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OUR COVER 17

With an in-depth understanding of the mining industry, pneumatics and automation specialist, SMC Pneumatics is a leading supplier to mines worldwide and can provide high quality solutions capable of withstanding the aggressive mining environment. Large bore cylinders, air filtration equipment, air dryers and shut-off valves are just some of the company’s offerings to this industry. Read our cover story on page 17 to find out about these products, as well as SMC’s purpose-built control cabinets that protect components from these harsh working conditions.

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The digital deluge

Welcome to our bumper issue of Motion Control. A big welcome also to new SAFPA president, Dustin Pereira. In the President’s letter we have an interview with him to see what his plans are for SAFPA. We also cover an exciting new initiative, the Hydraulics & Pneumatics Export Cluster (HAPEC), which will assist fluid power companies to grow their businesses through exporting.

IoT is entering the mainstream – the digital deluge – and Motion Control has started running an IoT feature in recognition of this. Our sister magazine SA Instrumentation & Control has recently issued the annual Technews Industry Guide: Industrial Internet of Things & Industry 4.0, which for those interested in IoT is well worth a read. It is available online at http://www.instrumentation.co.za/

All the buzzwords and jargon around IoT can be confusing, and one of them is the concept of digital disruption. This is a process whereby a smaller company with fewer resources is able to successfully challenge established incumbent businesses. Digital disruptors are organisations that have taken advantage of their digital capabilities to create and drive fundamental shifts. At a recent Wonderwared conference I attended, ABInBev’s demand manager, Grant Wolff, said that only 12% of the Fortune 500 companies of 1995 are still in business today. The average age has come down to 20 years. Disruptive technology is blamed for killing corporate America, but in fact it’s the lack of embracing new technology. Most companies don’t know how to implement innovation, they throw buzzwords at the problem and innovate for its own sake.

Some digital disruptors are well known – Facebook, Google, Netflix, Uber, Airbnb and Amazon. But there are also plenty of examples here at home – companies like Siyavula (online maths and science textbooks), HeroTel (low cost access to WiFi), DroneSnap (aerial imaging and delivery by drone that is 70% cheaper than helicopters), BrightBlack (roof-top solar energy that bypasses Eskom for industrial and commercial markets), WiGroup (on-demand mobile ordering), Snapscan (pay with your phone not your card) and Rain-Fin (a smart online borrowing and lending network), to name but a few.

They are changing the face of services in South Africa. Discovery has sold 90% of all Apple watches through its highly disruptive health insurance services and since inception, Uber has created 4000 work opportunities in this country – mainly for people from sectors losing jobs.

By 2020 there will be 500 million people in sub-Saharan Africa with connected smartphones. There are more innovations that affect real life coming out of Africa than America. One example is how data from mobile phones is being used to track the movement of people to understand how malaria is spread. In Rwanda the Safe Moto is like an Uber for small motorcycles.

An example that makes use of fluid power is Elon Musk’s planned new pneumatic tube transportation system, the Hyperloop. This is a magnetic levitation train running in a low pressure tube that has the potential to transport freight between major US cities at a speed of 1100 kmh. Not quite as recently, almost the entire population of mechanical shovel manufacturers was wiped out by a disruptive technology that had ignored – hydraulics. Of 30 established companies, only four survived the entrance into the industry of disruptive newcomers such as Caterpillar, O&K, Demag and Hitachi.

Further efficiencies are becoming reality in the courier space. It won’t be long before autonomous trucks are driving to centralised nodes before releasing swarms of drones to complete last-mile delivery. Each vehicle can deliver dozens of parcels simultaneously rather than driving from house to house.

So how does a company become a digital disruptor? Despite the intimidation factor, the entry barrier to explore new digital technologies for their disruptive potential is quite low. “Often it’s the combination of new or existing technologies and a different business model, focus in a given industry, or impact on society that creates the disruptive experience,” says BMI vice president, David Yockelson. For example, General Motors has begun to reimagine itself not as an automaker but as a personal mobility company. Often the disruptor is a company whose products, services and technology deployed in one sector offer a completely different and better way of solving problems in another.

This is all very exciting but CEOs are actually finding that the biggest challenge they face is not technology, but rather creating a culture that can embrace technological change. In posts to CEO magazine’s CEO blog, the consensus was that “culture is the number one impediment – culture moves in a linear way, technology moves exponentially.”
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.
For this issue, Motion Control interviewed SAFPA’s new president, Dustin Pereira, to get to know him a bit more and find out about his plans for SAFPA.

Dustin graduated with honours from RAU (now UJ) in 2006, with a degree in mechanical engineering specialising in mechatronics and control systems. He joined Hydac last year as fluid engineering manager after working for the previous ten years at Goldquest International Hydraulics, which was taken over by BMG in 2008, in positions ranging from projects manager to engineering manager in BMG’s Fluid Tech division.

He has been married to Holly since 2014. “She has been part of my life since we were kids,” he says. Holly is a travel agent so the two of them get to do quite a bit of travelling. When not travelling he loves outdoor pursuits like hiking and 4X4 trailing. Their next trip will be white river rafting in Namibia and the Richtersveldt. Another of his passions is restoring old, fast cars and he is currently working on an AC Cobra.

His final project at RAU was the development of a one-man vehicle for the Mini BAJA endurance challenge, where the RAU team took on all the South African universities and technikons. “We used hydraulics for the power transmission – the only one running on a hydrostatic drive – and quite a challenge,” he adds. Goldquest’s engineering director helped the students develop their solution and this led to his first job at the company.

Over the past years, SAFPA has put a huge focus on education and skills development and went a long way down the road with its training initiative to get a basic fluid power qualification off the ground, together with JFa2. Dustin says that this sadly has not materialised, despite a huge effort and countless hours put in by the SAFPA committee, and this has been heartbreaking. The four students who qualified are now being placed in employment at Hytec, Axiom and CT Hydraulics.

In place of this, SAFPA is now planning, rather than pushing a specific college, to get information on all fluid power training courses offered by its members, as well as other companies, and put this on the SAFPA website and market it. “So rather than competing with our members we will support them,” he explains. Pirtek, Festo and Hytec are already offering skills programmes like this and the plan is to roll this out and promote it at Electra Mining 2018, to be held from 10 to 14 September, where SAFPA will have a stand.

Another of his proposals on the table is to promote the fluid power industry at college and university level with the aim of getting a fluid power course introduced and presenting the career opportunities in fluid power open to young graduates. Currently, engineering students are not exposed to the fluid power concept at all. The curriculum is very theoretical and there is no interface between the theory and the mechanics.

Another new development is the Hydraulics and Pneumatics Export Cluster, which will help fluid power companies grow their businesses through exporting.

“I send my best wishes for success to all companies and individuals within the fluid power industry for 2018 and 2019,” he concludes.
SAFPA NEWS

At the recent SAFPA AGM, the keynote speaker was Bosch Rexroth regional president for Africa, Lucas Wintjes. He gave a fascinating account of the design and working of the hydraulic equipment on the world’s biggest ship, Pioneering Spirit, and showed how it can lift a 24 500 ton oil rig out of the sea. The €2.6 billion vessel is 382 metres long and wider than three football pitches. “This is the ultimate piece of machinery. You can’t find a ship with more equipment than this one,” he said.

The new SAFPA president is Dustin Pereira (Hydac) and the vice president is Wessie van der Westhuizen (Pirtek). The other committee members are Willem Gijzelaar (Hytec), Russell Gill (Engineering & Hydraulic Services), Eugene Tondolo (Axiom Hydraulics), Michael Abbot (CT Hydraulics), Ryno Landman (Enermech) and Manny Vieira (SMC Pneumatics).

SAFPA AGM 2018

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SAFPA Golf Day

At SAFPA’s annual Golf Day, held on Wednesday 16 May, there was a fantastic turnout of 25 teams. In spite of a light drizzle, the players were in good spirits and the day was a huge success. The winning team was Axiom Hydraulics, with the runner-up being Rand Building Hydraulics. Francois De Lange won the prize for nearest the pin and Steven Witcher had the longest drive. Congratulations to all the winners. Also, a huge thank you to all our sponsors and special thanks to Hydroscand for sponsoring the 18th hole and donating a great prize for the longest drive. We look forward to seeing you all there again next year.

SAFPA is in the Link Node between Halls 5 and 6

See us at www.safpa.org.za
An exciting new initiative is emerging in the South African fluid power industry, the Hydraulics and Pneumatics Export Cluster (HAPEC). Championed by Gerhard Hauptfleisch, this new cluster will operate under the auspices of the DTI-affiliated South African Capital Equipment Export Cluster (SACEEC). SACEEC assists capital equipment sector companies to grow their businesses through exporting of locally-manufactured or engineered value-added products.

The inaugural meeting was held in a packed meeting room at SMC Pneumatics, with Skype links to both Cape Town and Sydney. Together the participants spelt out the new cluster’s vision and mission. This meeting was followed up by a presentation at a SAFPA technical evening, which was very well received.

Active clustering
SACEEC promotes active clustering, where companies cooperate to set up mechanisms to reduce export costs, develop new products and build a common purpose. Current clusters under SACEEC’s umbrella include Valve and Actuator Manufacturers (VAMCOSA). Under the Export Marketing Investment Assistance (EMIA) scheme, exporters can be partially compensated for costs incurred in developing export markets for South African products and services and recruiting new foreign direct investment into South Africa.

A cluster is a group of businesses with a common value chain and it has channels for business transactions and communication. The businesses in a cluster have in common specialised infrastructure, labour, markets and services. Hauptfleisch described clustering as a bottom-up process, driven by industry for industry. It is product and sector specific and is structured to be responsive to opportunities and threats. The setting is informal, differing from the more formal association, and involves collaboration on multiple levels. The platform that clusters provide enables industry to address opportunities and barriers in a way that cannot be done on an individual basis. “A cluster grows and develops champions,” he said.

Key to the immediate HAPEC cluster strategy, is an outward selling mission (OSM) at the end of August to Perth and Brisbane. An OSM is a group of companies that goes as a group to see clients in a region. “This adds credibility, one company alone has a much more fragile base. As a group we can create more impact,” he continued.

Getting into action
Flagship initiatives are important, and the new cluster is wasting no time in getting into action. Hoenigcraft’s Kavir Singh has already represented the cluster at exhibition pavilions in Angola and Mozambique. There is also huge potential in Latin America, as South Africa is competitive in those markets and an OSM to Peru is on the cards for early August. The main target market will be the replacement market, especially the mines. “The plan is also to find someone in the engineering field who speaks Spanish and knows our products to be our eyes and ears and generate business, probably in Chile or Peru to start with,” explained Hauptfleisch.

Representation is also important. In Australia, the cluster is already represented by Kenneth Barnard in Sydney and Christopher Flint in Brisbane and the team is looking for a champion in Perth. “We need to understand the different cultures and we need repeat visits for success. The aim is to have a three-pronged approach: meet people face-to-face for cocktails, visit shows and exhibitions, and make visits to important players,” explained Barnard.

Also on the cards is an inward buying mission (IBM) that will happen in conjunction with Electra Mining in September. The DTI will fund flights and accommodation so, in essence, they pay for the delegate to come in and buy from us.

Benefits to industry
Another potential benefit is the DTI’s Localisation Programme and the possible designation of locally-manufactured hydraulic and pneumatic products. The DTI will be able to lobby state-owned organisations (SOEs) to buy locally on the basis of the designation of hydraulic-related products. The possibility of HAPEC being designated is on the table.

“There are many benefits for the fluid power industry,” concluded Hauptfleisch. “Companies can market themselves in other countries and open up opportunities in South America, for example. Many of the costs can be reclaimed from the DTI. If you work on your localisation drive and get your economies of scale going, you will also open up opportunities with SOEs that can impact your globalisation. A good example is hydraulics in the rail industry, which needs to increase its localisation. You can trade both outwardly and inwardly. We should hunt as a pack and be selling together. If you do this, you will help your business dramatically.”

For more information contact Gerhard Hauptfleisch, Honingcraft Moser, +27 11 824 5320, info@honingcraft.co.za, www.honingcraft.co.za
New value-added services from SEW-Eurodrive

SEW-Eurodrive has expanded its field service department and is growing its service offering with the addition of value-added services, such as vibration and oil analysis. “Normally we carry out a visual inspection to determine the condition of a gearbox or power pack. Now we can pinpoint a specific bearing or gear component within the unit that is starting to fail and identify whether or not the oil is in a usable condition,” says department head, Eben Pretorius. The advantage for customers is that they are made aware of potential problems or imminent failures, and can plan corrective actions around their normal shutdown periods. This approach is less disruptive to their businesses, and more cost-effective than unscheduled or unplanned downtime. The value-added services are applicable to SEW’s extensive geared motor and industrial gear product ranges.

The Field Service Department has grown significantly in the past year. The company has completed a major project for an automotive manufacturer that has extended its plant for the assembly of its latest model. It is currently busy at another automotive manufacturer, upgrading its entire plant with innovative, safe and energy-efficient concepts and products from the company’s comprehensive modular system of drive elements. SEW-Eurodrive’s field service department is available 24/7, and provides support in 23 African countries. Its large local stockholding enables it to respond quickly to breakdowns and critical situations.

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

BMG adds Dual Valves to its portfolio

BMG’s strategy to expand its fluid technology services to meet growing market demand incorporates the introduction of new products, with the latest developments in design technologies, materials and coatings. The addition of Dual Valves products to BMG’s portfolio enhances the company’s solution services and broadens BMG’s customer base, providing new market and application opportunities. Dual Products International, a local manufacturer of slurry valves for over 30 years, has become one of the world’s leading producers of abrasion resistant valves.

The Dual Valves manufacturing facility in Gauteng is equipped with the latest equipment, including an in-house pattern maker.

Products include dual valves, ball check valves, non-return valves, rotary disc valves, air release valves, double ball check valves and dual pinch valves. Recently launched abrasion resistant products include pivot gate valves.

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

Fifty years of powering the world

Schneider Electric is celebrating 50 years of automation transformation, with its invention in 1968 of the first PLC. Prior to the introduction of the PLC, the level of real-time measurement and control was limited to the most basic levels due to technology constraints. “It would be hard to imagine where our industry would be today without the PLC system. It is used in transportation, manufacturing, energy management and so many other industries. I am proud to have this legacy and be part of Schneider Electric’s DNA,” says Schneider Electric chairman and CEO, Jean-Pascal Tricoire.

The invention initiated the effective use of digital computer technologies in industrial automation, which triggered a massive transformation to the pervasive use of digital technology to deliver industrial measurements, controls and real-time information management. The use of digital technology introduced capability well beyond basic measurement and control to expand control system functionality by utilising the computing power of this innovative technology.

Throughout the 50 years following the invention of the PLC, the expansion capability delivered by automation systems appears to be limited only by human imagination. The results have been the introduction and common use of capabilities and functions that were not previously considered possible. These include advanced process control, process optimisation, manufacturing execution systems, inferential measurement systems, safety control, condition management, process historians, workflow control, batch management, real-time accounting, real-time profitability control and many others.

