. Effective February 28, 2018, Bosch Rexroth has acquired all shares in Hytec Holdings. Hytec specialises in the marketing of hydraulic and automation solutions. Hytec has about 40 branch operations, not only in South Africa, but also in Mozambique, Namibia, Zambia, Botswana, Ghana, and Kenya. In a first phase, Bosch Rexroth acquired a 50% stake in its marketing partner, Hytec in 2014.

“For Bosch, Africa has a lot of potential as a strategic market of the future,” says Uwe Raschke, the Bosch management board member responsible for Europe, the Middle East, and Africa. “In the years ahead, we want to significantly increase our sales in Africa,” he adds. “Considerable opportunities are offered by the heavy investments being made in infrastructure projects in areas such as construction and power generation. Together with Hytec, we can take better advantage of the market opportunities in the African growth industries,” says Rolf Najork, managing director of Bosch Rexroth. The region is characterised by a lot of end-user business, such as servicing and spare parts for users of machinery.”

With its new subsidiary, Bosch Rexroth hopes to expand this business further. Hytec has a well-established marketing network in sub-Saharan Africa, and its associates are familiar with what local customers want. “We are combining this high level of regional marketing knowledge with Bosch Rexroth’s product expertise and technological prowess. This will be a significant boost to our business on the continent,” Najork says. Hytec will continue to market the products of other manufacturers. Its portfolio includes roughly 30 brands. It will also continue to do business as Hytec, since this is a strong, well-known brand in southern Africa. The same applies to the Hytec subsidiaries Tectra, HAW, HFT, HYSA, Hytec Engineering and HSA.

Positive economic outlook
Africa’s population is growing at a rapid pace, and according to the United Nations is expected to double to 2.5 billion people by 2050. The continent also has the fastest rate of urbanisation in the world. Within the next ten years, it is expected that 187 million Africans – equivalent to half the US population – will live in cities. This means growing demand for drive and control solutions for industrial machinery, for mobile machinery such as construction vehicles, and for major construction projects. Even today, Bosch Rexroth and its marketing partner, Hytec are successfully collaborating to serve the African market in areas such as power engineering. In one major project, for example, the two companies renewed the entire hydraulic equipment of the Roseires Dam in Sudan. At 1800 megawatts, the output of this dam on the Blue Nile is comparable with that of a nuclear power station.

Bosch has been working with its marketing partner Hytec for more than 50 years. “The complete acquisition of Hytec gives us a welcome opportunity to extend this successful collaboration and to grow further in Africa,” says Tillmann Olsen, general manager of Bosch Rexroth in South Africa. In May 2018, Bosch Rexroth and its new subsidiary Hytec will move into new joint premises in Johannesburg. The premises will include new marketing and administration offices, as well as an assembly line, a service centre and a training centre for courses in hydraulics and automation technology.

Bosch in Africa
In recent years, the Bosch Group has systematically expanded its presence on the African continent. Today, it is represented in ten African countries. The company’s focus is on affordable solutions and services for local requirements. These include training programmes for tradespeople in Kenya, for example, or auto mechanics in Nigeria. According to preliminary figures, the company generated sales of some 460 million Euros in Africa in 2017. Including the Hytec workforce, Bosch currently employs more than 1500 associates on the continent. Bosch has been present in Africa since 1906. All four Bosch business sectors – Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology – are active there. There are two manufacturing sites in South Africa, in Brits and Midrand. Bosch also actively promotes talented young people in sub-Saharan Africa. In 2008, it was one of the initiators of Afrika kommt!, an initiative of German industry for junior managers from sub-Saharan Africa.

For more information contact Willem Gijzelaar, Hytec Holdings, +27 (0)11 979 4630, info@hyhold.co.za, www.hytecgroup.co.za
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- Port Elizabeth: August 15–17
- Cape Town: June 13–15, July 25–27

**Pneumatics (2) Maintenance PN121:**
- Johannesburg: July 11–13
- Durban: June 27–29
- Cape Town: July 4–6

**Pneumatics (3) Advanced PN122:**
- Johannesburg: June 6–8

**Electro–Pneumatics PN211:**
- Johannesburg: June 27–29, August 22–24
- Durban: August 1–3

**Energy Saving in Pneumatics PN361:**
- East London: June 18–19
- Cape Town: August 13–14

**Hydraulics (1) Basic HY511:**
- Johannesburg: June 20–22, July 18–20, August 15–17
- Durban: June 13–15, July 25–27
- East London: July 4–6
- Port Elizabeth: May 30–June 1, August 22–24
- Cape Town: June 20–22, August 1–3

**Hydraulics (2) Advanced HY521:**
- Johannesburg: June 6–8, August 1–3
- Durban: July 4–6
- East London: June 6–8
- Cape Town: July 11–13

**Hydraulics (3) Proportional HY132:**
- Johannesburg: July 25–27

**Hydraulics (4) Maintenance HY142:**
- Johannesburg: July 4–6, August 29–31
- Durban: June 20–22, Cape Town: July 25–27

**PLC Introduction PLC111:**
- Johannesburg: July 11–13
- Durban: August 22–24
- East London: May 30–June 1
- Port Elizabeth: June 27–29

**Servo and Stepper Drives ED811:**
- Durban: July 11–13
- East London: June 13–15
- Port Elizabeth: July 4–6
- Cape Town: July 18–20

**Mechatronic Systems AUT211:**
- Johannesburg: May 29–June 1
- East London: July 31–August 3

For more information contact Lucian Kirk, Festo, +27 (0)11 971 5626, didacticza@festo.com, www.festo-didactic.co.za
Hybrid Manufacturing Technologies has developed a CNC-based hybrid tool solution, the Ambit multi-task system, which can be integrated into almost any CNC metalworking machine. Ambit enables the alternate use of metal removal and metal deposition heads in the tool spindle, and ensures optimised machine communication through the use of a PC-based control platform with EtherCAT as the fast fieldbus system.

The hybrid tool solution combines conventional CNC technology and additive production processes with the ability to provide both machining and metal deposition tools on the same spindle. The tool change is performed automatically. Machine tool manufacturers who opt for the Ambit hybrid solution can expand the possibilities of their standard CNC machine by integrating additive manufacturing without additional and tedious re-clamping operations and programming steps. The post-treatment of components, such as polishing, milling and surface sandblasting, can also be done with the same machine equipment so that transfer to another production cell for finishing is not required. The use of different material compositions for the same product is also possible, and inspection during production guarantees quality grades that cannot otherwise be achieved or determined.

“The Ambit hybrid kit was developed to offer compatibility with most CNC machine configurations and robot platforms,” explains Jason Jones, managing director and founder of Hybrid Manufacturing Technologies. “Equipping an existing multi-axis CNC machine with automatically exchangeable deposition heads makes 3D printing in metal possible without having to purchase a separate machine. This not only reduces costs, but also enables extensive options in the operation of CNC machines.”

The hybrid system supports a wide range of processing heads with different geometries, laser profiles, powder supply configurations and unfocused beams in order to enable a variety of processing steps. These include 3D metal application, welding, marking, chipping, drilling, pre-heating, annealing/relief, surface re-melting and cleaning, and much more. The standard equipment can accommodate up to 15 processing heads. However, an unlimited number of heads can be added, depending on the space in the tool changer and the control system performance.

Beckhoff control technology as the new standard

The Ambit control platform consists of a CP2218 Panel PC with 18.5-inch multi-touch display that runs TwinCAT 3 automation software, as well as an EK1100 EtherCAT Coupler with in-line connected EtherCAT I/O Terminals. “Hybrid Manufacturing Technologies was particularly impressed by the HMI solution from Beckhoff and the possibility to use EtherCAT technology in the processing head,” stresses Jones.

Peter Coates, co-founder of Hybrid Manufacturing Technologies, adds: “We can supply our customers with processing heads tailored precisely to unique application requirements that are usable on just about any machine tool. The use of EtherCAT as the communication system makes connection to other production cells simple. TwinCAT 3 also simplifies the connection to other company systems, even extending into the integration of customer-owned Ethernet-based control and ERP solutions. In the future, we will continue using Beckhoff control technology as the standard in the advanced hybrid solutions we supply to the global market.”

Efficient engineering with TwinCAT 3

Coates comments on the transition to the PC-based control solution: “It was a significant upgrade from our previous solution, and after a minimum amount of training we were able to integrate all our engineering processes into TwinCAT 3. The advantage of programming with structured text is that we do not have to change the platform; instead, we can simply add new PLC code. This means that all controlers run programmes made with the same code, which is incredibly helpful.”

The next steps in the development process

Hybrid Manufacturing Technologies won the International Award for Additive Manufacturing (IAMA) at the MFG meeting in Orlando, Florida, USA. The innovative company is already looking ahead to the future, envisioning the next development steps. These include the migration of the machine tool into the offices to drive research and development, as well as the development of a user interface that is intended to become the basis of a future industry standard.

For more information contact Michelle Murphy, Beckhoff Automation, +27 (0)11 795 2898, michellem@beckhoff.com, www.beckhoff.co.za
BionicWorkplace
Alongside serial production, there is a trend in industry towards the customisation of products. A key role when it comes to production in batch size one, besides the digital networking of entire installations, is also played by systems capable of learning using artificial intelligence and robots that work hand in hand with humans. In the BionicWorkplace, all these requirements are combined in a future oriented working environment.

BionicCobot: robot arm with human movement patterns
A central part of the working environment is the BionicCobot. This pneumatic lightweight robot is based on the human arm in terms of its anatomical construction and – like its biological model – solves many tasks with the help of its flexible and sensitive movements. Due to its flexibility and intuitive operability, the BionicCobot can interact directly and safely with people. In doing so, it supports workers doing monotonous jobs and takes over tasks that are dangerous for humans.

Intuitive operating concepts for safe interaction
In the BionicWorkplace, the bionic robot arm works together with numerous assistance systems and peripheral devices, which are networked and communicate with each other. At the same time, artificial intelligence and machine learning methods turn the BionicWorkplace into a learning and anticipative system that continuously optimises itself. The whole workplace is ergonomically designed and can be adapted to people individually down to the lighting. At the centre of the worker’s field of vision is a large projection screen. It supplies the worker with all the relevant information and reacts dynamically with its contents to the relevant requirements. All around the projection screen, various sensors and camera systems are fitted, which constantly record the positions of the worker, components and tools. In this way, a human can directly interact with the BionicCobot and control it using movement, touch or speech.

