

AC → EC

Ice-cold savings

Roller is systematically changing from AC to EC technology in its air-conditioners and heat exchangers, and has been massively successful in doing so

°10 GreenTech is everywhere: saving day by day °14 Courage by excitement: an unusual pump-development °19 Freedom of speech: a cool mobile phone for your car °20 Lie down perfectly: a flexible operating table °22 A salt shaker in XXL: spreader machines for every season

“We are the hub for S.E.A.”

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Closeness to the customer is not just a buzzword

Thomas Borst
Managing Director
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ebm-papst Group

Dear reader, I am very happy to be able to present to you our Singapore subsidiary in this edition. For 16 years, it has been the turnstile

for the entire southeast Asian market – from Thailand to the Philippines. In this particularly strong growth region, proximity to the customer is a deciding factor in success. ebm-papst SEA is, therefore, an excellent example of how important it is to be present in each global market. We want to be there for you on-site – as a supplier in your area and as a competent partner that also knows about the local particularities of the market.

Just as important to us is the knowledge of the technical particularities of the customer requests. In any event, that is at the centre of our mission: We stand for the best aerodynamic and drive engineering solutions. Jointly with you, we

bring this requirement to life every day. For example, in development partnerships such as the one with the expert Italian heating supplier BAXI, in which our enthusiasm for technical challenges led to joint success – even for exceptional measures, as we advise you on page 14.

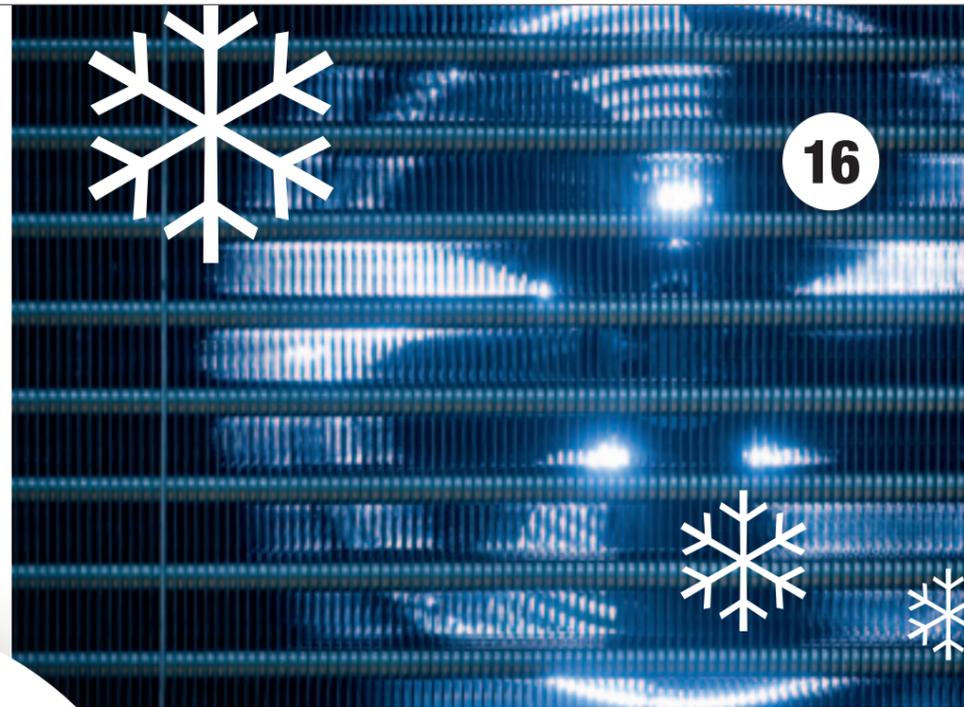
To spread our GreenTech philosophy continuously – and completely economically, via cost reductions which you can achieve with our products, this commitment helps. You can read on page 10 how deep our contribution to energy savings is in your everyday life. Because regardless of whether you communicate with your cell phone, shop in the supermarket or do your dishes at home, we provide the needed ventilation and drive solutions that work in the background as efficiently as possible.

In this spirit, I would also be glad to discuss with you the fitting solutions and the latest developments on the refrigeration and climate market at the Chillventa trade fair.





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Starting in September, Rainer Hundsdörfer (right) walks in the footsteps of Hans-Jochen Beilke who will go into retirement after six successful years. Hundsdörfer worked at machine tool and laser manufacturer TRUMPF for 17 years in a wide assortment of positions. He was Chairman of the Board for Michael Weinig AG. Since 2008, he has been the Chairman of the Executive Board for Industry and a member of the executive board at mechanical engineering group and automotive supplier Schaeffler AG.

CHANGEOVER

At the end of September, the Chairman of Board of Directors ebm-papst Group Hans-Jochen Beilke bids us farewell and goes into retirement. His successor is Rainer Hundsdörfer

Beilke, with his MBA, is being succeeded by the engineer Hundsdörfer. Does that change anything about the corporate management style?

Beilke: I think it is good that my successor is an engineer who can push research, development and production to higher levels. I held myself back in those areas, also due to the fact that there are many people in the company who know these areas well. What will remain is the role of a moderator for all the specialists in our company.

Hundsdörfer: As the new boss, I want to moderate, but I also want to break new ground. This is best done with questions: Does what we are doing still fit? How can we improve? What new approaches are there? I can do that with a good technical background. However, I will not and do not want to be the highest level developer, rather

the one who, thanks to experience from various industries, looks a little further over the horizon.

Will some things change in the division of tasks within the Group Managing Directors?

Hundsdörfer: That will be kept similar to how it has been. My core topics are corporate strategy in respect to acquisitions, brands and image cultivation as well as corporate communication. A Chairman of the Board of Managing Directors has directive compliance. For operations, there are good people there who bear the responsibility. You have to give them space to design.

