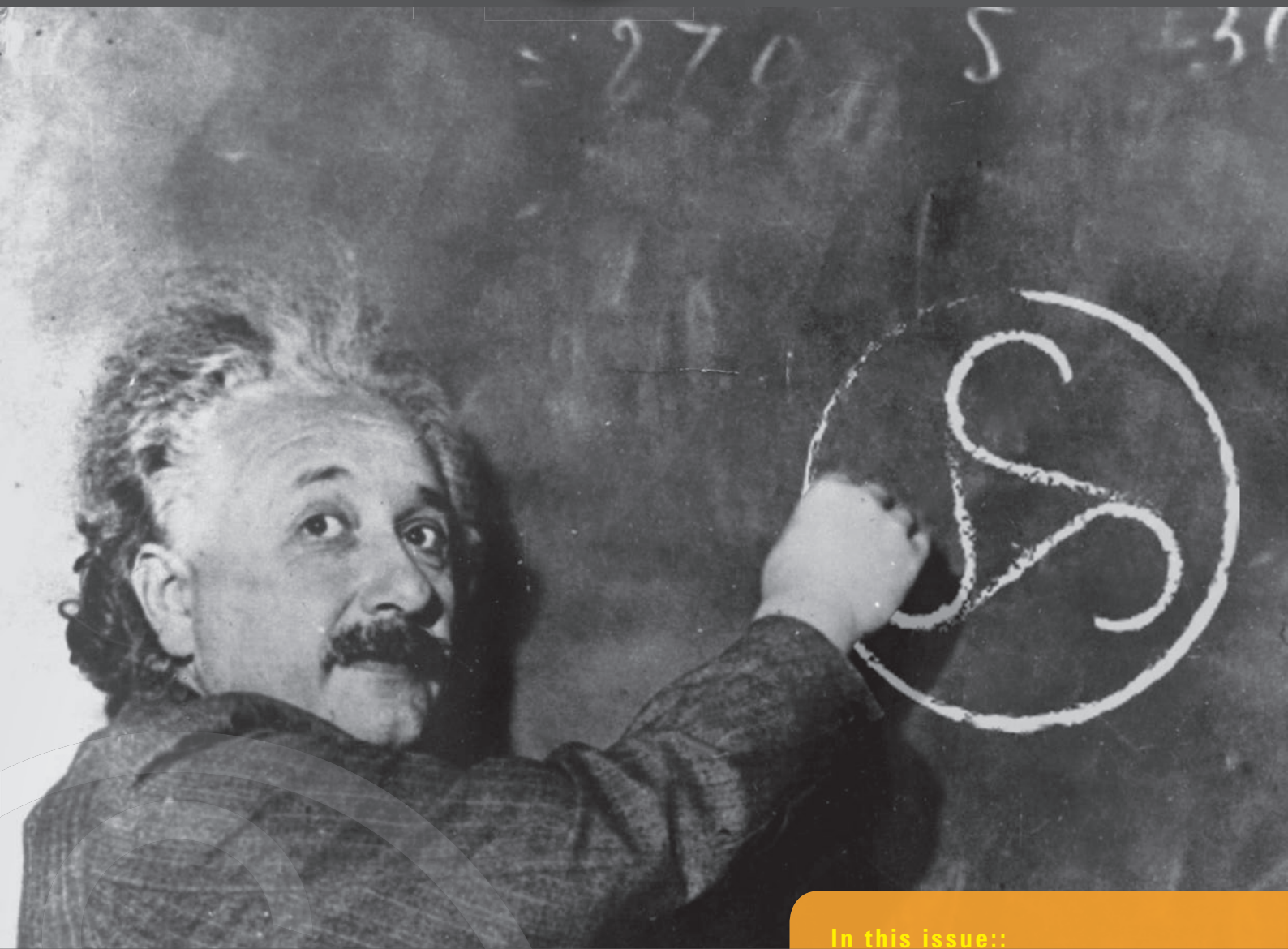


Manometer



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- New compressor controls: Sauer ecc 3.0 and Marine Logic Control
- ITER fusion plant and Einstein – how do they fit together?
- Go for Special! Customised solutions from Sauer

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Thanks to the following contributors:

Wim Ekels, William Koester

Do you have any questions, comments or suggestions? Write to

manometer@sauercompressors.com



Editorial

Dear readers,

You might struggle to answer the question of what Einstein has to do with Sauer Compressors.

