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BEEE level 6
SEW-Eurodrive is once again expanding its range with the launch of its ECDriveS brushless DC gearmotor. It will be on show in March at bauma CONEXPO Africa 2018, together with SEW-Eurodrive’s full portfolio of gearmotors, motor starters and decentralised drives. Read our cover story on page 11 to find out more about this simple, efficient drive system, a cost-effective solution for the lower power range of light-load roller conveyors.
The adventure of the century

The thrill of space exploration never goes away, and the next stage could be the most exciting ever as plans are made to put people on Mars. Apart from stories on a 50 ton flame throwing mechanical spider and motors on the golf course, in this issue we have an aerospace feature covering projects and projects from Siemens, Hytec and Horne Technologies – Mars rover missions, hybrid-electric passenger planes and thermoplastic presses. This reminds me of a MESA conference I attended at the end of last year where I was privileged to have lunch with theoretical physicist and quantum biology researcher, Dr Adriana Marais who is on the shortlist of 100 to go to Mars – one way. When I first heard of the Mars One project I thought the aspiring Martians were quite crazy but Adriana convinced me otherwise. She had us spellbound with her vision of life on Mars and the potential for this project to generate new technologies which could benefit people on earth in ways we cannot yet imagine in science, technology and medicine.

Mars One is a private non-profit organisation that plans to establish a permanent human colony on Mars by 2030. In this extraordinary and ambitious project, six teams of two men and two women will be selected in 2018 from the current Mars 100. Among them will be mechanical engineers. The selected teams will then begin training full-time for the first team’s departure. Mars One intends to use the Olympic model of making cash from TV broadcasting rights to raise the huge amount of capital needed.

Adriana says she applied to go to Mars because the allure of the unknown has always felt far more powerful than the comfort of the known. “Exploration is what defines us as human beings and it drives innovation,” she says. “Mars is the next step. We’re just doing in terms of space travel what we’ve always done in terms of exploring the globe.” Her research interests have led her to the question of what is life? Showing that life is sustainable on Mars, or finding evidence of life on Mars, would be one of the most important possible discoveries for humanity – a giant leap in the allure of the unknown has always felt far more powerful than the comfort of the known. “Exploration is what defines us as human beings and it drives innovation,” she says. “Mars is the next step. We’re just doing in terms of space travel what we’ve always done in terms of exploring the globe.” Her research interests have led her to the question of what is life? Showing that life is sustainable on Mars, or finding evidence of life on Mars, would be one of the most important possible discoveries for humanity – a giant leap in the adventure of the century.

Practically the journey will take seven months. "Man's greatest achievement could only be a feeling homesick. For earth when she's feeling homesick. The components needed for the Mars mission will probably be blasted into low earth orbit, then towed to cislunar space and assembled there. You expend about 80% of the energy it takes to get to Mars just to get to lower earth orbit. The first 250 km are the hardest, and the other 250 million are actually quite easy. You can store things like fuel and habitation modules in lower earth orbit to be assembled and used later on – a bit like the base camp for a mountain expedition; and 3D printing will be a critical resource – if you need a certain spanner for example.

We’re not doing it because it’s easy, we’re doing it because it’s hard:
Dr Adriana Marais

Advances in technology are toppling the old ways of travelling in space. Now anyone with enough money and initiative can go there. The race is now between companies rather than countries and there is a rush of companies scrambling to fill the gap with promises of cheaper access to space with innovations such as renewable rockets and horizontal launch systems.

Following in the steps of the visionary Mars One proposal, other companies such as Elon Musk’s SpaceX, as well as Boeing and Lockheed Martin have also announced plans to send manned missions to Mars in the next decade or two. But unlike the political eyeballing of the 1960s space race, it is now all about cooperation. SpaceX plans to land the first private cargo mission on Mars in partnership with NASA, and Mars One plans to outsource its technology to world leaders in the aerospace industry such as SpaceX and Lockheed Martin. Governments and private companies are working together, drawing on the best minds available. Man’s greatest achievement could only be a couple of decades away.

I am holding thumbs for Adriana Marais.
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.
The SAFPA committee experienced a busy period during the last quarter, particularly in the field of education. This area is subject to large amounts of red tape and we find that we spend a considerable amount of time on this subject.

Economy
The mood in the country has turned positive during the last two months after the political changes within the ruling party. Business confidence has improved during January and we are being made aware that certain sectors in the economy are recovering. This is borne out by the PMI figures released during the last week of the month. They increase from 44,9 to 49,9 for January. The figures point out that the local manufacturing sector started the year on solid ground compared to the recent past.

This augers well for the fluid power market, as we see the effects of major business decisions some months down the line. An improved market is expected during the second quarter of the year.

Education
Education remains our key focus at SAFPA. We continuously explore opportunities to identify service providers and member companies who are in a position to train our youth in the field of fluid power.

A further challenge we are facing is securing a pipeline of students wishing to enrol for studies in our industry. JFa2 College in particular is finding this a problem at this stage. We urge our member companies to identify possible recruits and guide them in the direction of the college. SAFPA is pursuing further opportunities in training and once we have more detailed information we will communicate it to the industry.

Safety in fluid power
From time to time we become aware of incidents by users of fluid power equipment who do not practice safety in the workplace. Recently there have been two such incidents. SAFPA will be sending out a communication with photographs of these examples to make the market aware of the dangers of unsafe work practices.

We are also planning a technical meeting on safety, using existing ISO standards as a guideline to sensitize our members to procedures that should be followed in the use of fluid power components and the assembly of systems.

SAFPA soccer tournament
The recent SAFPA soccer tournament was a great success. There were 22 teams, all showing great enthusiasm and sportsmanship. Well done to the winners, Parker Hannifin. The runners up were Hansa-Flex who were beaten 2-1 in the final. A big thank you to David Arends for organising a fantastic day in the sun.

SAFPA technical evening
At October’s technical meeting, Hytec’s group training manager, Allen Van Gent spoke about the latest developments regarding the past, present and future of the National Qualification: Mechanical Engineering; Fluid Power.

At the November SAFPA technical evening, Dawie Olivier gave a presentation on the essential safety requirements for pressure vessels and the associated legislation.
Hytec engineers new qualification

Hytec has become South Africa’s first company to receive full accreditation as a training provider to qualify ‘fluid power fitters’. The company received full accreditation with programme approval from the MerSETA to provide theoretical and practical training for the National Certificate Mechanical Engineering: Fitting (Fluid Power), and the National Certificate Mechanical Engineering: Fitting (Manufacturing, Engineering and Related Industries), both at NQF level II. The National Certificate Mechanical Engineering Level 2 is the first in a learning path of three consecutive qualifications which culminate in a Further Education and Training Certificate: Mechanical engineering, NQF Level 4, within the context of a traditional designated trade specialisation.

There are currently four learners undergoing training at Hytec for the National Certificate: Mechanical Engineering: Fitting (Fluid Power) who, once qualified, will be the first certified fluid power fitters in South Africa trained by a South African training provider. This is an achievement that the South African fluid power industry has been striving to achieve since 2009 when the qualification was originally registered with SAQA.

According to group training manager, Allen van Gent, the importance of the certification cannot be underestimated. “There are numerous mechanical fitters with hydraulics industry experience but it is the formal recognition of the specific training that’s important,” he says. “The scope of training that Hytec is accredited to provide encompasses every aspect that a fluid power fitter needs to know in order to conduct day-to-day activities within the fluid power industry.”

Hytec’s new training facility, due to open in 2018, will have three dedicated training rooms accommodating a combined capacity of 120 people and will provide both theoretical and practical training under one roof. Part of the learning experience will be a state-of-the-art WS290 hydraulic and pneumatic training workstation donated by Bosch Rexroth Germany. The hydraulic power unit, with a load sensing double pump, can accommodate four to six trainees simultaneously. It is perfectly suited for training sessions with respect to on/off, electro, proportional and closed-loop control hydraulics topics and on/off, electro pneumatics and PLCs which incorporate modular mechatronics systems. Hytec will use this for theoretical training and practical simulation to ensure that all learners gain hands-on experience in a controlled, practical learning environment.

The full accreditation and programme approval process dates back to 2006, when SAFPA developed a curriculum for a National Certificate Mechanical Engineering: Fluid Power, a process which took three years to finalise. During the design phase, SAFPA registered the curriculum and associated learning material with SAQA. Unfortunately, post-2009 no learners were registered against the qualification and SAQA deregistered it in 2015. MerSETA then replaced the qualification with the Quality Council for Trades & Occupations (QTCO) Tool Maker Occupational qualification. Subsequently, SAFPA attempted unsuccessfully to reinstate the original qualification as it planned to introduce a pilot programme for the fluid power industry.

SAQA required proof that industry faced a shortage of fluid power fitters and that there would be definite interest in the qualification. During the course of 2016, SAFPA enrolled six learners onto the NQF level II pilot programme administered by TVET College JFa² Technical Training Institute. The college focused on the theoretically driven Core and Fundamental unit standards. However, a company accredited to provide practical training was needed. Hytec, concerned over the existing training gap for fluid power fitters, then got involved.

Thus began the long and convoluted interactions between the relevant stakeholders, all doing their best to get the NQF qualification reinstated as it was prior to it being linked to the QTCO qualification. Hytec and JFa² worked closely with the MerSETA and once SAQA approval had finally been obtained, Hytec employed and registered the learners who had completed theoretical training and wanted to continue with the qualification. After many negotiations and a lot of work carried out by Hytec’s training department, Hytec received full accreditation as a training provider with programme approval.

“We were subsequently informed that, as of 2019, all legacy SAQA qualifications will be realigned or replaced by a QTCO occupational qualification,” van Gent says. “Subsequent to receiving this notification, relevant stakeholders in the fluid power industry are in the process of applying to register a QTCO Qualification: Fluid Power.” Hytec is now awaiting feedback from its submission for registration with the Department of Higher Education.

For more information contact Allen van Gent, Hytec; John Wingrove, CEO, Hytec.
Undrive Electric Motors is determined to keep each of its customers satisfied by always delivering more than it has promised. Established over three decades ago, the company is now black female owned and youth led, and continuously strives for excellence to ensure sustainability in a male dominated industry.

Unilever South Africa is amongst the customers that have been with Unidrive throughout the years and sings its praises when it comes to availability, reliability and quick turnaround time. “Unidrive has been our supplier for over two decades and they have never failed us. The company constantly delivers on all our requirements and the team works around the clock to ensure the best service in the industry,” says Mackenzie Gabela, electrical specialist at Unilever’s Boksburg plant.

Unidrive Electric Motors services Unilever with flameproof electric motors that meet all the required safety certificates on the Unilever plant. Gabela further adds that electric motors sourced from Unidrive are crucial in ensuring that the operations are functioning at all times on a 24 hours, 7 days a week cycle. The motors control all conveyor belts, taps, toasters and extractor drives throughout the Boksburg plant.

Unidrive has also granted young men and women the opportunity to harness their skills in the industry through internship programmes offered at the company. Even new employees at Unidrive follow the high service standards that have been set by the company.

New specialist for Dosco Precision Hydraulics

Dosco Precision Hydraulics, a Division of Hudaco Trading, is about to enter new territory in the hydraulics environment. Rob Masterton will be joining the company from the 1st of February 2018. Rob is a Kawasaki product specialist with 30 years of experience in the hydraulics industry.

Dosco is deeply committed to its customers, old and new, and with Rob’s vast knowledge and skills within the hydraulic environment, the company will endeavour to extend its footprint in the South African marketplace, focusing on Kawasaki Staffa and GPM products. Dosco is looking forward to a mutually beneficial relationship, based on positive integration.