Recording the worker’s position using wearables
The system recognises the worker and their movements by their special work clothing. These so-called wearables consist of a long sleeved top, which is equipped with inertia sensors, and a work glove with integrated infrared markers. With the help of the recorded sensor data, the BionicCobot is able to hand over objects to its human colleague with pinpoint accuracy and move out of their way if necessary – an essential requirement for direct collaboration between humans and robots.

Machine learning optimises work flow
The intelligent software simultaneously processes all the camera images, positional data and inputs from the various peripheral devices. It uses all this information to derive the optimal program sequence. The system then divides the tasks expediently to the robot and other tools in order to give the human the best support whilst working.

With every action solved, the system learns something new. This creates a semantic map that grows continuously. Along the network paths, the stored algorithms constantly draw dynamic conclusions. As a result, a controlled, programmed and set sequence gradually turns into a much freer method of working.

Remote manipulation via virtual-reality goggles
Another element of the intuitive operating concept is remote manipulation. For this purpose, a 3D stereo camera with a viewing angle of 180 degrees records the whole working space. At the same time, the worker, who is spatially separated, wears virtual-reality goggles besides the textile wearables. The worker can use these to access the images from the camera in real time and follow them. In this way the robot can be controlled in case of spatial separation or from a safe distance.

Learned knowledge building blocks applicable worldwide
By means of intelligent workplaces capable of learning, such as the BionicWorkplace, and the use of multifunctional tools, collaboration between humans and machines will be even more intuitive, simple and efficient in future. Knowledge building blocks and new skills, once learned, can be limitless shared and made available on a global scale. It would therefore be possible in future to set up workplaces as a worldwide network with local adaptations, in each case adjusted to the local individual tasks and customer requirements.

For more information contact Kershia Beharie, Festo, +27 (0)11 971 5509, kershia.beharie@festo.com, www.festo.co.za
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Life Is On Schneider Electric
New drive range for energy intensive applications

In difficult economic times, rising energy prices have an increasingly negative impact on production costs. This is seeing energy intensive industries under increasing pressure to improve energy efficiency by adopting the best available technologies. With this in mind, Schneider Electric has extended its range of Altivar Process drives to include a solution for energy intensive applications in the oil and gas, mining, minerals and metals sectors – the Altivar 960 variable speed drive.

“Energy efficient drive systems can assist energy intensive sectors in several ways,” says Marc Ramsay, vice president for Schneider Electric Southern Africa, Industry Business. “They help to boost business performance by reducing commissioning time and considerably improving production uptime. Moreover, they are specifically tailored to optimise energy usage during production, which lowers costs, and reduces CO₂ emissions.” According to Ramsay, Schneider Electric customers are now able to use Altivar Process drives for applications and projects across the board, from single drive projects to the most complex multidrive applications that have advanced loadsharing functions.

The Altivar range of drives connects to industrial networks, bringing process information right to the user for optimisation of individual industrial processes such as conveyor belts in mines, pumps for oil wells or process cranes used in steelworks. In addition, the drives have the ability to communicate real-time data as they feature built-in Internet connectivity. This allows users to adjust their operations, lowering energy usage and improving production outputs. The system also communicates performance data, enabling operators to anticipate and identify any possible maintenance issues.

Specific applications

Ramsay says the range is ideal for oil production as it boosts efficiency due to its enhanced application control and data connectivity. Users now have the ability to control production from a central location. Moreover, down-time for pumping operations is limited, even during power outages, and users have direct access to troubleshooting information. The product’s drive enclosures were specifically designed to withstand even the most extreme weather conditions.

For the mining, minerals and metals sectors, the drives offer better control for conveyors, stackers, reclaimers and process cranes, boosting energy efficiency and uptime. Other benefits include drive-to-drive loadsharing to lower strain on individual drives, as well as high resistance to load and higher available current for improved motor reactivity and stability. Finally, in a world where new cyber threats are targeting these industries daily, the Altivar range boasts enhanced safety and cybersecurity due to its compliance with the latest standards.

Innovative features

The Altivar 960 also features other innovations, including new technology for lower harmonics. In addition it addresses a variety of user concerns, including extended equipment life cycles and tight space requirements. The new low-harmonics 3-level technology is a first on the market. This low harmonics concept is based on a 3-level technology that lowers the total current distortion factor THD(i) to a value less than 5% in accordance with IEEE 519.

Extended motor life is another benefit. The solution features a common mode structure that lowers voltage stress and peaks in voltage for a smoother waveform, in turn reducing stress on the motor and extending its life considerably. With space at a premium these days, its space-saving design is another benefit. “Schneider Electric’s harmonics engineering has resulted in internal filter components being significantly smaller than the conventional 2-level low-harmonic technology. In this way, the drive takes up far less space on the floor.

Installation and operation have also been simplified. The company’s engineers went to great lengths to ensure that installation and operation were as smooth and simple as possible. The enclosure arrives ready to connect and meets the need for total current distortion factors.

In terms of adaptability, the system meets power needs of 110 – 800 kW. Schneider Electric has plans to extend this up to 1500 kW. Engineering begins with a base model that employs standard enclosures and is ready to connect. However, its modular construction allows the enclosure unit to be tailored to individual needs, making planning easier, and installation and commissioning faster than ever before.

“There’s no doubt that energy is becoming a strategic factor in competition around the world, with energy intensive industries increasingly considering the efficiency of the products they use. There simply isn’t another solution on the market that can match the performance and energy savings of the Altivar 960. As the demand for innovative, greener technologies grows, businesses wishing to succeed and remain competitive need to seriously consider solutions that are innovative and sustainable,” concludes Ramsay.

For more information contact Jason Ullbricht, Schneider Electric SA, +27 (0)11 254 6400, jason.ullbricht@schneider-electric.com, www.schneider-electric.co.za
Parker's unrivalled industrial distribution network extends to approximately 13,000 locations globally. Through this extensive network of local, independent businesses, Parker brings its products and services to customers in 104 countries. This includes continued penetration of the ParkerStore network of industrial retail outlets, which has more than 3,000 locations around the world.

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New soft starter with internal bypass

The new Allen-Bradley SMC-50 smart motor controller with internal bypass from Rockwell Automation brings greater operational control over motor starts and stops. As an extension of the soft starter family, the SMC-50 smart motor controller delivers greater functionality and efficiency across industries.

Soft starters traditionally use solid state, silicon controlled rectifiers (SCRs) to control voltage to the motor during start-up, runtime and shutdowns. The reduced torque and current slowly introduce energy to the motor, mitigating electrical and mechanical stress to the application. If these SCRs remain in the circuit once the motor is up to speed, the heat generated by these devices leads to electrical inefficiency.

"Now, users have the option of choosing the proper power structure for their application when purchasing the SMC-50 smart motor controller. For operations that run over an extended period, built-in internal bypass allows users to shift from solid-state switches to bypass contactors," said product manager for soft starters, Rick Anderson. "By switching over to the bypass circuit, users can save on energy and decrease operational costs by minimising excess heat build-up."

The SMC-50 smart motor controller with internal bypass provides access to several communication modules, including EtherNet/IP and DeviceNet networks. This connectivity, combined with its microprocessor platform, brings energy monitoring capabilities and protection features that make applications easier to troubleshoot and fix.

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Self-contained CLSP servo drive

Voith’s new self-contained Closed Loop 4Q Pump (CLSP) servo drive is a hydraulic linear axis from the company’s range of self-contained drives. The high energy efficiency, overload protection and virtually wear-free operation are all characteristic features of this servo drive. The CLSP drive also boasts automatic, load-dependent shifting of the hydraulic transmission. This significantly reduces the connected load of the drive. As a result, the motor and inverter sizes are more compact.

The CLSP servo drive can be used for all direct linear motions, particularly when dynamic response, reproducibility and reliability are required. Plant operators can expect significant increases in productivity thanks to the speed of the drive. It operates with a force of up to 500 kN and combines speed with extraordinary robustness, a fact demonstrated by its three-year maintenance intervals or 20 000 hours of operation. The CLSP is typically used in the automation of all types of linear motion, handling, and machines with bending, cutting and forming processes.

It consists of three main components: the servo motor, a 4Q internal gear pump and a directly coupled hydraulic cylinder. No hydraulic power pack or oil tank is required for operating the self-contained drive. As a result, all components are integrated directly. The drive is also suitable for force control and position control. In addition, the sensors installed already provide the basis for complete integration into automated manufacturing systems or production facilities.

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Tectra Automation designed, manufactured and commissioned a servo-driven automotive press for Auto Industrial (AI). The application-specific press is used by AI to assemble various front suspension linkages for a local range of light commercial vehicles in such a way that it produces one part every 40 seconds for 22 hours a day.

Tectra Automation was responsible for every aspect of the press aside from the tooling, which was manufactured in-house by the client. To facilitate the production of one part every 40 seconds, a Rexroth L2S motion PLC was used with control provided by a Rexroth VEP40 HMIK with on-board PC. Tectra Automation designed and manufactured the control panel as well as the operation software. The Rexroth EMC-12S-HD electromechanical cylinder, driven by an MSK101D servo motor, was selected for control instead of using a hydraulic cylinder due to its cleanliness, high degree of controllability and operational quietness.

“The press has an integrated load cell to control and record the press-in force in order to guarantee consistent quality,” explains general manager, Kevin Lombard. “The ram is guided by Rexroth heavy duty linear bushes running on hardened and ground linear shafts. The rotary table is driven by a Rexroth MSK050C servo motor driving a GTM planetary in-line gearbox. By utilising various sensors, the program will alert a supervisor in the event of an operator error. Any parts not conforming to the required press-in force specification will require intervention to ensure that no rejects pass through the system.”

The mechanical structure was subcontracted to longstanding Tectra Automation customer, Machine Tool Promotions, (MTP) and assembled on its premises. From here, final assembly and testing took place at Tectra Automation’s facility and the press was subsequently delivered to the client. Project duration was only four months and commissioning took place onsite over a fortnight. The first week of operation was dedicated to on-the-job operator training and technical training for maintenance and supervisory staff was conducted simultaneously.

“We kept Auto Industrial constantly informed of the project status and liaised with them regarding proposed changes and additional features,” Lombard concludes. “They appreciated this professional approach and we were subsequently commissioned to engineer a customised wheel stud press for another of their local automotive clients.”