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

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Parker Hannifin has opened a new state-of-the-art distributor facility in Limpopo. This is the 15th ParkerStore in South Africa and one of over 2300 Parker Hannifin distributors worldwide. The executive mayor of Polokwane, Thembi Nkadimeng, and Limpopo Economic Development MEC, Seaparo Sekoati helped cut the ribbon at the grand opening event on 18 May. “We are pleased to bring quality Parker products to our growing customer base in the Limpopo area, ” said executive director, Brian Munetsi. “My entrepreneurial venture was born 11 years ago on my dining room table. Since then we have gained vast industry experience that sets us apart from our competitors. ”

ParkerStore Limpopo was established to answer the demand in the province for hydraulic hoses and fittings, as well as pneumatic, filtration, sealing and shielding components, instrumentation and spare parts for heavy to light duty equipment and machinery. Applications are in the aerospace, mining, construction, agriculture, transportation and heavy and light transportation manufacturing industries. The modern purpose-built facility covers over 800 m², with strong stockholding of all products. “Our goal is to improve your productivity and profitability by delivering everything you need for your motion and control related applications in one place. ParkerStore Limpopo supplies complete turnkey solutions to OEM specifications for hydraulics, hoses, fittings, pumps, motors, valves and pneumatics,” he continued.

ParkerStore Limpopo does not stop at supplying reliable products. It has knowledgeable internal sales personnel on hand and a technical team is available to answer all questions 24/7 through the Hose Doctor field services unit. A Hose Doctor is a workshop on wheels with qualified technicians able to do fabrication at any location. “Providing solutions to your motion and control challenges is at the core of what we do,” concluded Nkadimeng.

For more information contact Brian Munetsi, ParkerStore Limpopo, +27 15 298 8512, brian@parkerstorelimpopo.co.za, www.parkerstorelimpopo.co.za

Schneider Electric at Ramaphosa’s WEF Roundtable

Schneider Electric participated in the World Economic Forum (WEF) Regional Roundtable with President Cyril Ramaphosa and members of the South African government held on 28 June 2018 in Johannesburg. Highlighting the need to develop and strengthen partnerships between the private and public sector, the Roundtable provided a forum for business and government to engage on critical topics for South Africa’s future development, including health, security, workforce, higher education, youth skills and governance. Caspar Herzberg, president of the Schneider Electric Middle East & Africa region co-chaired ‘Taskforce 8: How to create jobs for youth’. ‘We believe in investing in people, as the backbone of the economy, and we place significant focus on vocational training and on the job training,’ says Herzberg. For Schneider Electric, access to energy, education and basic connectivity is a basic human right. Our foundations are built on the principle that the digital economy and real economy are intertwined. Without energy, there can be no digitisation – everything we do is powered by energy.

“As leaders in the digital transformation of energy management and automation we support South Africa in its quest to provide safe, reliable and sustainable energy. Schneider Electric’s commitment to South Africa and its development remains firm, and it has been an honour and privilege to sit down with the country’s top leaders to work through the challenges and opportunities ahead of us,” he concludes.

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

Caspar Herzberg.
With the theme 'Engineering the Future', the recent annual Engineering Community Conference (ECC) was once again a resounding success. Hosted by engineering technology specialist, ESTEQ, with Siemens as a platinum sponsor, the conference provided engineering professionals from a wide range of industries the opportunity to share their experience and ideas for the use of technology to develop better products and systems.

Following the keynote addresses, the conference was divided into specialised user-focused breakout sessions focusing on areas such as simulation, test and measurement, product engineering and lifecycle management, manufacturing solutions, and the digital enterprise. Papers were presented by engineers from a wide variety of industries and technology applications. Some of the tantalising subjects included the state of the defence industry, a flight simulator for mining, innovative trailer design, rapid structural measurement through AI, and the role of MOM within the digital enterprise.

Dr Frans Cronje, director of the Centre for Risk Analysis and leader of its strategic intelligence team gave a thought-provoking talk on 'South Africa to 2030, a Strategic Intelligence Briefing'. He shared key economic drivers and their impact on the country and the fundamental pressures that will determine our future. His advice: stop trying to beat uncertainty, strategise for a plural future, sketch the realm of possibilities with scenarios, be prepared to turn on a dime and use fear of uncertainty as an advantage.

Ralf Leinen explained how Siemens tracks key market trends and translates these to market requirements. “Product definition is achieved through service, fairs and talks with our clients to monitor trends and product requirements,” he said. “In South Africa it is important to us to really understand the challenges of the country and deliver to society.”

He added that Siemens’ digital journey actually started decades ago. An example is a Siemens factory in Germany that employed 1000 people 20 years ago and still employs 1000 people, but output has increased tenfold. New technology and automation lead to employment, education, skills and productivity. “In 20 years time we see Siemens as a trusted, industrially relevant market leader in the space of digitalisation, with leading edge solutions for our clients. New products will help us remain competitive, increase productivity and contribute to the African economy. This will be achieved through innovation with good business ethics.”

As an example he quoted Siemens’ open IIoT operating system, MindSphere, which has massive potential to help users develop applications in their own areas, for example energy efficiency and utilisation rates. It gives them the ability to use IIoT to capture and analyse data far more easily, leading to better decision making and increased productivity. This is an ecosystem with thousands of potential apps that can be developed by users, where all knowledge can be shared.

For more information contact Jennifer Naidoo, Siemens Digital Factory and Process Industries and Drives, +27 11 652 2795, jennifer.naidoo@siemens.com, www.siemens.co.za
KSB Pumps and Valves has assisted the University of Pretoria in the construction of a large controlled temperature test unit, which will form the backbone of ongoing research into heat transfer, fluid mechanics and thermodynamics. The impressive unit will allow students to plug directly into hot, moderate or chilled liquids to use on research projects.

Chairman of the School of Engineering and head of Mechanical and Aeronautical Engineering, Professor Josua Meyer says the multimillion rand project was partly funded with donations from industrial companies like KSB Pumps and Valves. He explains that the system relies on temperature monitoring of flow loops where water is conditioned through the relevant heat pumps and chilling units at near boiling or lower temperatures, as well as subzero degree glycol. The user demand within each loop is controlled using a system of pumps, variable speed drives, pressure transducers and special valves to allow up to eight experiments to plug in simultaneously without affecting either the flow rate, working pressure or temperature of the unit.

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The university specified five Etanorm 50/32/250 pump sets with 3 kW, 2,2 kW and 1,5 kW motors. PLC control ensures that all parameters are checked and balanced to ensure the system delivers fluid at the right temperature setpoints and flow conditions 24 hours a day. With the system up and running, Meyer concludes that the project is proving to be a great success with numerous research projects already plugged in.

For more information contact Annett Kriel, KSB Pumps and Valves, +27 11 876 5600, annett.kriel@ksb.com, www.ksbpumps.co.za

Electra Mining Africa: more than just a show

From 10-14 September at the Expo Centre in Nasrec, Johannesburg, leading players in the mining, manufacturing, electrical and power industries will be engaging with visitors and displaying their latest products, services and solutions.

“There will be an exciting line-up of new products and services, live demonstrations and free-to-attend seminars at this year’s Electra Mining Africa,” says Gary Corin, managing director of Specialised Exhibitions Montgomery, organisers of the show. “New technologies and innovations are influencing the way we do business and it’s imperative that those in the industry keep up to date with these trends.”

New to this year’s show will be the Artisans Training Centre developed in partnership with The SAJ Competency Training Institute and the South African Equipment Export Council (SACEEC), which will be a fully functional workshop where learners will demonstrate the skills they learn.

Top industry speakers will present at the conferences hosted by leading industry associations SAIMM, LEEASA and WIMSA, which will be taking place alongside Electra Mining Africa. Further knowledge and learning will be central to the SAIMechE hosted daily free-to-attend seminars.

For more information contact Leigh Miller, Electra Mining Africa, +27 10 003 3060, leighm@specialised.com, www.electramining.co.za
How to locate a distributor

- Visit www.parker.com/za or www.parkerstore.com/za
- Click on ‘WHERE TO BUY’
- Enter your area Postal code
- Select products/technologies

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.

ParkerStore Aeroport | ParkerStore Boksburg | ParkerStore Cape Town | ParkerStore Durban | ParkerStore Krugersdorp
ParkerStore Limpopo | ParkerStore Pietermaritzburg | ParkerStore Pinetown | ParkerStore Pretoria | ParkerStore Richards Bay
ParkerStore Rustenburg | ParkerStore Secunda | ParkerStore Springs | ParkerStore Vaal

www.parkerstore.com/za | www.parker.com/za
Festo Didactic has launched the Festo Industry 4.0 Academy. The vision of the academy is to be the hub where managers, engineers, technicians and operational staff can be capacitated to face the challenges and leverage the opportunities presented by the Fourth Industrial Revolution.

As a strong global partner in factory and process automation for 300 000 plus customers worldwide, and the world market leader in basic and advanced training, Festo is playing a major role in shaping Industry 4.0.

From the first meetings in Germany and the coining of the term, Festo has been at the forefront of Industry 4.0. Dr. Eberhard Veit, previously chairman of Festo, is one of four industry representatives on the steering board for the German Federal Government’s high-tech strategy.

Today, Festo considers the different perspectives of Industry 4.0 from developments in technology, new production processes and the interaction between man and machinery and what this means in terms of training and development. In surveying the market, it was found that current training offerings in Industry 4.0 are fragmented, and mostly limited to expert talks, and product specific demonstrations.

Festo Didactic has always adopted the approach of an equal mix of theory and practical in their training offerings. The training is centred around technology, using a variety of industry sourced components from various suppliers. This ensures relevance when the incumbents apply their newly acquired skills in industry.

The Festo Industry 4.0 Academy has a curriculum aptly named Qualification 4.0. This curriculum was created during years of research in the areas of smart factories, digitalisation, augmented reality, artificial intelligence, and additive manufacturing. These learnings were practically implemented in the Festo Scharnhausen Learning Factory in Germany, a state-of-the-art manufacturing facility where the ultimate goal of ‘batch size one costs equal to mass produced goods’ was realised.

In order to bring the factory of the future to the classroom, Festo Didactic developed the CP Cyber Physical (CP) Factory, the ideal training and research platform for I4.0. The CP Factory provides the basis of all practical intervention in the academy, and covers concepts like ERP, MES, autonomous robotics, augmented reality, RFID and cloud computing.

A study by the VDMA, the German Machine Builders Association, has identified that training in I4.0 should go way beyond components and systems, but should include soft skills like leadership, change management, teamwork, autonomous thinking and the like. The Qualification 4.0 bouquet thus offer short form course ranging from two to five days, addressing exactly these areas.

In order to establish training needs, Festo has developed an application called I4.0QuickCheck. This application determines an organisation’s readiness and level of maturity in adopting I4.0 in terms of:

- Data collection and processing
- Networking and integration
- Production autonomy
- Strategy and processes
- Employees and culture

If a customer requires a deep dive into I4.0 readiness or maturity, covering the above, and other relevant topics, Festo Didactic offers an onsite consultancy service that focuses on strategy formulation and implementation.

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For more information contact Lucian Kirk, Festo, +27 11 971 5626, didactictac.za@festo.com, www.festo-didactic.co.za
The eight technologies that will transform manufacturing

Recent research identifies vendor challenges and solutions for new future technologies, including robotics, blockchain, AI and edge analytics.

In a recent report, ABI Research, a market-foresight advisory firm providing strategic guidance on the most compelling transformative technologies, outlines how technologies fit together with each other in smart manufacturing. The report identifies eight such transformative technologies:

- Additive manufacturing (AM).
- Artificial intelligence (AI) and machine learning (ML).
- Augmented reality (AR).
- Blockchain.
- Digital twins.
- Edge intelligence.
- Industrial Internet of Things (IIoT) platforms.
- Robotics.

The manufacturing sector has already seen increased adoption of IIoT platforms and edge intelligence. Over the next ten years, manufacturers will start to piece together the other new technologies that will eventually lead to more dynamic factories less dependent on fixed assembly lines and immobile assets. Each step in this transformation will make plants and their workers more productive.

“Manufacturers want technologies they can implement now without disrupting their operations,” says Pierce Owen, principal analyst at ABI Research. “They will change the way their employees perform jobs with technology if it will make them more productive, but they have no desire to rip out their entire infrastructure to try something new. This means technologies that can leverage existing equipment and infrastructure, such as edge intelligence, have the most immediate opportunity.

The transition towards a lights-out factory has started, but such a major disruption will require an overhaul of workforces, IT architecture, physical facilities and equipment and full integration of dozens of new technologies, including connectivity, additive manufacturing, drones, mobile collaborative robotics, IIoT platforms and AI.

IIoT platforms must support many of these other technologies to better integrate them with the enterprise and each other. Those that can connect and support equipment from multiple manufacturers, such as PTC Thingworx and Telit deviceWISE, will last.

After decades of producing little more than prototypes, the AM winter has ended and new growth has sprung up. GE placed significant bets on AM by acquiring Arcam and Concept laser in 2016, and Siemens announced an AM platform in April 2018. Other leading AM specialists include EOS, Stratasys, HP and 3D Systems.

ML capabilities and simulation software have made digital twins extremely useful for product development, production planning, product-aas, asset monitoring and performance optimisation. Companies with assets that they cannot easily inspect regularly will significantly benefit from exact, 3D digital twins, and companies that manufacture high value assets should offer digital twin monitoring as a service for new revenue streams. Innovative vendors in digital twins and simulation software include PTC, SAP, Siemens, and ANSYS.

The above technologies have already started to converge, and robotics provide a physical representation of this convergence. Robotics use AI and computer vision and connect to IIoT platforms where they have digital twins. This connectivity and AI will increase in importance as more cobots join the assembly line and work alongside humans. The robotics vendors that can integrate the most deeply with other transformative technologies have the biggest opportunity. Such vendors include the likes of ABB, KUKA, Fanuc, Universal Robots, Rethink Robotics and Yaskawa.

“The vendors that open up their technologies and integrate with both existing equipment and infrastructure and other new transformative technologies will carve out a share of this growing opportunity. Implementation will go step by step over multiple decades, but ultimately how we produce goods will change drastically from what we see today,” concludes Owen.

For more information contact Deborah Petra, ABI Research, +1 516 624 2558, pr@abiresearch.com, www.abiresearch.com
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Kuka is the world’s leading player in the development and construction of robotics and automation solutions. The company’s developments are also helping to drive forward the digital revolution taking place in the world of manufacturing. Working in association with Siemens company, Flender, Kuka has implemented a new kind of drive for sliding/tilting table trimming presses, which are used for deburring castings. The new electromechanical alternative to the previous hydraulically powered swivel motor offers users the benefit of up to 30 percent lower cycle times, improved dynamic response, lower component wear and reduced maintenance costs and times.

The new solution, which was developed by Siemens subsidiary, Flender in association with Kuka is an alternative to the swivel motors customary in the press sector and is based on a planetary gear motor. As Steffen Günther, Kuka vice president for casting solutions EMEA explains: “One of the reasons why coordination of the entire drive train from the control through the three-phase asynchronous motor to the torque at the tilting table has been so successful that Flender brought an enormous portfolio of over a million gear variants and decades of expertise in drive technology to the project table.”

**Optimum control response reduces cycle time**
Kuka has replaced the hydraulic swivel motor for the very first time in the sliding/tilting table press SEP SKT by a unilaterally acting electromechanical main drive. “As far as I am aware, with our innovative solution we are the world’s first manufacturer to use this type of electromechanical swivel solution as standard in a sliding/tilting table press,” says Günther. This offers an array of benefits to customers, most notably a reduction in the swivel movement cycle time of around 30 percent. The improved control response provided by the new technology also helps bring about other improvements to the overall efficiency of the production process.