For more information contact Jacques Lombard, Dosco Precision Hydraulics, +27 (0)11 452 5843, jacquesl@dosco.co.za, www.dosco.co.za

Megadyne accelerates international growth

Megadyne has further strengthened its growth on international markets through the acquisition of some important players in the field of power transmission. Founded in 1957, this Italian company is a world-leader in the development, production and distribution of rubber and polyurethane transmission belts, matched components, complete belt systems and other complementary products. Three new companies have joined the group. Ave in Spain specialises in the development and production of chains, belts, guides and components in stainless steel and new high-performance materials. With headquarters and factories in Barcelona, Ave products have multiple applications in industrial sectors, such as bottling, packaging, cosmetics and automotive. Megabelt is a leader in the distribution of transmission belts and conveyor belts in the Israeli market. Its range of products includes complete lines of machinery for the production of V-belts in rubber and toothed belts. Bandas Cimexa is a distributor of power transmission systems in Colombia.

The new acquisitions in Spain, Israel and Colombia come on top of the one completed in July 2017 which involved Sacif, an Italian leader in the production and marketing of special conveyor belts and toothed belts used in the industrial automation sector. This extension of its corporate structure has provided Megadyne with a further competitive advantage, determined by the expansion of its product range and geographical areas of reference, allowing the company to present itself successfully in new markets.

For more information contact Patrizio Trevisan, Megadyne South Africa, +27 (0)12 661 1652, patrizio.trevisan@megadynegroup.com, www.megadynegroup.com
BMG’s winning farming initiative

BMG has announced the winner of the Boer Slim/Smart Farming competition, held in conjunction with Facebook recently. “The rules were simple. To enter the competition, we needed a photograph of the contestant with one or more of BMG’s Boer Slim/Smart Farming items – a cap, belt buckle, shirt, bumper sticker, or rain meter,” explains agricultural manager, Carlo Beukes. “The winner, Lionel Smit, has won a Gedore 144 piece tool trolley for posting his photograph on Facebook.

“BMG’s Boer Slim/Smart Farming initiative assists farmers cope with constantly changing trends in the agricultural sector. Through the Boer Slim/Smart Farming project, BMG’s team of agricultural experts offers farming sustainability solutions throughout Africa that focus on effective food production, the correct use of suitable equipment for the specific task and the efficient application of advanced technologies. “We work closely with farmers to demonstrate that the investment in the latest equipment is necessary to maximise productivity,” says Beukes.

A recent case study is testament to this. BMG was approached by a local farmer who wanted to accelerate his tobacco drying process and expand crop production, but was restricted by power supply limitations. After the installation of BMG Motoline variable speed drives, the farmer is now able to run 22 tobacco drying containers at once, where previously he could only run and alternate between nine drying containers at any one time. BMG’s solution has enabled the farmer to more than double his crop production output.

For more information contact Carlo Beukes, BMG, +27 (0)11 620 1500, carlob@bmgworld.net, www.bmgworld.net

Massive motors installed by M&C

Martinsen & Coutts recently executed the sub-assembly of six gearless mill drives for Minera Panamá’s remotely situated Cobre Panamá project in record time. Minera Panamá, the Panamanian subsidiary of First Quantum Minerals, is currently developing the Cobre Panamá project, located in Colón province. The mine life has been estimated at more than 30 years and will produce around 300 000 tpa copper, 3,1 tpa gold and 2500 tpa molybdenum.

Of the six ABB gearless mill drives being installed at Cobre Panamá, four will power ball mills and the other two will drive SAG mills. These massive machines are among the largest ever installed in the world and were transported in quartered sections to site for assembly in situ. With an inside diameter of 14 metres, the sheer size of the machines presented challenges of its own, with each segment weighing approximately 80 tons. Work was done on four different positions on the machines simultaneously: 3 o’clock, 6 o’clock, 9 o’clock and 12 o’clock.

Divisional CEO, Richard Botton says that a team of six highly competent and skilled technicians was responsible for the completion of the project within extremely tight time schedules. Work on the machines was performed back-to-back and this was accomplished using induction brazing equipment and a bar wound winding with separate upper and lower stator bars, as opposed to set diamond lap-wound, formed type coils.

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

SKF Zambia kicks off on a high note

SKF Zambia recently joined forces with Mopani Copper Mines in hosting the prestigious Mufulira Sevens Rugby Tournament. The event saw the community of the Zambian mining town of Mufulira bristling with excitement as they welcomed the teams. SKF Zambia was delighted to join forces with Mopani Copper Mines in hosting this prestigious seven-a-side rugby fest.

SKF was one of the first sponsors to get on board with this highly popular event, which is breathing new life not only into Mufulira sport, but also into the town. SKF has contributed to the transformation of the Mufulira rugby stadium, now called the Leopard’s Cage, which has been converted into a world class sporting facility complete with new change rooms, a sponsors’ viewing deck, new advertising signage and playing field upgrades.

“Due to our involvement, everyone waited with great anticipation for the championship to kick off,” says SKF Zambia managing director, Sean Kennedy. “New additions to the stadium were completed at a frantic pace, all the lodges in the area tackled springcleaning tasks, local restaurants prepared new menus and bars stockisted up in readiness to welcome spectators, players and coaches.”

The opening ceremony was attended by all the participating teams, which included two women’s teams, and four international teams from neighbouring South Africa. South Africa’s Golden Lions won the competition, while the Plate and Bowl were won by the Eagles and the Diggers respectively. The Mufulira Leopards A roared proudly as they walked away with the Shield.

For more information contact Samantha Joubert, SKF South Africa, +27 (0)11 821 3500, samantha.joubert@skf.com, www.skf.com

Lionel Smit’s winning photograph.
The global mining industry faces major challenges and, in order to stay competitive, companies have to become leaner, stronger and more innovative. In this context, digitalisation plays a crucial role by offering new possibilities to increase productivity and operational excellence.

To present the comprehensive and integrated solutions in its mining portfolio, Siemens recently hosted a Mining Technology Day for its customers, featuring a delegation of leading global and local business and technical experts. “Our customers are using Siemens automation and drives technology to make mining safer, increase productivity and improve efficiency,” said CEO for southern and eastern Africa, Sabine Dall’Om. “In 2014, our technology enabled R140 billion of value by helping customers to move 175 million tons of material in key sectors like platinum, gold, diamonds, coal and iron ore.”

Siemens creates sustainable value in the mining industry by optimising plant efficiency, and digitalisation can help tackle major challenges like productivity improvement. The company offers proven digitalisation solutions such as an industry-specific process control system for comprehensive automation (MinAS); an engineering tool for effective plant management (Comos); and a platform for aggregating, relating and presenting operational and business data for analysis (XHQ). Siemens has been active in SA mining since 1897, and today much of the industry depends on it for innovative drive, automation and electrical technology for everything from extraction to transportation and beneficiation.

For more information contact Jennifer Naidoo, Siemens Digital Factory and Process Industries and Drives, +27 (0)11 652 2795, jennifer.naidoo@siemens.com, www.siemens.co.za

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**Appointments**

Hytec Group has appointed Tillmann Olsen as deputy chief executive.

Hytec has appointed Abrie van der Merwe as general manager of Hytec Hydraulics in Botswana.

Hydraulic & Automation Warehouse (HAW) has appointed Werner Joubert as general manager.

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**Digitalisation in mining**

Siemens’ clients enjoyed the presentation at the Siemens Mining Technology Day.

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**SAFPA UPCOMING EVENTS**

**SAFPA Golf Day**
Wednesday 16 May 2018
Benoni Country Club

**SAFPA Cycle Race**
Friday 24 August 2018
Avanto Muldersdrift

**SAFPA Soccer six-a-side**
Sunday 11 November 2018
Boksburg Stadium

Good Day Members,
Join us on one or more of the upcoming events and network with your industry whilst having some fun.

Diarise the event, contact Angie to find out more.
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The following courses are available from Festo Didactic.

Pneumatics (1) Basic PN111:
- Johannesburg: February 21-23, March 27-29, April 24-26
- Durban: March 14-16, April 24-26
- East London: February 21-23, April 18-20
- Port Elizabeth: March 7-9
- Cape Town: March 27-29

Pneumatics (2) Maintenance PN121:
- Johannesburg: March 14-16
- Durban: April 11-13
- East London: March 7-9
- Port Elizabeth: April 11-13

Pneumatics (3) Advanced PN122:
- Johannesburg: February 28-March 2
- East London: March 14-16
- Port Elizabeth: April 24-26
- Cape Town: April 18-20

Electro–Pneumatics PN211:
- Johannesburg: February 28-March 2, April 18-20
- Durban: March 7-9
- East London: April 4-6
- Port Elizabeth: March 27-29
- Cape Town: February 28-March 2

Hydraulics (1) Basic HY511:
- Johannesburg: February 21-23, March 27-29, April 24-26
- Durban: March 27-29
- East London: February 28-March 2, April 24-26
- Port Elizabeth: March 14-16
- Cape Town: April 4-6

Hydraulics (2) Advanced HY521:
- Johannesburg: April 11-13
- Durban: April 18-20

Hydraulics (4) Maintenance HY142:
- Johannesburg: March 7-9
- Cape Town: April 11-13

PLC Introduction PLC111:
- Johannesburg: March 14-16

Mechatronic Systems AUT211:
- Port Elizabeth: April 3-6

For more information contact Lucian Kirk
+27 (0)11 971 5626, didactic@festo.com, www.festo-didactic.co.za

A new hydraulics training manual

Introduction to Hydraulics is a training manual written by Walter Zimmerman, who has over 35 years experience in training as well as designing and manufacturing hydraulic systems within the fluid power engineering industry in South Africa.

The manual is suited to the newcomer to the fluid power industry, but also caters for technicians and engineers who require a knowledge and understanding of maintaining and applying hydraulic components and circuits, and the principles on which they are based.

The material offered is concise, and quickly provides the reader with the information required to grasp the principles of applying hydraulic components, in order to work with and troubleshoot hydraulics. The content covers basic principles; pressure controls; directional control valves; flow controls; flow dividers/combiners; accumulators; hydraulic pumps; actuators; motors/cylinders; filtration; reservoirs; hydraulic circuits; circuit mistakes; designing hydraulic circuits; slip-in cartridges (logic elements); and troubleshooting hydraulic systems.

The first print run of 100 books was sold in three to four weeks and the second edition is currently in print.

For more information contact Walter Zimmerman, Hydraulic Training & Consultants, +27 (0)11 421 6696, hytrain@iburst.co.za, www.hytrain.co.za

Hydromobile training

Hydromobile's popular hydraulics training course will be run on the following dates this year:
- 28-30 March
- 25-27 July
- 28-30 November

This gives students a good general understanding of hydraulic system design and valve applications. Each participant receives a Bosch training manual and Sharp scientific calculator. The following topics are covered:

Day One: Difference between pressure and flow; basic components of a hydraulic circuit and its symbols; basic calculations around the sizing of a power pack.

Day Two: Operation and functionality of pressure valves, flow valves, directional valves, modular valves, gear pumps, vane pumps and piston pumps.

Day Three: Hydraulic system maintenance, fault finding and diagnosis; sizing of hydraulic cylinders.

For more information contact Michelle Herron, Hydromobile, +27 (0)11 394 5837, michelle@hydromobile.co.za, www.hydromobile.co.za
SEW-Eurodrive is once again expanding its range with the launch of its ECDriveS brushless DC gearmotor. This drive system is a simple, efficient and cost-effective solution for the lower power range of light-load roller conveyors. It will be on show in March at bauma CONEXPO Africa 2018, together with SEW-Eurodrive’s full portfolio of gearmotors, motor starters and decentralised drives. Motion Control’s editor paid a visit to national sales manager, Norman Maleka, to find out more.

“We call it the Easy Drive because it is so easy to work with,” explains Maleka. “It’s a simple plug-and-play system that is easy to set up, install and maintain without any parameterisation or programming using a PLC.” The drive comprises a 24 V DC brushless motor in roller form, together with a gear unit. A communication interface controls the speed of the motor and when it should stop. It can be set up using dual inline package (DIP) switches, or programmed with SEW-Eurodrive software.