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Driving fan and pump control

From wine farms to the mining industry, the new LTP-B Eco drive from SEW-Eurodrive is finding application in a range of sectors. The purpose-built drive is distinguished by the fact that different parameters can be set for a range of functions, from fan to pump control.

While SEW-Eurodrive does have general-purpose units for fans, pumps, and even conveyors, the company initially saw a niche for a unit specifically for the heating, ventilation and air conditioning (HVAC) industry, targeted at building designers focusing on ‘green’ design. In terms of a commercial building such as a hospital, traditional drives meant that fans had to operate continually at full speed. “With the improved functionality of the LTP-B Eco HVAC drive, facilities managers can now control a fan by only running it according to demand, for example. This represents a major advantage in terms of energy-saving, as it allows for total flow control,” says national sales manager, Norman Maleka.

The HVAC sector remains a focus, especially in the key building design market of Cape Town. The broader energy saving benefits make it equally applicable to customers in other niche sectors, especially as the drive is available in a broad power output range from 0.75 to 250 kW. In addition, it replaces the traditional electrolytic capacitors used in the DC link with film capacitors, which have reduced energy losses, as well as eliminating the need for AC, DC or swinging chokes, which boosts the overall efficiency of the drive by 4% compared with a standard AC drive.

Maleka says that SEW-Eurodrive was recently approached by a Nelspruit customer for a 160 kW unit. “We are hoping to be able to use this as a case study, as the more real-time application data we can obtain, the more we can promote the new drive.”

To date, SEW-Eurodrive Cape Town has carried out small-scale projects relating to pumping applications for wine farms, which require mobile pumping stations. "Our customer focus on fan-and-pump applications convinced us that we needed a dedicated HVAC drive. Even though we can use a multipurpose drive unit, there are some limits in terms of functionality. It is always best to have a dedicated product for specific sectors, as our customers prefer customised to generic products for various applications," Maleka notes.

In terms of fan-and-pump control for mining applications, the LTP-B Eco drive is ideal to ensure clean airflow underground. HVAC control in mining operations is also highly energy intensive, which means the new energy efficient drive can make a significant contribution to total cost-savings.

Another benefit for mining operations in terms of enhanced health and safety is the drive’s fire mode, which allows for fans to run for as long as possible in the event of a fire, maximising smoke extraction and boosting evacuation time. In addition, the belt-break detection feature raises an alarm in the event of the belt slipping or any related fault occurring, in order to ensure continuous operation.

Extra features include pump cleaning and pump agitation functions, which are particularly useful if a pump has been out of operation for a period of time and needs to be restarted. The sleep mode function allows for added energy saving when the drive is inactive. “All of these functions can be monitored directly from the drive itself, as all inputs can be fed back directly to the management system, with no direct interface required,” Maleka adds. With two LTP-B Eco drives already sold to customers in Africa, he concludes that the growth opportunities for the new product remain robust, both locally and on the rest of the continent.

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The mortise and tenon joint represents a stable wood joining technique and forms the core of classic furniture manufacturing and a legacy of centuries old Chinese craftsmanship. Although it is both extremely stable and aesthetically pleasing, this type of joint is complex to manufacture and cannot compete in terms of price with industrially manufactured furniture. Based in the city of Nantong, China, Nantong Guoquan Woodworking Machinery Manufacturing has found a solution in Beckhoff CNC. This PC- and EtherCAT-based control platform controls the automatic manufacturing of mortise and tenon joints and provides a bright future for the traditional wood joining technique.

Mortise and tenon joints can be used to manufacture stable framework constructions that serve as the basic skeleton in traditional joinery, for example in the manufacture of solid wood furniture, windows or doors. A mortise is milled in the frame piece, and the mating part is given a tenon, which fits precisely inside the mortise. The result is an extremely stable wood joint that is capable of bearing heavy loads and ideally accommodates the properties of the wood, for example, shrinkage in dry conditions.

In modern mass production of furniture, this craftsman's technique has for the most part been displaced by board construction methods and machine manufactured connections such as dowels, screws or adhesives. However, more customers today value the durability and aesthetics of solid wood furniture made using more traditional methods.

In order to serve this market niche, Nantong Guoquan Woodworking Machinery Manufacturing has developed the CNC-800A3 machines, which are fully optimised for the automated manufacturing of mortise and tenon joints. The basis for the control platform is the TwinCAT NC I software. The geometries of the mortise and tenon joint to be processed are programmed via G-code, which is automatically generated by the CAD/CAM software. This makes the operation much simpler and more flexible: dozens of frame profiles and mortise and tenon joints that differ in shape, size and execution can be produced – quickly and with high precision.

The frame pieces are fixed on the machine and machined through three dimensional interpolation of the X and Y axes and the Z-motion of the machining spindle. The machining accuracy is within 0,1 mm.

Li Jiawang, electrical engineer at Nantong Guoquan Woodworking Machinery, says: “We chose the TwinCAT NC I software from Beckhoff because it can execute various programs for non-standard tenons, which has greatly simplified our development. We can react quickly to individual customer needs. Such flexibility was impossible with our previous PLC.”

Optimised vertical communication

“Many Chinese furniture manufacturers see the advantages of the central management of production data. For example CAD files can be downloaded directly from a central company platform to the machine,” says Li Jiawang. “In view of the various interface standards of the MES or ERP systems and different requirements for data acquisition from individual companies, we have developed a database on the basis of Visual Basic.NET in which all necessary machine states and production data are saved. Through the standardised connection of the customers’ MES/ERP platforms to these databases, customers have the option to transfer any data across company hierarchies from and to the machine by means of simple reading or writing access.”

A further advantage of the PC-based machine control platform is the possibility of remote maintenance. With remote diagnostics and maintenance, service technicians no longer have to visit the customer on site, which saves valuable time and labour costs.

Software-based CNC secures competitive advantage

Chen Guoquan, chairman of the board of directors at Nantong Guoquan Woodworking Machinery Manufacturing adds: “The software-based CNC controller from Beckhoff has taken us to the pole position in the woodworking industry. We are continually developing new machine models and are convinced that we will experience strong growth in the sales of CNC machines with Beckhoff platforms in 2016.”

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Designing an automated system requiring any type of linear motion is no easy task. Selecting the correct technology behind the actuator really depends upon what the designer wants to accomplish. Like much in engineering, making the right selection is less about focusing on a single characteristic than finding a good balance of performance from a number of different factors. Costly mistakes can be avoided by weighing up the available options analytically while designing efficient and economical motion control systems.

The majority of electromechanical linear actuators are comprised of five common types of drive trains: ball screws, lead screws, timing belts, rack-and-pinion tracks and linear motors. Understanding the strengths and limitations of each type and weighing them against the design requirements is the most logical approach. After all, linear actuators can be used in a breathtakingly wide variety of applications, from automated packaging lines and pick-and-place operations to complex machines such as 3D printers, which require precision positioning accuracy.

**Most common drive train types**

In linear motion, drive trains offer a dual function. They are primarily used for repetitive positioning and therefore need to provide acceptable accuracy and repeatability (the ability to back to the same commanded position repeatedly) according to the purpose for which they are required. At the same time, they apply force over distance, which requires them to possess sufficient tensile strength.

**Ball screws**, the popular and widely used drive trains consist of a threaded rod and matched ball nut with recirculating ball bearings between the nut and screw surfaces. Ball screws are an ideal solution for high duty cycle applications as well as applications requiring high force density, precision and repeatability. The rolling ball bearings reduce friction and provide high mechanical efficiency, even when in constant use. Ball screws can achieve moderate speed.

**Lead screws** consists of a threaded rod and matching threaded nut sliding interface surfaces. They are suitable for low duty cycle applications, or applications requiring small adjustments. Lead screws are typically only about half as efficient as ball screws, so they require double the torque to achieve the same thrust output of the screw. However, they offer cost efficient and compact solutions for high force applications. Moreover, they are resistant to back driving, removing the need of using a brake to hold the payload under a power loss.

**The timing belt**, the most simple and common drive train for linear motion systems, consists of two cogged pulleys; usually one driven and one idler, connected to a timing
Timing belts are a robust mechanism for high-speed applications requiring long life and minimal maintenance where precision greater than 100 microns is sufficient. Timing belts are efficient and easy to operate. They can be operated at 100 percent duty cycle and are available in longer lengths than screw drives, making them ideal for long stroke applications requiring high dynamics. Due to the elasticity of the belt we need a reliable tensioning system which is limiting the accuracy.

Rack and pinion systems consist of a machined linear gear and a round mating toothed gear. Typically, the round gear is mobile and the rack is stationary. This type of drive train is useful for very long travels requiring high speed, but is not known for its precision. They offer high force density but they require maintenance to maintain the lubrication of the system. In addition, removing system backlash from this type of drive train is not always possible, and they can also often be quite noisy in operation.

Linear motors are made up of a row of magnets – simply put, a ‘flattened’ rotary motor – which interface with an electromagnetic carriage to move the payload in a linear direction. They offer high speed, acceleration and precision. The main drawback is the cost of implementing this technology due to the cost of the magnets and linear feedback devices required. Force density is also lower than for the other drive system. The lack of a mechanical connection between moving and static parts of a linear motor makes the use of it difficult in vertical applications.

The PETS principle
The list of potential performance characteristics that a designer might be interested in is long, so to focus the selection process more precisely, the options can be classified into the following categories: Precision, Expected life, Throughput and Special considerations (PETS).

When weighing the options with a focus on precision, always start with an understanding of your needs relative to resolution. The other considerations are repeatability, followed by accuracy and finally velocity control. Linear motors and precision ball screws are typically the most superior for precision characteristics. (The majority of motion applications do not require these high levels of precision, which is why the timing belt remains the most commonly applied technology.)

Upon examining the expected lifespans of all the options, mechanical efficiency will be the number one consideration, unless the requirement is for a dirty or otherwise harsh operating environment. High efficiency of the drive train is synonymous with long life and lower energy consumption. Issues such as wear resistance, dirt resistance and maintenance requirements are also important factors to be considered in this category. Because of their high efficiency and limited maintenance needs, timing belts are the go-to drive train of choice in this category.