Let us take a look forward: ebm-papst is well positioned, even during the crisis.

What do you see as the greatest challenges?

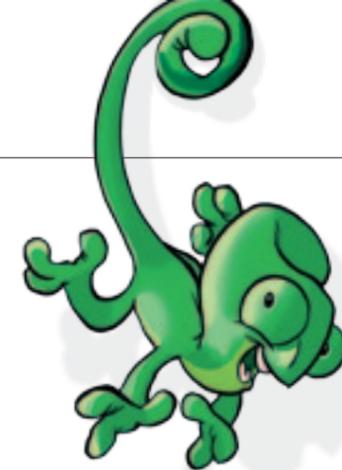
Hundsdörfer: Our competitors closely track what we are doing. Therefore, we have to and will

maintain our high rate of innovation and we will prove daily that we are the best – in the basics of technology as well as in application, service and consulting. Of course, we have to continue to keep up the pace with globalisation – and we have to be present in all markets, wherever the action is. This applies to Asia just as much as North and South America.

Mr Beilke, what will remain from your time here?

Beilke: First, a clearly structured group with clearly structured levels of management remain. Control instruments were developed and, with reasonable scope, key figures that are necessary for controlling the company. Image, development of the brand and first-class positioning in the public eye have also gone well.

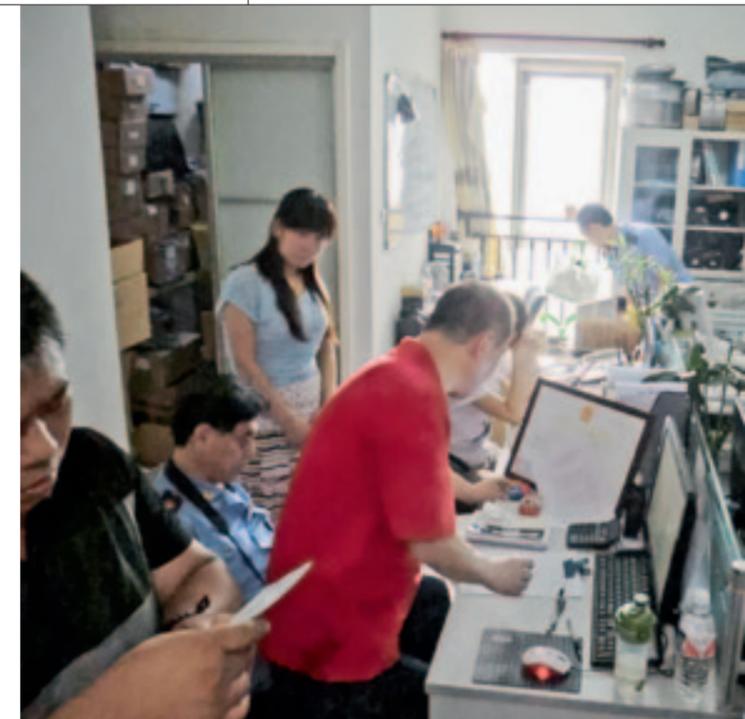
That the GreenTech philosophy is now touring the globe with a worldwide campaign is a nice end to the publicity campaign which I initiated. ○



It's a chameleon!

ebm-papst has a new mascot

ebm-papst's new mascot is called Leon Green – a chameleon. The characteristics of the reptile and its 20 million year history match the innovation leader well: its eyes can see in almost 360°, thus allowing it to take in the whole picture at all times. It also perfectly adapts to its environment. Aware, flexible, innovative and successful over the long-term – these are characteristics to which ebm-papst can also lay claim. The small representative was created by internationally successful cartoonist Timo Wuerz. The mascot got its name through a special employee promotion.



Raid at a Chinese fan dealer

Protecting intellectual property

ebm-papst fights product piracy in China

In a raid at fan dealer Beijing Longwei Shengda Technology, authorities from Chinese industry and trade government agencies found large quantities of boxes with counterfeit fans, all designated with ebm-papst brand labels. The investigators confiscated tens of thousands of labels and printing plates. The owner confessed to acquiring the counterfeit products from southern China, labelling them himself, and reselling them as ebm-papst originals. The government officials gave the dealer a warning.

The trade company from Beijing is not an isolated incident in the Central Kingdom. At about 150 million EUR per year, counterfeits of this type represent a share of turnover of about ten percent. For ebm-papst, the fight against product and brand piracy is about securing confidence and protecting the customer. "The low-quality counterfeits wear more quickly and cannot fulfil the stringent safety standards to which all ebm-papst products are subject," says Dr Bruno Lindl, Group Managing Director of Research and Development. This is why ebm-papst also had its brand copyrighted in China and works closely together with the central government in Beijing to pursue people and companies violating copyright. Intellectual property protection has developed into a high priority; product piracy is pursued aggressively – not least because it also hurts Chinese companies.

News in brief

The jury of the Association of German Engineers (VDI) awarded an interdisciplinary team for value analysis from ebm-papst St. Georgen with the **Innovation Prize**. The jury acknowledged the improvement of the value analysis method itself—a by-product of developing the S-Force fan.

3,900 athletes took part at the **ebm-papst marathon** in Niedernhall this year. They competed in ten races – from marathon, semi-marathon to handbike and inline-skating. At the 17th edition of the most important event for runners in Hohenlohe, more than 3,500 participants made it to the finish line.

In the fiscal year 2011/12 ebm-papst has earned the **highest turnover of its corporate history**. The group achieved a sales revenue of 1.377 billion EUR – an increase of 5 per cent. To advance its position as innovations leader ebm-papst will continue its research and development activities at a high level of some 72 million EUR.