A big advantage is that the ECDriveS is easily integrated into existing applications and platforms such as Ethernet and Profinet, so there is no need for users to change their network. Maleka notes that while the product is easy to use, behind the scenes it is backed by the full force of SEW-Eurodrive’s high end technology. The gearmotor is directly integrated into the roller. The external commutation electronics have Ethernet-based zone controls or binary control. Ethernet controls featuring integrated conveyor logistics provide both conveying with zero pressure and decentralised solutions for a wide range of conveying tasks.

Another advantage is that the integrated encoder allows for precise positioning of ramp-up and ramp-down on the conveyor, as well as varying the speed. This enables items to be positioned accurately where they need to stop. There are also inputs and outputs fed back to the system, which can send an alarm to alert the user in the event of any problem.

Maleka explains that SEW-Eurodrive’s overall strategy is to cover all gaps in its product offering. He continues: “Applications evolve along with changing customer requirements, and we identified a new opportunity. We realised customers are now wanting something smaller, more cost-effective, quicker to build and easier to handle. These applications do not need much power.”

SEW-Eurodrive keeps over R130 million worth of stock, with servicing back-up in all the company’s branches countrywide. Maleka notes that stock of the ECDriveS is coming in soon ahead of the launch, together with test units to enable customers to try out the system, and samples for an awareness campaign. “This is a huge market and very competitive. We are giving ourselves a year to focus, get out and create awareness, and develop the market,” he adds.

“We used to be known solely as a component supplier and a gearbox manufacturer, but now with our wide range of products, we partner with system designers and integrators, as well as OEMs, to develop total solutions. This is in line with our strategy of system integration for the provision of total solutions,” he concludes.

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

A hybrid-electric passenger plane

Siemens is working together with Airbus and Rolls-Royce to test a hybrid-electric propulsion system in a large aircraft. This will be a big step closer to electric aviation. What the companies have in mind is a 100 seat passenger aircraft in which one of the four conventional turbines has been replaced by a high powered electric motor. Such an aircraft is expected to make its maiden flight as early as 2020 and serves as a technology demonstrator for the new drive system.

Dr Frank Anton, head of Siemens eAircraft, and Wulf Roscher, project manager for E-Fan X at Siemens eAircraft, discuss this revolutionary project.

What does this project mean for Siemens in view of the company’s existing eAircraft activities?

Frank Anton: Following-up on the kick-off of our partnership with Airbus in 2016, this large flying demonstrator will be a major step for eAircraft toward a hybrid-electric future. By testing the demonstrator and its electric propulsion system in flight, we will learn how to harness this disruptive innovation for aviation.

Thanks to our existing drive systems for drones and ultralight and light sport aircraft, we are already involved in aviation. Recently, we also presented a prototype motor for the CityAirbus, a flying taxi for use in urban areas.

We are now building on the experience we’ve gained during development of motors with these outputs in order to develop the first solution for a commercial aircraft: a hybrid-electric airliner that can seat 50 to 100 passengers. This development will enable passenger transport to become quieter and more sustainable.

What exactly are you planning?

Wulf Roscher: The electric propulsion systems that eAircraft has developed to date – our world-record drive system, for example – have had outputs of up to one fourth of a megawatt. But now we are developing a two MW electric propulsion system for regional aircraft that will be about eight times more powerful than the system that drives our Extra 330LE. Four to eight such motors on the wings of a regional plane could power an aircraft’s propellers or fans. In the flying demonstrator, the electric propulsion system will obtain its power from a generator that will be powered by a turbine in the fuselage. Take-off and climbing will be supported by lithium-ion batteries, each of which will have 700 kW of power.

Anton: Our intention is to replace one of the test plane’s four jet turbines with a two MW electric propulsion system in time for the maiden flight, which is scheduled for 2020. That would be the first time that such a powerful electric motor would help to propel an aeroplane. We can imagine that in subsequent tests, we will replace an additional turbine with an electric propulsion system.

 Wouldn’t such a powerful drive system weigh a lot and take up an incredible amount of space? Although electric mobility has many benefits, can such a drive system be efficient?

Roscher: Thanks to the extensive amount of research we have conducted in advanced lightweight engineering and high-tech materials, we expect to be able to drastically reduce the size and weight of our drives. Although our previous record-breaking motor achieved a continuous performance output of 5.2 kW per kilogram of motor mass, we want to significantly improve on this in our 2 MW motor.

Anton: The secret recipe is not materials or topology. The kinds of extremely light propulsion systems we are talking about can be developed and built only thanks to Simcenter, a Siemens PLM simulation suite software that takes all known physical and technical effects into account. Using this technology, we iteratively build digital twins and thus virtually optimise our prototypes. This not only accelerates development, but also results in more powerful machines.

What are the roles of the project’s partners?

Anton: Airbus will be in charge of overall integration and test flights and will deliver the energy storage systems. Rolls-Royce will provide a 2.5 MW turbine and integrated generator that will supply the electrical power for our electrical propulsion system. In addition to the electric motor for the inverter, Siemens will provide the energy distribution system. I think that by partnering, three major players are building a flying demonstrator that will bring us closer to a vision of flying across Europe in hybrid-electric passenger planes.

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2020 is the year of the next rover mission to Mars. The main payload of the Russian Proton rocket is the ExoMars rover, developed by the European and Russian Space Agencies (ESA and Roskosmos). The plan is for the vehicle to be equipped with nine measuring instruments, including one that will be mounted on a two metre mast on the rover. The panoramic wide angle camera (WAC) will take stereo images of the planet. The PanCam features two rotating filter wheels which are mounted in front of its wide angle cameras to enable it to take three dimensional images of panoramic landscapes. Three stepper motors from Faulhaber drive the rotation shaft for the filter change system, as well as the focus of the high resolution camera.

The requirements for equipment planned for use on Mars are so stringent that nothing quite compares to them. And if the mission goes according to plan, the rover, built by ESA, will start searching the surface of Mars for past or present biological activity as soon as it lands. Meanwhile, the ExoMars Trace Gas Orbiter will stay in orbit in order to help the rover phone home and ensure that the data it collects make it back to earth.

Improved images and protection from dust

The ambient conditions on Mars require every single piece of equipment to deliver unrivalled performance. For starters, the rover will be working under an atmospheric pressure of 0.00636 bar, which is equivalent to the pressure found at an altitude of 35 kilometres on earth. And temperature fluctuations go from 20 down to -120°C.

With the filters in front of the WACs, the system will be able to take pictures at various wavelengths during the mission and use them to generate images with varying content. “The plan is to send 10 images to earth every day,” says Jonathan Jones, mechanical engineer at the Mullard Space Science Laboratory (MSSL) in London.

Stepper motors position lens filters

With 11 filters per wheel, it is possible for the PanCam WACs to take a wide variety of pictures under various light conditions. These filter wheels rotate in front of the two WACs, and must be brought exactly into position in order to obtain sharp images. For driving the rotating filter system, MSSL makes use of two stepper motors from the Faulhaber PRECiStep portfolio. These two units have been passing the endurance tests currently being conducted on them with flying colours.

During the development process, the MSSL engineers looked for motors that would not only be able to deliver reliable and precise positioning performance, but that would also be extremely compact. Stepper motors were the natural choice given these requirements, as they are not only able to precisely position objects with a resolution of 1280 steps per revolution without the need for a separate feedback system, but are also much sturdier and easier to use than conventional servomotors. The focusing mechanism of the high resolution camera is driven by a Faulhaber PRECiStep stepper motor. “It is the perfect solution for optical application as the motors can hold the lens position even without current thanks to their residual torque. Moreover, the control in open loop gets rid of jittering effects so we obtain very sharp and clear images,” explains Faulhaber PRECiStep, sales manager, Sébastien Vaneberg. “In short, it is a simple and robust drive with outstanding capabilities, ideal for the harsh space conditions.”

Miniature motors approved for use on Mars

In each camera, each drive has a diameter of just 10 mm. The stepper motor counts 20 steps per revolution, and is combined with a precision gearhead of the same diameter with a gear ratio of 64:1. On top of this, Faulhaber worked closely with MSSL to further customise the engineering behind its two drives. The resulting changes include a dry lubricant and custom sintered bearings. “The motors need to be able to survive on Mars,” Jones says.

The MSSL is currently testing the components in conditions even harsher than those on Mars. The positioning drives must complete 5000 positioning cycles with temperatures oscillating between -130 and 50°C. “The motors are really showing what they’re made of,” Jones happily reports. During the development of the drives, there was nothing else on the market that could come even close to the Faulhaber units, not to mention the fact that Faulhaber is already a go-to partner for the ESA.”

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AEROSPACE

Thermoplastic press for aerospace industry

Hytec Cape Town recently designed and constructed a 400 ton thermoplastic press for composite materials supplier AAT Composites, a Recaro Group subsidiary based in Somerset West. The press is capable of deep-moulding composite materials up to 1 m² used in the manufacturing of components such as seat pans and interior panels in the aerospace industry.

The contract was awarded in the face of considerable competition from international manufacturers. Hytec, with the assistance of a local mechanical engineering company and an electrical company, was able to supply a complete, integrated press machine, a turnkey solution from a single supplier that was tailored to suit AAT Composites’ specific production requirements, as opposed to modifying an imported press.

Resin-impregnated cloth is first suspended in trolley frames for moulding. The machine has an infeed-loader to pre-load trolleys whilst a cycle is in operation, plus an automated feeding system to transfer the trolleys precisely from one station to the next. A preheater with two sliding drawers, each containing 99 ceramic heating elements, preheats the resin-impregnated cloth to 450°C prior to moulding and curing. The material then has to be transferred into the press within three seconds and the pre-heated moulds closed quickly in order for moulding and curing to take place at a maximum temperature of 280°C.

Once the thermo-forming duration has been completed, the press opens and the part is transferred to the out-feed station for manual removal. All of these functions require precise real-time control, as neither of the individual functions has the same operating duration. The machine design includes a range of safety and operator protection and a scada system to provide visualisation and control of the production process.

“Special consideration had to be given to avoid heating of the press structure, and in particular the platens and guides, as any fluctuations would alter the 0,2 mm flatness tolerance of the platens,” explains systems engineer, Max Hoffmann. “An insulating layer together with cooling platens enables the heating of press moulds as opposed to press platens. This also serves to reduce energy consumption as heating is limited to the size of the moulds installed. Press platen cooling was excluded on request of the customer, however can be easily retrofitted.”

A range of Bosch Rexroth hydraulic components are used across the system. These include a standard press-control manifold with the latest EU safety features such as double load-holding and spool-position monitoring on all critical directional valves, and proportional displacement and pressure control with a 30 kW electric motor on the hydraulic power unit.

The main ram, supplied by sister Hytec Group company Hytec Engineering, is a single-acting displacement unit with a 450 mm diameter and 700 mm stroke. Fast extend and retract utilises two 80/50x700 slave cylinders (one with LVDT for position monitoring) which also aid in pressing. The automated feeding system is powered by two VSD drives with a pneumatic in-feed loader.

“This was an exciting project to be a part of, and is a great advertisement for the technical competency and capabilities of the Hytec Group to the country and the world,” Hoffmann concludes.

For more information contact Max Hoffmann, Hytec, +27 (0)21 551 4747, max.hoffmann@hytec.co.za, www.hytecgroup.co.za
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Complete Process Control Solutions
Automated tool magazines
Compact, flexible tool handling solution.

The tool terminal developed by Wassermann Technologie in collaboration with system integrator, Becker Engineering is characterised by an exceptionally compact design and high flexibility. This is largely due to the open and modular control technology from Beckhoff, with which machine tools can be seamlessly connected to the most diverse control systems available.

Christoph Neuhaus, application software developer at Becker Engineering in Leichlingen, Germany says, “Higher flexibility gives the option to integrate the widest variety of machine tools with the most diverse control platforms. The openness of PC-based control is crucial for this capability. For instance, third-party software can also run on the Beckhoff control hardware, which among other things facilitates access to the tool tables for the individual machine.”