The category of throughput can be considered by first examining the speed and acceleration or deceleration characteristics of each technology – depending on the length of linear travel required. If you have a longer travel where more of the cycle time is spent at the top velocity, speed is the most important. If the application requires shorter moves, acceleration and deceleration characteristics will take precedence. Depending on the application also other criteria, for example frequency response, duty cycle must be taken into account. Linear motors are unparalleled from a throughput perspective, due to their ability to achieve high speeds and accelerations, and given that they have no mechanical compliance, they have a high-frequency response.

Some special considerations to take into account when looking at each technology include material costs and implementation costs to ensure that the right combination of functionality is achieved at the minimum cost. Force density is also an increasingly important factor to bear in mind as machine designs continue to miniaturise, particularly when specifying end effectors or tooling mounted to an axis.

A precise balancing act
Some applications make the choice of a linear drive train relatively simple. For example, it’s clear to see from the above that timing belt drives are an ideal choice for long-travel applications requiring high linear velocity and acceleration. If the application travel length and required speed are moderate, but the acceleration should be high, or if a high positional accuracy is required, then a linear motor based drive would most likely be a better fit.

When the choice isn’t as obvious, all the available application parameters should be weighed carefully to make the best possible selection. If one key performance characteristic is optimised, it is likely that another performance indicator may be sacrificed. Analyse the requirements against the abilities of each technology using the PETS principle from the beginning, or contact the specialists at Parker Hannifin for specialist advice on modular linear drive solutions.

For more information contact Lisa de Beer, Parker Hannifin SA, +27 (0)11 961 0700, lisa.debeer@parker.com, www.parker.com/za
HYDRAULICS

BMG’s fluid technology services include solutions for hydraulics and pneumatics, lubrication, fuel and industrial filtration systems, hydraulic hose and fittings, as well as instrumentation, pumps and industrial valves.

“Fluid power – which encompasses the use of fluids under pressure to generate, control and transmit power – comprises hydraulics using a liquid such as mineral oil and pneumatics using a compressed gas such as air,” explains David Dyce, business unit manager, BMG fluid technology.

“With its broad technical capabilities BMG is able to offer total process, filtration and lubrication management solutions throughout Africa, in applications where conventional products have failed after short periods of service.”

BMG’s fluid technology team has a thorough understanding of the filtration process and offers solutions which ensure fluids, including oil, fuel and lubricant oil, are within the required cleanliness standards. Efficient filtration disciplines result in optimum performance, improved reliability and extended service life of machinery, equipment and vehicles. Without efficient control and contamination prevention, premature equipment failure is likely, resulting in downtime and costly replacement of parts.

A key area of growth for BMG is in replacement components for hydraulic oil filtration systems. The company has recognised a growing demand from industries, including earthmoving, mining, transport, chemicals, shipping and petrochemicals, for the supply of quality parts that ensure cleaner, non-contaminated diesel and lubricant oils. BMG’s extensive range now encompasses EcoPart filter elements for stationary and mobile hydraulic systems from the Filtration Group. These components, with defined filter performance and purity class, comply with stringent DIN and ISO standards and have all other necessary standard industry approvals. The FG EcoPart series, which includes a wide range of pressure filter and return filter elements, is available from BMG in different versions, with various grades of fineness.

These components are suitable for diverse hydraulic applications, as well as gear oil treatment. FG Filter elements are designed to reduce the solid particle contamination to the prescribed contamination class, to prevent the ingress of dirt from the environment and to maintain the properties of the hydraulic fluid for an extended time period.

BMG also supplies FG desiccant breathers, which protect lubricants and machines from damage caused by moisture and the ingress of particles. Breathers are suitable for use in hydraulic units where there is high humidity and temperature fluctuations. The normal hazards of condensation – rapid ageing of hydraulic oil, degradation of additives and corrosion – are prevented. These desiccant breathers have an enlarged housing, which ensures up to 20% more absorption of moisture than conventional breathers. Typical applications include wind energy, power plants, tunnel construction, aerospace and manufacturing processes, as well as petrochemical and chemical plants.

In addition, BMG supplies FG coalescer filters, which are used in the fuel line for the efficient operation of marine diesel engines. BMG also offers the design and commissioning of diesel and lubrication systems, in-line diesel and oil conditioning and particle monitoring and filtration training. Optimum filtration performance, combined with lower differential pressure of the system, significantly reduces energy consumption, which is critical to maximising production efficiencies.

BMG’s national branch network supports an extensive range of fluid technology products and bespoke systems, with field services and a technical support facility to ensure optimum efficiency and extended service life of every product, even in hazardous environments. The company also offers a design and manufacturing service, according to exact requirements, for small installations and major projects.

For more information contact Lauren Holloway, BMG, +27 (0)11 620 7597, laurenhy@bmgworld.net, www.bmgworld.net
Performance driven, market priced valves

Sun Hydraulics has launched its new Sun FLeX family of competitively priced, high performance electro-hydraulic products. These 16 completely new solenoid-operated cartridge valves and coils are the first products in the FLeX Series of solenoid valves for the mobile and industrial hydraulics markets. They use Sun’s unique floating-style design, adding an extra layer of security in harsh applications where torque and force can become excessive. Designed to outperform comparable valves, FLeX Series solenoid valves deliver:

- A consistently better pressure drop in a virtually leak-proof poppet style valve
- Over 10 million cycle operations
- A zinc-nickel plating standard (1000 hour salt fog) on valve and coil
- Coil options that include interchangeable low power, high power and explosion-proof versions for expanded configuration flexibility

FLeX valves offer significant performance advantages over competitive valves. For example, the FLeX DTBF normally closed, direct-acting blocking poppet valve, like all the FLeX valves, was designed with advanced computational fluid dynamics (CFD) simulation tools to optimise flow path geometries. It is coupled with a solenoid actuator that provides optimised actuation force at critical points in the valve stroke. The result is a lower pressure differential across the valve at a given flow rate and increased shift performance at higher pressures and flows. In practice, this means hydraulic systems utilising the DTBF valves will see significant improvements in both efficiency and reliability while providing higher pressures and flow rates than competitors’ products.

Hytec reduces cylinder downtime

Hytec Engineering recently made another commitment to lowering cylinder down-time with the purchase of an additional 242 cylinders that will be used in its Service Exchange Programme. Through the company’s exclusive Service Exchange Programme, clients are able to exchange defective hydraulic cylinders for fully functioning units while theirs are repaired, ensuring minimal downtime at their operations. “The primary aim of the programme has always been to get clients replacement cylinders in the shortest time-frame possible,” explains general manager, Pierre Goosen. “With this increased stockholding, we are now able to offer clients an even shorter downtime potential by lowering the lead times on exchanged units.”

The new stockholding will complement the company’s current extensive Liebherr service exchange stock which includes various-sized hydraulic cylinders from leading brands such as CAT, Komatsu, Volvo and Hitachi that have long proven their success in Africa’s earthmoving, drilling and surface mining operations.

Hytec Engineering ensures the operational efficiency of all second hand and refurbished cylinders by adhering to strict OEM standards through its CAD facility, reverse engineering services as well as its specifically designed cylinder test bench that tests stroke sizing and leak detection on every cylinder.

“Every component is inspected and tested upon arrival at our factory,” adds Goosen. “We also monitor the amount of times we reuse a component before scrapping it to ensure that no cylinder is at the risk of material fatigue.” Once a cylinder has been tested, the automated system generates a certificate that can be used for quality control by clients.

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Multi-sided digital manometer

The Kobold model MAN-SD intelligent digital manometers offer reliable pressure monitoring of plant and machinery and have application in the fields of mechanical engineering, environmental technology and hydraulics. These battery-powered devices, which are fitted with piezo-resistive sensors, resist overloads up to three times nominal loading.

There is a choice between 24 measuring ranges, which extend from -1 ... 0 up to 0 ... 1600 bar. The manometer can be installed in such a way that the easy to use four digit LCD display can be very easily read, as both the process connection and the front cover are rotatable.

Operation is simple and convenient using three function buttons on the film-covered keypad. The zero point can be set automatically using the zero function, and a freely selectable password offers protection against incorrect or unintentional operation. Models with analog or relay output are available. In the model with a push button and relay, switching point and hysteresis can easily be set using the keypad. The devices can also be provided with a peak value memory.

This robust pressure measuring device fulfils Protection Class IP65 and is therefore suitable for use in tough applications. All parts which have contact with media are of stainless steel or ceramic.

For more information contact Instrotech, +27 (0)10 595 1831, sales@instrotech.co.za, www.instrotech.co.za
Modern industry needs far more from its suppliers than straightforward product sales. Instead, today’s technology providers must support their customers with accessible and professional targeted services that aid plant and equipment efficiency and reliability and minimise costly and disruptive downtime.

One area where this is relevant is gas-loaded hydraulic accumulators, which store energy or smooth out pulses or shock when installed within hydraulic systems. A hydraulic system with an accumulator can use a smaller pump because the accumulator stores energy from the pump during periods of low demand. This energy is available for instantaneous use, released upon demand at a rate many times greater than what could be supplied by the pump alone.

Industrial applications may include bladder, piston or diaphragm accumulators, each offering particular advantages and limitations depending on the specific application.

Regular maintenance
When properly applied in a hydraulic circuit, accumulators can have a long and reliable life. Regular maintenance is critical in order to maintain production efficiency and control cost. To minimise the risk of downtime, engagement with an accumulator service team that offers fast and easy access will provide numerous benefits. This can help combat and even eliminate a number of potential technical and performance issues which can affect accumulators in service.

Selecting the optimum supplier of accumulator services is paramount, and there are several factors to consider for those seeking comprehensive and innovative support. Firstly, only consider suppliers with a dedicated resource for accumulator services as this will help guarantee the necessary expertise, experience and responsiveness. When a hydraulic system begins to underperform or fail, it can prove extremely disruptive to operations, so a professional support team is vital.

Legislation
New directives, including the Pressure Equipment Directive 2014/68/EU, place requirements on manufacturers and those who ‘place equipment on the market’ and national regulations require most accumulators to be independently checked and recertified on a regular basis. However, despite the financial and legal risks, it is estimated that 80% of accumulators in Europe are not fully compliant with legislation.