Einstein thought outside the box, looked for solutions to challenges and demonstrated persistence and good humour. He became world famous for stating that "Everything is relative!"

Sauer is the global market leader in starting air compressors for shipping and is setting new standards in the industry, particularly with its 3-stage air-cooled PASSAT series. We supply the shipping sector with more than 2,500 compressors per year, all of them custom-built and delivered on time through a tight logistics, production and testing network, making us a true specialist.

But specialism is relative and we also provide it in other areas. This issue includes a report on ITER, the world's largest fusion plant. Through our sister company Girodin-Sauer, we are supplying a customised solution for recompression of helium in the plant.

While high pressure compression of air is a relatively tough challenge, when it comes to helium we are operating at the real cutting edge of compressor technology. With a density less than that of air by a factor of 7, helium can escape through the narrowest of gaps, which is extremely undesirable as it is a very expensive gas. Those in the know choose Sauer helium compressors because of their gas tightness, which no other supplier can match.

We can offer both standard compressors and complex special projects. Such contrary products bring challenges that we have to face up to on a daily basis. They bring contradictory objectives, which we pursue with persistence and good humour – just like Albert Einstein did.

I wish you enjoyable reading and hope you stick with us.

Yours

A handwritten signature in blue ink, appearing to be 'H. Schulz', written in a cursive style.

HARALD SCHULZ

Sauer Snapshot





A look into the future – creating the ITER fusion plant

Can we on earth generate energy the way the sun does? The ITER experimental fusion plant is designed to take a critical step towards the objective of tapping into plasma, which supplies energy and is an almost unlimited source of power. The huge plant has been under construction in Southern France since 2007 with cooperation from around the globe.

In this issue, we report on the biggest challenges to be overcome with this kind of energy generation and the contribution that Sauer compressors are making to this crucial research project.

Read our article on page 14.

Sauer On Air

State of the art quality testing: the Accura 2 measuring centre

Since last year, the Accura 2 measuring centre from Zeiss has guaranteed that production parts undergo state of the art quality testing at Sauer Compressors. The most advanced CNC coordinate measuring machine on the market allows accurate and reliable dimensional stability tests even on workpieces with demanding geometry.

It continues Sauer's optimisation of its machinery, ensuring more efficient production processes and premium compressor quality – which is ultimately Sauer's trademark.



ACHEMA 2015: "Mission accomplished"

The process engineering and process industry sector is becoming increasingly important for Sauer Compressors. The most important forum for establishing a strong international presence in this market is the ACHEMA trade fair, which is held every three years in Frankfurt am Main.

From 15th to 19th June 2015, our highly motivated team worked flat out in Hall 9 of the Frankfurt exhibition centre to demonstrate to expert visitors from across the world the benefits that Sauer compressors and accessories can offer to the industry. The level of interest was high and the number of meetings and new contacts were such that we consider the five days of the trade fair to have been an unqualified success.

Thanks for your visit, and see you next time.

Sauer USA: New facilities, additional capacity, greater opportunities



The high pressure market in North America is growing rapidly and Sauer Compressors USA has responded by moving into new facilities to open up additional production capability. In addition to generous office space, the established location on the Chesapeake Bay Business Park in Stevensville now has enough space for in-house container construction and packaging, its own test facilities, a modern automated warehouse system for spare parts and a training centre.

You will find more information about the developments at Sauer Compressors USA in the next issue of Manometer.

New accessories: PureRack & BasRack pressure receiver cascades

With its durable pressure receiver racks, Sauer now offers an even wider choice of accessories, all designed to operate reliably with our compressor range. The new range of ready-to-operate assembled pressure receiver cascades starts with the PureRack and BasRack versions.

Both racks are designed for pressures up to 330 bar. PureRack – for dry gases – is available with a capacity of 300 l or 600 l. The BasRack is also available as a smaller 100 l version. Equipped with a separate drainage connection, this rack is also suitable for moist gases. Both models can be combined and extended with no problems.