Flexible in structure and use
The concentrically structured tool terminal consists of one, or the addition of up to two more drums running inside one another. The tools are handled by a linear unit with an integrated tool changer. The latter places the tools in the drums and also takes them to a tool buffer or to the outside via the gripper rotation axis. This means that the customer benefits from significant cost savings. “In the tool terminal we have designed a standard magazine with a wide range of uses, and that is reflected in its excellent price-to-performance ratio. However, an individual connection to a machine can be realised entirely according to customer specificiations if desired. The tool terminal is available as standard in two model variants: S-Curve for up to 280 tools and D-Curve for a maximum of 570 tools,” he explains.

Open, scalable and efficient control technology
According to Neuhaus, numerous benefits have been achieved. “PLC and additional high-level language applications can be realised on one universal multitasking platform. Another advantage is high scalability. Should performance requirements increase, the system enables the uncomplicated migration of a control project to more powerful hardware, such as a device equipped with a multi-core processor, for example. For Neuhaus, other important aspects of PC-based control are the simulation options available without additional licence or hardware requirements. “The complete system can be simulated on your own development PC. This means, for example, that you can convert the motion axes to simulation axes or map the I/O behaviour similar to that with hardware using software simulation blocks,” he concludes.

Convenient and efficient motion control
In a recently implemented tool terminal with two drums, a total of five servo axes are used for fast and precise tool handling. The associated AX5000 servo drives and AM8000 servomotors are controlled by a CX2030 embedded PC with TwinCAT NC PTP. In addition, one rotational axis is provided for each of the two tool drums as well as a vertical axis for reaching the desired drum level, a horizontal axis for reaching into the level and a rotational axis for a double gripper. The pneumatic control for the double gripper is an additional automation task. Hahl adds: “The tools are transferred from the drum to the outside via the gripper rotation axis. This can also be implemented as a telescopic axis in order to transfer the tool directly to a magazine on the machine without intermediate handling.”

The motion control application was implemented in TwinCAT software with the aid of PLOpen motion blocks, which Neuhaus says has proven itself in practice: “The programming of the motion functions with the associated function blocks was very simple and extremely time-saving. Another advantage of the Beckhoff drive technology is the One Cable Technology (OCT). It dramatically reduces assembly and material costs and allows the use of smaller cable carrier chains, facilitating more compact designs. Apart from that, the electronic name plate considerably accelerates startup procedures.”

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Energy consultants TEPM, on behalf of Ray & Sons Electrical and Chromoflo, recently called Adroit Technologies to assist in solving an energy related problem they were experiencing on some large fans. Brad Campbell, sales engineer at Adroit Technologies said, “I was quite nervous initially as the energy saving claims made by Mitsubishi were fairly aggressive, and I felt that both my and the company’s reputations were at stake. These were large drives and it meant a lot to me to ensure that we were successful.”

Chromoflo ordered two 110 kW variable speed drives to be installed on some extraction fans at the factory. The biggest problem they were having was that the incoming power from the city supply was only rated at 800 A, which meant that due to high starting currents, it was difficult to start the factory, let alone when the power was down and a smaller standby generator had to be used.

“The most impressive feature is the percentage reduction in current drawn from the supply, significant power saving with only a small impact on overall performance,” said TEPM’s David Baudains.

These results were without even taking advantage of the patented Optimal Excitation Control (OEC) technology incorporated in most Mitsubishi VSDs. When the drives were then tuned to the motors and run as based on the amount of air the fans were required to deliver for the given process requirements, further savings were realised.

Adcor Fans did an independent verification which found that running the VSDs at 50 Hz yielded a 31% reduction in power for an overall 4% reduction in airflow, while reducing this to 47 Hz whenever possible increased the energy saving to 42% for an overall 5% reduction in airflow.

In terms of return on investment, the annual savings with the plant running eight hours per day, five days per week for 49 weeks of the year, was estimated at R70 000 per annum i.e. a payback of less than one year.

Dave Wibberley, managing director of Adroit Technologies concluded: “Having researched and verified data such as this is extremely valuable to potential users as it is customer to customer research and not just vendor marketing speak. We believe Mitsubishi has the best energy saving and quality product on the market. We have shown it time and time again under both harsh environmental and power conditions.”

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Energy saving from Mitsubishi VSDs

Fans and pumps offer the most potential for energy saving using variable speed drives.
Easy, high-performance servo drive system

Today, machinery construction OEMs are facing special challenges. The goal is to produce even more quickly at lower cost, while at the same time satisfying the highest quality demands. As a consequence, systems that couple maximum efficiency with simple engineering and intuitive operation are demanded. The versatile Sinamics S210 servo drive system is as compact and easy to handle as it is powerful. The single-axis Sinamics S210 converter is connected to the Simotics S-1FK2 servomotor specifically developed for it, using just one spacesaving cable to connect the motor and servo drive to transfer energy, connect an encoder and control the brake.

Commissioning is completely intuitive using a web server and One Button Tuning or via the Totally Integrated Automation Portal (TIA Portal). Selectable dynamic levels to adapt the converter to the required machine dynamics allow the controller settings to be simply optimised. Sinamics S210 presently addresses a power range from 50 to 750 W. The system is mainly for dynamic, discontinuous applications in machinery construction. The integrated safety functions come with STO (Safe Torque Off) and SS1 (Safe Stop 1) as standard.

Sinamics S210 fully leverages its strengths when the application involves precise positioning and motion control. Even with the highest dynamic performance, all motion sequences are executed with the utmost precision. With its powerful performance, Sinamics S210 is convincing in packaging machines as well as in handling systems, in woodworking and plastics processing, as well as in digital printing.

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Rising energy costs, increasingly stringent international regulations and a global drive to reduce carbon emissions has resulted in pulp and paper customers opting for SEW-Eurodrive’s high energy-efficient IE3-compliant DRN motor range. The DRN IE3 premium efficiency motors comply with the highest level of European Union standards in terms of energy efficiency. According to Richards Bay sales engineer, Jacques Swart, this, along with the company’s long history of ensuring world-class delivery, and an unwavering commitment to its customers, is what sets SEW-Eurodrive apart from its competitors in the pulp and paper industry.

“Our projects department gets involved right from the enquiry or tendering stage, when we ensure we select the correct products to meet all of the requirements. Once the customer accepts our proposal, we proceed with planning and management until the project is completed. We always supply the best, most suitable solution,” he stresses.

SEW-Eurodrive offers customised solutions based on pulp and paper customer requirements to ensure that an application is successful and achievable. “Our involvement commences from the inception of the process when the raw material arrives on site, utilising conveyors powered by SEW drives, to the gearmotors and industrial gearboxes used in the processing plants themselves,” Swart continues.

“For the global demand for paper ever increasing, SEW-Eurodrive is well positioned to support the ongoing growth of this sector with the latest technology in terms of energy efficiency and cost-effectiveness,” he concludes. For more information contact Jana Klut, SEW-Eurodrive, +27 (0)11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za
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How drives are revolutionising the printing industry

Whether it’s for actual printing press machinery or supplementary systems, such as inserters, reel stands and cart loaders, many in the print industry are taking steps to replace DC drives with AC drives in a number of core processes. The latest variable speed AC drives offer advantages that include an attractive price-to-performance ratio. For example, matching a variable frequency drive with a high-efficiency asynchronous motor as part of a complete three-phase main drive on an offset printing press will yield many benefits, not least high performance and reduced energy consumption. However, there are more factors to consider here. Take compatibility for instance. Many print shops will have an entire range of DC drives employed by their machinery, which are considered the driving backbone of the presses. So when beginning a transition project to AC drives, always check for complete compatibility between the two.

Further factors to check include Ethernet and EtherCAT interfaces, as well as the availability of various optional modules and interface units that allow the drive to integrate seamlessly with existing systems. Such modules might include those offering feedback, communications, applications (onboard PLCs), I/O and enhanced safety functionality.

When selecting suitable AC drive technology, ensure it has onboard real-time Ethernet and can provide high-level motor control. Ultimately, any drive for print industry applications should be capable of optimising system performance, ideally through integrated motion control for 1,5 axes. This is vital for high speed, round-the-clock operations, such as printing shops.

To ensure superior motor control, engineers should seek out drives with high bandwidth algorithms to suit various motor types. This enables maximum machine throughput in every application and with every motor, from standard closed-loop induction motors to dynamic linear motors, and from energy saving permanent magnet motors to high-performance servo motors. Furthermore, flexible speed and position feedback interface can support a wide range of feedback technologies from resolvers to high resolution encoders.

Inherent drive flexibility should also help design engineers looking to create centralised and decentralised control systems as required, while versatility can be assured by AC drives offering Safe Torque Off (STO) functionality and both analog and digital I/O.

Another common reason why printing shops are seeking out the latest AC drive technologies is the obsolescence of existing drives. In such instances there exists real opportunity not just to avoid any potential for production downtime, but upgrade to AC drives offering compact dimensions, a flexible interface and an in-built PLC; perfect for machines such as inserters, which feature a lot of rotating equipment and fast-moving grippers.

For inserters, motion has to be perfectly synchronised, which is where the on-board PLC comes into play as it eliminates the requirement for I/O. However, check that programs are fast and easy to develop, and ensure the software is user-friendly and conforms to industry standard IEC 61131-3 programming languages. This way it will be possible to build highly flexible and productive systems.

Of course, open-platform technology should be at the heart of any successful drive solution. With this in mind, check that the drive supports a wide range of industry standard technologies and protocols, not just IEC 61131-3, but open fieldbuses and networks including Ethernet/IP, EtherCAT, Profinet and Profinbus, as well as Ethernet protocols including PTP protocol for clock synchronisation to IEEE 1588 V2. This open approach provides significant benefits to machine builders and OEMs, as well as engineers and end-users who many want to expand the system in the future.

Compatibility is again a prerequisite with inserters in order to avoid excessive machine hardware changes and code modifications to the controller. A high degree of compatibility also streamlines the replacement process into a short period of time. Further benefits for busy print shops include a flexible interface on the AC drive. This design capability allows printers to use different Profinbus modules or different encoders, for example, thus simplifying communication with other equipment. Also, the interface can determine what motor is deployed and link to it immediately, which means print shops are not restricted to using one motor type.

The demands placed on modern printing machines are increasing almost continuously. Today’s print shops are looking to maximise performance, print quality and machine availability (uptime), while at the same time reduce scrap and waste. This is why increasing numbers are turning to technology suppliers with industry-leading know-how of drive and automation solutions, in particular AC drives.

For more information contact Ryan Chetty, Nidec Industrial Automation Southern Africa, +27 (0)11 462 1740, ryan.chetty@mail.nidec.com, www.nidecautomation.com
Tectra Automation has added two more products to its Bosch Rexroth frequency converter range. The EFC 3610 and the EFC 5610 provide even more options to implement demand-oriented motor use in a simple and economical package for the power range 400 W to 90 kW. Scalable and flexible in performance and functionality, these drives can be integrated into a wide range of automation environments with simple commissioning, integrated PID control, open interfaces and various I/O and fieldbus option modules. “With their multi-Ethernet interfaces, the new EFC drives afford maximum connectivity to automation networks, supporting Sercos, Profinet, EtherCAT, EtherNet/IP and Modbus/TCP,” explains divisional manager of electric drives and controls, Georg Venter.

Another key feature of the EFC drives is their simple programming through intelligent yet user-friendly software, allowing remote starting and operation. “It’s very easy to specify converter speeds, control start and stopping as well as adjust the drive parameters,” Venter continues. “Parameters can be saved and stored to ensure reliable archiving.”

In addition to the freely definable V/f operation, the EFC 5610 offers vector control for an optimal torque curve. In heavy duty mode, the overload capacity can be maintained at up to 150% for 60 seconds. The high torque EFC 5610 frequency converter offers an optimal start torque of 200% at 0.5 Hz. In addition to the EFC range of frequency converters, Tectra Automation supplies the Bosch Rexroth Expanded frequency converter range (for power range 400 W to 90 kW) and the Fv (750 W to 160 kW) frequency converters.