Parker Accumulator Service Centres
Parker Accumulator Service Centres have been established with certified Parker distributors to optimise customer systems by combining industry-leading products backed by quality service, to deliver stress-free accumulator management alongside maximised performance, efficiency and safety. With training and certification provided by Parker, Accumulator Service Centres offer detailed product knowledge and expertise. Customers can benefit from services such as system improvement, as well as accumulator maintenance, recertification and pre-charging – complete with audits, scheduled inspections and replacements.

Integrated solutions
With locations across Europe, Parker service centres offer an integrated solution that combines products, services and technologies, whether on an in-house (at the service centre), mobile or onsite basis. With an in-house service solution, the accumulator is sent to the service centre, while for mobile solutions the service centre travels, with equipment, to the customer facility using a vehicle. For onsite solutions, the service centre establishes a fully equipped container workshop on location.

Aside from preventing any loss of system performance or failure, support from Parker service centres can help to protect employees from accidents. Moreover, compliance with legal requirements is assured, while warranty validation and preventative maintenance reduces downtime and increases productivity.

With regard to the use of original spare parts, tangible benefits include shorter inspection time and the reduction of complexity in logistics (tracking systems, data monitoring and recording) and documentation, both of which help to lower costs and save time.

Service centres can utilise the Parker Tracking System (PTS), which helps schedule accumulator maintenance, providing automated notifications on inspections and replacement parts.

In automobile MRO operations, appointing an accumulator service provider could also help to make the production performance fit for Industry 4.0. Further potential asset management activities include energy and efficiency audits; risk assessment and servicing for safety equipment; and asset condition monitoring and prognostics (sensors).

The implementation of preventative maintenance, improved reliability, extended application possibilities and reduced total production costs are among other advantages. These benefits are also available to hydraulic systems in production plants.

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Safety for your plants

The safety and reliability of technical processes are of vital importance for companies in the process industries. Bulk materials and powders in sectors such as the chemical, pharmaceutical and food industries can be very dangerous. One spark and dust can explode. Festo has a wide product range and the necessary expertise for applications in which the safety integrity level (SIL) or explosion protection is required.

The company offers comprehensive solutions for explosion protection according to the Explosion Protection Directives for Zones 1 and 21, as well as 2 and 22. Products such as linear and quarter turn actuators, cylinders, sensor boxes, pilot valves, valve terminals and remote I/O can control and regulate the entire pneumatic and electrical control chain in potentially explosive areas. They have wide application in handling powders and bulk materials. Regulations, certifications and standards for explosion protection are available both internationally and regionally so that the required safety can be guaranteed. For all the above-mentioned products, Festo has the necessary international approvals according to ATEX, IEC Ex, Inmetro, TR CU, Nepsi and Kosha.

The SIL and the EC Machinery Directive are used, for example, to minimise risks in process engineering systems. Safety functions reduce risks that could cause injury and damage to people, the environment and property. The SIL describes the extent to which risk is reduced to an acceptable level. The possible spectrum of risks to be assumed for safety related systems has four levels. Festo offers products and solutions for both low demand applications, for example in refineries, and high demand applications in the food and pharmaceutical industries. This starts with the right selection of products for process valve automation like actuators and sensor boxes, continues with the necessary control concepts and pneumatic circuits in redundant control blocks in 1oo2, 2oo2 and 2oo3 designs and ends with separate control of the electrical components through safety PLCs.

Planners, machine builders and operators of processing systems must document the required risk minimisation in potentially hazardous system sections. Certified products make it much easier to verify the risk minimisation and provide safety during machine construction. Festo products help achieve this as the certifications and manufacturer’s declarations are available on the Festo Support Portal under www.festo.com/supportportal. After the product type or part number is entered, the available documents can be accessed directly.

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In an effort to innovate continuously and provide total engineering solutions while meeting demand, SMC recently expanded its local production offering to include the design and build of electro-pneumatic control panels for a range of industrial applications. From a simple assembly to a complex system, SMC’s sales engineers, designers, panel builders and technical teams work with its customers to ensure that panels are designed to specification, within budget and on time.

Most recently, SMC’s team worked with a large automotive manufacturer to shorten labour time and speed up production by using one of its custom-built panels. The previous application required that the staff on site had to manually manoeuvre two side panels on a vehicle and have them welded onto the chassis. This was proving labour intensive and safety was of concern.

The SMC team found the perfect solution to the problem – an SMC panel which housed control valves and operated CP96 cylinders (ISO) and AS flow controls; this allowed for an automated process that reduced both welding and labour time. The customer once again regarded SMC as a one-stop supplier to fulfil its automation needs and the SMC team collaborated to ensure that the project was carried out seamlessly. From a single, once-off special to a multiple cabinet order, SMC prides itself on having the resources and expertise to build high quality, fully tested control cabinets that deliver outstanding performance and offer peace of mind.

For more information contact SMC Pneumatics South Africa, +27 (0)11 100 5866, sales@smcpneumatics.co.za, www.smcpneumatics.co.za

In today’s tough economy the need for high quality compressed air filtration at a reasonable cost is paramount. With this in mind, Artic Driers International has launched the E Series filter range. The casings and elements are manufactured by a German-owned group in Malaysia. This combination of low operating overheads combined with German standards results in high quality in-line coalescing air filtration at an extremely low price.

The E series has five different air filter elements that fit into any of the filter casings. Filtration ranges from 3 down to 0.01 microns, with oil removal down to 0.003 mg/m³. Element filtration performance is routinely checked by independent ISO auditors in Germany. The pleated media elements give a high level of dirt retention and low pressure drop, with 40% more surface area than a spiral wound filter element.

The elements are finished with a colour coded anti re-entrainment sock. The aluminium casings are internally treated to prevent corrosion and are also powder coated externally. All casings have a differential pressure gauge to alert operators when to change the filter element. A level-controlled automatic drain valve drains the bowl. If required, an adjustable, timed electronic drain valve can be fitted to the outside of the bowl for precision drainage, or intelligent no-loss drains may be used.

Artic also recently introduced activated alumina air drying canisters and activated carbon absorption canisters that fit into the standard E series casings. These may be used as point-of-use dryers and final oil vapour removers, providing end-users with additional protection for demanding applications.

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Digitalisation and automation are driving South Africa towards the Fourth Industrial Revolution, where smart technology improves efficiency, upskills workers and creates new jobs. At the forefront is automation specialist, PCMP. The Pretoria-based company boasts a team of 15 experts who conduct detailed analyses of their clients’ manufacturing processes, before providing customised state-of-the-art solutions for all areas of production. PCMP’s core objective is to provide a full turnkey industrial automation service under one roof. “Our engineers have the skills and expertise to integrate automation hardware and software from a variety of manufacturers. The end result is a highly efficient and integrated system designed to the exact specification of any application,” says director, Matthew Cramb.

PCMP engineers are industry-leading specialists in the world’s top automation brands, including Siemens, Rockwell, Schneider, OPCSystems.NET, Invensys WonderWare and ifm. “Our industrial automation service offering includes engineering consulting, project management and design that guarantees measurable results and a positive impact on any business,” adds Cramb.

As part of its value-added service offering, PCMP has invested in developing comprehensive service level agreements to ensure that the company fully understands every client's unique operating environment, and that it delivers flexible service solutions that provide ongoing business value. “An increasing number of manufacturing businesses in South Africa are moving towards integrated automation solutions as the country continues its progression to Industry 4.0, and PCMP is helping them make the transition a seamless and profitable one,” Cramb concludes.

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Prejudices last for a long time, even when reality has long since disproved them. One of these prejudices is that hydraulics have no place in Industry 4.0 because they are not intelligent – but they have actually been ready for the future for some time.

For decades, hydraulics have been equipped with electronics, sensors, appropriate accessories and autonomous controls. In terms of automation technology, they have been at the same level as electromechanical drives for some time – partly thanks to the numerous system modules from Bosch Rexroth. Black and white valves have already disappeared from many applications, replaced by autarkic servo-hydraulic axes. The question is no longer whether hydraulic valve technology will benefit from networking capability, but simply when. We are currently experiencing the transition from classic, analog hydraulics to largely digital networked fluid technology. European machine manufacturers are increasingly digitalising their machines and expect the hydraulics to integrate seamlessly into these networked environments. The challenge now is extending networking beyond the machine itself and handling the wealth of data obtained. It has to be bundled and evaluated meaningfully and securely.

Intelligent interplay is the key

Tasks that were previously performed by steel and iron valve controls are now being carried out by decentralised intelligence in an electronic drive control unit. It adjusts the speed of the pump drive as required when power is needed at the consumer, or reduces it to almost zero. In many processes, this is a considerable energy advantage. The variable speed hydraulics consume up to 80% less energy than constant systems. Current discussions about Industry 4.0 show how important it is that all necessary functions and functionalities are defined. Active networking and communication is only possible if the mechanics, electronics, and sensors are standardised across different manufacturers. In the future, not every hydraulic-mechanical pressure valve will have on-board digital electronics and connect to a control or other valves. This will only be the case when it makes sense.

Smart solutions with decentralised intelligence

Decentralised intelligence and open interfaces are the crucial requirements for future automation solutions. As a result, Bosch Rexroth uses multi-Ethernet interfaces that support all standard protocols in its electrics and hydraulics. The next step is to integrate sensors into the existing valve housing. This opens up a range of possibilities. Let’s consider condition monitoring, for example. Here, sensors can record information about everything from oil quality to temperature, vibrations and completed switching cycles. Deep learning algorithms enable users to identify wear before it leads to a failure – a key step on the road to preventive maintenance.

Intelligent single-axis controllers are already responsible for decentralised hydraulic motion in a closed control loop. To achieve this, a powerful motion control is integrated into the valve’s on-board electronics. It carries out the target/actual comparison locally and makes adjustments to an accuracy of a few micrometers. The control quality of the system depends solely on the resolution of the measuring systems. These control cabinet-free motion controls are being used increasingly frequently in a wide range of markets.

With its IAC control valve, Rexroth also offers a control cabinet-free motion control that is completely integrated into the valve electronics. It can be fully networked using open interfaces, as can servo-hydraulic axes with a dedicated decentralised fluid circuit. In these ready to install axes, the pump, valves and cylinders make up a single assembly, which the machine manufacturer only has to connect to the power supply and control communication.

Plug-and-play for hydraulics

In the future, best-in-class controllers will replace valves that were previously necessary for motion. The electric drive positions the hydraulic cylinder based on the speed of the pump drive alone. Thus, the hydraulic gears essentially do the same as an electromechanical linear drive – they convert the rotary motion of electric drives into linear motion, but with all the advantages of hydraulics.