100 new trainees started at the German locations of ebm-papst in September 17 more than in 2011. This increase is also a response to the challenge of twice as many secondary school graduates in Baden-Württemberg.



The attending ebm-papst employees (from left): Georg Eimer, Dan Hopkins, Dr Erik Reichert, Katrin Schaake, Gabriel Axtmann, Wolfgang Laufer, Dr Marc Schneider

Ventilation experts

ebm-papst at the international fan conference

A seven-person ebm-papst team attended the international FAN2012 fan conference in Senlis in northern France in April. The focus of the three-day conference was methods for analysing and optimising fan aerodynamics and aeroacoustics.

Both of the presentations by ebm-papst experts were met with substantial interest from trade visitors. Dr Marc Schneider presented options for active noise reduction for fans. In his experiments, he lowered noise emissions using sounds produced specifically to cancel out the other noise. Gabriel Axtmann presented numerical tests for optimising axial fans arranged in series. More than 250 fan developers from 30 countries got together at FAN2012 and presented more than 60 scientific papers and industrial developments.

GreenTech travels

The "Every day is a GreenDay" campaign

We are serious about our GreenTech environmental and sustainability strategy. Our customers can see it in the logo on our products and they can experience it every day, particularly when interacting with our employees. Our "Every day is a GreenDay" campaign has been travelling around the world since mid-April in order to anchor this awareness in the minds of our staff even more. Each of the subsidiaries are breathing life into the idea for a whole week. A multitude of implementations are taking place for the campaign in order to improve awareness for sustainable behaviour, from waste sorting at a kindergarten and picking up garbage in wetlands, to planting trees, to individual energy consumption consulting. Some subsidiaries have also integrated customers into the campaign; one has even crowned a "greenest customer".



Green expedition: our Czech subsidiary touring nature

Making the world more green: Japan asks the customers

At ebm-papst, environmentally responsible actions are a matter of course. Therefore the Japanese subsidiary took the opportunity of the "Every day is a GreenDay" campaign to spread the idea of GreenTech among their local customers. They liked the idea, as the response from kitchen appliances manufacturer Hoshizaki Electric proves: "Currently we have observed that many companies follow the trend to impress with environmental sustainability. However in many cases their main concern is profits in the short term. Yet, with its high standard of ecological manufacturing, ebm-papst is pursuing a long range vision of acting environmentally responsible. This deep-rooted policy is one of continuous improvement which places ebm-papst in a separate green class above its competitors."



The employees of Hoshizaki Electric are taken by GreenTech

For more information please go to: www.ebmpapst.com/product-news

The new benchmark in disposal of heat given off is the compact DV6300 diagonal compact fan. The innovatively shaped impeller permits a drastically improved air performance with a 8 dB(A) lower operating noise level. The improved motor efficiency of its new drive brings a performance increase of over 15 percent at low consumption and an extended service life.

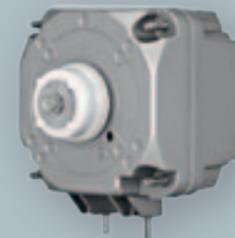


EVEN MORE RADICALLY

positioned are the new centrifugal compact fans of the S-Force RadiCal® series. The optimised impellers made of a plastic-metal-combination are quieter, more robust and have higher performance. Their newly developed three-phase external rotor motor with 85 percent efficiency contributes to this.



Smart to the power of two the iQ² motors are. They have even more advantages in addition to the 70 percent energy savings of the conventional iQ line compared to classic shaded-pole motors. For example, additional functions enable



some different operating modes such as the short-term operation of the motor in the other direction of rotation when switching on (ROS = Return on Start) in order to prevent getting the condenser dirty.

Ideal solution The AxiTop diffuser, through its pressure-boosting effectiveness, achieves a significant reduction of exit loss. That allows the operating noise level to decrease up to 7.2 dB (A) – a substantial advantage, above all in noise-sensitive environments. Moreover, it increases efficiency, which is demonstrated in a power reduction of up to 27 percent input. AxiTop therefore provides users and developers an enormous optimisation potential.



CHILLVENTA

Let us explain our products for the refrigeration and air-conditioning technology industry to you in person at our trade fair stand at this year's Chillventa in Nuremberg from the 9th to the 11th of October.



LITTLE BROTHERS For applications in evaporators and condensers, there is now the extended HyBlade® series. The solid, fibreglass-reinforced plastic impellers have been aerodynamically optimised further. With improved noise behaviour and increased impeller efficiency, the extremely energy-efficient series in GreenTech EC technology is now available in sizes of 200 to 1,250 mm.

Every day is a saving day

In nearly all areas of life, ebm-papst products make their contribution to energy savings



In and around the house, efficient and quiet technology provide for high living comfort.



Shopping directly in the supermarket or conveniently from home – GreenTech EC technology makes its contribution.



Reliable components from ebm-papst support smooth communication in the digital age.



RESIDENTIAL HEATING

When heating residential space, ebm-papst helps with different types of heating. Motors drive the feed screw of a pellet heater, and fans regulate the air intake and exhaust. In gas-fired heating, the LambdaConstant burners and complete gas air modules make condensing boilers even more efficient. In heat pumps, HyBlade® or RadiCal® fans are at work.



HOME VENTILATION SYSTEM

With the aid of GreenTech EC fans, the system draws the warmth exhaust air and heats the intake air with it – at minimum noise level.



PHOTOVOLTAICS/SOLAR-THERMAL

In photovoltaics, an inverse rectifier converts direct current into alternating current and fans provide the necessary cooling. In solar thermal energy, solar collectors generate hot water that is circulated through pumps with GreenTech EC motors.