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Rockwell Automation has broken new ground in South Africa’s rubber industry, with the supply of the company’s flagship medium voltage variable speed drives, the PowerFlex 7000, to Sumitomo Rubber South Africa’s rubber mixing lines at its Ladysmith plant.

The rubber mixing lines require exact adherence to the relevant recipes of the rubber mixing processes to achieve a usable end-product. The addition of two new medium voltage drive systems further complements the large install-base of Rockwell Automation low voltage PowerFlex variable speed drives and ControlLogix PLC systems already installed and integrated. Roughly 60% of the automation infrastructure for the Ladysmith plant consists of Rockwell Automation products, according to factory director of Sumitomo Rubber South Africa, Udaiyappan Ulagappan.

To meet the high demand from both domestic and regional markets, the tyre manufacturer must continuously produce high quality products that are delivered on time. Downtime in the tyre manufacturing process must be minimised to prevent significant losses in production and delays in delivery. In addition, greater demands on tyre performance requirements have increased the complexity of the rubber mixing process, with several individual processes fully integrated with modern control technology.

The tyre manufacturing process begins with the mixing of ingredients necessary to make different types of rubber for different kinds of tyres the plant produces. A Banbury mixing machine combines basic rubbers with process oils, carbon black, pigments, antioxidants and other additives, each contributing certain properties to the compound.

The ingredients are blended at high temperature to create a black gummy compound which is milled several times before forming and curing. To achieve the correct compound, accurate speed control is required, as a change in speed has an impact on how the ingredients are mixed, which impacts the elasticity of the compound. “Parameters such as temperature, consumed power and duration all need to be precisely controlled in an application exerting a harsh load profile,” explains power control account manager, Jacques Lottering. “The solution was engineered according to our client’s specific load profile, the mechanical system data as well as the expected impact on the electrical system.” Third-party kWh counters were integrated in the PowerFlex 7000 drives during manufacture, taking advantage of the company’s open-source automation topology and Ethernet protocol.

This drive system was designed in collaboration with electro-mechanical equipment manufacturer, Actom. The Rockwell Automation PowerFlex 7000, in combination with Actom’s motors, has now become the standard for all future mixers commissioned by Sumitomo Rubber South Africa. “Rockwell Automation worked closely with Sumitomo process engineers in both South Africa and Japan to engineer a solution that achieves complex process control functionality through high-tech, energy-efficient drive systems,” Bhardava explains.

Phase Two of the project will include new mixer lines which will enable Sumitomo Rubber to meet the increasing demand from vehicle manufacturers for its numerous tyre brands. The Industry 4.0-ready Allen-Bradley PowerFlex 7000 medium voltage AC drive is an air- or liquid-cooled general-purpose, standalone drive for controlling speed, torque, direction, starting and stopping of standard synchronous or asynchronous AC motors from 150 to 25 400 kW.

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In a move which is a first for South Africa, Powerworks, the South African based manufacturer of Powerstart starting systems and piston accumulators, is now producing all of its accumulator products as CE marked and pressure equipment directive (PED) compliant.

The pressure equipment directive lays down stringent guidelines for the design, production and testing of pressure vessels and is mandatory in order for products to be sold and used in the European Union. All elements, from product design to material procurement, manufacturing and testing and the particular materials used need to be inspected throughout the process to ensure the utmost quality and adherence to this strict directive.

The accumulators have also been appraised as being compliant with the harmonised European standard EN14359:2017 (gas-loaded accumulators for fluid power applications) as well as the latest revision of the PED, which is 2014/68/EU. The EN14359 standard was updated only last year and Powerworks quickly moved to have its products re-assessed as compliant with the revised standard.

Powerstart piston accumulators are produced in Midrand and are 100% third-party inspected by Lloyd’s Register. For local customers, this translates to a product which far exceeds industry standards for safety and reliability. Users can enjoy the peace of mind which comes from using such a product in our challenging industrial and mining environments. For OEMs who plan on assembling machinery and equipment for subsequent exportation to other countries, the benefit is that they can do so knowing full well that that component is compliant and legal for use in various overseas locations, not only the European Union.

Powerworks has been producing piston accumulators to work at 200 bar for many decades and they boast unique safety features, some of which are patented. Features like a split ring design, which means that accumulators cannot be dismantled whilst under pressure, a double bubble tight seal on the charging valve as well as plugs which have slotted threads for leakage detection are standard and greatly improve the safety of the products. Other features like high purity nitrile custom made piston T-seals which resist rolling, as well as a range of oil process connection options, make these the leading accumulators in the industry.

It is advisable for users of pressure equipment to acquaint themselves with the rules and regulations as ignorance is not a plausible defence in any circumstance. Many mine managers and safety officers are blissfully unaware of a directive by the government mining engineer which recommends amongst others that “all accumulators with screw-in end caps should be phased out as they are replaced.” This comes as a result of an injury which occurred in an underground workshop at a local coal mine when the end cap of an accumulator blew off whilst workers were busy charging the accumulator.

For more information contact Nick Ruberg, Powerworks, +27 (0)11 203 9911, nick@pwrstart.com, www.pwrstart.com
Cast iron gear pumps for enhanced valve steering

Hydraulic and Automation Warehouse (HAW) has introduced the latest Salami Group 2 (PG20) range of cast iron gear pumps. These are highly suited for mining, agriculture and forestry applications. They are dust resistant and explosion-proof and are more compact than their predecessors.

Housed in a front mounting flange and rear cover, pumps in this range boast a one-piece drive shaft construction and feature double shaft seals on pumps with reinforced inner shaft seals for motors. They are available with displacements from 16 to 26 cm²/rev and come with the option of shafts, flanges and ports as per European and American standards. All have two flange mounting styles, five shaft types and the porting is the standard BSP/SAE threaded/Bosch square and diamond porting.

In addition to extended product longevity gained from the cast iron composition, their high carbon content and low static discharge capabilities secure their explosion-proof status. The small dimensions are achieved by installing the gear set, gear support bushings and suction and delivery ports within the main body and the design satisfies a variety of OEM manufacturing designs.

Pumps in this range have a maximum starting viscosity of 800 mm²/sec, minimum operating fluid viscosity of 12 mm²/sec and suggested fluid viscosity range of 17 to 65 mm²/sec. Double shaft seals are used, with nitrile seals as standard and Viton seals for high temperature applications. The fluid operating temperature range varies from -25 to 85°C and -250 to 110°C with Viton (FPM) seals.

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Controllers for hydraulic functions in off-highway mobile applications

Parker Hannifin has released new functional safety controllers for mobile machinery applications. As well as offering high levels of robustness and straightforward system integration, the new RISE (SP) certified IQAN-MC4xFS controllers have been developed to provide a more cost-effective way of meeting the safety standards required for heavy mobile machinery. Typical applications include reach stackers, aerial platforms, refuse truck loaders, mobile cranes, telehandlers, and steer-by-wire forestry machinery and construction machinery.

Designed for controlling hydraulic valves and certified to IEC 61508 SIL2, the IQAN-MC4xFS is an ideal choice for mobile machinery applications where electronic controllers are evolving with safety functions up to SIL2/PLd required. The Machinery Directive states that control systems must be designed to prevent hazardous situations, and with the EN ISO 13849-1:2015 update there is now a precise limit for safety functions where safety ratings (SIL/PL) by the controller manufacturers is required.

IQAN-MC4xFS is suited for use in applications where non-certified controllers were previously accepted.

Extended diagnostics measures have also been introduced, such as the run-time diagnostics of dangerous faults, along with extensive start-up tests. Further features include the execution of safety-related applications in the lockstep core, ECC-protected Flash and RAM, and the implementation of a safety certified real-time operating system.

The new IQAN-MC4xFS controllers have been designed to simplify and ease implementation in customer applications allowing faster development of new machine functionality. This is supported and enabled by full compatibility with the established IQANdesign platform which provides an intuitive tool for programming, simulation, testing, production, service and maintenance.

For more information contact Lisa de Beer, Parker Hannifin SA, +27 (0)11 961 0700, lisa.debeer@parker.com, www.parker.com/za
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Axiom Hydraulics is proud to be a supplier of selected high quality hydraulic products to industry.

One of Axiom’s primary strengths lies in our ability to produce complete solutions for any hydraulics requirement for any industry, as well as our ability to offer a variety of mechanical solutions.

Oerlikon Fairfield

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SAM Hydraulik

SUN Hydraulics

Sole distributor for:

Distributors:
Sun’s new compact, bluetooth configurable electro-hydraulic driver is built to stand up to extreme environmental conditions in mobile and industrial applications. The XMD is a high powered, electronic control device for electrically operated hydraulic actuators. It is the first of its kind from Sun Hydraulics and was jointly engineered by Sun and Enovation Controls, a Sun subsidiary company.

Sun’s new XMD bluetooth-configurable, electro-hydraulic driver is both CE and E-Mark rated, meeting the needs of international mobile and industrial equipment. The XMD serves actuators used in on- and off-highway equipment in numerous applications including agriculture, forestry, construction, marine, earth moving and material handling.

The XMD is designed and offered in two models – the XMD-01 with a single universal input and PWM output and the XMD-02 with two universal inputs and two PWM outputs. Sun’s mobile driver has the ability to output 0-3000 mA with ±1 mA resolution, which allows it to maintain precision control when used with pumps, valves, motors or cylinders.

**XMD mobile app**
In addition to its sleek, compact design, the new XMD offers a range of advanced features:

- Simplified configuration via Sun’s XMD mobile phone app.
- SAE J1939 CAN communication capabilities.
- Pre-programmed profiles for common tasks.
- Comprehensive diagnostic mode.
- Ability to easily shape and apply output curves.
- Hydraulic system designers in the market have sought a simple, high-powered device capable of meeting the needs of many harsh environments in mobile and industrial applications. Sun’s XMD delivers that and much more.

“The XMD Drivers are the answer to customer requests for simple and configurable electronic control products that live up to Sun’s reputation for quality and performance while delivering outstanding value in today’s cost-conscious hydraulics market,” says global product manager, Gary Gotting. “They combine Sun’s hydraulics experience with Enovation Controls’ electronics expertise in a solution tailored to the present and future needs of the global mobile and industrial hydraulic markets.”

**XMD compatibility**
The electrical connection is made via a standard 12-pin Deutsch connector. The open architecture of the XMD allows many compatible connections and coil types including:

- DIN 43650
- Amp Junior Timer
- Twin-lead
- Metri-pack
- Sun’s new FLeX coils

Through collaboration, Sun and Enovation Controls engineers designed the XMD for use with Controller Area Network (CAN) communication. Using the free XMD mobile app, available in both Android and Apple products, the driver serves as a remote I/O module to receive and transmit SAE J1939 messages simply and securely. The intelligent system works as a master controller for the driver and provides minimal I/O investment for the user.

The XMD is compatible with standard DIN 35-mm rails and can also be mounted to any flat surface such as a manifold block using an innovative snap-in-place installation bracket.

With the addition of electronic products and the first of its kind XMD, Sun continues to deliver quality, performance, and innovative products for the industry. The XMD is now the most capable and most price-competitive of its kind in the mobile hydraulics market today.

For more information contact Fritz Kern, Axiom Hydraulics, +27 (0)11 334 3068, fritz@axiom.org.za, www.axiom.org.za
MP Filtri’s new LPA 3 third generation sensing unit allows quick and easy monitoring of solid particle pollution in hydraulic oil, avoiding costs linked to unnecessary replacement or damage due to contaminated lubricant. With a presence in most industrialised countries, the company has a workforce of more than 350, and designs, develops and manufactures a wide range of hydraulic filters as well as a complete line of components for power transmission and accessories for hydraulic units.