**Servicing made easier by digital integration**
Digital integration of the drive into the control system ensures that the controller knows the position of the table at any given time. Digital monitoring and review of the components and documentation make for simplified servicing. The Flender drive is also impressive in terms of its robust design and wear resistance. Despite the bottom tool weighing a full six tons, the torque and acceleration levels occurring during the tilting movement of the table around the rotary axis are effortlessly absorbed by the new gear technology, as evidenced by endurance testing under load. After testing, the Flender components demonstrated no signs of wear whatsoever. “The extraordinary robustness of the planetary gear motors and the improved setting and actuating capability of the drives means we can now increase the swivel weight by up to 30 percent,” says a delighted Günther. “The frequency converter decelerates the high inertia torque levels and at the same time feeds energy generated by this process back into the grid.”

**Future-proof technology**
The new technology is designed to enable existing presses to be quickly retrofitted, either within one or two days or on a step-by-step basis. Günther is confident of a promising future for the new technology: “Because the benefits gained by changing to the new technology are not only impressive but sustainable too, we’ll be making use of the Flender SIP planetary gears wherever they bring about the same improvements as in our sliding/tilting table presses.”

For more information contact Jennifer Naidoo, Siemens Digital Factory and Process Industries and Drives, +27 11 652 2795, jennifer.naidoo@siemens.com, www.siemens.co.za
Mining is a capital-intensive industry, and breakdowns and downtime are costly. Challenging economic conditions, intense global competition, environmental regulations and a continuous focus on safety, coupled with the need for zero downtime, are just some of the critical issues in this industry. Mining equipment must be robust enough to meet the challenges of harsh working conditions and high potential risk, while still ensuring maximum safety. Only the best components can withstand these extremes.

Over the last few years, advances in technology and equipment have dramatically increased production rates, reduced extraction costs and raised health and safety standards in mines around the world. Today, mine owners and operators can select the right equipment for their particular needs from a vast range of suppliers. However, it is still a balancing act. Optimum performance with a long lifecycle and proven endurance at the most cost-effective price remains the industry's holy grail.

SMC understands the mining industry
With a firm understanding of the mining industry, pneumatics and automation specialist, SMC Pneumatics is a leading supplier to mines worldwide and can provide high quality solutions capable of withstanding the aggressive mining environment. SMC Pneumatics South Africa’s regional sales manager, Manny Vieira, says that there is no solution that the SMC team cannot find an answer to. With 51 subsidiaries located at key sites around the world, the company has been developing standard and special products for mining applications in Australia, Canada, China, North and South America, Russia and South Africa for over half a century. This global experience has resulted in a multicultural team of mining experts that share information and knowledge, and have developed some of the best performing products available in the industry.

“The mining industry is a key focus area for us. SMC has been providing pneumatic solutions to this sector since 1968 and has developed components to withstand some of the toughest environments. Over the years, we have worked with numerous customers in this sector and our offerings are built specifically around their needs,” he adds.

SMC offerings to the mining industry
Understanding some of the broader challenges that the mining industry faces allows the SMC team to provide the best possible support. Large bore cylinders, air filtration equipment, air dryers and shut-off valves are just some of SMC’s offerings to the mining industry. “We can build a complete range of high quality pneumatic cylinders up to 500 mm bore size with guaranteed long lifecycle performance,” he continues. “And specifically the VPT series of tried and tested bomb-proof solenoid valves, developed specifically for harsh environments, is the product of choice in numerous mines throughout the world.

“In addition, SMC has the perfect solution for taking components out of harm’s way, thanks to our purpose-built control cabinets to support various applications. By keeping solenoid valves and filtration systems enclosed, it is easy to maintain them and increase the working life of the components.”

Each cabinet is custom-built, based on customer requirements. Prior to building, customers will receive a layout and circuit drawing for approval. Depending on the application, components fitted into the cabinet include AW series filter regulators, VHS series pad lockable isolation valves, VP7 series solenoid valves, KQG2 stainless steel fittings and KQ2 standard push-in fittings. To add to this, all solenoid valves are individually isolated for improved safety and long service life. Solenoids can be locked off in the top cabinet while the bottom cabinet is free for operators to do their isolations free from contact with electrical circuits.

“Large bore cylinders, air filtration equipment, air dryers and shut-off valves are just some of SMC’s offerings to the mining industry.”

“Essentially, SMC designs and builds customer-centric solutions. As our history has proven, our company has evolved around the needs and requirements of our customers and continues to do so in the mining industry,” he concludes.

SMC Pneumatics is a leading pneumatics provider and has been voted for three consecutive years as one of the most innovative global companies by Forbes magazine. The company has sales offices in 83 countries, employing over 20 000 people across the globe. It has an R&D engineering team of 1450 and an 8200 strong sales force of experts who enjoy a close working relationship with customers. To deliver automation solutions for its diverse customer base, SMC offers more than 12 000 basic products with over 700 000 variations.

For more information contact SMC Pneumatics South Africa, +27 11 100 5866, sales@smcpneumatics.co.za, www.smcpneumatics.co.za
Rockwell Automation has released an updated version of the Allen-Bradley Motion Analyser software tool. This enhanced software offers an optimised user experience with intuitive navigation and in-workflow product selection. This can help engineers more easily and efficiently develop complete motion control systems for their machines.

Using the Motion Analyser software, engineers can determine a system’s specifications, evaluate multiple products to find the best fit, finalise the design and create a bill of materials. The tool can also help reduce motion-system design time from a multiday process to a few hours. “Sizing a motion system can be time consuming,” said control systems business manager, Christo Buys. “In the latest release of the Motion Analyser software, we have simplified workflows to improve user experience; and we have added additional features that make the process of designing a motion system as efficient as possible.”

Key improvements include faster axis definition and sizing, redesigned solution search and configure components features, additional application template profile support, and the ability to import from a legacy motion profile with the support of more advanced motion segments.

SEW-Eurodrive’s IE3-compliant DRN series of asynchronous motors has set a new benchmark for energy efficiency in the local electric motor industry. Stricter international regulations have meant that all two-, four- and six-pole asynchronous motors with a power rating of 7,5 to 375 kW must meet the requirements of energy efficiency class IE3 in the European Union (EU). While South Africa does not face the same regulatory pressure as the EU, SEW-Eurodrive has decided to raise the benchmark locally by launching the new DRN series as its standard range of electric motors. “We not only supply the local market, but have to take our export obligations into account as well,” explains national sales manager, Norman Maleka.

SEW-Eurodrive offers the DRN series as a complete range. “It sets the standard. A customer who buys a gearbox or drive from us will automatically have an IE3-compliant motor,” he adds. “The DRN series is downward compatible with our previous motors, regardless of the energy class. It fits right onto our gearboxes, for example. Another feature is a global stator, which boosts both parts availability and stockholding.

Maleka points out that the total cost of ownership of the equipment is reduced significantly over the long term. “Not only do we inform our customers about these benefits, but we also advise on application requirements. Our aim is to offer a total solution, as opposed to simply being a component supplier,” he concludes.

For more information contact Christo Buys, Rockwell Automation, +27 11 654 9700, cbuys@ra.rockwell.com, www.rockwellautomation.co.za

For more information contact Jana Klut, SEW-Eurodrive, +27 11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za
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Football players Lukas Podolski and Jerome Boateng have them. Olympic swimmer Franziska van Almsick has them. Pop stars such as Robbie Williams and Madonna also decorate their bodies. What does this have to do with Faulhaber? In the handy machines used for tattoos and permanent make-up there are DC-micromotors – made in Schönaich.

Requirements
Tattoo professionals consider themselves to be artists; accordingly, their tattoo devices are the equipment with which they realise their art. They are occupied for many hours, without a break, when creating a large-scale tattoo. Modern tattoo machines are, therefore, characterised by a low intrinsic weight and the flexibility to adapt to individual movements. What is also desirable is that the device operates quietly and with low vibration, and it fits the hand well.

The underlying technology
Essentially, tattoo artists can choose between two types of machines: coil-based machines and rotary machines. Coil-based machines belong to the older generation, and function somewhat like an old-fashioned doorbell in which a clapper strikes a little bell repeatedly in rapid sequence. These classic tattoo machines work with alternating current, which flows through a magnetic coil while the electrical contact is closed; this causes a magnetic field to build up in the coil, which then interrupts the contact and simultaneously moves the needle.

This earlier technology is now rapidly being superseded by a more modern one. However, the newest generation tattoo machines work with high-performance electric motors. With them, the needle is no longer actuated by means of a coil, but instead by a motor. The advantages are that these rotary machines are especially smooth running and significantly quieter than the coil-based machines, and – thanks to their low intrinsic weight – fit much better in the hand. In these angular devices, the motor is located in a cross-piece and drives an eccentric mechanism in order to linearly oscillate the injection needle. This requires thicker and shorter DC-micromotors. These are available in Faulhaber’s product range in various versions and technologies. Depending on the model, the drives just barely weigh 20 to 60 grams, yet can deliver the necessary performance – thanks to their high efficiency factor of up to 86 percent.

Enduring, but not everlasting
Permanent make-up was developed from tattooing and refers to an enduring outlining of features by means of micro-fine colour pigments. In contrast to a tattoo, permanent make-up is not irreversible. The result lasts about five years. Beyond the aesthetic aspects, permanent make-up can also cover up small imperfections and scars.

Precision in ballpoint pen format
Cosmeticians who apply permanent make-up also benefit from having a light, handy device that they can delicately operate. The colour pigments are injected in the surface of the skin with an oscillating needle. The devices that are employed must meet the highest demands in technology and design, and work precisely and reliably. As the most sensitive parts of the body – such as the eyes – are being treated, extremely smooth running is necessary. Motors made by Faulhaber can also be successfully utilised in devices for applying permanent make-up. Because the devices are elongated and ideally have a format somewhat resembling a ballpoint pen, the slender models of Faulhaber DC-micromotors have proven themselves ideal.

Unique solutions
Faulhaber motors are distinguished by a high efficiency. As a result of the high power density, more compact, lighter drive solutions are possible. Faulhaber models are differentiated from conventional DC motors by the rotor. It is not wound around an iron core, but instead consists of a copper coil manufactured with a self-supporting, skew-wound design. This provides for low rotor weights, very smooth-running operation and a highly dynamic cogging-free action, without the usual magnetic hysteresis losses associated with other technologies.

For more information contact David Horne, Horne Technologies, +27 76 563 2074, sales@hornet.cc, www.hornet.cc
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See you at Electra Mining Africa 2018, NASREC, Hall 7, Booth A18!

New Automation Technology BECKHOFF
SEW-Eurodrive South Africa is the only company to assemble complete drive units and electronic products locally. This not only gives customers a significant advantage in terms of lead times, but ensures that the products are of the same quality and latest technology as if they had been imported directly from Germany.

Gearmotors, servo motors, and a range of electronic products are assembled locally at SEW-Eurodrive Cape Town, which represents the national electronics and technology assembly hub for the company, branch manager Jason Jackson reveals. Electronic products assembled in Cape Town include Movigear mechatronic drive systems, Movitrac MC07B next-generation frequency inverters, and MOvidrive B drive inverters.

“This definitely gives us a competitive edge in the local market, as none of our competitors are carrying out local assembly. With an average lead time of four weeks to import a unit from Germany, this represents a massive saving in terms of both time and money,” Jackson comments. While the Cape Town branch is actually smaller than the main Johannesburg facility, it carries a larger stockholding in terms of electronics specifically.

Jackson explains that the power modules and control heads are imported as separate items, in addition to the option boards. The fact that the units assembled in Cape Town use more or less the same power section reduces stockholding of different components, allowing for the accelerated turnaround time. In addition, keeping complete units as stock items not only takes up valuable warehousing space, but is an additional cost as well.

National sales manager, Norman Maleka explains that local assembly is a strategy embarked upon by the company globally. “Obviously it has taken a while to institute this strategy in South Africa, as we first had to ensure we had both the capability and the demand to justify local assembly. The main benefit for customers is quicker delivery and guaranteed availability, which are critical factors in terms of increased productivity and reduced downtime.”

Maleka adds that local assembly is also part of SEW-Eurodrive South Africa’s longer term strategy to cut costs and improve efficiencies even further. At the Johannesburg facility, for example, the company has made a significant investment in installing state-of-the-art assembly islands to reduce turnaround time from order to dispatch of high-volume products such as gearmotors. The new assembly islands reduce waste dramatically, as well as assembly errors, thereby boosting product quality significantly.

These assembly islands have been duplicated at the Cape Town facility, which had already been assembling gearmotors, which meant that electronics was a natural progression. “We selected Cape Town as our electronics hub as it not only had the space and the capability to do so, but the fact that it was familiar with assembling a range of products,” Maleka elaborates.

While the electronic products are assembled in Cape Town and then dispatched to the various branches countrywide for delivery to customers, a future part of the localisation strategy is to deploy Cape Town as the main distribution hub as well.

“In future, we will be able to service the entire African market in terms of electronic products from our Cape Town facility. For now, for quality control and logistics purposes, the products go to the respective branches and are dispatched from there. At the moment we are ensuring that the quality is 100% and that we are able to oversee every single aspect of the local assembly process,” Maleka highlights.

An important aspect of this rigorous quality control is that all electronic products assembled in Cape Town are tested fully on an MTP test bench, which is integrated into the new Assembly Islands. The results are printed out and scrutinised carefully to ensure that they are within all of the required parameters.

“Quality is a major factor, and we have to ensure that our assembly process is exactly the same as it is in Germany,” Jackson points out. A Cape Town representative received extensive training in Germany, whereupon he was equipped to train additional personnel locally. “Main training is always conducted in Germany, and then passed on to other locations specifically. In addition, SEW-Eurodrive South Africa believes very much in terms of internal progression when it comes to skills development and advancement.”

With major growth opportunities in the bottling, winery, food and beverage and mining sectors in the Cape region, Jackson concludes that being able to stock all of the components and spares necessary for complex products such as Movigear mechatronic drive systems gives the company the flexibility to cater for customers’ needs in a very short period. While all assembly is carried out at the Cape Town facility, any repairs necessary are undertaken in Johannesburg.

For more information contact Jana Klut, SEW-Eurodrive, +27 11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za
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IMA Klessmann of Lübbecke, Germany is an international manufacturer of trend-setting manufacturing machines for the woodworking and craft furniture industries. In 2017 the company modernised a complex, multi-track transport system for wooden workpieces for one of France’s largest kitchen cabinetry manufacturers, Fournier of Thônes. In the process, a reliable monitoring system that prevents unauthorised entry was implemented in an extremely simple, flexible and cost-effective way using analog sensors and TwinSAFE SC safety technology from Beckhoff.

In the plant area concerned, board-shaped workpieces for kitchen furniture are removed from a sorting warehouse and stacked on pallets in two picking stations. The finished stacks are subsequently transported out of the order-picking areas to the downstream machines. Following destacking, these machines then receive the necessary parts in precisely the right order to assemble a kitchen cabinet. The two picking stations each have six gates to discharge the workpiece stacks.