The feedback for our pressure receiver cascades from industrial partners at the Hanover Trade Fair 2015 was hugely positive. Would you like more information about the PureRack and BasRack?

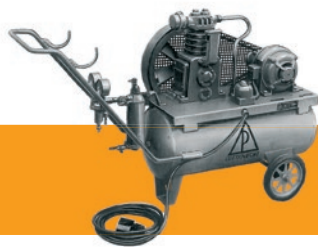
www.sauercompressors.com/de/purerack-basrack/



Compressors to assist fertiliser production

Time and again, Sauer compressors prove they can withstand even the most extreme conditions in a wide range of special applications. This range has now been extended by their use at a production facility for fertiliser (urea) in Romania. Through its partner YNNA in the Czech Republic, Sauer received an order for two HURRICANE WP 4351 Basic high pressure compressors, which will have the job of creating a protective layer to prevent corrosion in the production plants.

A high concentration of ammonia? A corrosive environment? No problem for the two compressors from the HURRICANE series, which are designed for this kind of application. Supplemented with a service contract, our new customer is getting a complete, comprehensive no-worries package.



Did you know ...

... Sauer started producing small workshop compressors in the "Luftknecht" series back in the 1950s? Many of these little workhorses are still being used in different trades.

Sea Japan
Tokyo, Japan
13.04. – 15.04.2016

OTC
Houston, USA
02.05. – 05.05.2016

Sajam Tehnike
Belgrade, Serbia
16.05. – 20.05.2016

Mecanica São Paulo
São Paulo, Brazil
17.05. – 21.05.2016

NAVALIA
Vigo, Spain
24.05. – 26.05.2016

Posidonia
Athens, Greece
06.06. – 10.06.2016

Brasil Offshore
Macaé, Brazil
20.06. – 23.06.2016

ONS Stavanger
Stavanger, Norway
29.08. – 01.09.2016

SMM
Hamburg, Germany
06.09. – 09.09.2016

Marintec South America
Rio de Janeiro, Brazil
19.09. – 21.09.2016

Offshore Marintec
St. Petersburg, Russia
07.10. – 10.10.2016

Rio Oil & Gas
Rio de Janeiro, Brazil
24.10. – 27.10.2016

ADIPEC
Abu Dhabi, UAE
07.11. – 10.11.2016



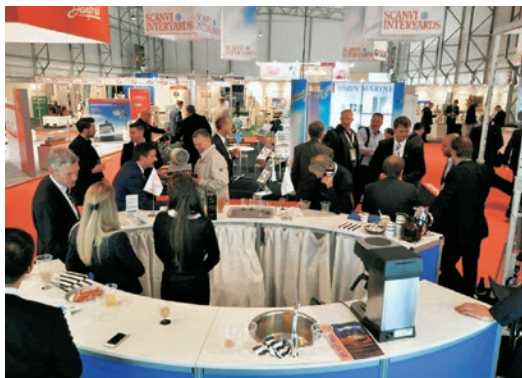
Sauer On Air

Training compressor for Ethiopian training centre

In conjunction with the local university, future maritime engineers at the EMTI S.C. (Ethiopian Maritime Training Institute) in the Ethiopian city of Bahir Dar will receive top quality training, certified to international maritime standards.

Sauer is supporting the education of the mechanical and electrical engineering students by supplying a 3-stage air-cooled compressor. The arrival of the PASSAT WP 121L was met with great enthusiasm, and it will help to provide practical training on the very latest technology.





Successful anniversary for NOR-Shipping

Fireworks in Oslo! From 2nd to 5th June 2015, the 50th NOR-Shipping was held in the Norwegian capital, providing one of the world's most important platforms for the international maritime industry.

Alongside our Norwegian partner Scanvi Interyards, Sauer Compressors was at the anniversary event presenting the successful 3-stage air-cooled compressors from the PASSAT series. With large visitor numbers generating plenty of enquiries and interest, there was good reason for us to enjoy the firework display that brought proceedings to a close.

Tolkien ahoy! Sailing experience at Kieler Woche

The huge maritime event "Kieler Woche" seems to take over the city, port and sailing area and is the time for Sauer Compressors to take to the water for its traditional cruise.