However, fitting high performance filters appropriately in a hydraulic circuit is not enough to ensure the functionality of the circuit itself, especially in hostile environments such as in agricultural applications. It is also essential to control the rate of pollution by solid particles in the oil quickly and frequently so as to be able to intervene promptly when necessary, while avoiding unnecessary replacement of filters and fluids.

The LPA3 measures and displays the level of contaminant particles, humidity, pressure and temperature in a hydraulic system. In addition it is programmable by the end user and has a 25 cm diagonal colour touchscreen monitor interface.

Equipped with a memory capable of holding up to 4000 tests, it can be connected to any PC via a USB output. It is equipped with its own printer and can operate even in the absence of an electrical network thanks to a rechargeable lithium battery.

For more information contact Haroun Pochee, Hydrasales, +27 (0)11 392 3736, harpo@hydrasale.co.za, www.hydrasale.co.za
SMC Pneumatics recently launched a new version of the VEX3 power valve series, used to control actuators. The new modifications allow for improved cost savings and versatility by offering greater energy efficiency and added handling flexibility, thanks to the addition of new manual override options, which have been added to the existing non-locking push type.

The new 3/3 way VEX3 series features additional benefits to the existing conventional 2/2 way, 3/2 way and 5/3 way power valves. Compared to its predecessor, the VEX3 is not only smaller in size, but with fewer components required per circuit, it delivers on space and cost savings. With a flow rate of up to 3300 l/min, the VEX3, with its three positions, makes it possible to perform intermediate stops of cylinders up to 125 mm bore size or to change the speed of cylinders up to 200 mm bore size.

What's more, two valves can be connected to a double acting cylinder, controlling speeds, slow stopping, acceleration and deceleration with nine different valve position combinations.

Product manager, Brian Abbott says: “While the functions of the VEX3 can be performed by an electric actuator, the new power valve offers our customers greater force and flexibility while being more cost efficient to purchase and operate. It is another great example of the SMC team working closely with its customers to deliver a product that improves productivity and reduces overall production costs.”

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

Compressed air leak detection

Compressed air costs around R0.13 per cubic metre. A typical 160 kW air compressor will consume around R1.3 million a year in power when providing a basic plant air service plan operating 24/7/365. In a recent compressed air leak survey carried out by Artic Driers at a major production facility, the audit engineer found compressed air leaks accountable for costs of some R600 000 per annum. The cost of the leak detection service was recovered in days.

There are many types of ultrasonic leak detection devices, from inexpensive to high-end equipment that is capable of performing air and vacuum leak detection, steam trap malfunctions, as well as bearing ultrasound checks. The equipment used by Artic Driers during auditing is sophisticated and provides the cost-per-leak, as well as the actual compressed air volume lost. The report is already complete and ready for download from the cloud.

Should the accuracy of a report be challenged, the audit engineer will place an inline flowmeter in the supply when the facility is off-line. The ultrasonic air leak detection gun is then used to ‘chase down’ these leaks in the plant, after which the two figures are compared. Invariably there is less than a few percent difference between the results.

For more information contact Allen Cockfield, Artic Driers international, +27 (0)11 420 0274, allen@articdriers.co.za, www.articdriers.co.za
Pneumatic systems as an energy efficient alternative

When planning municipal water management systems, it is worthwhile to consider the service life costs. In addition to the purchase price, follow-up costs such as operation, energy consumption, maintenance and repair can become real cost drivers. Not so with pneumatic automation technology. It is robust, cost-effective and reliable because the compressed air is easy to transport, store and regulate. A comparison of pneumatic and electric actuator technology reveals surprising results in favour of pneumatics. A classic example of a filtration system for a municipal water treatment plant with seven multi-layer filters, seven activated carbon filters and 84 automated process valves revealed that the acquisition costs of a pneumatic system are 28% more advantageous.

Since pneumatic actuators are overload-proof and a higher actuation force can be achieved very simply by increasing the pressure, it is often possible to use smaller sizes with a lower weight than would be the case for electric actuators. Provided the tubing has zero leakage and the units are precisely dimensioned, the resulting solutions are energy-efficient. Pneumatic systems from Festo are able to deliver high forces of up to 75 000 N and torques of up to 10 000 Nm.

Digitalisation for even greater energy efficiency

The brand-new Festo Motion Terminal VTEM catapults pneumatics into the age of Industry 4.0 with apps that can replace over 50 individual components. Just as the smartphone turned the mobile communication market on its head a decade ago, so too is the Festo Motion Terminal set to revolutionise automation technology. The new type of function integration, combined with software apps, simplifies the entire value chain, since only one piece of hardware is now required.

With the Motion Terminal, for example, different pressure levels can be used for opening and closing process valves. This can drastically decrease compressed air consumption. In addition, a diagnostic function can be activated after a freely selectable number of switching operations. This function detects any leaks on an actuator-specific basis and sends specific maintenance messages or shuts down that section of the plant. This makes laborious manual leakage detection in extensive compressed air networks unnecessary.

Overload-proof

In water technology plants, process valves are often actuated only infrequently or not at all for long periods of time. This can lead to the formation of deposits and caking and thus to increased breakaway torques or forces. Pneumatic actuators can overcome this problem simply by increasing the air pressure. They cope well with loads without getting damaged and are not affected by differences in temperature, contamination and humidity. Pneumatic actuators only require electricity for regulating and generating compressed air and act directly on the shut-off valves.

Energy efficiency perspectives

The energy efficiency module MSE6-E2M, makes saving energy easy. The integrated flow rate and pressure sensors monitor and automatically reduce the air consumption in systems. The module detects the operating status when no compressed air is consumed, and automatically shuts off the supply. Once the supply is shut off, it checks for any leaks in the system. If there is too much of a drop, the controller is notified. This automatic leakage detection system enables specific maintenance to be carried out, and the continuous monitoring of consumption increases process reliability.

Simple and uncomplicated

Pneumatics is an uncomplicated technology, and is easy to install. Apart from end-position sensing and monitoring the compressed air supply, it doesn’t need to be monitored and checked. It follows the ‘fit and forget’ principle.

Pneumatic actuators have proven to be resistant to vibration and are durable. They are made from a small number of components and are thus less likely to break down. Pneumatic actuators are also resistant to continuous loads and remain maintenance-free over their entire service life.

Unbreakable

With up to 1 million switching cycles, the average service life of pneumatic actuators is rather impressive. This is true even in harsh environments with high temperature differences, contamination and humidity. Extreme heat or cold and humidity cannot harm corrosion-resistant pneumatic components. They are temperature-insensitive between -20 and +80°C, with special low temperature designs being insensitive down to -40°C and high temperature designs up to 120°C. Components made entirely of stainless steel supplement the product portfolio.

For more information contact
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www.motioncontrol.co.za First Quarter 2018 29
Manufacturers in the food and drink sector are increasingly asked to provide a wider variety of offerings, without suffering a decrease in productivity. These demands have dramatically increased both the amount, and complexity of tests. Omron’s mobile projects director for Europe, Bruno Adam explains how smart mobile robots are adapting to meet future food factory requirements.

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

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

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

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

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

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

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

For more information contact Omron Electronics, +27 (0)11 579 2600, info.sa@eu.omron.com, www.industrial.omron.co.za
SMC recently launched a new addition to the SY series of valve manifolds targeted at the food and packing market. According to product manager, Ernst Smith, the new IP69K manifold is available as part of the SY 5000 range and was originally developed with USA food industry customers in mind. The USA had various customer requests for such a manifold and it was developed based on local market research.

The SY 5000 series now offers a dedicated manifold with an IP69K rating. “This is yet another leading product that SMC has produced for the market. The focus on quality and performance of this product is second to none and once again demonstrates that SMC’s focus is on customer driven product development,” says Smith.

The unit is now suitable for wet areas and can withstand washdown and cleaning. Customers have the ability to install valves outside a protective box and close to the actuators for better control. The new device is lightweight and comes in a small package. It is corrosion resistant and easy to clean and maintain. The manifold is available with from two to 16 stations with a variety of valve styles offered. The manifold valves are available with options of rubber or metal seal valves. Pressures from −1 to 7 bar are achievable in the rubber seal, with the metal seal operating at up to 10 bar. The compact unit also comes with an optional power saving coil which draws as little as 0.1 W.

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

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**Valve manifolds for food and packaging**

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**A small investment now can prevent costly, unexpected engine damage later**

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**Belts and metal parts for timing, auxiliary and cooling systems**

SMC replacement kits for timing, auxiliary and cooling systems include all the components needed for everything from basic engines to the latest high-performance, downsized engines.

SKF’s belts are OE length and all components meet or exceed the original OE specifications. SKF offers higher kit content, and the largest range offering.
With industry subjected to increasing demands for product miniaturisation, a major challenge is manufacturing in cleanroom conditions. This applies especially to sectors such as pharmaceutical, medical, food, microsystems and microelectronics, where even the smallest amount of air pollution or contaminant can lead to high and costly reject rates. As a result, there is an increasing need for linears that meet the requirements of cleanroom applications, while at the same time providing customers with an attractive and viable cost-to-performance ratio.

**Tasks and requirements**

The principal requirement of cleanroom technology is to aid production without compromising air purity. The design of a cleanroom is governed by the required air purity class. As a rule, cleanrooms are served by vacuum systems operating in suction mode, whereby the air is fed to one of the room’s boundary walls or ceiling in order to create a room-filling, unidirectional flow.

This ideal scenario occurs if there is no place within the whole cleanroom where air can rest, and if there are no sources of interference positioned at right angles to the direction of flow. Moreover, relatively slow motions are required in order to avoid any additional whirling of particles and so avoid conversion from laminar to turbulent flow. The permissible particle concentrations in the air of cleanrooms are graded according to purity classes defined in various standards such as VDI 2083, US Federal Standard 209E and DIN EN ISO 14644-1.

**Rodless pneumatic cylinders**

Standard rodless pneumatic cylinders are normally unsuitable for use in cleanroom environments as they emit tiny abrasive particles, fine lubricant particles and oil mist during operation. They can also stir up contaminant particles when operating at high speeds. In terms of design, the majority of rodless pneumatic cylinders use an axially slotted cylinder barrel. Here, power transmission through the slot outwards to the carriage is form-fit. The slot is sealed on the inside by an internal stainless steel sealing strip along the cylinder barrel wall that prevents the penetration of contaminants.

Cleanroom-compatible rodless pneumatic cylinders differ from their standard counterparts in a number of ways. For instance, a partial vacuum is created via a vacuum line in the space between the inner and outer sealing band. This feature helps to reduce possible emissions, such as abrasive particles from the piston seals or slide elements, using suction to remove and feed them into downstream filters. Special vacuum connections at both ends of the barrel are used for this purpose. The vacuum generates a suction flow from the cylinder that ensures emissions are extracted and no particles are released into the cleanroom atmosphere.

Parker’s Origa System Plus (OSP-P) cleanroom cylinder offers this functionality. It combines the efficiency of the Origa cylinder slot seal system with vacuum protection against progressive wear and contamination from sliding components. A partial vacuum is drawn between the inner and outer sealing bands, preventing emission into the clean room.

To generate the vacuum, a suction volume of approximately 4 m³/h is required.

**Benefits for cleanrooms**

Cleanroom-compatible rodless pneumatic cylinders, such as the OSP-P, offer extensive customer benefits with a very good price/performance ratio that is achieved by demonstrating high cleanliness and cleanroom suitability in practical applications. Specific performance attributes such as excellent low speed running characteristics are delivered thanks to the use of special piston seals, and this is supported further by stick-slip-free operation at low speeds of around 0,005 m/s.