In the next development stage – autarkic linear axes – the advancement is particularly apparent. These are ready to install cylinder assemblies with a dedicated, highly-integrated fluid circuit. To operate these axes, machines therefore require no central hydraulic unit. The autarkic axes are connected in the same way as electric drives – all that is needed is a power cable and a data connection to the machine control. The same software tools are used for commissioning as for electric drives. Commissioning engineers require no in-depth knowledge of hydraulics, because they simply configure the preprogrammed functions for the machine conditions.

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For Festo, Industry 4.0 is more than marketing hype, it is backed up by solid projects and products. The company is a member of the Industry 4.0 platform and is advising the German government in this regard. The company is also developing continuing education concepts and qualification measures for new career paths. In addition its Bionic Learning Network is carrying out visionary research into autonomous and self-controlling systems such as BionicANTs and an interactive, collaborative pneumatic 7-axis robot, the BionicCobot.

**Industry 4.0 products**

Festo is already delivering real automation technology products for the fourth industrial revolution: integrated drive packages, modular valve terminals with OPC-UA and IoT gateways, decentralised Codesys controls and autonomous mechatronic subsystems in IP20 or IP65. In addition, there are apps and cloud concepts. However, the top innovation in pneumatics is the most appealing: the Festo Motion Terminal. This is the first automation platform to be built as a cyber-physical system replacing up to 50 individual pneumatic functions.

Festo, in contrast to consulting companies, benefits from its ability to generate large amounts of user experience from pilot projects on its own production lines at The Scharnhausen Technology Plant. These include areas such as energy management and optimisation, as well as innovative one-piece-flow concepts. These employ standardised networking, mobile maintenance with tablet computers or automated, flexible test systems for individual products.

**Energy management**

Festo’s new factory building in Ostfildern-Scharnhausen has been designed to meet the most exacting energy standards. For example it has been fitted with solar energy systems and employs heat recovery concepts. The objective was to make it possible to compare and network energy data with consumption data from all machines. As a result, Festo has equipped the factory with the OPC-UA communication standard and implemented a concept that enables the company to save one third of the energy consumed at the old factory in Esslingen-Berkheim.

Festo has equipped the new Scharnhausen Technology Plant with machines and systems that offer much greater flexibility and are oriented towards the concept of the SmartFactory. The result is that changes of batch are possible within only 13 seconds – much faster than on the previously used machines and systems, which required anything from half an hour to several hours to achieve the same effect. This also applies to exchanging individual stations and modular cells, something which can now be undertaken in one afternoon rather than several weeks or months.

**Networking**

Festo has equipped many machines with OPC-UA as the basis for an optimised Kanban and one-piece-flow concept. If a particular resource within a multi-stage production sequence fails and this results in a reduction in the production capacity, all the upstream process steps are automatically throttled back so as to optimise them to this bottleneck. This avoids the need for buffer stores which would otherwise have to be processed at great expense in the night shift or at weekends.

The introduction of tablet computers in maintenance has proven to be an ingenious step. Not only does the overall system effectiveness of all production systems increase, the level of workforce motivation is also boosted. In future, networking will optimise wealth creation with a return on investment inside six months.

**In use with the customer**

Customer applications in Germany and abroad reveal the innovative potential of Industry 4.0 worldwide. For example, Festo’s customers are consistently building modular machine concepts according to the Industry 4.0 approach for the automotive industry, and are saving weeks between the order and delivery, or are using IP65 controllers from Festo for automation without control cabinets, in order to offer lower prices.

Others are considering delegating parts of their preventative maintenance and spare parts business to Festo via cloud-based concepts to allow them to concentrate on their core business in line with lean management principles – at the same time as developing a new pricing model.

For more information contact Kershia Beharie, Festo, +27 (0)11 971 5509, kershia.beharie@festo.com, www.festo.co.za

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**Getting a grasp on Industry 4.0**

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Digitalisation is having a huge effect on manufacturing and SKF is at the forefront of using it to improve service to its customers. The ability to collect and manipulate vast amounts of digital information will catapult manufacturing into the future. By embracing digitalisation, SKF is enhancing its core offering – bearings technology – so that customers can further boost the performance of their rotating equipment. Furthermore, by focusing on industrial digitalisation, SKF aims to drive the optimisation of cost and efficiency of the full value chain, including world class manufacturing and supply chain integration.

Growing expertise
Digitalisation will affect all parts of the value chain, from design and manufacturing through to purchasing and maintenance. SKF has been monitoring equipment remotely for around 15 years and currently has around a million bearings connected to the cloud. Data from them is gathered and interpreted daily by experts. The ability to handle this data leads to enhanced analytics, allowing the early detection of potential failures in rotating equipment, and a better understanding of critical product and system design requirements.

There are various platforms available to help customers gather and interpret data. For instance, the Enlight platform helps operators visualise data from a variety of sources using a device such as a smartphone or tablet – an easy way to put Big Data into an operator’s pocket.

The connectivity of the data runs in all directions, and can be used in many ways. At its simplest, it connects a sensor to a remote diagnostics centre. However, the data – on the health of a bearing, for instance – can be fed right back to the design stage, and used to help redesign a better product.

Increased digitalisation has also begun to allow more customised manufacturing. Because it can cut machine resetting times close to zero, there are fewer restrictions to making customised products. Recently, the owner of an aluminium mill required bearings that would allow increased output through a higher rolling speed, as well as lower maintenance costs and the elimination of unplanned downtime. SKF was able to produce four-row cylindrical roller bearings complete with optimised surface properties and customised coatings to boost service life and robustness, as well as designing out product cost.

Paid for performance
A major shift in the future, aided by digitalisation, will be the way in which customers are served. While the usual transactional model of providing hardware will remain important, it will start to be replaced by more performance-based contracts. Here, SKF will be responsible for ensuring that the customer’s operations remain efficient. Supplying hardware like bearings will then be supported by services – from predictive maintenance to lubrication expertise – that deliver this extra efficiency.

Recently, the company agreed a five-year Rotation For Life contract with Zinkgruvan Mining of Sweden. SKF will carry out remote monitoring of four mills at a Zinkgruvan enrichment plant for a fee, based on whether productivity targets are met.

This arrangement relies on digitalisation technologies working in synchronisation. In one element of the contract, monitoring data from a conveyor belt is gathered automatically and a specialist analyses the deviations if necessary, while a distributed lubrication system keeps the line running at optimum efficiency.

The ability to correlate a wider variety of data can further improve performance. For instance, condition monitoring data can be combined with process data to make more informed decisions on maintenance and asset performance. For example, analysing both monitoring and process data might reveal that slowing a machine down by 3% would extend the maintenance period by four weeks. The customer can then balance a slight reduction in output with a longer production period and make the best possible decision.

Self-replacement
Automatic detection of a failing bearing is a massive step forward in efficiency. However, the process of ordering the replacement still involves human intervention, which is why SKF is already gearing up for a future in which the faulty part effectively puts in an order for its own replacement. This extends the just in time manufacturing concept down as far as the individual component and could one day bring stock levels close to zero. This type of system is still under development. However, SKF is running pilots in specific areas of the supply chain. In the future, the plan is to join these together, allowing full, end-to-end digitalisation.

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To simplify and speed up the manual process of spreading butter on pretzels, MFDO UG based in Althütte in Baden-Württemberg has developed a machine capable of automated pretzel buttering. The machine is fitted with system components such as Logo! 8 and Simatic operator panels from Siemens, and enables pretzels to be spread with butter twice as quickly as the traditional manual method.

As a snack between meals, for breakfast or when out and about, the simple buttered pretzel traditionally enjoys enormous popularity in Germany – and demand is growing. Manually cutting and spreading butter in the bakery for hungry punters waiting in line can become highly stressful at the busiest times.

Electrician Dieter Obertautsch and designer Michael Feil from Althütte in Swabia – an area of Germany renowned for its creators and inventors – put their heads together to come up with a solution. They founded the company MFDO UG, and set about developing and building a machine for automatic buttered pretzel production. At the press of a button, the machine pumps butter into the pretzels. The technology used to control the machine and the process comes from Siemens. It takes around ten seconds to turn a plain pretzel into a buttery treat.

Big plans
Operation is also extremely simple. Once programmed, the operator only has to start the sequence for each pretzel by pressing a button. The correctly portioned quantity of butter is pressed out of the metal container through the needle into the pretzel by a pressing rod. A lamp indicates when the supply of butter is running low in the container. “Our machine takes around ten seconds to turn a plain pretzel into a buttered one, and the butter quantity is precisely portioned so that none of the pretzels come off worse than others,” explains Feil. With all these benefits, not only does the machine double the production speed compared to manual buttering, it also ensures a consistent standard of quality. Users can keep an eye on the portioning process at all times using an optional KP300 Simatic Basic Panel and adjust it if necessary. The machine can be conveniently operated and monitored using the supplementary module for remote communication with the aid of a smartphone app. The second machine generation now also optionally comes with active electrical cooling. “This ensures that the butter stays fridge-cold at all times for that freshly prepared taste – even in summer,” says a delighted Feil. To allow industrial production of buttered pretzels in large quantities, MFDO UG is planning to bring out a machine with a larger butter container and injection variants for different fillings such as nut paste.

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Schneider Electric boosts dairy production

Schneider Electric’s dairy solutions allow users to seize new market and profit opportunities, thanks to zero waste and 100% traceable production. This is achieved through Schneider’s EcoStruxure Hybrid DCS, which helps customers manage their dairy processes in an easy, smart and energy-efficient way. The new platform improves the production monitoring and control system, while making provisions for the company’s future expansion.

Woodlands Dairy, one of the largest dairies in South Africa, bought a second hand powder plant from Denmark. However the control system was outdated. Top of the agenda was a single platform that could integrate all the plants on site and preserve past investments in expensive assets and legacy systems, while making provision for future expansion. Schneider Electric’s ArchestrA System Platform was selected for the following reasons:

- Universal data connectivity that could cope with Woodlands Dairy’s variety of PLCs.
- A distributed system.
- Easy to create reports and easy retrieval of historical data.
- Full redundancy and scalability.
- The high level of support from Schneider Electric.