This year, in glorious sunshine more than 30 partners and friends were welcomed on board the 42-metre topsail schooner J. R. Tolkien, which revealed no sign of its incredible history. Originally built as a tugboat and retired after many years of service, its new owners not only rescued it from the scrapyard but actually had it completely rebuilt as a proud two-master.

In top seafaring spirits, the Sauer team and their guests enjoyed fantastic views of the colourful activity in the port, along the coastline and on the sea, with catering that real seafarers could only dream of – a sumptuous buffet fresh from the galley. After such a wonderful day, everyone agreed that there are some traditions that deserve to be maintained.



New compressor controls: Sauer ecc 3.0 and Marine Logic Control

Sauer ecc 3.0 for industry

Evolution not revolution – the new Sauer ecc 3.0 control module is a consistent advancement of the previous Sauer ECC. Adapted to current and future industry standards and incorporating feedback from customers, the new control guarantees convenient and reliable compressor operation. In addition to the clear display, intuitive operation and choice of 19 different languages this is mainly because of its extended functions.

As well as an integrated base load switching control for up to eight compressors, special versions for booster variations are now available. It covers every eventuality in terms of connectivity too, with a choice of interfaces including ModBus, Devicenet and Profibus, and enables the compressor system to be easily integrated into existing systems.

The Sauer ecc 3.0 can now be ordered for all compressor series with the exception of the 6000 series.

Marine Logic Control for shipping

The starting air compressors on board a ship represent an important part of the machinery and are essential for smooth operation of the ship. Even more than in other sectors, what counts here is absolute reliability of the components and ease of maintenance for the ship's personnel.

While in the past traditional relay controls met these requirements, in many respects they also limited the technical capabilities of the ultra-modern compressors. Sequential control was previously only available using the additional Sauer Ecobox control module and there was very limited scope for remote maintenance.

The Marine Logic Control (MLC), which is based on the Sauer ecc 3.0, will change all that in the future. Compliant with all class requirements, the fully electronic module combines all the advantages of a traditional relay control with additional safety features, easy operation and extended functions, such as integrated sequential control (lead-lag control) for all starting air compressors.

At an additional cost, this function can be extended to Eco⁺, allowing different pressures to be set in manoeuvring and sea modes.



Sauer Compressors



The digital control panel features a blue LCD screen displaying the following information:

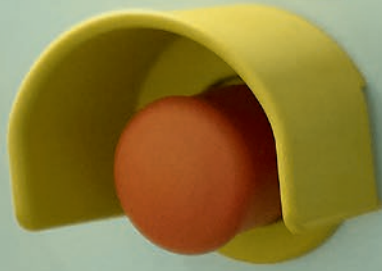
- Pressure: 124 bar
- Status: Running/loaded 100%
- Mode: automatic
- Setpoint: 3.2 bar
- Temperature: 24.2°C
- Time: 19:31

Navigation buttons include a home button, a power button, and four directional arrow buttons. A QR code is located in the top right corner of the panel, and the Sauer Compressors logo and 'ecc 3.0' are printed in the bottom right corner.

Spannung
vorhanden
voltage
present



Not-Stop
emergency stop



Go for Special! Customised solution know-how

What many companies avoid at all costs is welcomed at Sauer Compressors – customised special systems. Alongside standardisation in the shipbuilding sector, in recent years Sauer has revisited some old values and is increasingly implementing large special projects. The rapid growth in the industrial and offshore segment is primarily thanks to these complex projects.

Always on the search for a new niche, it is special projects that generate important market know-how and will help to ensure stable growth and continuous development in the future. Particularly in the demanding offshore segment, standard products no longer meet customers' needs and often put them in a quandary – invest in expensive custom developments or adapt standard products to the situation as effectively as possible? Even manufacturers of suitable standard products with experience of project business often shy away from the protracted certification process in the offshore sector and turn down enquiries of this kind – the financial risk and the engineering requirements are just too much for them.

Things are different with Sauer Compressors. Targeted knowledge from past projects is pooled and experience is shared within the engineering team, which is spread throughout the world. It is the customers who then benefit from the knowledge acquired. They have an expert partner who knows exactly what is involved in designing a system that has to function reliably under extreme conditions and last for many years. No matter whether it is ATEX guidelines or certifications by international classification bodies or associations, there is hardly anything that Sauer hasn't already done. And if something new does come up, that stimulates our ambition to find the optimum solution for new requirements.