EXHAUST AIR IN THE BATHROOM

A pleasant climate should prevail even in bathrooms and water closets without windows. Quiet fans guarantee a reliable air exchange.



REFRIGERATOR

Defrosting the refrigerator is annoying – there is really never a good time for it. Thanks to a fan in the NoFrost system, manual defrosting is superfluous.



RANGE HOOD

Even when you're in full cooking action, the apartment smells like food. A blower with GreenTech EC technology in the range hood conveys the air reliably out of the kitchen via the oven.



HEAT PUMP DRYERS

Within a short amount of time, the laundry is dry. Thanks to a condensate pump which pumps out the condensation water, a process air blower which circulates the air and an evaporator fan which dissipates the heat from the warm-air circulation.



LAWN MOWER ROBOTS

Freshly mowed grass without walking behind a noisy device: This job is done by a robotic lawnmower whose wheels and cutters are operated by small, high-performance GreenTech EC motors.

DISHWASHERS

If plates, cups and glasses come out of the dishwasher not only clean but also dry, then a blower has provided for drop-free drying, jointly with zeolite pellets.

HOME

SHOPPING

DEPOSIT-RETURNING MACHINES

No one wants to wait for a long time when returning their returnable bottles. An accurate and nimble motor for the barcode scanner keeps down long lines.



BEVERAGE COOLER

A refreshing beverage has its pleasant temperature thanks to the ESM motors installed in the beverage cooler.



AIR CURTAINS

Centrifugal blowers and axial fans create a "wall" of warm air behind the door. This keeps the precious heated or cooled air in the building and the temperature in the supermarket comfortable at all times.



AIR-CONDITIONING SYSTEM

If you want to enjoy shopping, comfortable temperatures are a must. Therefore many supermarkets and department stores are using air conditioning with quiet GreenTech EC fans.



REFRIGERATED COUNTERS

Food needs a cold chain which may not be interrupted in any case. iQ-motors and ESM fans in continuous operation keep the goods fresh.



ONLINE SHOPPING

Shopping conveniently from home is not a problem thanks to modern logistics. Drives for conveyor belts and sorting units contribute to goods arriving quickly at the customer's location.



REFRIGERATION CHAMBER

Even goods in the warehouse stay crispy and fresh. For a controlled freeze time, evaporators and condensers equipped with fans kick the cooling circuit into gear.



MOBILE PHONE

Transmission towers have to do their job around the clock and in all seasons so that the mobile telephone can fulfil its purpose. Therefore, weatherproof DC fans cool the control cabinets.



HANDS-FREE SYSTEM

The smartphone is connected to a modern passenger vehicle via a special clamp, called a cradle. A small GreenTech EC fan makes sure that the mobile phone does not run hot even at full load.



COMPUTERS

E-mail traffic, databases and the intranet – a server which manages all of these is an indispensable part of any office. So that it does not overheat even at peak loads, GreenTech EC fans cool the sensitive technology.



DATA TRAFFIC

Network operators around the world work the switches for international data traffic in countless joint connections. S-Force fans secure perfect cooling in these control cabinets.



COMMUNICATION

Passion vs. Gravity

During development of an innovative upright unit for the Italian boiler manufacturer BAXI S.p.A., ebm-papst had to go into some uncharted territory

Some success stories begin with a misunderstanding. Landshut Managing Director Stefan Brandl was excited when he returned from his business trip to Italy in February. He had spoken with long-time client Baxi about the use of a special pump, which is currently being developed in Landshut.

Soon after in March, Lamberto Del Grosso, responsible for Strategic Product Development at BDR Thermea, came to Landshut to discuss the topic in person. He showed keen interest in the presentation that Dr. Roland Keber had prepared. But at one point, Del Grosso interrupted, "Very good, but the pump is far too large." The confusion of those from Landshut was quickly clarified; the Italians had been considering a completely different type of pump from the start. They had a condensate pump in mind.

In condensing boiler technology, combustion results in water vapour which collects as condensate in the heat exchanger. If the drain for the condensate is higher than the boiler, a condensate pump must be used to span this difference in height. Since such units are frequently

installed in basements, the pump for the BAXI boiler has to be able to pump against gravity up to four meters. So far, only external pumps have been available on the market with this capacity – but BAXI wanted the pump integrated. This was a show-stopper. But expectations were high, based on twenty years of collaboration with Landshut. "From the very beginning, ebm-papst has always maintained an enthusiastic dialogue", clarifies Del Grosso, "and always understands our needs well."

This was true, too, of the now legendary meeting which took place in March. Brandl and Keber immediately arrived at the idea of using a condensate pump intended for clothes dryers, which Landshut had already been producing successfully in large numbers. Del Grosso was so impressed by the smart solution that he wanted to present the device at the upcoming Mostra Convegno trade fair – just two weeks away. "Then we did something very unusual," admitted Keber. He had spontaneously said yes. Then he and his team put together the desired presentation unit in very little time – just a dummy unit, however. "Sometimes you have to go



A meeting at the Landshut lab: Lamberto Del Grosso, Dr Roland Keber and Stefan Brandl (from left) take a close look at the condensate pump

"Sometimes you have to go with your excitement and be courageous." Dr Roland Keber

with your excitement for a project and be courageous." The success proved him right. "Our boiler with its fake pump instantly generated huge interest", confirmed Del Grosso, "because this design solves several problems related to boiler installation." Only then did the real work begin. After all, a clothes dryer is not a boiler, and the differences in application are considerable. "In a clothes dryer, a delivery head of about two metres is sufficient," explained Keber. "In this case, a significantly higher flow rate is required." But the biggest challenge would be with

the condensate itself. "In boilers it is substantially more aggressive because it contains, among other things, sulphur." While most of the standard components of the pump can handle that, the impeller cannot. The Landshut developers had to experiment with more resistant materials.