Tests in a class 1 cleanroom provide an idea of the increased performance levels offered by cleanroom-compatible rodless pneumatic cylinders in comparison with standard versions. While a standard cylinder will show counts of up to 3,4 million particles/m³ in operation at a velocity of 0,5 m/s, a cleanroom-compatible rodless pneumatic cylinder featuring extraction and aspiration in the slot area between inner and outer sealing band will statistically show that it emanates no cleanroom particles. Values measured in the direct vicinity of the cylinder will be equivalent to those of the ambient air in the cleanroom. Based on these performance levels, a cleanroom-compatible rodless pneumatic cylinder can be used dependent on the velocity in ISO class 4 and 5 cleanrooms.

The Origa OSP-P rodless pneumatic cylinders also provide many additional advantages. For instance, double-action force can be delivered due to their duplex design, a configuration that also offers rigidity in high load and rotational movement operations. Cleanroom cylinders are available in 16, 25 and 32 mm diameter. The design principle also offers a cost-effective alternative to electrical linear drives in cleanroom applications.

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Simple verification of modified atmosphere packaging

Modified Atmosphere Packaging (MAP) is well established in the food industry and continues to gain in importance. MAP means that the natural ambient air in the package is replaced by a gas or gas mixture, often nitrogen and carbon dioxide. This packaging under a protective atmosphere preserves the quality of fresh produce over a longer period of time, prolongs shelf life and gives food producers access to a geographically larger market for perishable products. Other benefits include fewer preservatives, an appealing package design and a reduction in microbial and chemical spoilage. The standards required by MAP are high and have to be controlled and monitored to ensure safety. Therefore, food manufacturers rely on modern MAP gas technology and various levels of quality assurance for maximum process safety.

Artic Driers International now offers a solution for measuring the gas composition within sealed packaging. Sourced from HTK Germany, the AtmoCheck One is a practical hand-held, battery-operated oxygen/nitrogen analyser for random sample checking and measurement of residual oxygen and nitrogen levels in gas treated food packaging. It is a fast, accurate mobile checking device for use at the packaging machine, in the warehouse or in the laboratory. AtmoCheck One is easy to operate and has a short measuring time and low gas volume sample requirement. The integrated data-logger supports traceability and provides complete documentation (HACCP/IFS/ISO). AtmoCheck One software has uncomplicated communications and is equipped with all facilities for converting handwritten measurement to electronic records. Electronic measurement records are also exportable to Excel.

For more information contact Allen Cockfield, Artic Driers International, +27 (0)11 420 0274, allen@articdriers.co.za, www.articdriers.co.za
A combination of exercise, relaxation and a sporting challenge – these are the things that motivate golfers when they step onto the green. The golfer’s most important companion is a lightweight and manoeuvrable golf trolley. The latest models assist their owners as e-caddies, like the TiCad Liberty, the premium golf trolley from manufacturer TiCad. The drive for these trolleys is provided by micromotors from Schönaich.

**Hand-made**
The TiCad Liberty is the most convenient variant of the TiCad titanium family, and captivates with its puristic design and virtually limitless functionality. Regardless of whether the terrain is flat or demanding, the TiCad Liberty accompanies its owner unconditionally. The hand-crafted titanium frame and titanium wheels glide gracefully and charmingly over the golf course. Personal comfort is provided by a drawbar with individual height adjustment and a button or twist-grip control with automatic forward movement. Thanks to the electromagnetic parking brake the TiCad Liberty is extremely stable, even on uneven ground.

**Impressive on any terrain**
The practical motor brake ensures that the speed remains constant when going downhill so that the owner can regulate the speed himself on any terrain. Even extra holes are not a problem, at least as far as the equipment is concerned, since the TiCad Liberty guarantees a range of at least 27 holes, thanks to the handy lithium battery. Other features are a pivoting joint which ensures that the trolley can be assembled and disassembled in seconds, as well as the impressive packing and storage dimensions of just 68 x 63 x 7 centimetres. The TiCad Liberty therefore fits in almost any car boot.

**Powerful DC micromotors**
The golf trolleys are driven by powerful DC micromotors with graphite commutation. With a diameter of 32 millimetres and a length of 72 millimetres, the motors are particularly lightweight and compact. The graphite commutation is extremely robust and ideally suited for dynamic applications with quick start and stop operation, as well as occasional overload conditions, such as those that occur during use on the golf course.

**Established sales network**
TiCad has revolutionised the sector with the invention of the world’s first titanium golf trolley when it started 27 years ago. TiCad currently has more than 50 employees at its headquarters in Altenstadt. With about 370 dealers in Germany and a total of 600 across Europe, TiCad has an extensive and established sales network. All products are sold only in pro shops and by selected specialised dealers.

**Made in Germany**
TiCad is based in Altenstadt near Frankfurt, and has been hand-crafting golf trolleys since 1989. The company manufactures trolleys made from high-quality titanium, and produces unique models that have impressed customers throughout Europe. TiCad recently started to install Faulhaber motors in all of its motorised trolleys. “Faulhaber is a traditional German company like us, and is one of the leading providers in its sector and offers top German products,” says TiCad managing director, Björn Hillesheim about Faulhaber. “This is a match made in heaven for us and our own high standard of quality and service.” As far as Faulhaber is concerned, Hillesheim particularly values the quick and reliable cooperation.

**For more information contact**
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Arcadia Spectacular is a performance art community that combines sculpture, architecture, recycling, pyrotechnics, lighting and music into large scale mechanical landscapes and shows. The spectacular shows feature aerial performances, innovative technology and breathtaking mechanical theatre, engulfing audiences from every angle.

The brainchild of technical director Bertie Cole and creative director Pip Rush Jansen, Arcadia’s best-known creation is the 50-ton Spider, a transformer-like industrial robot. The mechanical artists have reworked ex-military machinery and industrial components into installations and 360 degree arenas, following a transformational and environmental ethos.

As the clock approaches midnight, it feels like the world is about to end. Standing in a sodden field in Somerset, a huge crowd is watching a vast mechanical creature erupt into life, shooting fire and spitting lasers like the vanguard of an alien invasion. The only clue that this vast intruder is not from outer space is the thundering bass heavy soundtrack that perfectly accompanies its movements. As a recorded message recounts how “the fate of those abducted by the creature remains unknown”, Cole and Rush Jansen survey the chaos that they have created.

Cole and Rush Jansen constructed their 50-ton spider out of reclaimed hardware from around the globe to create a unique festival stage for DJs and live theatrical shows. The giant fire-spewing arthropod is a 360-degree structure built from recycled materials – scrap jet engines, bits of helicopter, fishing boat cranes, satellite dishes, firemen’s ladders, an old cowshed, and much more.

The control booth/abdomen is composed of the turbine rotors from a TriStar jet engine, The legs began life as customs scanning machines, while the top muscles originate from Gazelle helicopter tails. Its eyes are spy plane engines and its claws are log grabbers. It features three hydraulic cranes that can fire jets of carbon dioxide ten metres, nine flame cannons that can shoot 15-metre fireballs and six RGB lasers running on a Pangolin control system. All the different disciplines have their own operating systems and they are synced to the music using timecode controls. The Spider’s soundtrack comes courtesy of a massive 230 kW Funktion One 360-degree sound system, complete with a 50 metre sound field, all linked to a mixer and two Pioneer CDJs, and set in a circle designated by flaming Victorian lamp posts. The creature is given a skin by video mapping. It takes four days to set up, four articulated trucks to transport, stands 20 metres tall and requires a minimum of 45 people to operate.

Cole and Rush Jansen first debuted the Spider in 2010 at Glastonbury Festival, Somerset and have been travelling the world with their upcycled extra-terrestrial ever since. Arcadia’s creature has become one of the most talked about spectacles of the festival season. It’s truly an immersive mechanical experience.

An experience like no other

A 50-ton, flame-throwing mechanical spider.
The terms ‘functional safety’ and ‘Industry 4.0’ are on everyone’s lips. In coming decades, industry will have to manage myriad new tasks, which means that digitalisation in production will have to develop rapidly to keep pace. SIKO’s aim is to create machines that can independently control and monitor short-term production changes, without posing a risk of danger or death.

In this digital world, machine safety in accordance with Machine Directive 2006/42/EC is of great importance. The safety concept is evaluated using system and subsystem failure probabilities. Subsystems and products that have already been qualified and certified are a big advantage when creating a complete system.

This exact requirement is now met by the absolute measuring SIKO MagLine Encoder MSA111C with DRIVE-CLiQ[1] interface and SIL 2. The sensor has been tested and certified as SIL 2 compliant according to EN 61508, performance level ‘d’, category 3 (according to EN ISO 13849) by TÜV Rheinland. This means that the SIKO Encoder can be used in machine manufacturing safety applications without additional outlay. Whereas up to now two separate sensors had to be used to obtain position values that are independent of each other, the functional safety requirements can now be achieved with the MSA111C-DQ SIL 2 magnetic linear sensor. The DRIVE-CLiQ interface itself has the advantage of being easily connected (Plug-and-Play) to existing Siemens SINUMERIK and SINAMICS controllers. It is equipped with an electronic rating plate. This contains component-specific data, which enable error-free drive system configuration during start-up. This leads to a significant reduction of effort required during project planning.

Advantages of the MSA111C-DQ with SIL 2 are cost-optimisation, automatic start-up and a high degree of error monitoring. The safety requirements for SIL 2 call for a special measurement channel. This is taken care of by the new sensor. It passes independent position values on to the DRIVE-CLiQ interface. The controller is informed of possible data transmission errors by error bits (DRIVE-CLiQ). This guarantees that the safety-oriented controller is informed of the actual position values at all times.

Possible errors (i.e. measuring distance to the gauge exceeded, non-plausible values) are recognised immediately, so that the controller can bring the machines into a safe state. Emergency mode operation is guaranteed at all times. The safe position, in other words the maximum possible change in position before an error message is generated, is a maximum of 6 mm with the MSA111C.

Sources of danger are minimised or at least significantly reduced. This satisfies current as well as future stringent requirements for personal and environmental safety in modern production. Mean values for service life (MTTFd) and probability of failure (PFH) are accurately specified. This makes the system ideally suited to be used in safety-critical complete systems with SIL 2 and Performance Level d.

The compact linear sensor also excels when it comes to the features of accuracy and operating speed. The system accuracy is ±10 µm, while the reproducibility accuracy is even as good as ±2 µm. The maximum resolution is 1 µm (absolute). It has an operating speed of up to 5 m/s.

The absolute measuring channel (DG) ensures that the position value is correct at all times, including immediately after start-up or following a power failure. The usual time-intensive reference run for incremental systems is not needed with the MSA111C-DQ.

The linear sensor MSA111C-DQ is based on the proven magnetic measuring principle, has non-contact operation, and like all MagLine sensors distinguishes itself by being unaffected to a large degree by dirt (dust, oils, greases, shavings) and vibration. The SIKO linear sensor also has the clear benefits of withstanding condensation (100% moisture) and has a high UV resistance.

The MSA111C-DQ works with the MBA111 gauge, which has a maximum measurement length of up to 4000 mm. The gauge (absolute coded magnetic tape) is equipped with self-adhesive supportive strapping, making installation easy.

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SENSORS & ENCODERS

Absolute encoders are ideal for applications where a power outage requires machinery to reorient without having to reconfigure any of its settings. This is because they are suited to applications where positional information is required periodically and not continuously. When power is restored, the system master or controller identifies the position as soon as the encoder starts relaying information again.

Generally, absolute rotary encoders are used as these offer absolute accuracy in determining the position of an object. However, the encoder cannot simply collect feedback data. It needs to be sent somewhere in a language that can be interpreted by the system. Bryant explains that absolute encoders use binary coding which can be translated into many different protocols.

The Hengstler Acuro range of absolute encoders finds application where both speed and position are required, and where there is no room for error. Using a static reference point, the encoder will determine the speed or position of an object and can be configured to measure, monitor and control the linear movement and acceleration.

Innovative engineering has resulted in optimised functionality and ease of operation. Designed as a modular system, it can be configured to allow the correct variant for an application taking factors such as motor feedback and automation into account. The Hengstler Acuro is equipped with an open BiSS sensor interface allowing for optimal integration into any system.