ITER Project:

In search of tomorrow's energy supply

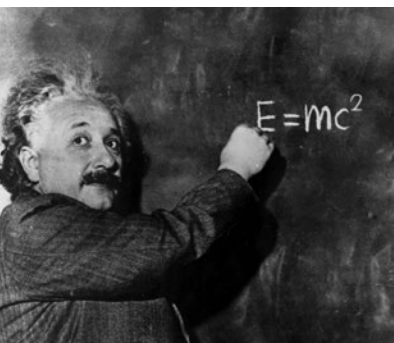
It sounds like something out of a science fiction film, but the first steps towards making it a reality are being taken at Cadarache in Southern France. That is where the ITER fusion plant (International Thermonuclear Experimental Reactor) has been built as part of the world's largest research project. The aim of constructing the power station is nothing less than to demonstrate that generating energy by nuclear fusion – as happens in the sun – is possible on earth. Could this totally inexhaustible energy source secure our future power supplies?

Construction of the "Tokamak" type fusion reactor began in 2007 with participation from 34 nations. It is due to start experimental operation around 2020 and, with a volume of 840 cubic metres, is significantly larger than any previous plants of this kind. The aim is for this plant to be the first to generate more energy from fusion that has to be used to operate it. Although fusion has been achieved in smaller reactors already, it has only been for a few seconds and with no net energy gain.

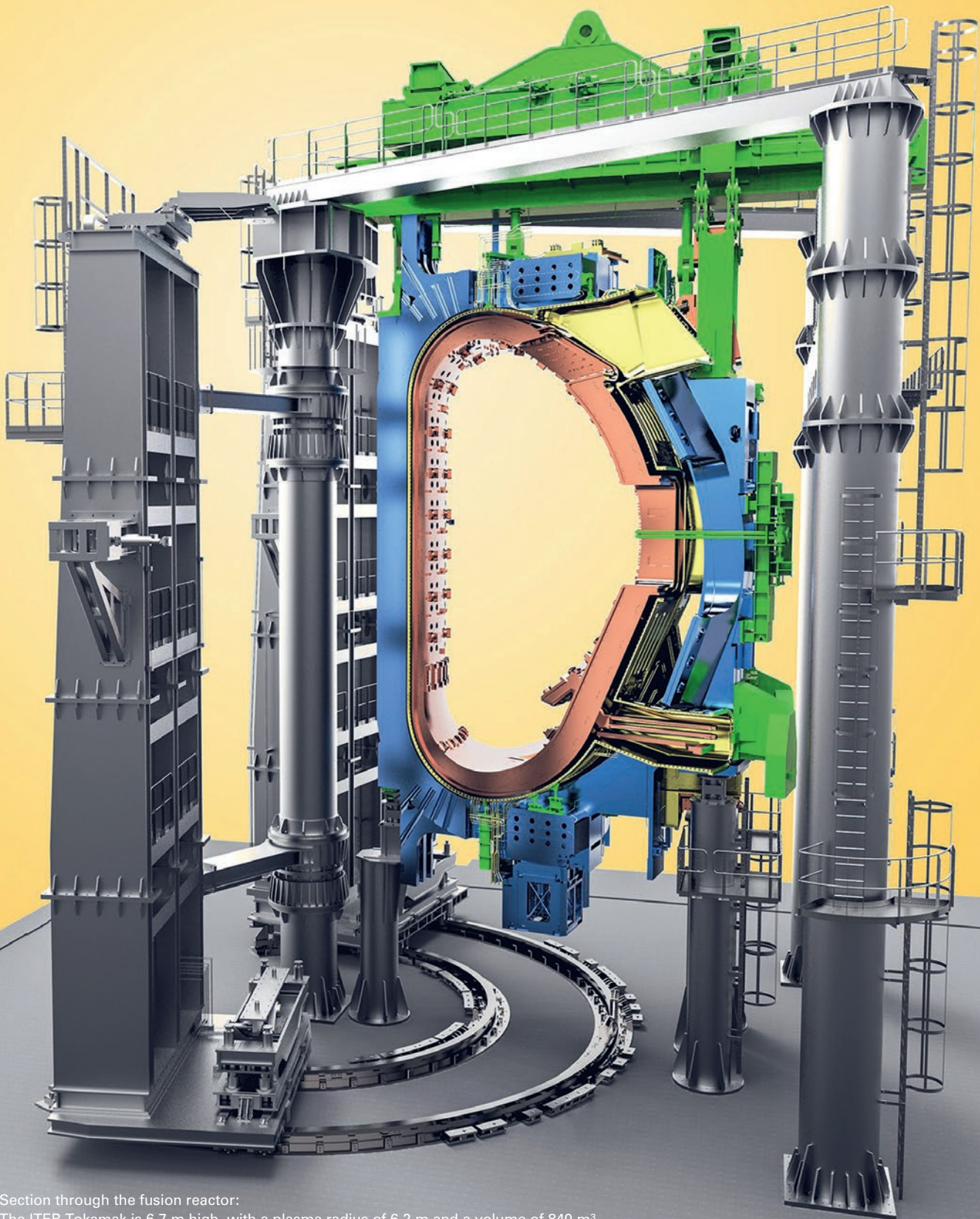
The biggest challenges with nuclear fusion include the temperature and pressure inside the reactor. For fusion to occur, the hydrogen isotopes deuterium and tritium are combined to form a hot plasma at 100 million °C. As no material can withstand these temperatures, the plasma is held in suspension by huge magnetic fields. A vast quantity of helium is required to cool the super conductive magnets, and this is where helium compressors from Sauer come in.