According to Michael Gube, the software developer at IMA who was responsible for the startup of this project, it must never be possible for a human to enter the risk area. There is a high safety risk involved on account of the high dynamics of the transport portals located in this area and the large masses that are moved. The conventional method to control access to such plant areas is to use safety light barriers and muting functions. However, such measures alone were deemed insufficient in this case. One of the requirements, therefore, was to guarantee personal and process safety through a second safety device. If anyone attempts to gain unauthorised access to the picking area, they must pass through two devices. As soon as they pass the first, the portal switches to the Safely Limited Speed (SLS) mode. As the person approaches the second device, the machine is stopped from the safe speed.

The first safety device consists of three standard transit time sensors. There is always a safety risk when there is either no material stacked in the area of these sensors or when the material stack is not moving in this area. The entry risk during this phase is reliably avoided in the following way: As soon as a board stack moves underneath the transit time sensor area and is subsequently stopped, the transit time sensors measure the current stack height once (latch). If the stack moves completely out of the area, the stack height is given the value 0. The values of the three sensors determined at a standstill are transmitted to the safety controller and continuously compared to the actual values of the transit time sensors. Now if someone attempts to gain entry when no stack is present or by climbing over a stationary stack, at least one of the three actual values deviates from the latched position. This immediately causes the portals to switch to Safely Limited Speed (SLS) mode.

Once a person has overcome the first safety device, he or she must additionally overcome the second set of devices, safety light barriers placed immediately in front of the picking area. If they detect entry, then the axes which are already moving at a safely limited speed are finally brought to a standstill.

For Gube, the prerequisite for an efficient safety solution was the analog signal processing capability of the EL6910 TwinSAFE Logic terminal. “The core is the EL6910 TwinSAFE Logic terminal with its extended safety functionality. In addition to the safety function blocks from the EL6900, it offers certified safety function blocks to process analog signals, as well as more complex functions such as counters, limit value and comparison. In addition, the EL6910 supports the TwinSAFE SC technology, which makes it possible to securely transmit data from standard EtherCAT I/Os via the TwinSAFE SC extension to the EL6910. As a result, analog signals can now be analysed, checked for plausibility and evaluated within the logic.”

The fine scalability of PC-based control technology from Beckhoff resulted in one of the biggest advantages in the installation of the new safety solution, as Gube explains: “The entire production facility is controlled by TwinCAT 2 software. However, the TwinCAT 3 software generation is required to connect the analog sensors directly via the EL6910 TwinSAFE Logic terminal. The modular Beckhoff control technology is scalable to suit the application demands and it allowed this by simply and cost-effectively realising new safety functions via a subsystem that consists of the CX9020 Embedded PC with TwinCAT 3 as well as the TwinSAFE and TwinSAFE SC terminals.”

For more information contact Michelle Murphy, Beckhoff Automation, +27 11 795 2898, michellem@beckhoff.com, www.beckhoff.co.za
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Modern electromechanical machine design

Engineers from the older generation will remember the days when machine design had to be based around catalogued electromechanical actuators. Variations from standard were rare, in addition to being expensive. Fast-forward around 40 years and the modern experience is somewhat different. Today’s machine designers not only desire highly configurable and adaptable products, they expect them.

With this in mind, many leading motion technology suppliers have developed their product portfolio specifically for machine designers. Explained below are some key factors that will aid the selection of electromechanical motion products for use in the machines of today.

Stroke capacity
Among the fundamental questions to ask is: does the actuator offer various stroke lengths as standard? A product using a ball or lead-screw drive is commonly restricted to stroke lengths up to around two metres maximum for practicality. There are some actuators offering strokes to four metres, however at lengths such as these, speed is often limited due to screw whip, so the product that achieves a particular speed at one stroke will not usually achieve that speed at a longer stroke length.

Very long stroke lengths can, however, be achieved by belt drives, which perform to a similar level regardless of stroke length, but lack the precision of a screw-driven product.

A further option is linear motor-driven products, which provide performance levels that scale extremely well with increases in stroke. In addition, linear motors do not demonstrate speed restrictions at longer strokes and offer the same repeatability over the full stroke.

Scalability
With regard to scalability, machine builders should determine if the actuator is available in a number of different frame sizes or widths. Having a family of products to select from allows the project to be cost-optimised. Moreover, many multi-axis applications demand different loading for each axis.

Having multiple drive train choices in the same product is often overlooked, but the availability of screw or belt options within a given product can prove extremely useful to a machine designer. In the same form factor, designers can tailor the drive train to specific requirements, be it thrust density normally obtainable from a screw drive, or speed from a belt drive. The ability to bounce between the two without having to rethink the machine’s layout can be highly beneficial.

Modularity and performance
It is a common requirement for electromechanical actuators to be connected to other actuators or mechanical devices. The ability to combine linear actuators into XY, XZ, or XYZ assemblies quickly and effortlessly is vital. As a result, most modern electromechanical products can be bolted together like building blocks, without the use of transition plates for XY systems (plates are often unavoidable for the Z or vertical axes to maintain stability).

A further factor here is performance-to-size ratios, which should be considered carefully. Using a product that is highly condensed leaves more space for machine designers to include end effectors and tooling. For this reason, metrics such as thrust or rated load per height-by-width become important.

Selectable resolutions and encoder types
To retain good servo control, an actuator should have five to ten times more resolution available than the repeatability of motion required. With this in mind, having multiple options is the optimum solution as high resolution encoders can be quite costly.

Being able to adjust the resolution is also important. Some of the latest encoder products can vary their resolution through a relatively simple hardware change. A further approach is to deploy analog feedback devices and compatible servo drives. In using analog feedback signatures (typically 1 V peak-to-peak), two analog signals are passed from the encoder to the drive, 90° out of phase with one another. Equivalent resolution is established within the drive, and is dependent upon the pitch of the linear scale and resolution of the drive’s analog input.
Flexible encoders

As well as flexible resolution, the availability of flexible encoder technologies is another major benefit. Optical encoders with glass scales have been a popular choice for many years, but today there are many alternative technologies that provide competitive resolutions and costs.

For example, in applications that do not require especially high levels of precision, magnetic encoder technology is a cost-effective option, while applications that do require high precision but not long stroke lengths benefit from the very high resolutions of capacitive encoders. Inductive encoders are often popular for applications directly exposed to heavy contamination, such as coolant from a machine tool. Applications which require constant positional information regardless of an axis being homed will require an absolute feedback source.

With regard to communications, until recently, most encoder protocols were based on embedded propriety signals, which meant that designers had to use a limited list of manufacturers. Today, open standard protocols such as the single cable Hiperface DSL solution allow design engineers to use a variety of products and even reduce installation and cabling efforts.

Digital design

In cutting-edge design software, finite element analysis (FEA) can be used to understand not only the deflection characteristics, but also the thermal or magnetic variations within the product. Naturally, these simulations cannot give results with 100% certainty as they are only as good as the algorithms and assumptions that are used, but modern machine design is starting to leverage these digital design methodologies more heavily to expedite development.

Metrology test data

Test data from metrology can be used to take ball-screw backlash into account, and improve overall system accuracy. For applications with very specific requirements, these tests can be performed to mirror the actual application characteristics. Cleanroom applications are a good example as there are many characteristics, such as speed, acceleration, orientation and air flow, which can greatly impact product performance.

Selecting products from a design partner that understands the mission-critical aspects of the application and tests will prove particularly advantageous.

Summary

Today, the demand for faster turnaround time on machines has become critical. The same design engineer who might have allowed for a machine to be developed in several months, now expects it in weeks. Key to the machine-building race is selecting the right product from a manufacturer that understands the daily design hurdles and has systems in place that allow for rapid machine development.

Factors such as breadth of product, range of options, modularity and product test data should be taken into account when designing the machines of today. This strategy will enhance the machine builder’s ability to respond to customer needs, and provide faster ROI.

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With SIMATIC Technology – more performance, more technology, more motion

The Simatic S7-1500 Advanced Controller portfolio has two new technology CPUs for motion control tasks. Standard, safety and motion control functionalities for gearing and camming up to the control of kinematics. Even challenging motion control tasks can be easily handled in combination with Sinamics servo drive systems. The “Simatic Safe Kinematics” software library safely monitors kinematics in space – to protect the machine operator.

Find out more: www.siemens.com/simatic-technology
HYDRAULICS

Demand-oriented motor control is enabling users to reduce their electricity consumption by up to 80% compared to fixed-displacement drives. Bosch Rexroth has recently added two new models to its range of frequency converters, the EFC 3610 and EFC 5610, to provide intelligent speed and torque control for motors from 400 W up to 18.5 kW. These are open-source, scalable and expandable drive controls that are easily integrated into many different kinds of machines and automation environments, including pumps, compressors, fans, conveyors, presses and packaging machines.

The EFC 3610 is a universal, low-cost converter for control- and demand-oriented energy supply for almost all industry segments. The EFC 5610 is a high-torque solution with efficient, high-performance vector control for specialised requirements and an expanded power range up to 18.5 kW. Both are available in heavy duty and normal duty configurations.

The communications interface has been expanded to include support for Modbus, Profinet and CAN bus protocols. Pluggable I/O connection terminals and fieldbus modules enable a high degree of expandability and flexibility in the way drive architectures can be configured. Integrated brake choppers and mains filters (EN61800-3 C3) reduce the need for external componentry, enhancing the plug-and-play functionality. Process control is improved through integrated PID controllers alongside an eight-step sequence control system. Other innovative features are the detachable control interface that allows parameters to be dumped into additional drives using the panel’s memory and the copy function. Additional braking resistors are available for applications where the controlled motor is required to stop instantly, dissipating the electromotive voltage.

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Variable speed drive specialist, Control Techniques has linked up with the world’s strongest man in a bold new partnership. Eddie Hall, officially the strongest man on the planet, has lent his considerable strength to the Welsh firm as official brand ambassador. Eddie, who reached the pinnacle of strongman competition, will now appear as the face of Control Techniques, helping raise awareness of its products and capabilities.

Anthony Pickering, president of Control Techniques, said: “We’ve been through some transformations recently – new owners and new products on the horizon – and wanted a symbol we could use to demonstrate our rediscovered confidence. The idea of working with another British specialist who has competed and won on a global stage appealed greatly to us. We have a history of making bold decisions, and working with Eddie is the latest in a long line of firsts from Control Techniques. We’re looking forward to seeing people’s reactions when they see what we have in store with Eddie.”

Eddie added: “Control Techniques is, like me, a specialist in its chosen field. The company understands the importance of identifying your strengths and working hard to achieve your goals. I’m excited to be the face of a British success story in Control Techniques, and I look forward to helping the team make the right impact.”

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Frequency converters for leaner automation
BMG has been appointed as exclusive distributors of the Hydrotechnik range of analog and digital test and measurement equipment in southern Africa. “Through this agreement, BMG has extended its range of fluid technology products to include Hydrotechnik measurement sensors and data logging equipment for digital hydraulic testing and analysis,” says fluid technology business unit manager, David Dyce. BMG also now distributes Minimess test points and adaptors, high pressure microbore hose assemblies, pressure gauges and test kits for analog testing, charging, bleeding and sampling of almost any fluid or gas.

BMG’s fluid technology division’s measurement sensor range also includes new pressure, flow, temperature, speed and force measurement devices, designed for extremely accurate analysis of hydraulic or process systems. High precision Hydrotechnik equipment, which is manufactured to stringent international quality standards, is known globally for reliability, ease of use and flexibility in diverse industries, including arduous conditions. BMG’s range of components for fluid technology systems and general industrial applications also includes valves, hydraulic hoses and fittings, accumulators, cylinders, heat exchangers, hydraulic motors and hydraulic plumbing, as well as pumps and reservoir accessories. The company supports this equipment with a technical advisory, back-up and repair service throughout southern Africa.

Hydraulic test stand for mobile applications

Commercial Shearing is a major supplier of hydraulic equipment and solutions and specialises in custom manufacture, and the supply and service of pumps, motors, valves, gear pumps, hydraulic filters and much more, all covered in its extensive catalogue.

The company recently completed an order where the brief was to design and manufacture a hydraulic test stand for spring applied hydraulic brakes with hydraulic release on vehicles.

The operation of the brakes is as follows: in park (Failsafe) the brake is applied by springs acting on friction plates. When the vehicle is driven, the brake is released by applying pressure to an internal cylinder. This compresses the springs and releases the force applied to the friction plates, allowing the vehicle to drive. To allow the vehicle to slow down or stop (Service), an opposing pressure is applied to the opposite side of the cylinder. This compresses the friction plates and the vehicle slows or comes to a stop.

Brake test specifications

A maximum static torque of 2 kN/m is applied to the brake in Failsafe mode and the brake must hold. A maximum torque of 3 kN/m is applied to the brake in Service mode when the brake is applied. The torque simulation is applied to the brake by stalling a 800 cc/rev hydraulic motor.

The brake is released (Failsafe mode) by applying pressure through an adjustable pressure reducing valve, which allows the motor to run. The brake is applied (Service mode) by applying pressure through an adjustable pressure reducing valve and this stalls the hydraulic motor. Torque figures are recorded via pressure gauges.

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Hydrotechnik test and measurement equipment

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The development of a range of class-leading hydraulic piston seals required SKF engineers to create tailor-made materials and apply advanced analytical techniques.

The piston seal lies right at the heart of hydraulic cylinder performance. Located in a groove on the outer diameter of the piston, this seal must contain the high pressure hydraulic fluid without impeding the motion of piston along the length of the cylinder. Since most hydraulic cylinders operate bi-directionally, the seal must be able to handle pressure from either side. The design of piston seals requires engineers to tread a fine line between friction and sealing performance. If the seal allows too much fluid to leak from the high pressure side of the cylinder to the low pressure side, performance is compromised. On the other hand, excessive friction on the cylinder wall leads to accelerated wear and a reduced operating life. Outright failure of a piston seal, known as blow-by, can have significant operational and safety implications, potentially causing construction or materials handling equipment to lose control of its load, for example.

If the basic operating requirements weren’t demanding enough, piston seals also present a significant materials engineering challenge, with hydraulic fluids at high temperatures and pressures that are tough on sealing materials and which can cause other components to expand and contract during operation. It was a quest to overcome the disadvantages of PTFE seals that led a team of engineers at SKF to attempt the development of an alternative sealing technology, based on the company’s well-established Ecopur polyurethane material.

“Constructing a polyurethane seal that could match the performance of the best PTFE seals was far from straightforward,” explains Wolfgang Swete, head of R&D for the fluid seals strategic product line. “The large extrusion gap between the piston and cylinder wall means you need a material with sufficient extrusion resistance to hold its shape under the full range of operating conditions.” The company took advantage of its in-house material development and manufacturing capabilities to produce a special grade of Ecopur specifically for the piston seal application.

With a suitable material in place, the SKF team then had to create the right sealing geometry. This was familiar territory for the company’s engineers, who have a well-established product development process that combines extensive computer simulation using finite element techniques, rapid prototype development using CNC machine tools and physical testing on custom-made static and dynamic test equipment.

In the final design, the geometry of the outer surface of the polyurethane slide ring has a shallow ‘M’ shape with two carefully optimised sealing lips. “A seal profile with pronounced sealing points provides more effective sealing forces than a flat surface, improving seal performance while reducing the amount of frictional drag that is created by the seal, says Swete. “And concentrating the forces on two sealing edges rather than one means the seal won’t tilt in use, which can lead to early failure.”