Landshut is developing, building and measuring the pump. The colleagues from BAXI in Bassano del Grappa are defining the specifications and inspecting how the pump behaves in the boiler. Since the start of the project in March,

the developers have got together five times in person and by conference call and, each time, have brought the product closer to the ideal operating point. "Since we are designing the pump, we are sending CAD data to Bassano", said Keber, "so that they can test there whether the pump will fit correctly into the unit."

Field testing will begin in October, and the series production in January 2013. "We are far along in this project," emphasises the Landshut Development Manager. "This is because the customer's passion is as high as ours." ○



“For many years, we have maintained good contacts; therefore, we know the specifications exactly.”

Martin Schulz, Team leader project management sales Germany
ebm-papst Muldingen

Roller development manager Ingo Raisch (left) and Martin Schulz from ebm-papst while inspecting a fan with a GreenTech EC motor

ICE-COLD SAVINGS

The specialist for refrigeration and air-conditioning devices, Roller, is consistently converting from AC to EC technology in its evaporators – the customers have also been convinced of this step now

If we picture the refrigeration and air-conditioning industry as a large parking lot, Roller would probably be a Mercedes or BMW. On the global market, this company based in Gerlingen is one of the top providers of evaporators, heat exchangers and air-conditioning devices for commercial use. This self-image is something that development manager Ingo Raisch deals with very consciously. “We don’t even try to use price to break into the market. Instead we put everything into always being a

step ahead technologically.” A symbol for this innovation-driven thinking is surely the consistent change to modern, energy-efficient technology. Since the beginning of this year, energy saving GreenTech EC fans have been replacing their AC counterparts in three evaporator series. This new variant is not an alternative as with other providers, but rather is mandatory. If you want Roller, you also have to want EC. “Surely a bold step”, Raisch admits. “But it has paid off for us.”

The pilot project To understand how it came to this step, first we have to turn back the clock a little and jump to the year 2009. At that time the situation at Roller still looked a little different. AC and shaded-pole motors still operated in the appliances then. However, the energy efficiency trend was also becoming ever more important for the customers of the Gerlingen, Germany-based company. Large supermarket chains, for example, often explicitly demanded EC technology in their tender documents. Therefore Raisch risked the pilot project with an evaporator series that to date had been driven by shaded-pole motors. The great requirement of technology partner ebm-papst was this: The changeover has to take place on a 1:1 scale. The motor replacement must be possible without any additional changes to the end product. Besides the dimensions, accordingly, the air performance had to remain identical – ideally, with a decreasing noise level.

“Naturally it was to our benefit that we have nurtured good contacts with Roller for many years,” explains Martin Schulz,

Team leader project management in sales at ebm-papst Germany. The two companies have worked together since the mid 1990s. “Our engineers knew precisely the application and its specifications.” Accordingly, the mechanical changeover happened very quickly. The developers also masterfully overcame the challenge posed by low operating temperatures in the double-digit below-zero range, as Schulz reports: “We purposely selected materials and parts which have no problem functioning, even at minus 40 degrees.”

Higher investment with added value The real challenge was for Roller: the company’s Sales team also had to communicate the paradigm shift to all those customers who had not insisted on it. “Of course, one or two were a bit upset upon seeing a price increase in the new price list,” says Raisch. “We contained that by taking the initiative in communicating the added value.” Roller started an information campaign with flyers, presentations and everything else that goes along with



Roller is now installing energy-saving motors in half of their evaporator series – the rest are to follow suit shortly

“In two to three years we want to be using EC motors exclusively.”

Ingo Raisch,
Development manager at Roller

this. This strategy bore fruit: The sales figures remained stable and even rose in some cases. “Naturally this was due not only to our Marketing department, but also to the facts, which simply speak for themselves,” adds Raisch. The data is indeed impressive. With the energy-saving motor, the energy savings

compared to the shaded-pole motor are as high as 70 percent. In other words, the extra cost for the supposedly more expensive technology is recovered right away within two months. After two to three years, the savings even cover the entire purchase price of the end device. The high efficiency of the energy-saving motor even goes one better. For when less energy is required, the waste heat also decreases, and with it the required cooling capacity. All of that went over well with the customers.

The feedback was so unanimously positive that it was easy for Roller to decide to also risk the switch to EC technology in series with AC motors. Even if the jump in efficiency is not as high as with shaded-pole motors, with the newest EC generation it is nevertheless a respectable 30 percent.

Reducing four to two In 2011 the starting gun for the next phase was fired. The new EC fans were integrated into three series at once. The project requirements were similar: Dimensions as well as output and noise data remained the same, while savings as a result of state-of-the-art technology

stood in the foreground. “Of course another important point was added to this”, adds Martin Schulz of ebm-papst. “Roller was concerned with reducing the diversity of its components – instead of four different motors which drive the evaporator fans there should be only two.”

The previous diversity can be explained rather simply: Vacuum or pressure evaporators commend themselves depending on room geometry and range of applications. Since not all customers require the same output, Roller offered two motors with different speeds for each of the two variants. “And that was precisely the starting point for reducing the diversity”, explains developer Raisch. “An AC motor has a fixed speed, while in the EC motor two different speeds are as easy as child’s play to program.” For Roller, cutting the diversity of its components is a humongous advantage: “Needing to have fewer different components in the warehouse enables us to have a substantially more flexible warehouse and spare part logistics.” Not only that. The service benefits from the mechanical interchangeability of shaded-pole, AC and EC motors from ebm-papst. If an end device ever fails, the technician can get it running again with whatever variant he or she happens to have in the boot. When the replacement EC arrives, they can be swapped without much effort.