Other process areas were also upgraded and these included a new CIP station, a new cream pasteuriser and butter plant, an upgrade to the milk pasteuriser, new pasteurised milk silo and milk lines, new pasteurised cream silo and a new milk reception area with its own CIP station.

For more information contact Jason Ullbricht, Schneider Electric SA, +27 (0)11 254 6400, jason.ullbricht@schneider-electric.com, www.schneider-electric.co.za

Drives cater for strict hygiene

From standard cast iron, epoxy coated surfaces to complete stainless steel units, Bauer Gear Motor provides drive solutions for a range of application requirements. Its standard drives comprise the helical gear motor Series BG, the helical bevel gear motor Series BK, the helical worm gear motor Series BS, and the shaft mounted gear motor Series BF. Its washdown duty drives are CleanDrive, AsepticDrive and AsepticDrive with mounting solutions.

Cleaning strategies incorporating the alternating use of acidic and alkaline products must be taken into account. Another problem that has to be contended with is the air turbulence generated by the drive and the associated air circulation. In addition, if the drive system is located above the product, it poses a risk of direct contamination of the entire product cycle. Proper hygiene is therefore critical, as bacterial growth on any surfaces must be avoided at all times.

Bauer’s special geared motor design features fully smooth surfaces for efficient, comprehensive cleaning. All surfaces slope by at least 3° to prevent the formation of dirt deposits, as well as allowing cleaning products to run off. The outer surfaces of the drives are coated with a paint that repels water, producing better hygiene properties than even stainless steel, which is hydrophilic. In addition, all motors are designed to comply with the latest energy efficiency rating.

For more information contact Bearings International, +27 (0)11 899 0000, info@bearings.co.za, www.bearings.co.za
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Heat Resistant • Corrosion Resistant • Grease Free

Stainless Steel Cylinder  Series CJ5/CG5

Features
- Uses grease for food processing machines (Approved by NSF-H1)
- Special scraper (standard) prevents water from entering the cylinder
- Two types of seal material NBR or FKM can be selected to accommodate the application
- Can be disassembled (Series CG5-S ø20 to 40)

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Series CG5

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Stainless Steel Speed Controller  Series ASG

Features
- Metal parts: Stainless steel 316, Seal parts: Special FKM
- Ambient and fluid temperature: -5 to 60°C

Applicable tubing I.D. (mm) | Connection thread
---------------------------|---------------------|
4, 6, 8, 10, 12            | M5, 1/8, 1/4, 3/8, 1/2

Stainless Steel 316 One-touch Fittings  Series KFG2

Features
- Compact and lightweight
- Fluid temperature: -5 to 150°C
- Material: Metal parts stainless steel 316, Seal parts special FKM
- Grease-free/Can be used with steam

Applicable tubing O.D. | Connection thread
---------------------|---------------------|
Metric                | M5
ø3.2, ø4, ø6, ø8, ø10, ø12, ø16

Inch                  | R, Rc 1/8, 1/4, 3/8, 1/2
ø1/8", ø5/32", ø1/4", ø5/16"
ø3/8", ø1/2"

Stainless Steel 316 Insert Fittings  Series KFG2

Features
- Compact and lightweight
- Fluid temperature: -65 to 260°C
(Swivel elbow: -5 to 150°C)
- Material: Stainless steel 316. Rubber material is not used. (Except swivel elbow)
- Grease-free/Can be used with steam

Applicable tubing O.D. | Connection thread
---------------------|---------------------|
Metric                | R, Rc 1/8, 1/4, 3/8, 1/2
ø4, ø6, ø8, ø10, ø12, ø16

Inch                  | NPT1/8, 1/4, 3/8, 1/2
ø1/8", ø5/32", ø1/4", ø5/16"
ø3/8", ø1/2"

Contact us for a free consultation on +27 11 100 5866 or sales@smcpneumatics.co.za

SMC helping you reduce contamination

Join the conversation on SMC Pneumatics (South Africa) or SMC Pneumatics – South Africa

www.smcpneumatics.co.za
As in many other industries in the world today, food and beverage manufacturers are under immense pressure to increase productivity and sales, while keeping manufacturing costs down. A normal reaction to this dilemma would be to increase production. However, there is pressure from consumers demanding a wider variety of products – new flavours, sugar or gluten-free varieties, or different portion sizes. Increasing production is not the simple solution it once was.

These conflicting pressures have forced food and beverage manufacturers to adapt production lines to try to satisfy customer demands without sacrificing productivity. Some manufacturers look to install smaller, dedicated lines, while others are trying to ramp up production, adding new lines. In both these cases, the amount of testing required increases. There is also an increased need to transport smaller amounts of produce around the factory. This additional complexity introduces several issues with current production lines.

An increase in the number of test samples creates an issue with identification and traceability, which, in turn, requires a robust tracking system. Furthermore, the need to transport product around the factory is generally accomplished by hand, meaning that the efficiencies gained from automation are being eaten away by additional staffing costs. One alternative method of transporting goods is by using automated guided vehicles (AGVs). These mobile robots can carry a tote from one set position to another. They generally use physical guides to navigate, such as magnets embedded in the floor or painted lines. The downside to AGVs is that when they are asked to do a different task, the physical navigation guides have also to be moved, which can halt production.

One way to solve both these challenges can be found in a new generation of mobile robots. Autonomous intelligent vehicles (AIVs), such as Omron’s LD platform, use sensors to create a static map of their surroundings, so they have no need for physical guides. Initially, all that is required is to take the robot to different positions on the factory floor and let it scan its surroundings. From the map, the AIVs can work out the optimal route between any two points. The sensors are then used to detect moving objects, such as humans, in the AIV’s path. Vertical sensors are also incorporated to ensure the AIV avoids any obstacles, such as spillages on the plant floor, or the overhang from forklift forks.

AIVs can work in fleets of up to 100 mobile robots, and the workload is controlled by fleet management software. The fleet management software can also assist the AIV’s navigation by reporting any busy routes or blockages on the factory floor. If the management software is integrated into the production management system, as is the case with Omron’s Sysmac software, all pick-ups and drop offs are automatically logged. The AIV can also check it is picking up the correct package by interrogating the machine using WiFi or optical networking. This comprehensive system ensures that the information required for testing is accurate and reliable, cutting down errors and reducing the risk of an expensive quality failure.

AIVs offer a number of different configurations, giving them the flexibility to accomplish a number of tasks in the food and beverage manufacturing plant. For instance, they can have a fixed top, either flat or a lock box, to carry totes, but in this case, they have to be loaded and unloaded by hand. Other fully automated configurations include conveyors and cart transporters, including Omron’s LD Cart Transporter range, which was released at the start of 2017.

For manufacturers and distribution centres, having the flexibility to release manpower from repetitive jobs to more productive employment, while being able to provide comprehensive, fully automated traceability will be a real game changer in fast paced food production and supply environments.

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FOOD & BEVERAGE

Bosch Projects focuses on multi-disciplinary projects, integrating engineering technology and project management to provide specially tailored solutions for diverse industries, including sugar, power utilities and materials handling, as well as commercial and industrial projects. The company, with over 55 years of service in the global sugar sector, offers a comprehensive service encompassing strategic planning and feasibility studies, sugar technology development, project structuring and funding, plant design and engineering, design and supply of sugar processing equipment, project delivery, operational support and training.

“An important part of the company’s service to the sugar industry is in equipment design. The Bosch Projects team, which works closely with sugar growers, millers and refiners around the world, has a thorough understanding of current trends in the industry and is able to identify exactly where opportunities exist for future improvements in mechanical design,” explains business manager, Neil du Plessis. “The company has developed advanced equipment designs by combining the latest technologies and manufacturing trends, whilst retaining the tried and tested proven technology principles favoured by the sugar industry. “By modernising the design of equipment to optimise efficiencies and enhance performance, the cost of sugar processing is reduced, productivity is improved, maintenance requirements minimised and the service life of every system is significantly extended.”

A recent milestone for Bosch Projects, in conjunction with its technology partners in Thailand, was the development of a new short retention time (SRT) refined sugar conditioning silo, designed to significantly reduce conditioning time and capital investment expenditure.

The first installation of the SRT silo, which commenced mid-2017 in the western cane growing region of Thailand and was commissioned at the beginning of 2018, has been designed to process 35 tons of refined sugar per hour.

Granular white sugar leaving a refinery requires conditioning to prevent lumping and caking in the final packaged product. The major advantage of this new SRT silo process over conventional conditioning of refined sugar is the reduced residence time of 16 hours compared to the standard period of between 65 and 72 hours.

This new silo, which is completely automated for continuous output of conditioned sugar to the packing station, comprises a sugar infeed conveyor system, dual air conditioning plant and blowers, four silos, a silo discharge elevator and a system for dust extraction.

The short retention time conditioning process, which operates in a batch sequence, makes use of three or four equally sized smaller silos. As one silo is being filled, one will be discharged, and simultaneously two silos will be undergoing conditioning phases that are staggered by eight hours. With the correct scheduling, this arrangement permits the silo to operate continuously, with two conditioning phases and two material transfer phases active at any one time.

The key to SRT success is in the humidity and volume of air, which is introduced during the conditioning phase. The air passes through a filtration system before being de-humidified to a specific value and then transfers into the duty blowers. Downstream of the blowers, the air is cooled before being introduced independently into the two silos which are in the conditioning phase.

Bosch Projects provides a wide range of sugar equipment designs through its international partners in South East Asia, USA, India and Brazil and directly to its clients for various prestigious projects in global sugar producing regions.

Bosch Projects designs and supplies a full range of equipment, from the front-end cane preparation and juice extraction, through to processing, refining and packaging. The Bosch Projects team works closely with its technology partners and various fabricators, to ensure manufacture of all equipment adheres to stringent international quality standards and exact design specifications. The company has an extensive network of offices in Africa, South and Central America and the United Kingdom.

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New sugar conditioning silo
Cylindrical sensors offer strength

Leuze cylindrical sensors offer a higher mechanical strength than standard sensors. Engineered for particularly arduous conditions, the 328 series is based on the optical platform of the well-known standard Leuze 318B series, however this new device features a metal sleeve in the housing.

The operational sensors available in the new Leuze cylindrical series, which range from throughbeam photoelectric sensors to retro-reflective photoelectric sensors to light scanners with sensitivity adjustment via teach button, are designed with the option of either a cable or plug connection. An adjustable retro-reflective photoelectric sensor model with a polarisation filter is also available for particularly tricky applications.