In the new SKF design, side vents are incorporated into the radial side walls of the slide ring to ensure pressure activation of the energiser. This enables the seal to rapidly shift position as the direction of pressure changes, reduce the potential for blow-by and loss of cylinder functionality. The side vents also reduce the likelihood of a pressure trap occurring when the slide ring seals against the radial walls of the seal gland, which can also result in the loss of cylinder functionality.

To validate the designs, prototype seals underwent further arduous testing involving more than 200 km of movement up and down a 400 mm test cylinder at pressures of up to 250 bar and temperatures of 80°C. Friction and leakage were measured during the test, and after the tests, seals were measured and examined to check extrusion and surface wear.

SKF has now developed its innovative piston seal design into a full offering for a broad range of hydraulic applications. The light duty LPV range with an O-ring actuator is aimed at indoor, stationary applications, like manufacturing machinery. The seals are suitable for pressures of up to 250 bar, speeds of up to 0,5 m/s and temperatures of between -20 and 100°C. The medium to heavy duty MPV range is aimed at more demanding applications such as those found in mobile agricultural and construction machinery. Sized to fit into metric-sized housings, MPV seals are suitable for pressures of up to 400 bar, speeds of up to 1 m/s and temperatures of -20 to 110°C.

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Ausco LC Brake System
Wet Brake Solution for Toyota Land Cruisers

SAFER •
LOWER COST •
WORRY-FREE PERFORMANCE •

Axiom Hydraulics is pleased to represent the Ausco LC brake, a true multi-disc wet brake solution for the Toyota Land Cruiser. The LC brake combines independent hydraulic service and failsafe parking into one simple package that bolts to the existing hub while using the stock OEM master cylinder. The brake also features a unique cooling chamber design for long life and fade-free performance, even at highway speeds.

The LC brake’s field history from Canada, Australia, Europe, and Africa demonstrates unrivaled performance compared to all other Land Cruiser braking solutions. In a recent study at a South African mine, the LC brake outlasted a competitive product by 17:1, lasting 34 months compared to the competitive brake’s 2 months. Customers enjoy trouble-free, worry-free performance.

The LC brake is approved for both mining and on-road use in South Africa and has SABS 1589 and ECE R13.08 approval. Stock is available locally at Axiom’s facility in Johannesburg.

For more information or to find a dealer near you, please contact Axiom Hydraulics at +27 11 334 3068 / 86 or visit us on the web at https://axiomsa.co.za.
Axiom Hydraulics is the exclusive agent for Ausco Products’ wet enclosed LC brake for the Toyota Land Cruiser, the vehicle of choice for South African mining. This well-proven vehicle is commonly used for moving people, maintenance teams, equipment, or emergency response personnel. The vehicle is robust, relatively inexpensive, easy to fix, and enjoys excellent parts availability.

A bakkie’s OEM brakes are not built for mining, compromising safety while suffering frequent and expensive repairs. Simply put, the brakes were never designed for use in the highly corrosive and abrasive mining world. The linings are exposed to mud, as well as acidic or salty water. The result is brake deterioration and wear. In addition, if the operator forgets to set the parking brake on a steep incline, or if the parking brake is inoperable (a common occurrence), the vehicle can run away. Clearly, a better solution is needed.

Ausco’s LC brake system is an ideal alternative. The LC brake is made by Ausco Products in the US. Ausco has a reputation as experts in brakes for harsh environments. Indeed, they are the number one brake supplier to John Deere and a major supplier to Caterpillar, JCB, CNH, Bell, etc. Ausco manufactures more than 30 different brakes for underground mining equipment worldwide.

The Ausco LC brake is a sealed wet brake system. Similar to other off-highway equipment, the LC uses an oil immersed, multi-disc brake design. To minimise maintenance and maximise safety, Ausco recognised the need to keep the environment out of the brake and to keep the brake cool. To keep the environment out, Ausco used its mine-proven Double Grease Barrier sealing system. Ausco’s experience shows that this is the only sealing system that reliably prevents water and contamination intrusion in mining. Moreover, not only does Ausco’s seal design protect the brake, it also protects the axle, as many customers report a dramatic drop in wheel bearing and differential repairs when the LC brake is used.

To keep the brake cool, the LC brake uses a unique internal cooling chamber that suppresses oil temperatures even in the heaviest braking conditions. The cooling chamber allows the brake to be used at highway speeds, an important feature when a Land Cruiser is required to drive both underground and on-road, e.g., when used as an ambulance. In four years of production in Canada, Australia, Europe, and Africa, Ausco has never seen an overheated LC brake.

The LC features both service and failsafe braking. The service brake works with the OEM master cylinder and booster without the need for intensifiers or other modifications. The failsafe brake ensures that the brake automatically sets to prevent runaways. The unit comes pre-assembled, ready to drop in and bolt into place. No vehicle modifications or heavy lift equipment are needed for installation or service. The system includes a hose kit that comes with stainless steel lines pre-bent for easy installation. The brakes are designed to allow 30 minute brake replacement for minimal downtime. The LC brake system also includes a sealed, stainless steel pump pack. The pump kit includes Ausco’s patented tow mode, which allows the operator to safely release the failsafe brakes for towing. No jumpers or hand pumps are required, and the system automatically returns to normal operation upon engine start up.

In recent studies at two different South African mines, the LC brake outlasted a competitive product by 17:1, lasting 34 to 36 months, compared to the competitor’s two month life.

The Ausco LC brake is approved for both mining and on-road use in South Africa and has SABS 1589 and ECE R13.08 approval. It is now locally available from Axiom Hydraulics’ Johannesburg facility and is supported by a nationwide dealer and service network throughout South Africa.

For more information contact Fritz Kern, Axiom Hydraulics, +27 11 334 3068, fritz@axiom.org.za, www.axiomsa.co.za
BMG has extended its range of Eaton Winner hose and fittings to include Eaton’s latest generation of 4S/6S spiral hose and hose fittings, designed for use in high pressure hydraulic systems used in mobile machinery and equipment. Three outstanding features of this range are the elimination of cool-down leakage, advanced metal fitting corrosion protection and a simple, user-friendly hose fitting assembly process. These new Eaton 4S/6S hose assemblies – which refer to the 4-spiral and 6-spiral wire reinforcement of the hose, approved with respective 4S and 6S series fittings – exceeds stringent industry specifications.

Eaton’s DURA-SEAL technology eliminates hose assembly cool-down leakage, thus reducing equipment downtime and extending life of the hose assembly. DURA-KOTE plating technology offers over 1000 hours of corrosion protection on carbon steel fittings, which is three times the corrosion protection of competitive hose fittings. The MatchMate hose/fitting identification system helps the assembler of spiral hose and hose fittings to quickly and easily identify the correct hose and hose fitting to be cramped together. This system not only enhances reliability and safety of the product, but also reduces wastage from assembling the wrong hose and fitting.

Eaton 4S/6S hose is designed for applications that include high pressure hydraulic systems, petroleum and water-based fluids, as well as construction and agriculture equipment. This range consists of a synthetic rubber tube and cover with 4 and 6-spiral wire reinforcement. An ink transfer layline in this series is standard. Matching hose and hose ends reduce the chance of assembly error.

For more information contact Lauren Holloway, BMG, +27 11 620 597, laurenhy@bmgworld.net, www.bmgworld.net
Siko's SGH wire-actuated encoders measure cylinder stroke as well as speed in hydraulic cylinders with impressive efficiency, flexibility and robustness.

The technology
SGH sensors use a wire draw mechanism that is integrated directly into the cylinder to measure the stroke. The wire is secured to the piston head. When the cylinder extends, the wire wound on a wire drum is pulled out. The resulting rotation of the drum is detected by the contactless sensor system and converted into a linear position. This means that precise and absolute position or speed tracking of the cylinder is possible at any time. The magnets used to measure the rotation are scanned by the contactless sensor system through the pressure resistant base plate of the SGH sensors. The electronic components are fully encapsulated and located on the non-pressurised side of the system. The entire measuring system is therefore incorporated into the cylinder and optimally protected against external environmental influences. The advantage is that in contrast to measuring systems mounted externally on the cylinder, the sensor system cannot be damaged, negatively affected or even destroyed by environmental conditions.

Developed for tough conditions in mobile hydraulic applications
The SGH sensors were designed and developed in line with the strict specifications of renowned hydraulic cylinder manufacturers.

Market demands ensured that Siko met their requirements regarding robustness, durability and functionality. Siko worked closely with cylinder manufacturers to define and satisfy the specifications regarding service life, shock and vibration resistance, EMC and compatibility with various hydraulic media. All specifications were tested and confirmed in endurance tests at the facilities of cylinder manufacturers or in external accredited laboratories.

Intelligent sensors for smart cylinders
The SGH technology transforms hydraulic and telescopic cylinders, as well as piston accumulators into smart cylinders and hydraulic systems. A suitable sensor is available for all applications. With measuring lengths of up to 5000 mm, a wide selection of interfaces as well as high flexibility for integration of the sensors, the SGH family offers a wide range of possibilities. Redundant options and sensors for performance levels of up to PLd are available for safety critical applications.

Reliable position tracking
Smart sensors take mobile hydraulics to a new level of safety and efficiency. Functional safety is a term that is being widely discussed. Safety concepts for mobile machinery have been a topic of interest since the implementation of the new Machinery Directive EN 13849. Sensors in the Siko SGH range help implement intelligent safety concepts for mobile machinery and meet the requirements of the specific safety standards for different utility vehicles.

The safety versions of the SGH25 and SGH50 sensors meet the requirements for use in applications up to Performance Level d (PLd). Safe and redundant design in compliance with CAT3, as well as a safe mechanical design, means Siko products are pre-destined for use in safety-critical applications, also under unusual conditions.

In addition, the sensors supply process data which not only serve to satisfy safety requirements, but also offer an added value for the machine. The process data can therefore provide insight into an impending seal maintenance interval. Flexible support tracking in crane and lifting applications extend the working ranges of the machine. Memory functions in industrial trucks save time and make work safer.

All these are examples of how SGH sensors not only make machinery safer, but also more efficient.

Advantages of the SGH encoder include:
- Absolute detection of the cylinder position.
- Direct integration into the cylinder.
- Measuring range up to 5000 mm.
- Can be used in safety applications up to PLd.
- No drilling of the piston required.
- Can also be used in telescopic cylinders.
- Perfectly protected due to protection category IP69K.
- Durable and robust – developed in line with mobile hydraulic requirements.
- High EMC.

For more information contact Instrotech, +27 10 595 1831, sales@instrotech.co.za, www.instrotech.co.za
Simplifying standard pneumatics

Why we need to reduce complexity
The diversity of pneumatic applications and solutions throughout industrial manufacturing sectors can often make it challenging for buyers to select, procure and standardise their component choices for factory automation. What selection do I buy? Will it be flexible enough, versatile enough, comprehensive enough? Most importantly, will it be affordable? Ideally, manufacturers require a collection of products and solutions that could potentially suit the majority of tasks across the pneumatic control chain.

What is the solution
As a leading global manufacturer in the pneumatics field, Festo has applied its many years of experience to the development of an innovative product portfolio to address this exact and growing market need.

The answer to simplified pneumatics lies within the Festo Core Product Range and its easy to identify ‘Stars in Pneumatics’. Consisting of more than 2200 key devices and accessories for both factory and process automation, the ‘Stars’ are accessible across the world, attractively priced and designed with the optimised functionality necessary to fulfil 80% of standard automation tasks. This offer simplification makes it much easier for users to choose, purchase, apply and ultimately streamline automation applications almost anywhere.

Easy procurement
The ‘Stars in Pneumatics’ are readily available from the company’s 13 service centres around the world. Selection has also been made really easy as these components are marked with a distinctive blue star in the catalogue. To further simplify procurement, the intuitive and user-friendly Festo online shop portal allows ordering in just a few clicks.

Perfect mix of components
To suit a broad spectrum of industries and application needs, ‘Stars in Pneumatics’ components have been carefully selected, ensuring that they can mix and match with each other perfectly to deliver optimum performance levels.

Actuators
Actuators include mini slides, compact cylinders, guided drives, standard, short stroke and round cylinders, as well as compact semi-rotary drives that require little installation space. Additionally, many of the cylinders offer the self-adjusting pneumatic end-position cushioning ‘PPS’, which adapts optimally to changes in both load and speed.

Valves
‘Stars’ from the world of valves naturally include electrically and pneumatically actuated directional control valves, standards-based and universal directional control valves, flow control valves, shut-off and one-way flow control valves – plus the electrical components required for valve terminals.

Air preparation
Ensuring the ideal compressed air solution for specific applications requirements, the core product range also includes a comprehensive mix of service units, filter regulators, standard regulators, on-off valves for switching on and exhausting, as well as soft-start valves for gradual pressure build-up.

Connection technology
To stitch your solution together, you will also find a flexible and comprehensive mix of connection accessories including fittings and connectors in all typical shapes – such as straight, L, T, X and Y-variants. These in turn combine perfectly with standard or hydrolysis resistant tubing ranges, available from Festo in a variety of colours – including transparent.

Sensors
Sensors also feature among the ‘Stars in Pneumatics’, with pressure sensors, and proximity sensors optimised for Festo drives and actuators. To further simplify connectivity, modular cable systems are available for quick and easy connection of the sensors to the relevant evaluation units.

Process automation
Over and above general factory automation, the ‘Stars’ also include a range of solutions to meet the specific needs of process automation environments. These include solenoid, Namur and angle seat valves, positioners, sensor boxes, ball valve actuator units, products for air preparation, and accessories.

The usual quality, service and support
Beyond a superbly balanced component mix, product quality, service and support standards remain uncompromised. Across the globe, the ‘Stars in Pneumatics’ portfolio comes with all the usual benefits associated with choosing Festo.

When ordering the ‘Stars’, users can still access convenient software and engineering tools for selection and sizing, engineering design, ordering, commissioning and after-sales support to optimise their machines and systems.

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Any engineer tasked with specifying a linear actuator for an industrial automation application, will look for products able to deliver reliability, precision and speed. However, there are numerous other, often overlooked factors that should feature in the purchase decision. Consider rodless linear actuator solutions that integrate 3/2 directional control valves into their end caps; these can prove far more advantageous than deploying control valves separate from the actuators, for a multitude of reasons.

Arguably the most obvious benefit is the potential saving on space. Rodless pneumatic cylinders are used primarily for their compact design. The external carriage slides back and forward along the cylinder body, instead of an external rod extending and retracting. This is especially useful for applications that demand long strokes or elevated moment loads, due to the shorter, enclosed and self-guided configuration.

The benefit of reduced space is enhanced by rodless cylinders that offer valve integration, as well as the inclusion of mounting rails on the sides of the cylinder. These allow modular components such as linear guides, brakes, valves and magnetic switches to be fitted to the cylinder itself, solving many installation problems, especially where space is limited.

Miniaturisation trends
Pneumatics technology continues to play an important role in many modern systems and machines. The ongoing requirement to build smaller machines by taking advantage of more compact components is a driving force behind the use of rodless pneumatic cylinders. These efficient and cost-effective devices offer a high-performance way of moving loads in many different industrial applications, for example, those in the food processing, glass, plastics, textiles and electronics industries. Cutting, packaging, material transfer and sliding-door applications can also be served by rodless linear actuator technology.