Inspired by these many arguments and by customer feedback, Roller is consistently carrying out the changeover to GreenTech EC technology. For Roller the plan stands firm: “In two to three years we want to be using EC motors exclusively.” The next large series changeover will follow in the Spring of 2013. Currently the work for this is already in full swing at Roller as well as ebm-papst. ○

Mobile phone on four wheels

In a modern car, the smartphone has now become an indispensable passenger. Proper ventilation ensures that it does not overheat from all of its many functions

The smartphone is, today, one of a driver’s best friends. The small pocket device serves as a navigation unit, music library and web radio receiver. An appropriate app can be used to turn on the heater in winter even before getting underway so that the driver is cosy and warm. Oh, and you can also make calls, of course.

Many of these functions can be called up directly using a multi-functional steering wheel for the highest level of operating convenience. Automakers provide their customers with cradles so that this works smoothly. A smartphone can simply be inserted into this clamp; a corresponding interface ensures the greatest possible connectivity to the car. The cradle also provides the battery with electricity so that the driver gets the greatest degree of use from apps. During a multi-hour drive

on the motorway in intense summer sunlight, the heat given off in the process could quickly become dangerous and cause the device to overheat.

As a cradle supplier for many large automakers, communications technology company Peiker has a solution ready: a built-in fan. Peiker uses the smallest of the small in the ebm-papst product line for this purpose. The 250 N series is just 25 x 25 x 8 millimetres. Its output is sufficient to fulfil the application’s requirements. After all, they do not have to handle huge quantities of heat given off, but simply circulate it within the interior of the cradle and thus distribute it sufficiently. The thermal load dissipates on the entire surface of the smartphone without negative effects, instead

of forming potentially dangerous hotspots. Peiker integrates the fans without major modifications. Only the cable and plug were adapted slightly in co-operation with ebm-papst. Because a cradle, as an optional auxiliary unit, is not subject to the strict EMC benchmarks of other automotive electronics, the developers could make use of standard components in this application, such as the 250 N series. Reliability is unaffected. Today the Peiker cradles are allowing thousands of users to be able to fully enjoy their smartphones during travel in the summer. ○

Whirlwind in the cradle

The fan (●) is directly below the rear side of the attached smartphone. There, it whisks the warm air to achieve uniform distribution (●).



Small but powerful: The 250 N is 25 x 25 x 8 millimetres



For full connectivity, the smartphone is latched in a clamp

A table for every position

An operating table is more than a couch. It is a complex medical system that has to be versatile, stable and easy to operate. It helps here to have the right drives

Every day in modern operating rooms, surgeons are performing ever more complex medical procedures. In doing so, they also trust in state-of-the-art technology at the operating table. It has to be reliable, stable and flexible so that the surgeons can fully concentrate on their true job. For in modern medicine, the table is far more than a mere surface for the patient to lie on. It has to be adjustable to the most diverse operation scenarios – accurately and quickly at that. This is a challenge that was encountered by the medical technology experts of Trumpf and the drive specialists of ebm-papst when developing the TruSystem 7500 operating table. The first contact between the two companies took place already in the 1990s. Since 2005 the two sides have combined their expertise in a co-operation.

The table these experts developed is flexible, reliable and user-friendly, thereby fulfilling the stringent requirements of real-world applications. It can be conveniently controlled by remote, and table positions configured once can be saved and called up again. "Achieving the desired performance data for the gearbox and control system while taking into considera-

tion cost-effectiveness was one of the greatest challenges", explains Philipp Rauch, the person responsible for the sales of drive technology in the medical and laboratory technology segment at ebm-papst St. Georgen. The installed brushless internal rotor direct current motors enable fast and smooth acceleration and braking. This way the digital inputs can be implemented with mechanical reliability. The modular design of the ECI 63 drives used permits various modifications. Thus gearboxes, drive motors, sensors and brakes can be configured for their individual planned use. The drives are particularly reliable, since even power failures and technical defects do not impair their function.

Moreover, the compact components enable the base and table column to be built in a way that saves an extreme amount of space. That guarantees the surgeons a great amount of legroom and thereby also makes their work easier. The heart of the table control system is the compact drive

system networked via CAN bus. This bus solution provides for fast and efficient communication of the control electronics. Moreover, the control system is in contact with other devices and thereby prevents collisions when the table is moving. Along with this, however, the installed drives fulfil all criteria concerning electromagnetic compatibility (EMC). This means that, unlike mobile telephones, which are undesirable in hospitals, they do not have a negative impact on other electronic devices – a criterion that is potentially of vital importance. The design of the table follows the human anatomy; the table

is segmented in accordance with the body's shape. By means of its stability and design, the table can literally put every patient in the right position. The table can carry up to 360 kilograms and move into any position. Thus it also safely brings patients into positions in which either the head or the legs have to be the highest point of the body. The customers are satisfied, as Philipp Rauch knows: "Feedback has been entirely positive due to the high adjustment speed and the many flexible configuration options." The table successfully holds its ground in real-world applications and is on duty in hospitals all around the globe. ○

Part of the TRUMPF medical system: The operating table in the midst of lights, video solutions and equipment trolleys that can be hung at the ceiling supply units

A new class of spreaders

From agricultural dealer to device manufacturer: With its electrically powered spreader machines, LEHNER Agrar has created its own successful niche

It used to be that if you wanted to spread road grit over large areas in winter, you had two options: hydraulically or mechanically driven spreader machines. The associated carrier vehicles with hydraulic drive or cardan shaft are often high-maintenance and relatively expensive – too expensive for many municipalities or businesses. In many places this meant grit had to be spread by hand – with unsatisfactory results: more use of material, uneven distribution and, last but not least, high burdening of the personnel. The call for a cost-effective alternative grew loud.