With ranges of up to 15 metres (throughbeam photoelectric sensors), 6 metres (retro-reflective photoelectric sensors) and 1 metre (light scanners), the new sensors are ideally suited to a variety of applications for object detection in materials handling and packaging technology.

The cylindrical sensors are especially popular for integration into constricted production facilities as well as into assemblies in transport systems or other machinery. In many production processes and internal transport systems these optical sensors are used for the detection of objects and thereby control processes or partial steps. The highly visible light spot facilitates alignment and two antivalent outputs expand the application options.

High precision gap checker sensor

The new ISA3 series of gap checker sensors from SMC offers several significant benefits, including lowered air consumption, increased precision and reduced cabling work. The range of applications is expanding to cover faster, more precise processes in quality control and in-process quality assurance. For improved visibility, the gap checker sensor has a two-line, three-colour digital display so readings are possible from some distance or at a brief glance. It is designed for quick and simple installation as well as easy operation and is extremely robust and maintenance-friendly.

The switching points can be adjusted in three easy steps. A button lock function also prevents settings from being unintentionally changed. The sensors score points with their compact dimensions and reduced weight. They are particularly suitable in confined assembly conditions.

The ISA3 series covers three types of catch sensors: a new addition to the existing type G, with a query distance of 0.02 to 0.15 mm; type H, with a query distance of 0.05 to 0.3 mm; and type F with a nominal range of 0.01 to 0.03 mm. This expansion creates the opportunity to introduce the ISA3 gap checker sensors in processes with very short measuring distances, or those where higher precision is required.

An added feature is the connection cable, allowing several sensors to be linked to a centralised lead wire. In addition, the air connection can be on either the right or left side of the control unit. Both serve to reduce the wiring work, giving more flexibility in the design.

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New generation motion control solutions

From adding smart capabilities and upgrading systems to ongoing maintenance, the huge range of products on offer from RS Components fits almost every motion control application. They include offerings from many of the world’s leading motion control companies, including Festo, Danfoss, Omron, Phoenix Contact, Schneider Electric and ifm.

One application that is benefiting from a contemporary motion control approach is conveying. Conveyors are the main arterial link in multiple industries and applications, and the upgrade of conveying solutions can offer immediate and tangible benefits in throughput, energy usage and long-term service life.

Upgrade options include the addition of more intelligent hardware such as the QUINT4 power supply units from Phoenix Contact. This intelligence can improve access to the wider connected enterprise using IoT-based solutions and capabilities.

Energy efficiency can be tackled through the use of higher efficiency motors such as the IE3 AC motor range from TECO Westinghouse, or the deployment of variable speed drives and inverters to control motor output more intelligently. Products of note include the new VLT FC 280 from Danfoss. RS also provides multiple products and services to support predictive maintenance regimes, such as electronic vibration sensors from ifm. These can be used to monitor motor and bearing vibrations to identify critical operating states before failures occur.

RS has also extended its Festo stock with the addition of 400 new products on top of the initial 1200 products launched in 2016. The extended offering comprises Festo’s top selling ranges, plus other innovative products such as EPCO electric cylinders, which offer various benefits compared to their traditional pneumatic equivalents.

For more information contact RS Components SA, +27 (0)11 691 9300, sales.za@rs-components.com, www.za.rs-online.com

Quality power transmission products

BMG’s Fenner range of power transmission components encompasses shaft mounted speed reducers (SMSRs), transmission belts, pulleys and accessories, as well as shaft fixings, chain drives and couplings. Key components are highly flexible SMSRs that provide an efficient method of reducing speed in diverse applications, including conveyors, mixers and mills, as well as cranes and hoists.

Fenner SMSRs ensure a good power/weight ratio within compact dimensions. Benefits over other drive systems include simplicity, minimal spares requirements, ease of changing speed, ideal backstop position and the use of standard motors.

The latest Fenner SMSR series, the PowerPlus range, offers a 50% increase in power to weight ratio over previous versions and is capable of handling powers between 0.25 and 250 kW. These units have a more compact design for easier handling and a wider range of bore sizes from 20 to 190 mm. The Fenner Taper-Grip bush locking system transmits 300% more torque and accommodates shaft tolerance to h11. This locking system allows the SMSR to be mounted directly on the driven shaft, instead of requiring foundations of its own and eliminates the need for flexible couplings and external belt take-up arrangements. This fully interchangeable unit is resistant to fretting corrosion and has a significantly improved shaft grip. A torque arm anchors the reducer and provides quick, easy adjustment of the wedge belt by means of its turnbuckle.

For more information contact Lauren Holloway, BMG, +27 (0)11 620 7597, laurenhy@bmgworld.net, www.bmgworld.net

Verderflex hoses stand apart from competitors

Verderflex pumps are reliable, innovative, high performance peristaltic pumps that pump difficult products in tough conditions. They provide top quality solutions to an array of problems within process industries. They are used by OEMs as custom solutions that can be incorporated wherever accurate dosing is required.

The Smart and Scientific models are easily programmable tube pumps and are ideal for use with chemicals. This range is complemented by the industrial tube pump range. Specifically designed for use in hazardous areas, they provide a compact pumping solution for automated systems as standalone pumps or as part of an OEM system. These pumps have multiple power options and quick and easy tube change features.

The Dura and VF hose pumps pump the toughest fluids reliably and can pump slurry with high solid content from the mines to water plants. The hose is the most important feature of any hose pump and Verderflex has designed its hose to be long lasting. Both the VF and the Dura’s hose connections are disaster-proof, totally containing the hose inside the pump casing. They have a vacuum capability of 95% or a 9.5 m lift of water. The largest peristaltic hose pump can pump 90 m³/hour at pressures up to 16 bar.

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Easy motor starting solutions

New to Magnet’s range of Schneider low-voltage motor starting solutions are EasyPact TVS motor starters, designed for motor control and protection for simple applications. The new E range – an extension of the current range – includes contactors, thermal overload relays, control relays and motor circuit breakers, all designed and precision engineered to give OEMs and panel builders a motor starter solution that offers high performance and safety at a competitive price.

Direct mounting of the thermal overload underneath the contactor minimises cabling and installation time, also enhancing reliability of the system and saving panel space. This all contributes towards cost saving. A clear reference system ensures easy product selection for every application and because fewer components are required, design is simplified and stocking requirements are reduced. Thermal elements for overload protection include automatic compensation for ambient temperature variations. For protection to personnel, all live parts are safeguarded against direct finger contact to IP20.

The EasyPact TVS range ensures co-ordination between protection and control components, which means there is a safe and fast restart after a short circuit. To ensure suitable protection of electrical components against fire, product damage or power loss, Magnet recommends installation of this system in a spacious CRN steel enclosure. Severe conditions, including dust, humidity and high temperatures, can expose personnel and equipment to serious risks.

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SMC rolls out compact cylinders

SMC Pneumatics is helping customers meet the demand for space-saving components that drive down costs and drive up productivity, with the launch of two compact cylinders. The company’s latest compact cylinders, the JMGP guide cylinder and the compact JCQ Series, have been designed with weight and space savings in mind. Both help to reduce machine sizes and costs, and deliver increased efficiency due to their lightweight nature which could enhance cycle time.

The JMGP is a guide cylinder, featuring a dual rod, which has been designed for a variety of applications, including pushing, clamping and lifting, where there are space and weight restrictions in a transport line or for robotic manipulation and handling. The compact JCQ is ideal for similar applications where a short cylinder is required, but without the lifting capability.

With space being at a premium in many manufacturing plants, the need to produce smaller, more efficient machinery is growing. These two new models achieve just that, as they are both smaller than similar cylinders on the market. Being lighter in weight, they also achieve improved cycle times and help to deliver higher output.

The ability to directly mount auto switches reduces overall labour costs, and the fact they do not protrude beyond the body of either cylinder helps minimise the risk of interference with other machine parts. In addition, the option of four piping directions and three mounting surfaces on the JMGP model makes it extremely versatile.

**For more information contact Joanne Zimmerman, SMC Pneumatics South Africa, +27 (0)11 100 5866, sales@smcpneumatics.co.za, www.smcpneumatics.co.za**

Slurry pumps push the boundaries of reliability

KSB Pumps and Valves has busted the ‘slurry pumps have short lifespans’ myth with the ongoing success of its Navachab Gold Mine installation in Namibia, where ten of its LSA slurry pumps have operated for nearly a year without incident. This is in stark contrast to the previous pump sets at the mine, which operated a mere 4 to 6 weeks between breakdowns in the aggressive wear environment of the mine.

The hard metal design and additional high pressure gland water system of the pumps are less prone to component wear. They make use of a unique high pressure gland water system and gland service package that pressurises the stuffing-box with non-slurry laden water to prevent particle ingress that can cause wear of critical components. Hard metal linings and specially designed impellers further contribute to the hardwearing nature of the pumps.

The new pump station has now run more than 5000 hours without a single breakdown. It consumes 18% less power than the previous installation, while the maintenance requirements over the first 5000 hours of operations are limited to the repacking of the glands and the checking of bearing assembly oil levels.

The rural nature of mines in Namibia makes it imperative that pumps are manufactured from the highest quality materials and manufactured to the highest international standards. Correct pump selection is important, making it essential to work with the best technical teams available, such as those of KSB Pumps and Valves.

**For more information contact Annett Kriel, KSB Pumps and Valves, +27 (0)11 876 5600, annett.kriel@ksb.com, www.ksbpumps.co.za**
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<td>Tectra Automation</td>
<td>+27 (011) 971 9400</td>
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<td><a href="http://www.hytecgroup.co.za">www.hytecgroup.co.za</a></td>
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<td><a href="http://www.yaskawa.za.com">www.yaskawa.za.com</a></td>
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The new SEW DRN IEC motors – Small, Compact, Light.

Introducing the new energy-efficient IE3 asynchronous AC motors from SEW-EURODRIVE. The weight and dimensions of the new IE3 motors of the DRN series have been changed only marginally compared with the IE2 DRE product line from SEW-EURODRIVE, which is used successfully all over the world. It goes without saying that the IE3 motors of the DRN series can be combined with the same gear units as the IE2 product line.

Class H, IP 65, Aluminium up to DRN 180, Cast Iron from DRN 200 and above & foot or flange mounting

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