Thanks to end caps that can be rotated into various positions, rodless linear actuators provide increased flexibility when it comes to mounting and tubing options. In fact, with some of the latest cylinders, the air connection can be rotated in 4 x 90° steps, while the solenoid can be rotated 4 x 90° and the pilot valve can be rotated 180° (just one air connection is required per valve). In addition, where valves are built into the end caps, the actuation of the rodless cylinder becomes much more direct and dynamic.

Rapid ROI
Downtime is another major factor that should influence the choice of actuator. In an era when downtime can seriously impact ROI, attention should be given to achieving maximum system utilisation. When repairs or replacements need to be performed on rodless linear actuators with integrated directional control valves, system downtime is minimised as there are no external valves with separate air connections to cause concern.

Ultimately, factors such as this contribute greatly to system reliability. Indeed, the reduced number of compressed air connections required as a result of the compact design of these actuators means less tubing, less potential for leakage and overall reduced air consumption.

A greater amount of inherent rigidity in rodless linear actuators also translates into longer lifespan. This design feature derives from the profile design of the cylinder itself, which reduces the tube’s propensity to expand and twist, so that service life can be extended. Rodless cylinders are exceptionally stress-resistant, allowing for a range of possible uses.

High performance
Despite the compact design of rodless cylinders, it should be noted that there is no compromise in technical performance. They allow for easy, precise positioning of the cylinder, smooth operation at the lowest speeds and fast response, making them highly suited to the direct control of production and automation processes. As a point of note, high piston velocities can be achieved, often with a maximum of three exhaust ports, while fully integrated 3/2 directional control valves (N/O function) provide optimal cylinder control through short switching times and high flow rates.

A variety of sizes are available in the marketplace, typically between 25 and 50 mm diameter, and many offer suitability for use under high ambient temperatures, in clean rooms, explosive environments and for low/high speed applications. Stroke lengths beyond 40 metres can be sourced. In fact, rodless air cylinders are the ideal solution for any application that requires a long stroke, as they are not affected by overhang, piston binding, bending or uneven seal wear. Further benefits of many modern rodless linear actuators include an integrated operation indicator, integral exhaust throttle/speed control valve, manual override, silencer function, adjustable end cushioning and ease of retrofitting.

For more information contact Lisa de Beer, Parker Hannifin SA, +27 11 961 0700, lisa.debeer@parker.com, www.parker.com/za
The new Schmalz vacuum tube lifter, JumboFlex Battery, provides a complete solution for the ergonomic and safe handling of starter batteries. It ensures the reliable commissioning of starter batteries for system suppliers and distributors. Batteries that are commissioned edge-to-edge on a pallet are difficult to remove, especially for models without handles. These batteries, weighing up to almost 30 kilograms each, have to be manually removed and transferred because they cannot be mechanically gripped.

The JumboFlex Battery vacuum handling system grips, lifts and transports starter batteries of different shapes, sizes and weights without any physical exertion for the user. It consists of a lifting unit, operator handle and gripper. The gripper is the extraordinary feature of this system and is equipped with a special sealing gasket and suction resistances. This enables the system to retrieve batteries from above, regardless of whether they have different cover geometries and whether or not they have handles.

There is no need for tool conversion between different battery sizes and geometries. The ergonomic operator handle is designed to be operated with one hand and is easy to use. The lifting unit consists of a flexible hose that provides the required suction flow to hold the batteries securely and the system is completed with a responsive aluminium crane used as a jib crane or as an overhead crane system. In addition to commissioning starter batteries for system suppliers and distributors, the JumboFlex Battery ensures they are supplied to automotive manufacturers in the correct sequence.

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In a first for South Africa’s compressor rental market, compressor and generator rental stalwart, Rand-Air, recently took delivery of an Atlas Copco DXT85VSD electrically driven, oil-free air/nitrogen booster, complete with high pressure hoses. Coupled with its oil-free compressor and dryer, the company can now offer a total solution for 42 bar high pressure, oil-free compressed air.

The 100 kW DXT has a high outlet pressure range of 25 to 42 bar at volumes of 1200 m³/hr, which makes it eminently suitable for a range of specialised industrial applications, such as food and beverage packaging. “Previously, we offered diesel-driven oil injected boosters or compressors, which we provided to our customers in response to demand from the drilling and geological exploration market sector,” explains fleet manager Craig Swart. “However, enquiries for high pressure oil-free compressed air from the local soft drink manufacturing and bottling industry highlighted the suitability of the Atlas Copco DXT compressor. Diesel-driven oil-injected boosters were not suitable for this application, as there was a certain amount of oil residue in the compressed air they supplied. They were also not designed to provide a 24/7 compressed air supply to manufacturing facilities. While in Europe, the DXT is mainly used in steam production applications, we anticipate that in South Africa – as industry sees the potential of this compressor – there could be demand for more units of this type from a number of other industry sectors.”

For ease of handling and deployment, the DXT has the same dimensions and attaching points as a standard shipping container. Marketing and communications manager, Byron Thorne, says that this unit is more suited to long-term rental applications. “Should we receive more enquiries for machines of this nature, we can speedily supply additional units from Europe. We are pleased to have added the DXT to our compressor fleet, as it is operationally an expansion of our high-pressure oil-free solution offering,” he adds. “At Rand-Air, the safety, quality and reliability of all the equipment in our rental fleet is non-negotiable. As such, we have ensured that we have the appropriately qualified technical expertise to support all rental items, including, of course, this new compressor.”

The new DXT compressor is a welcome addition to Rand-Air’s current fleet of some 400 rental compressors, which make up part of a total fleet of 1100 compressors, generators and related equipment. Swart explains that with units of this nature, customers have the advantage on a long-term rental of knowing exactly what their future compressed air costs will be over the next five years, for example. “This makes it much easier for our customers to project future input costs, total cost of ownership and overall return on investment,” he points out.

“We understand the pressures of working in industry today; for that reason, the company has developed an industrial rental model which enables our customers to focus on their core business while we supply their portable air and power requirements. This has been proven to impact positively on our customers’ productivity, while enhancing their operations and ultimately their bottom line,” says Thorne.

“Rand-Air has been in the equipment rental sector for the past 45 years, with consistent and stringent standards of safety, quality, reliability and availability. Despite our lengthy track record and market leadership position, we are however always ready to positively disrupt the market with further innovations and developments to our customers’ strategic advantage and benefit. The introduction of the DXT compressor – the first of its kind in the local rental market – is a great example of our ethos of innovation and commitment to exceeding customers’ expectations,” he concludes.

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PNEUMATICS

The incessant need to reduce energy consumption is an ever-present fact for all plant engineers. It is estimated that compressed air production and compressed air treatment amounts to approximately 30% of an average production plant’s power consumption. SPX Flow has introduced a radically new approach to compressed air drying.

The phase change material (PCM) compressed air dryer provides low dew point air via a unique and patented 4-in-1 heat exchanger. The PCM housed within a plate to plate heat exchanger possesses a high latent heat property that enables the material to melt or freeze at constant temperature. It absorbs heat from warm moisture-laden compressed air without a significant change in temperature and stays colder for longer periods of time. This system allows the freon compressor within the dryer to cycle the freon compressor with long off-time periods, resulting in great cost savings.

The PCM dryer lowers the air system power costs and improves productivity by matching power consumption to compressed air demand. It cycles the power load to match compressed air demand with great effectiveness. As the load fluctuates, the power requirement to dry the compressed air is matched in proportion to the demand. As a comparison, a non-cycling dryer uses a constant 96% under any operating load. A PCM dryer when operating at 60% load only consumes 60% of its full load energy. It offers superior power savings, without the need to use complex VSD drives, coolant pumps or glycol tanks.

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Magnetic gripper for handling without vacuum

SMC has added to its gripper range with the launch of the MHM-X6400, which uses a magnet for the handling of steel plate, without the need for vacuum. Ideal for workpieces with uneven or irregular surfaces or featuring holes, this magnetic gripper provides reliable and safe handling at reduced cycle times for improved productivity. It is also ideal for many varied sheet metal handling applications including robotic systems. With a holding force of up to 120 N, the MHM-X6400 continues to hold a workpiece even when air supply is lost completely or pressure drops are experienced, offering peace of mind when it comes to reliable and safe movement of workpieces. Furthermore, with a residual holding force of only 0.3 N or less, cycle times are reduced and productivity output is improved.

Product manager, Brian Abbott explains that the MHM-X6400 fills a void and satisfies a need which vacuum could previously not accommodate. “The initial feedback has been really positive thanks to its clever design that offers flexibility, cost savings, reliability and most of all system safety.” Suitable for a range of transfer applications, the holding force of the MHM-X6400 can be adjusted by simply changing the height of the bumper being used. Made from Fluororubber, the bumper also prevents the workpiece from slipping and causing damage during operations, improving safety. Featuring three mountable surfaces and the option to mount auto switches, the MHM-X6400 offers flexibility and greater process control.

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Safe landing every time

Aeronautics research institute studies aircraft braking operations using simulation software from Siemens.

The Brazilian Aeronautics Institute of Technology (ITA) is involved in training, research and technological development in the field of aeronautics. The ITA attaches particular importance to fostering links between research and industry and works in close cooperation with the Brazilian Government to ensure that research aligns as closely as possible to the needs of industry. Issues currently in the spotlight are brake system performance and anti-skid technology in normal and failure modes.

To play through possible scenarios, the ITA relies on the use of simulation software from the Siemens PLM Software Simcenter portfolio. This allows students at the ITA to gather experience with the latest features of the advanced simulation setup during their course training. Quite apart from this benefit, ITA has also been able to speed up the evaluation of brake system performance under failure conditions, helping to strengthen Brazil’s position in the highly competitive aeronautical industry.

Aircraft brake systems are not only highly complex but also crucial to aircraft safety. The blocking of brakes during braking manoeuvres, for instance, must be avoided at all costs. Traditionally, brake system performance has always been tested by executing multiple load rig tests and test flights. This is time consuming and also a costly process, which explains why the research team at the ITA set about looking for a new method that would ensure a safe landing every time the Aeronautics Research Institute studies aircraft braking operations using simulation software from Siemens.

Applications & Technology News involve simulation of the aircraft’s hydraulic brake system. A study carried out by the ITA demonstrated the usefulness of system simulation to design and validate the model of a hydraulic brake system in order to assess functionality in both normal operation and in the event of a failure. The experts at the ITA used the LMS ImagineLab Amesim from Siemens PLM Software to model the hydraulic system. Computational parameterised model the researchers at ITA decided to base their study on a braking system supplied with power by the aircraft’s own hydraulic power generation system. This system is later duplicated to independently provide hydraulic power to each brake. The model generated in LMS Amesim is composed of three elements: the valve assembly, the brake assemblies and the input blocks. “LMS Amesim is a great tool for quickly creating system models, mainly due to its facility for dealing with the physical blocks found in its software libraries,” says Mario Maia Neto, a PhD candidate at ITA.

As he explained, this enabled the creation of complex models without the need to write entire mathematical formulas for each subsystem. Using LMS Amesim helped ITA develop a computational, parameterised model for the aircraft hydraulic brake system to assess the behaviour of its relevant variables in normal operational conditions, as well as when typical failures are simulated. Subsequently the results were compared in order to find a way of compensating for the loss of performance in the ‘failure mode’. The last step of this computational method was to devise a strategy or actions such as the definition of specific maintenance tasks to maintain the required system level. Neto envisages enormous potential for the new methodology. “In the current context, modelling and simulation has the potential to improve the execution of several design development activities, such as system architecture study, requirements validation, performance analysis and optimisation, safety and assessment, fault detection and diagnosis,” he concludes. Using LMS ImagineLab Amesim from Siemens PLM Software, the experts at the ITA are able to quickly and simply generate a virtual model of a hydraulic aircraft brake system. The model – composed of the valve assembly, brake assemblies and input blocks – is used to analyse brake system performance and anti-skid technology in the normal and failure modes. The brake’s normal torque response can then be directly compared to braking behaviour in the simulated failure mode.

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The crew of the Horizons Mission embarking for the International Space Station (ISS), has motors from Faulhaber on board. These serve as the drive for the Crew Interactive Mobile Companion (CIMON) astronaut assistant, a scientific project with the first artificial intelligence (AI) for the ISS. The free-flying technology demonstrator is intended to support astronauts during routine work by, for example, displaying procedures or offering solutions to problems. Its screen displays a friendly face, its voice and the AI make it a ‘colleague’ to the crew members, with whom it can engage in a true dialogue.

The mission companion is intended to, among other things, lighten the load during daily routine work and function as an early warning system in the event of technical problems. The artificial assistant was developed on behalf of the Space Agency in the German Aerospace Centre (DLR) by Airbus in Friedrichshafen.

The astronaut assistant is approximately the same size as a medicine ball and weighs about five kilograms. In zero gravity, it floats freely in space and, on command, flies to the astronaut who needs its help. It moves by means of fourteen small propellers which transport it to the desired position and keep it there. They are driven by brushless DC-servomotors of the 0824 series from Faulhaber and controlled with speed controllers of the SC1801 series. The motors were selected on account of their reliability and longevity, with very small dimensions, low weight and low energy consumption.

The Horizons Mission carrying the German ESA astronaut, Alexander Gerst is planned for June to December 2018. The artificial intelligence of the technology demonstrator was developed using, among other things, voice samples and photos of him. Gerst will perform three tests with the mission companion: the astronaut and his assistant will experiment with crystals, together solve the Rubik’s cube and perform a complex medical experiment in which CIMON will announce the individual steps and serve as an ‘intelligent’ flying camera. While Gerst will return to earth at the end of the mission, the artificial helper will remain on board and lend assistance during future missions.

Faulhaber specialises in the development, production and deployment of high-precision small and miniaturised drive systems, servo components and drive electronics with output power of up to 200 watts. The product range includes brushless motors, DC-micromotors, encoders and motion controllers. In addition, Faulhaber also offers customer-specific complete solutions for, among others, medical technology, automatic placement machine, precision optics, telecommunication, aerospace and robotics.

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FOOD & BEVERAGE

Drive solutions for the sugar industry

SEW-Eurodrive exhibited at the 91st congress of the South African Sugar Technologists’ Association (SASTA) from 14 to 16 August at the International Convention Centre in Durban.

The sugar industry represents a major growth area for SEW-Eurodrive, where it aims to supply energy-efficient drives to maximise the load and capacity of mills and refiners. “We provide unique drive engineering solutions, as factories require varying options for sugar production. Our geared motors are ideal for horizontal crystallisers, filters, clarifiers, conveyors, batch pans and mixers and packaging. We also offer back-up support and service,” says national sales manager Norman Maleka.

He explains that industrial gear solutions from SEW are in great demand in the sugar industry. Whether sugar cane or sugar beets, an extremely challenging production process is required to turn the harvested product into finely granulated sugar. The main component of any sugar factory, no matter where it is located globally, is the sugar mill. During the harvest period, these run 24/7 for several months.

This is a harsh environment that therefore requires highly robust and reliable drive solutions that can easily generate a nominal torque of up to 1.9 million Nm. Typical applications for these large gear units are rotary kilns and segmented girth gears, large agitators, extruders, and crane technology, among others.

As with industry in general, the sugar sector is also moving towards tailored drive packages and total system solutions. SEW has the necessary application knowledge for this specific sector, in addition to offering process and logistics expertise.