New niche LEHNER Agrar developed the solution. More than 10 years ago the family-owned company began by developing attachable spreader machines for nearly all types of vehicles, from small ATVs, to conventional cars, to full-fledged fire engines. But what this company on the edge of the Ostalb region in Baden-Wuerttemberg actually specialised in was the trade of seeds, fertilisers and pesticides. The shift to tinkering and puzzling can be justified in a typically Swabian, pragmatic way: The core business of LEHNER Agrar is subject to strong

seasonal fluctuations, which regularly led to a low workload in winter. When the managing directors rather accidentally became aware of the potential of manageable spreader machines, they decided to engage in pioneering work in this field. Thus LEHNER Agrar solved two problems at once: full-time employment for the staff and the opening up of a new, lucrative business sector.

The technical approach of LEHNER Agrar is also pragmatic. The "POLARO" spreader machine simply uses an energy source already in the vehicle: electrical current. The Polaro draws its power entirely from the alternator via the vehicle's voltage socket. This is how it drives an electric motor which transfers the energy to a rotary table. Its rotational speed determines how far the road grit flies. The user can regulate this process continuously in order to effectively cover narrow walkways as well as large-area parking lots.

Failure rate: zero What sounds quite simple in theory involved a few little pitfalls in the development. With up to 3,000



The "MiniVario" scatters fertilizer or slug pellets, even on the narrow area between grapevines

"This brings along with it the necessary energy efficiency to keep from overloading the circuit." Nevertheless, the St. Georgen staff together with their partners at LEHNER Agrar closely examined the application once more to further optimise the efficiency in the relevant areas of performance. The BCI motor persuaded the developers with its good controllability and long service life with minimum maintenance effort. "To date we have not had a single complaint," confirms Schrag.

Versatility driven by electricity: the spreader machines by LEHNER

revolutions, the electric motor must provide a substantial output, after all, but must not burden the carrier vehicle's circuit with currents that are too high. Otherwise a 12-volt car battery would very quickly reach its limits. When it came to designing a corresponding motor for the spreader machine, LEHNER developers received support from ebm-papst in St. Georgen. "Since the device has to run under relatively adverse ambient conditions, we decided in favour of a robust BCI motor," explains Thomas Schrag, Branch Manager for Drive Engineering at ebm-papst. St. Georgen.

The BCI motor persuaded the developers with its good controllability and long service life with minimum maintenance effort. "To date we have not had a single complaint," confirms Schrag.

With these convincing arguments it is only logical that the "POLARO" would turn into an absolute sales hit for LEHNER Agrar. Though only 100 units were sold in the first year, one year later it was already 1,000. They didn't leave it at just one model for long. Additional specialised spreader machines followed, such as for combating agricultural pests or for fire engines. The export of spreading technology now makes up 40 percent of their business, and the trend is rising. ○



With "POLARO", even small vehicles can keep the streets clear in winter

The "ÖITiger" quickly remedies spilled oil that can remain after an accident





Dipl.-Ing. Martin Bürkert
Team leader
Electronics Development
at ebm-papst Mulfingen

Free of side effects

Concerning current reverse transfer from intermediate circuit capacitors

Intermediate circuit capacitors cause current reverse transfer – this is a thesis that users of EC technology have recently discussed. The discussion focussed particularly on large installations with many EC fans in evaporators or control cabinet cooling systems. The scenario assumes that the intermediate circuit capacitors remains active even if the motor stands still. A proposed solution is to disconnect the devices from the power system when there is a standstill. However, a more accurate consideration of the function and design of modern EC motors contradicts this thesis.

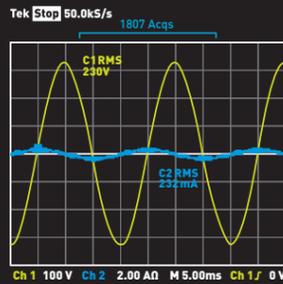
An EC motor is driven by control and power electronics using DC voltage. For mains-powered systems, this DC voltage is gained from AC voltage. This so-called DC-link voltage is smoothed by the intermediate circuit capacitor. If no current is drawn from the intermediate circuit, the capacitor will remain charged. Due to the effect of the intermediate circuit capacitor, in this operating state there can be no phase shift between voltage and current, no idle power, no current harmonics and therefore no current reverse transfer, since no charging current flows through a charged capacitor. Therefore it is not necessary to separate the motor from the power system when the speed is zero.

However, if current is accepted from the running motor, the nonlinear charge current of the intermediate circuit capacitor loads the power system through

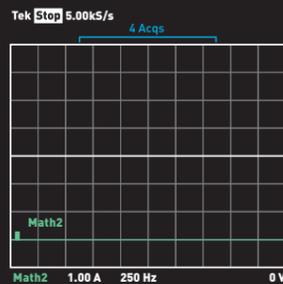
current harmonics. In addition, the switching operations of the power electronics cause higher frequency faults. In state-of-the-art electronics, however, both phenomena can be reduced to a standards-compatible degree.

To counter current harmonics in our GreenTech EC motors we use current harmonic filters; we use mains filters to reduce higher frequency interference emissions at the line input of the electronics. These filters are composed of capacitors and chokes and lead to capacitive idle currents at the line input which cause an idle power input for as long as the electronics remain connected to the power system. However, the effective power in standby mode, for example, is only approximately one-thousandth of the rated output for a 3 kW EC motor. This output is buffered by the intermediate circuit capacitor, but in return, the charge current is so low that, compared to the idle current of the mains filter, it is of no consequence. Thus the idle current output at rest has nothing to do with the intermediate circuit capacitor, but instead is to be traced back to the use of the mains filter.