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Sensors for De Hoop Dam

The De Hoop Dam is a gravity dam on the Steelpoort River near Burgersfort, Limpopo. The dam is 81 metres in height and 1000 metres in length, with a total capacity of 347 million cubic metres and a surface area of 1690 hectares. It is operated by the Department of Water and Sanitation. The De Hoop Dam project, worth R3,4 billion, is the largest dam built in South Africa since the 1970s. Its purpose is to enable the extraction of rich mineral deposits in the eastern Limpopo province and to improve the supply of water to towns, industries and communities in the Sekhukhune district. The dam opened in 2014.

Challenge
There have been large earthquakes in South Africa in the past, notably a 6.3 magnitude earthquake north of Cape Town in 1969. Experts report that the East African Rift tectonic plate faultlines are spreading to southern Africa. Cognisant of the fact that major earthquakes can lead to large scale loss of life and property, the government wanted a system that would effectively monitor the dam. The remote location of the dam made the installation a substantial challenge because all the necessary equipment and consumables had to be brought in from outside.

Solution
The goal of the project was to supply a modern, state-of-the-art seismic monitoring system as well as an Ambient Vibration Monitoring (AVM) system. GeoSIG offers a wide range of seismic sensors, recorders and software for projects of this nature. With more than 25 years experience in providing earthquake, seismic, structural, dynamic and static monitoring and measuring solutions, GeoSIG’s partner, Tilt-Tech proposed a winning solution with the expert help of engineers at GeoSIG. In this case two GMSplus recorders and six AC-73D digital force balance accelerometers were utilised. Communication to the outside world was achieved with industrial GSM modems connected to an LPDA high gain antenna.

The six sensors required 900 metres of industrial cable to be installed, including about 370 metres of the outside cable into galvanised pipes for protection against the elements. Even the pipes had to be installed using saddles and anchor nails. The main equipment, such as the two GMSplus units, battery and battery charger, was installed into a specially manufactured stainless steel enclosure, which also housed the modems, network switches, inverter and laptop. The battery enclosure and charger were installed just below the main enclosure. The system is currently being monitored remotely and is set up to send system error messages, log files and event triggers. The customer also concentrates on ambient vibration monitoring in order to ascertain the health of the structure over the years to come. Site inspections, as well as collection of raw data, are done on a monthly basis.

This is another example of a solution using GeoSIG instruments together with a capable partner, effectively showing that quality and reliability can also be cost-effective.

For more information contact Jan Hanekom, Tilt-Tech, +27 (0)83 370 2125, sales@tilt-tech.co.za, www.tilt-tech.co.za
**Power quality and motor analyser**

Fluke has introduced the new Fluke 438-II power quality and motor analyser, adding key mechanical measurement capabilities for electric motors to the advanced power quality analysis functions of the Fluke 430 Series II power quality analysers. They measure and analyse key electrical and mechanical performance parameters such as power, harmonics, unbalance, motor speed, torque and mechanical power without the need for mechanical sensors. The 438-II is the ideal portable motor analysis test tool. It locates, predicts, prevents and troubleshoots power quality problems in three-phase and single-phase power distribution systems, while giving technicians the mechanical and electrical information needed to effectively evaluate motor performance.

The analyser can measure key parameters on direct-on-line motors such as torque, RPM, mechanical power and motor efficiency; perform dynamic motor analysis by plotting motor de-rating factor against load according to NEMA guidelines; and calculate mechanical power and efficiency without the need for mechanical sensors. It also measures electrical power parameters such as voltage, current, power, apparent power, power factor, harmonic distortion and unbalance to identify characteristics that impact motor efficiency and identifies power quality issues such as dips, swells, transients, harmonics and unbalance.

In addition, the PowerWave data technology captures fast RMS data and shows half-cycle averages and waveforms to characterise electrical system dynamics such as generator start-ups and UPS switching. The Waveform capture function captures 100/120 cycles (50/60 Hz) of each event detected event in all modes without set-up, while automatic transient mode captures waveform data at 200 kS/s on all phases simultaneously up to 6 kV.

*For more information contact Comtest, +27 (0)10 595 1821, sales@comtest.co.za, www.comtest.co.za*

**Heavy duty vortex pumps**

Becker Mining’s PVS range of vortex pumps has been designed to pump sludge and slurries containing large abrasive solids and fibrous materials in service industries. It can handle solids to 72 mm and SGs to 1.5, and achieves up to 87 m heads at speeds of 2950 rpm. With a heavy duty construction, these units are available in 5 and 8 cm models, with a 0.7 m spindle length and single motor drive.

The most important feature of these vertical pumps is the recessed, non-clog impeller design that prevents binding and clogging problems. Since the impeller is clear of the pump casing, any solids and fibrous materials that enter the suction inlet will be expelled through the pump discharge without damaging the impeller. A locknut that fastens the impeller to the shaft prevents the impeller from turning off if the motor is started in the wrong rotation direction. Another advantage is that spares are completely interchangeable.

They have a sleeve stuffing box clearance that minimises blow-back of materials being pumped around the shaft sleeve without requiring sealing contact. A high strength pipe column maintains alignment between the bearing frame and its casing. There are no submerged bearings on the cantilevered shaft. Bearings have been selected for a minimum service life of 24 000 hours when operating at any point on the hydraulic coverage curve with 1.0 SG. Grease lubrication is standard.

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**Total plug-and-play solution for condition monitoring**

The FAG SmartQB is a ready-to-use, preconfigured condition monitoring system for electric motors, fans, compressors and gearboxes. The system is ideal for industries such as cement, paper, steel and water management. Commissioning takes a mere five minutes and requires no special skills or understanding of vibration diagnosis. Clearly understood plain text messages relating to the causes of any possible defects are generated on the touch-screen display when changes occur in the condition of the equipment.

The system allows for 24/7 monitoring for maximum plant availability and is preconfigured for the capture of various anomalies, with up to six sensors. Output of five error states is possible, namely bearing damage, unbalance, friction/cavitation, temperature increase and basic variations. Additional features include a live display of current values, trend pattern and damage development, an RJ45 Ethernet interface for service technicians and static information regarding operating hours, defect frequency, maximum values and mean values since the last evaluation.

Bearings International focuses on top quality products from leading international manufacturers involved in the industrial aftermarket, OEM, manufacturing and mining sectors. “Our premium products offer our customers the best cost-to-performance ratio. They can also count on leading technical support and service,” says product manager, Coenie van Deventer. “We recognise the challenges of high energy prices, low productivity, skills shortages and a highly competitive economic environment. Our engineering and reliability divisions offer a highly flexible range of predictive, planned and breakdown maintenance services.”

*For more information contact Bearings International, +27 (0)11 899 0000, info@bearings.co.za, www.bearings.co.za*
Product selection tool saves time for optimum results

Bosch Rexroth recently launched its integrated LinSelect selection and sizing software tool, enabling design engineers to find optimal linear axes and actuators from around 100 000 possible Bosch Rexroth product variants for their application in just five steps.

LinSelect delivers an integrated digital engineering process, from selection right through to configuration and electronic order at the Bosch Rexroth eShop. Here, selecting complete axes and actuators extends beyond the mechanical considerations and also encompasses suitable Bosch Rexroth motors and drive controllers.

LinSelect does not just simplify design and procurement for experienced engineers; even inexperienced users are guided intuitively through the selection process, without the need for laborious training and familiarisation. In just five steps, the software narrows down the number of possible variants based on individual needs.

In addition to a pure calculation of mathematical parameters, the software developers have also integrated algorithms with comprehensive application-specific expertise of linear motion systems. Beyond pure mechanics, the tool also suggests suitable Bosch Rexroth motor and drive controllers.

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Speedy supply of seals

SKF South Africa recently provided a turnkey solution to assist an OEM customer in reducing lead times and streamlining planned downtime. In addition to the long lead times on seals for their underground earthmoving equipment, the customer was also unhappy with general service delivery from the supplier and took the decision to look for a single source supplier. The logical step was to approach SKF as the customer was already using SKF bearings and was happy with service delivery.

SKF’s OEM division suggested Speedi-Sleeve as the best sealing solution for the earthmoving equipment. The new generation Speedi-Sleeve uses a proprietary stainless steel material giving an optimised seal counterface surface that minimises wear on both the sleeve and sealing lip. The contact surface is wear resistant. Imperceptible lubricant pockets enable the lubricant to reside on the sleeve and thereby prevent dry running of the sealing lip that otherwise can create excessive wear.

The thin-walled Speedi-Sleeve is simply pushed in position over the worn area. There is no shaft disassembly or machining involved, minimising costly downtime. Furthermore, since the installation tool is supplied with the sleeve, no special equipment is required to fit the seals.

In addition to supplying the Speedi-Sleeves, SKF also provided product training, assisted with planning of downtime to replace worn seals and helped the customer to achieve its goal of reducing supplier and vendor lists. The customer was extremely satisfied as it was now possible to deal with a single source supplier for both seals and bearings.

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Drive alignment laser

BMG’s extensive range of Fenner power transmission components encompasses the Fenner drive alignment laser instrument, designed for accurate pulley and sprocket alignment to reduce wear on belts and pulleys and ensure drive efficiency.

“This portable drive alignment laser system is suitable for both vertical and horizontal mounted machines and is quick and easy to use for accurate results,” explains Carlo Beukes, general manager of power transmission. The laser line of this compact and lightweight tool allows rapid adjustment to perfect alignment. Conventional alignment methods, which often require difficult, lengthy positioning of components, can prolong downtime and affect efficiency.

The Fenner alignment system shows parallel and angular misalignment and as a result, drive efficiency is improved and energy savings are increased. With minimal friction and vibration, the service life of chain, sprockets, shafts and bearings is significantly extended and the costs of maintenance, repair and downtime are reduced.

For maximum accuracy, the mounting unit is magnetised to attach firmly to sheaves or pulleys. It is also possible to attach this instrument to non-magnetic sheaves using double sided adhesive tape. BMG’s Fenner range also includes synchronous transmission belts, pulleys and accessories, as well as shaft fixings, chain drives and couplings. BMG also supplies Fenner shaft mounted speed reducers.

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Motors used in robotics must be lightweight while simultaneously providing high torque in order for arms and grippers to move dynamically. This is why Swiss drive specialist, maxon motor is offering a new solution: the tried and tested brushless flat motors as frameless kits. This gives rise to a number of benefits.

DC motors cannot always be optimally integrated into a structure. In robot joints for example, space and weight are priority considerations that take standard solutions to their limits. This is why maxon developed an alternative for the growing robotics market and is now offering its brushless flat motors (EC flat) as frameless kits. Rotor and stator are delivered separately, without bearings and motor shaft, and connected only when the components are assembled. This offers the best of both worlds: high torque density and minimum volume. With outer diameters of only 43 to 90 mm, the EC flat series brushless flat motors are extremely compact. Designed as external rotor motors, they offer plenty of space inside for cable glands. They also come with Hall sensors for easy control.

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<td>Tilt-Tech</td>
<td>+27 (0)83 370 2125</td>
<td><a href="mailto:sales@tilt-tech.co.za">sales@tilt-tech.co.za</a></td>
<td><a href="http://www.tilt-tech.co.za">www.tilt-tech.co.za</a></td>
<td>37</td>
</tr>
<tr>
<td>Unidrive</td>
<td>+27 (0)11 813 3026</td>
<td><a href="mailto:info@unidrive.co.za">info@unidrive.co.za</a></td>
<td><a href="http://www.unidrive.co.za">www.unidrive.co.za</a></td>
<td>6</td>
</tr>
</tbody>
</table>

For more information on these and other suppliers please see www.mcbg.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 Limpopo | ParkerStore Pietermaritzburg | ParkerStore Pinetown | ParkerStore Richards Bay | ParkerStore Rustenburg | ParkerStore Secunda | ParkerStore Springs | ParkerStore Vaal

www.parkerstore.com/za | www.parker.com/za