“Our clients in the sugar industry require custom solutions that can be implemented quickly and reliably for maximum productivity from the get-go. Our plus-80 years of experience in drive technology means we are the ideal partner for the sugar industry,” Maleka highlights.

Coupled to this is SEW’s international expertise and experience in the sugar industry. For example, it supplied three-stage bevel-helical gear units and 200 kW IE3 DRN motors to the Offstein plant of Südzucker AG, a global market leader in sugar production that processes 16 000 t of sugar beets a day into about 2 000 t of glucose syrup and sugar.

Here, a new conveyor belt was equipped with two almost identical drives. The two gear motors were connected to the drive drum using a pin coupling. For changing from one gear unit to another, the two couplings had to be interchanged mechanically, an efficient process that could be undertaken within two hours thanks to the solution provided by SEW.

The IE3 motors supplied are operated at a fixed rotational speed, and are also suitable for soft-start. Torque is transmitted from the motors to the conveyor belt by the two large industrial gear units, designed for a nominal gear unit torque of 90 kNm.

In terms of SEW’s latest innovations for the sugar industry, Maleka points to the P-X Industrial Gear unit series, which combines a compact planetary stage with a robust versatile industrial gear unit. This provides for a perfect solution for medium- to high-torque drives, especially in demanding applications such as the sugar industry. In addition, the combination of planetary and helical-bevel gear units translates into an optimum power/weight ratio, in addition to an improved thermal limit rating by means of a shared oil chamber.

SEW has the distinct advantage of being able to provide a fully comprehensive drive technology portfolio from a single source. “We rely not only on our own universal expertise in mechanical, electrical, and electronic drive technology for your specific solution, but are also able to offer the necessary expertise in control technology, engineering tools and system software, enhanced further by the highest safety and energy efficiency standards,” Maleka concludes.

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Juan José Albarracín (JJA) is among the market leaders in the production and marketing of high quality spices, such as paprika and pepper blends. To future-proof the quality of its products and to simplify the operation of its plants, JJA relies on extensive solutions from the Siemens product portfolio. These not only help the producer to improve the performance of its milling plants, but also increase plant availability and simplify control of the drives.

Until the new solutions were introduced, the products were still processed using largely manual processes. This meant that only limited or no use of product data could be made to optimise production sequences, and also made the process of troubleshooting and localising faults very complicated. The extensive modernisation of its operations using Siemens components such as a modern scada system, a new plant controller as well as converters and motor starters has allowed JJA to move its production into line with the latest state of the art technology.

The Siemens solution was rapidly and successfully integrated into the existing infrastructure, and allows simple plant operation, coupled with the assurance of high product quality. The production data can now be integrated into the existing enterprise resource planning system, improving both traceability and documentation. The selected configuration is additionally designed to permit trouble-free expansion of the plant at a later date. Detailed visualisation of the production sequences enables particularly intuitive plant operation, while the simple localisation of faults has meant a significant improvement to plant availability.

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Bauer drives innovation in food and beverage

The AsepticDrive from Bauer Gear Motor is an asynchronous motor with a basic design that does away with a fan and cooling ribs. As a result, its entirely smooth outer casing makes it ideal for the strict hygiene requirements of the food and beverage industry. In addition, the outer casing is sealed with a matching non-drive end shield. A standard feature is a stainless steel round connector, itself with a smooth surface, that allows for quick and simple motor connection. This connector contains not only the motor contacts, but also those of the thermistors. The AsepticDrive can be fitted easily onto any gear in the BG, BF, BK, or BS Series, which translates into maximum flexibility in terms of design requirements.

Production areas in the food and beverage industry have special requirements in terms of hygiene and cleaning due to the perishable nature of the products. The AsepticDrive represents the latest innovation in drive technology for the food and beverage industry. The smooth surface means that it can be cleaned simply and effectively, without allowing any pockets of dirt to accumulate, making it difficult for any deposits to adhere. An additional benefit is that ambient and room-air infections are also prevented, as any germs that form under the cowling are not recirculated when the machinery is restarted. “In combination with the extensive gear series from Bauer, the AsepticDrive provides for a highly-effective and all-inclusive total solution for the food and beverage industry.”

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Parts of the so-called ‘smart factory’ are already reality, and many processes and functions between information and operations spheres are becoming increasingly coordinated. At the centre of implementing Industry 4.0 is the requirement for intelligent and communication-enabled sensors to provide the smart factory with the data it needs. A communicating, intelligent sensor network, where sensor data is exchanged with a machine controller, or a cloud-based application, allows automatic adaptation of process parameters to new production orders within seconds. That means increased agility and better process efficiency across the enterprise.

Best-in-class sensors ‘Sensor Intelligence’ has been at the core of the SICK brand since 2004, manufacturing sensors that are best in their detection class. They also support the communication standard IO-Link, in whose development SICK played a major role. They become smart through wide-ranging potential for self and process diagnosis, and through integrated logic functions for processing signals directly at the sensor itself. However, what, in concrete terms, does intelligence through diagnostic capabilities and integrated functions mean in the context of the smart factory? Smart photoelectric sensors, for example, can detect patterns in an object structure and any changes in them. This takes place directly and autonomously in smart sensors for smart factories the sensor – not in the PLC. Machine processes are therefore accelerated and the control program streamlined. This means greater plant efficiency and lower costs for customers. The wide-ranging diagnostic functions of smart sensors can detect critical situations, and correct them, promptly, before the machine experiences an unplanned stoppage. This increases operating reliability, and thus the productivity of the entire plant.

An example of the benefit of upgrading to smart sensors can be seen in the case of inductive devices. The SICK portfolio includes a range of inductive smart sensors that, for example, detect the distance between the object and the sensor. They can detect when machine processes deviate from the target state and provide a warning in good time, or even make autonomous statements regarding product quality.

Smart sensors for the smart factory

Ultimately consumers also profit from intelligent sensors and dynamic interactive production processes. The key term is batch size 1. Many people are searching for ways to express their individuality. They want to have products that are perfectly adapted to their individual needs. Such true one-offs are either impossible or very expensive using classic production structures.

This is where smart sensors can open up new innovation potential. Furniture, for example, can nowadays be configured on the Internet. Dimensions, design elements, the type of wood and colours can be freely selected, combined, and ordered. The customer order reaches the production system and the machines via the network. The machines are equipped with intelligent sensors that the controller can parameterise appropriately for the particular product, so that the desired piece of furniture can be produced automatically. Production, inspection, packaging and dispatch all take place according to that individual order – and without any manual interventions. The customer receives their personal one-off piece at the price of a mass-produced item. This, however, is by no means the limit of the potential of smart sensors. Structures that are more autonomous; plants and factories with greater networking; production (and products) that involve more software and IT – all this can already be seen, and makes smart sensors a critical technology of future production processes. Flexibility will therefore be in greater demand in future.

Highly individualised requirements will mean manufacturers have to be able to react rapidly and precisely to each specific requirement. This will lead to a continuing demand for new functionality in sensors that will keep getting smarter.

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Avid Technology is a leader in the design and manufacture of electrified powertrain and advanced thermal management systems for heavy duty and high performance electric and hybrid vehicles. Its technology also improves conventional internal combustion engine efficiency through parasitic loss reduction, efficient thermal management, lubrication, electrified ancillary systems and waste heat recovery.

The company develops powertrain improvement solutions for a wide range of electric and hybrid vehicle applications, including high performance passenger cars, heavy duty buses and trucks, as well as motorsport vehicles and off highway machinery. Its high efficiency electric motor and power electronics technology delivers class-leading electrified powertrains and propulsion systems.

In order to test and characterise the high performance electric motors used in electric and hybrid powertrains, Avid Technology designed and built a special purpose test rig. Central to the design of the test rig is an innovative wireless rotary torque measurement device from Sensor Technology. These non-contact surface wave acoustic transducers offer significant advantages compared with strain gauges, magnetic torque sensors and optical devices that might be fitted to a conventional dynamometer for motor characterisation.

Sensor Technology’s SAW-based devices are non-contact, robust and highly accurate. TorqSense torque sensors use two tiny SAW devices made of ceramic piezoelectric material containing frequency resonating combs. These are glued onto the drive shaft at 90 degrees to one another. As the torque increases, the combs expand or contract proportionally to the torque being applied. In effect the combs act similarly to strain gauges but measure changes in resonant frequency.

The adjacent RF pickup emits radio waves towards the SAWs, which are then reflected back. The change in frequency of the reflected waves identifies the current torque. This arrangement means there is no need to supply power to the SAWs, so the sensor is non-contact and wireless.

These characteristics make the TorqSense transducers ideal for use in the stepper drive test rig. Avid Technology sales director, Jordan Taylor explains: “The TorqSense transducer was chosen as it allowed us to use a fixed pedestal load motor and eliminate frictional losses and parallax errors from the load installation in the measurements. This allows Avid to produce very accurate performance characterisation results compared to a conventional motor dynamometer.”

Not only has the sensor delivered superior and more accurate characterisation results, it also enabled Avid to design a simpler test rig. The device has performed flawlessly in the application to date, and Avid Technology is confident that its test rig will be key in enabling it to provide even smarter powertrain electrification, delivering on its vision of a cleaner, greener world.

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High resolution encoder in a compact design

Requirements on encoders are becoming more and more demanding. This applies particularly to positioning applications with high precision constant speed control, where increasingly compact housings need to accommodate an ever greater number of electrical contacts. maxon motor solves this problem with its new top of the range ENX 16 RIO optical encoder. It is a mere 16 millimetres in size and offers a resolution of up to 65 536 counts per turn, making it ideal for precise position and velocity control of DC motors.

The new maxon ENX 16 RIO encoder (reflective, interpolated, optical) fulfils all the requirements for a high resolution optical encoder in a compact and rugged housing. The resolution can be configured at the factory or online. With 16 millimetres outer diameter and 7 millimetres overall length, the housing is mechanically robust and protected from dust due to its injection moulded construction. The operating temperature range is -40 to 100°C.

Easily configured online for combinations with maxon motors, the encoder can be combined and configured online with matching drives. It fits the new brushless EC-i 30 motors and the brushed DCX motors (diameters of 16 millimetres and up). The counts per turn and the electrical interface of the ENX 16 RIO encoder are also configurable online.

Compact, explosion-proof absolute encoder

Many applications that require the use of absolute encoders are demanding, not just from a performance perspective but also because of the operating environment. An example of this is in applications where the encoder has to be explosion-proof due to the dangerous atmosphere in which it operates. Another would be applications that involve harsh environmental influences such as offshore platforms or those that experience huge shock loads of over 100 Gs or even shaft loads of hundreds of Newtons. The Hengstler AX65 absolute encoder has been engineered to handle all these requirements, and is one of very few devices that can do this.

Certified explosion-proof, the Hengstler AX65 is built with marine-grade stainless steel and has a shock rating of 200 Gs and shaft load of 300 N. This tough encoder is not only the most compact in its class, it also offers an exceptionally shallow depth and body diameter of only 59 mm. This means it can be installed in applications where other larger explosion-proof encoders cannot be used. Carrying explosion-proof certification makes it ideal for mines, chemical plants and offshore oil platforms, as well as other applications that require an encoder constructed from marine grade stainless steel. The shaft load rating eliminates the need for load modules, reducing costs.

The device can be installed quickly and easily due to its flexible, quick-connect terminal system. It comes standard with the choice of SSI or CANopen interface, and it is also possible to integrate the CANopen encoder in a ring network configuration.

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Smart sensors for industrial motion control

Smart sensors are facilitating the manufacturing sector’s shift to Industry 4.0. The latest smart sensors are able to share information with the controller via technologies such as IO-Link. They can also receive commands and parameter information from the controller and adapt to new requirements on a continuous basis. The upshot for manufacturers is an improvement in efficiency, alongside greater flexibility and better maintenance planning.

This applies to all kinds of smart sensors, including those used for pneumatic and hydraulic cylinders. The latest sensors feature intelligent functionality and comprise one of the three parts of smart pneumatics, namely sensors, processors and communications protocols. Smart sensors on cylinders offer fast, accurate, high resolution and contactless sensing of the piston’s position. Direct detection of the piston magnet is achieved without the requirement for separate position encoders or additional mechanics.

Cylinders with intelligence
Among the latest sensors, are those such as the new P8S CPS sensors from Parker Hannifin, which continuously supply data via analog signals, IO-Link process data or flexible switching point. The continuous transfer of position data serves to upgrade the functionality of pneumatic cylinders, making them more intelligent and more versatile. It is now possible to solve engineering challenges in areas such as quality monitoring and process control, particularly in consumer goods markets, like packaging.

Among the principal benefits of continuous position sensing, is the ability to monitor quality, deliver process control and support optimisation, especially in tensioning applications like paper or film processing, where quality, repeatability and speed are vital to profitable operations. Here, the remote reading of data from position sensors permits process deviations to be seen fast and acted upon, therefore retaining process optimisation and promoting predictive maintenance strategies.

Numerous other applications can also benefit, including materials handling, consumer packaging, small component assembly, machine building, and tasks in the renewable energy industry, such as the positional control of solar panels as they track the sun. Offering the appropriate resistance to shock, vibration, moisture, chemicals and water ingress, continuous position sensing can be deployed reliably in demanding operating environments over extended time periods.

Two-way communications
The key to smart functionality is two-way data flow. Using traditional discrete or analog signals, the monitoring of sensor data is simply one-way communication, which may be sufficient to allow the remote monitoring of automated processes, for instance. However, in order to adopt Industry 4.0 strategies, two-way communication is required, meaning connection to a network such as Profinet or IO-Link. With regard to CPS sensors on pneumatic cylinders, implementation would include not only monitoring, but automatic configuration at startup and during replacement as part of maintenance routines.

The shift to predictive rather than preventative or reactive maintenance is one of industry’s principal current trends and is an area where smart sensors can add significant value.

Specification and selection of smart sensors
The potential application benefits of smart sensors are significant. However, to maximise the gains, engineers need to consider several factors.

Firstly, the sensor needs to be able to fit securely on the cylinder body. External profiles may include linear slides, T-slots and dovetails. Alternatively, a combination screw combining an Allen key head and a slotted screw can provide a convenient, simple and fast method of locating and securing the sensor. Alternatively, retaining ribs on the side of the sensor can hold the device in the desired position before the screw is tightened.

Rugged design is a requirement for a smart sensor operating in an environment with wide variations in temperature and vibration, and exposure to aggressive fluids or chemicals. Smart sensors may be offered with specific IP ratings to denote suitability for use where exposure to moisture is an issue. Automated applications where the smart sensor operates 24/7 make operation more demanding, and sensor failure leading directly to downtime can be extremely costly. So smart sensors must be easy to change to keep costly downtime to a minimum. This operation must be completed without removing cylinder end caps or any other strip down of the assembly.

During installation and at points in the sensor’s operating life, adjustment and configuration of operating parameters will be necessary. Typical approaches are either via the IO-Link, or a portable teach pad. The ready availability of a supply voltage for the sensor is also an absolute requirement, and a visual cue of an active state or output in the form of an LED is of value to operators.