Thus no problematic current reverse transfer is caused by using state-of-the-art EC motors. Therefore additional control and switch-off mechanisms are unnecessary. On the other hand, if shutoffs and power-ons are too frequent, it will lead to a reduction of the device's service life – and that is why it makes sense only in exceptional cases. ○



Phase voltage L1-N and phase current L1 in an idle 3kW GreenTech EC motor. Vertical: 100 V/division, 2 A/div. Horizontal: 5 ms/div. The phase shift between the current and voltage is nearly 90°. This indicates a (practically) pure reactive power input of approx. 53 VAR per phase.



The corresponding current harmonics spectrum of phase current L1 for an idle 3kW GreenTech EC motor. Vert.: 1 A/div. Horiz.: 250 Hz/div. Only the first harmonic with a value of 230 mA is visible.

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- Trade fairs**
- Chillventa**, Nuremberg, 9 – 11 October 2012
 - FinnBuild**, Helsinki, 9 – 12 October 2012
 - Elmia Subcontractor**, Jönköping (SE), 6 – 9 November 2012
 - electronica**, Munich, 13 – 16 November 2012
 - SPS / IPC / Drives**, Nuremberg, 27 – 29 November 2012
 - AHR**, Dallas, 28 – 30 January 2013
 - Climatizacion**, Madrid, 26 Februar – 1 March 2013
 - Data Centre World**, London, 27 – 28 February 2013
 - Wind Power Expo**, Tokyo, 27 Februar – 1 March 2013
 - Energiesparmesse Wels**, Wels (AT), 27 Februar – 3 March 2013

Our complete trade fairs dates: www.ebmpapst.com

- Events**
- 11. ebm-papst Hallenmasters**, Mulfingen, 5 – 6 January 2013
 - “Jugend forscht” (Youth Research)**, Künzelsau, 1 – 3 March 2013



Technology for further reading

Are you interested in technical data, developments and products? The current issue of our sister publication tech.mag once again features a wide range of technical articles:

- Prize-winning low-energy housing complex in Switzerland with modern GreenTech EC fans**
- One world, many climate zones, one fan for worldwide use outdoors**
- GreenTech EC fans for potentially explosive atmospheres in zones 1 and 2: Safety for systems with natural refrigerants**

Highly integrated gas/air module makes installation and maintenance easier for condensing boilers

EC motors under scrutiny: What was that with current reverse transfer?

The **tech.mag 2/2012** is available. Contact our sales team or e-mail Katrin.Lindner@de.ebmpapst.com.





This Black Forest clinic helps

The Katharinenhöhe rehabilitation clinic accompanies children and teenagers on their path to recovery. ebm-papst in St. Georgen has been supporting this commitment for more than ten years

Modern medicine has made gigantic advances in recent years. Many illnesses that used to be regarded as incurable can be treated today; however, this often involves great physical and mental burdens for the patients. These strike children and teenagers particularly hard. Their families also shoulder a heavy burden in this process. The Katharinenhöhe rehabilitation clinic in the Black Forest has specialised in precisely such cases. The goal of the project is to ease the often painstaking path to recovery for young patients and

their families. By means of a diverse therapeutic offering, the specialist succeeds in opening new prospects to the patient despite the difficult situation.

In this task, the Katharinenhöhe clinic relies on dynamic support of every kind. For this reason, ebm-papst in St. Georgen has been in a partnership with the institution since 1998. The occasion for this was a change in thinking at Christmas. In that year the managing directors decided to send business partners only greeting cards instead of presents, and in the card they

referred to a worthwhile social pro-

ject. The amount saved for the presents went entirely to the benefit of the Katharinenhöhe clinic, which was being built at the time. This donation enabled the institution to afford a transport vehicle, an important part of the clinic infrastructure. The action went over so well with our business partners that now some of them also belong to the supporters.

Although some projects have been added since then, ebm-papst still continues donating to the Katharinenhöhe clinic every year at Christmas. "It was important to us from the beginning for this to be more than just a one-time action", comments Peter Metzger, Manager of Business Development and Marketing in St. Georgen. "The commitment of the people at the Katharinenhöhe clinic has simply earned long-term support." In this way, over the years, the clinic has been able to acquire things such as important therapy equipment, a concert grand for the music room and a high rope course. This year as well, the donation will be used to make the everyday life of the young patients somewhat more colourful. ○

After all, the young patients at the Katharinenhöhe aftercare facility have a lot to laugh about



“ There are many reasons why Singapore is the ideal centre for the South-East Asian market. The small country has a long tradition as a marketplace for the whole world and therefore is considered to be a bridge between the east and the west for about 200 years now. Just take as an example those more than five million people from different cultures and with different religions living and working peacefully together in the vibrating ‘City of Lions’. Business on this island is also flourishing because there is zero import tax. For ebm-papst Singapore is the hub for the markets in Malaysia, Indonesia, Thailand, Vietnam and Philippines. And I believe that our GreenTech EC products will provide us here with greater opportunity and differentiate us to our competitors. ”



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Cause.

Effect.



-29%

When using ebm-papst A3G800 axial fans in heat exchangers, energy costs can be reduced by 29% at an average duty cycle of 75%.

GreenTech stands for climate protection that pays off for more than just the environment. As a result, consistent use of ebm-papst fans with GreenTech EC technology can radically reduce the power consumption compared to AC fans – and that pays off. In a heat exchanger with 6 fans and an average duty cycle of 75% for example, approx. 14.4 t of CO₂ and the cost of more than 24 MWh of energy can be saved annually. After all, it's not for nothing that our basic philosophy is: Each newly developed product must exceed the economic and ecological performance of its predecessor. www.greentech.info



A3G800

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