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BEARINGS, SEALS, BELTS & CHAINS

ContiTech expands automotive belt range

ContiTech has extended its range of automotive belts for the South African aftermarket. This service is the result of the company updating its catalogue to include belts of most vehicles in those regions that fall within the aftermarket segment. Every automotive fan, Poly-V and timing belt is manufactured to OEM quality standards, with all fan belts and the majority of the Poly-V belts are manufactured in ContiTech’s ISO 9001:2000-, ISO 14001- and SHAS ISO 18000-certified production facility in Uitenhage. Additional Poly-V belts for the South African market are manufactured at Continental ContiTech’s ISO/TS 16949-accredited facility in Kranj, Slovenia, while all timing belts are manufactured at ContiTech’s ISO/TS 16949-, ISO 14001-, ISO 50001- and ISO 9001-certified plant in Hannover, Germany.

“We have updated our car parc to include most vehicles in the replacement market,” says operations manager, Paul van Zyl. “The current car parc is close to 6,5 million vehicles, and this number should increase as each year passes.”

Delivery of belts can be turned around within 24 to 72 hours of an order being received, depending on delivery location. This turnaround time, combined with the fill rate goal of 98%, positions the company as a preferred supplier in the automotive aftermarket industry. “We continue to update our catalogue – it is a work in progress,” van Zyl says in conclusion. “Our short-term aim is to ensure that ContiTech Africa can comprehensively cover at least 95% of all vehicles in the South African and sub-Saharan African automotive aftermarkets.”

Wheel-end seal for extreme performance

SKF’s new Scotseal X-Treme wheel-end seal for trucks and trailers offers superior reliability and high temperature performance, as well as a market leading five year or 800 000 km warranty on trucks and seven years on trailers.

Truck and trailer operators can now dramatically reduce the risk of premature wheel-end failures, as well as the high costs associated with unplanned downtime and vehicle recovery.

Scotseal X-Treme offers an extension of the current three year full parts and labour warranty provided by Scotseal Plus XL to a new market-leading five years for truck and seven years for trailer applications for the new product under the SKF Trouble Free Operation coverage plans TF05 and TFO7 respectively. SKF has been able to offer this generous guarantee thanks to new design features that include optimised primary and axial lip profiles, new metal unitiser geometry and the use of an upgraded HNBR lip material which enhances the performance of SKF’s unique wave lip design. Collectively, these new features deliver unrivalled under-lip temperatures, lower running friction, improved contamination exclusion and longer seal life.

With a wheel-end seal replacement and hub relube taking around two hours, vehicle downtime costs can quickly soar. Thanks to its innovative new seal design, Scotseal X-Treme has the potential to cut unscheduled downtime events by half and can drastically reduce wheel-end failure events due to seal problems. The new seal is also designed to cope with the higher temperatures generated by braking systems that are compliant with new ‘shorter stopping distance’ legislation.

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For more information contact Samantha Joubert, SKF South Africa, +27 11 821 3500, samantha.joubert@skf.com, www.skf.com
Motion and control specialist, Parker Hannifin has launched a new web-based engineering tool: the Parker O-Ring Selector. This innovative tool enables precise selection of the right O-ring material and seal size according to the user's application conditions. Close interlinking of material and size selection delivers reliable results, ensuring the desired performance of the O-ring in the subsequent application. The Parker O-Ring Selector covers both imperial and metric standards.

The O-Ring Selector combines a wide range of sealing materials with a calculation platform for O-ring seals. The selection of materials takes into account operating temperatures, fluids relevant to the sealing application, the polymer family and seal hardness as well as required approvals and conformance. The data set of the material that has been characterised this way is subsequently fed into the actual selection of the sealing system. In this step, O-Ring Selector offers the user extensive options to parameterise the sealing system such as thermal expansion coefficients of the seal and the hardware components, volume swelling of the seal and manufacturing tolerances for the hardware components.

In addition to the delivery of reliable results, high user friendliness was a key objective in the development of the O-Ring Selector. The three part structure divided into Service Conditions & Material Selector, Size Selector and Notes as the main sections is logical and clearly arranged, thus assuring ease of use.

For more information contact Lisa de Beer, Parker Hannifin SA, +27 11 961 0700, lisa.debeer@parker.com, www.parker.com/za
High-performance chain

BMG’s extensive range of Tsubaki high-performance chain, which offers enhanced strength and reliability, a cleaner environment and extended operating life, includes the robust Workhorse elevator series. “Workhorse elevator chains, manufactured for greater strength and durability, are designed to resist the abrasive and demanding forces of aggregate elevators. This chain is particularly well suited for use in aggressive bulk material handling environments with harsh fine particulates like cement, lime, gypsum, coal, fertiliser, grain and sugar,” says, power transmission manager Carlo Beukes.

“Carefully selected high strength steels, advanced manufacturing processes and refined heat treatments, ensure maximum fatigue strength and protection against failure, even when these chains are used in the most severe applications.”

The Workhorse 5800 and 5900 series, with average tensile strength ratings (ATS) between 65 909 kg and 129 545 kg, can be upgraded with various plated pins, bushings and joint seals – individually or in combination – to ensure dependability and enhanced wear resistance in specific applications. An important feature of this series is that extended bushing barrier seals prevent abrasive materials from entering and attacking chain joints. The chain bushings are extended beyond the inside sidebars to minimise the clearance between the outside bars and the bushings. This in turn creates a solid barrier that inhibits abrasive material from entering the pin/bushing joint.

The wide face seal, which is manufactured from a high temperature engineered polymer, encircles the extended bushing and provides an additional particulate resistant barrier to help protect the joint, thus minimising contamination. A patented stainless steel internal ring seal holds tight onto the pin and rotates within a groove in the bushing to create a labyrinth to prevent debris from getting into the pin/bushing area. Tsubaki standard backstops – designed for safety in normal low speed conveyor applications – offer a simple and cost-effective means to protect capital equipment, including inclined conveyors and bucket elevators.

These uniquely-designed backstop cam clutches prevent reverse rotation of, for instance, the head pulley of an incline conveyor; thus acting as critical safety equipment, as well as avoiding damage to machinery and expensive equipment.

The BS135 (135 mm shaft size) and smaller units are greased for life, with no maintenance required. Bigger units only require lubrication once every 4000 to 8000 hours, depending on environment. Old grease can be flushed out and changed, while the unit is in operation – there is no need to remove the backstop from the shaft. BMG carries a complete range of up to 250 mm shaft size in stock, which is available in short lead times.

BMG’s technical team advises on the selection of the correct cam clutch for each application and the appropriate installation and usage for optimum performance and improved safety standards. For extended service life, correct lubrication methods and dust prevention care are also critical.

For long overland conveyors, Tsubaki’s BS-HS high-speed capacity backstop cam clutch series has many critical features not found in conventional models. This range has an upgraded cam cage and bearing supported design, which provides much higher torque/speed capacity than other cam clutches. Other advantages include the use of a smaller clutch, which provides cost-savings and high-quality clutch component parts made from heat treated alloy steel that provide wear resistance and extended life performance. These backstop cam clutches also have an anti-rollover cam design that ensures durability against heavy shock load in back stopping. The dust proof construction of this series – with the combination of a double lip oil seal and dust protective plate – keeps grease in and dust out.

Another important feature of the BS-HS series is reduced maintenance. Because special heat-resistant grease with no EP additives is packed into the unit as standard, only minimal maintenance for the lubricant is required. This makes maintenance easier and significantly reduces operational costs.

Tsubaki’s complete range of cam clutches is available from BMG in different capacities and styles, designed to provide the best functional characteristics for three basic modes of operation – overrunning, indexing and backstopping. The outer and inner races of these cam clutches are manufactured from special selected high alloy steel, with high surface hardness and core toughness, to be able to withstand operation in arduous conditions. These races are precision ground, providing excellent concentricity and a special surface finish to obtain accurate cam rotation. Cams are manufactured from special selected high alloy steel, with a hardness option up to 2500 Hv.

For more information contact Lauren Holloway, BMG, +27 11 620 7597, laurenh@bmeworld.net, www.bmeworld.net
Hybrid belts by Megadyne

Megadyne is a multinational company specialising in power transmission tools. The company now offers the Hybrid belt series (Basic version, Hybrid Belt Plus, Hybrid Pro Belt Plus and Hybrid Belt For Vacuum). These belts are used in the packaging, food, medical, paper and printing industries, as well as robotics and automation. These innovative hybrid belts with unique characteristics are made with the application of one or more polyurethane timing belts in the central part or at the edges of a conveyor belt, optimally combining the qualities of both products.

The Hybrid Belts series operates in a wide temperature range (-20 to 80°C for Hybrid Belt and Hybrid Belt Plus and -25 to 80°C for the top-of-the-range Hybrid Pro Belt Plus) and ensures greater productivity, with a driven speed up to 550 metres per minute, even in the case of customisation. The lower energy absorption of about 30%, combined with a quick and economical retrofit onto existing systems, lead to further savings, while the smaller pulleys allow a compact transmission and greater flexibility.

The timing belts used to make Hybrid Belts and Hybrid Belt Plus are Megalinear. The pitches commonly used are T10, TS, HTD5M, HTD8M and STD8M, while Hybrid Pro Belt Plus mounts the Megalinear QST that guarantees less noise. Finally, Hybrid Belt For Vacuum is the ideal solution for automation and vacuum handling due to the addition of a polyester plain fabric that guarantees optimal suction.

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High-capacity winch cranes

Demag's compact high-capacity winches can handle loads of up to 500 tons. With its outstanding combination of size and lifting capacity, the HCW creates a full range of solutions for power stations, shipyards and heavy mechanical engineering applications. By using them as tandem units, their lifting capacity can be increased to 1000 tons. HCW open winch units can be configured to meet customers’ needs thanks to their modular system design, without the need for any additional design or development work.

The load on the crane superstructure can be significantly reduced due to the low hoist unit dead weight. HCW hoist units are equipped with wear-resistant components, ideal for harsh African environments, and offer good accessibility for service and maintenance. They can also be used to modernise existing crane installations where little space is available.

Demag’s open winch units are ultra-reliable and offer optimum approach dimensions to utilise the existing floor area. Depending on their design, the 4- or 6-wheel crabs ensure uniform distribution of the load on the crane girders. Many additional options are available according to customer needs, such as single or double hooks, a motor-driven design and a hook position that can be locked at increments of 90°.

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Kabelschlepp cable carrier systems

BMG’s extensive portfolio of Tsubaki Kabelschlepp cable carrier systems and safety cables includes S/SX steel cable carriers, which have been designed for carrying heavy mechanical loads in harsh environments, including corrosive conditions. “The S/SX series comprises robust steel cable carriers, with a chain-link sandwich design, consisting of two plates welded together for high stability,’ says power transmission business unit manager, Carlo Beukes. “This link design, with optimised geometry, allows contaminants found in harsh environments to fall through the system when the cable carrier is in motion. Dirt build-up, which normally causes blockages of the stroke system, is prevented to ensure continuous running operation.”

The design of the S/SX series allows for increased unsupported lengths and large additional loads without sagging, when perfectly sized to the application. The stroke system, with special bolts and locking rings, is designed for extended service life. Plastic or steel dividers maintain neat cable separation and an aluminium cover system or covers with a steel strip, enhance cable protection.

These cable carrier systems are available in heavy duty steel (S) and corrosion resistant stainless steel (SX), as well as in durable, lightweight plastic materials.

Applications for Kabelschlepp cable carriers extend from computer plotters and micro-sensitive test and measurement equipment, to offshore drilling rigs and high-speed automated machining centres.

For more information contact
Lauren Holloway, BMG, +27 11 620 7597, laurenhy@bmgworld.net, www.bmgworld.net
The IIoT Motor Diagnostic System accurately diagnoses the state of equipment in real time and automatically notifies users of problems as well as solutions. It analyses the voltage and current signals supplied to the motor. Users need only connect a sensor between the motor and the distribution board. The diagnostic system analyses the current state of the motor and makes estimations about its health. The system runs a comparison analysis between the measured data from the motor and that of the line motor database. It picks up even slight differences and analyses them to diagnose abnormalities and then gives advance notice in real time of possible impending failure.

The system has a periodic notification function that evaluates the performance of the motor at set intervals and informs of possible maintenance risks and estimated time to replace parts. It is installed in the motor control panel and results are analysed automatically. It is easy to use and can conveniently be managed remotely as well. The IIoT Motor Diagnostic System detects both electrical and mechanical faults of various types in industrial equipment, driven by three-phase electric motors. It is also capable of detecting abnormalities of the connecting cable and terminal blocks, as well as changes in the load and supply. Hence the system allows users to observe in real-time whether the motor is performing optimally.

The IIoT Motor Diagnostic System also has a built-in power quality measurement function for electrical signal analysis as an integrated solution that saves energy, lowest cost without suffering from quality problems or unexpected failures.

For more information contact Lourens Janse van Rensburg, CIS Industrial Services, +27 79 512 8027, lourens-cisindustrial@telkomsa.net, www.cisindustrialservices.com

Safe, efficient cable sealing

Proof Engineering’s range of double-compression cable glands, including the Orion, Crater & Taurus Exd AMPgland, ensures safe and efficient securing and sealing of cables in the mining, oil and gas industries. AMPgland’s unrivalled cable securing and sealing capability is due to its unique design which features two O-rings on the shielding cone. The double-compression O-ring ensures double sealing by preventing the intrusion of contaminants such as water and dust. Alongside achieving high strain relief and explosion proof protection, the special shape of the gland’s lower and upper seal also earns it an IP66/68 rating.

Installation of the AMPgland is easy and simple, keeping downtime to a minimum. There is no need to change, remove or adjust any internal components as long as the diameter of the used cable is within the declared clamping range. The swivelling shielding cone for clamping armour is secured to the upper and lower body by the O-rings. This prevents the shielding cone from being lost during disassembly of cable gland during installation.

“The addition of these cable glands has boosted our comprehensive flameproof product range of plugs, sockets, connectors, adaptors, couplers, plug couplers and luminaires,” says MD, Donovan Marks. “Our expanded basket of offerings which now includes the cable, the connector and the AMPgland, positions us as a solutions provider for virtually any electrical installation,’ he concludes.

For more information contact Donovan Marks, Proof Engineering, +27 11 824 1146, donovan@proofholdings.co.za, www.proofeng.co.za

The new brushless EC 90 flat motor from maxon motor features maximum torque in a compact design. The EC 90 flat motor has a diameter of 90 mm and is available in two versions, with 160 W or 260 W of power. In the 260 W version, the motor delivers an impressive continuous torque of up to 1 Nm, which makes it the most powerful of all drives. The characteristics of the 260 W version make it an interesting choice for direct drives without a gearhead. Possible applications include wheel drives, logistics systems and pumps. In combination with the MILE encoder, this brushless DC motor is ideal for positioning tasks.

maxon now offers cable versions of the new EC 90 flat models and the smaller EC 45 flat motors. By default, the cables are attached to the motor and come with a connector.

For more information contact Hans Burri, DHN Tradeserve, +27 11 468 2722, hans.burri@dnhtrade.co.za, www.dnhtrade.co.za

A flat motor for high torque

IioT platform for motor quality analysis

The IIoT Motor Diagnostic System accurately diagnoses the state of equipment in real time and automatically notifies users of problems as well as solutions. It analyses the voltage and current signals supplied to the motor. Users need only connect a sensor between the motor and the distribution board. The diagnostic system analyses the current state of the motor and makes estimations about its health. The system runs a comparison analysis between the measured data from the motor and that of the line motor database. It picks up even slight differences and analyses them to diagnose abnormalities and then gives advance notice in real time of possible impending failure.

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