Sauer Compressors is supplying the largest helium recovery system ever built for ITER. A total of four WP 6305 BasSeal^{He} type helium compressors ensure recompression of the helium already used for cooling. The contract includes all the components of the recovery plant, including buffer tanks, filtration system and controls. A further PASSAT WP 156L BasSeal^{He} type helium compressor is used to compress any leaks that occur in the helium circuit.

Fusion energy – how does it work?



In the sun, four hydrogen atoms fuse to form a helium atom. However, the resulting helium is around a tenth of one percent lighter than the original hydrogen, with the remaining mass being converted into energy. The relationship between mass and energy is expressed in the famous equation $E = mc^2$ (Energy = Mass x Speed of light²) developed by Albert Einstein. This means that even very small changes in mass release huge quantities of energy. It is thanks to this energy source that the sun has already been shining for many billions of years.



Section through the fusion reactor:
The ITER Tokamak is 6.7 m high, with a plasma radius of 6.2 m and a volume of 840 m³.

Compressed air for new Royal Navy aircraft carrier

It's the largest shipbuilding project in British history - the new "HMS Queen Elizabeth" and "HMS Prince Of Wales" aircraft carriers from the Queen Elizabeth class.

The construction of the two giants is important for Sauer because the Royal Navy uses exclusively Sauer compressors for the compressed air supply.

Scheduled to come into service in 2020, the two new flagships will replace the Royal Navy's existing aircraft carriers and form the backbone of the future British naval forces. With their huge dimensions of 285 m length, 73 m width and a displacement of 65,000 t, they can hold up to 40 aircraft and helicopters, while accommodating a crew of 1,450. They are being built by the Aircraft Carrier Alliance, a consortium involving BAE Systems, Babcock, Thales and the British Ministry of Defence.

Sauer was selected to provide the sophisticated compressed air supply for the floating fortresses, and had the chance to prove that there is a customised solution for any application. For each ship, a total of 18 different compressor units have been supplied for a huge range of tasks. For the core – the central compressed air system – six WP 5500 type high pressure compressors are used.

The "HMS Queen Elizabeth" left her assembly dock at Rosyth in Scotland more than a year ago and since then has had more equipment fitted at sea. Of course, she was given a fitting launch ceremony. On 4th July 2014 Queen Elizabeth II herself smashed the bottle on the hull of the ship that bears her name. However, it wasn't champagne it was an excellent single malt whisky.



The HMS Queen Elizabeth shortly after her launch at the Rosyth Dockyard in Scotland. Visible on the launch pad on the bow is one of the Lockheed Martin F-35B Lightning IIs, specially commissioned as a STOVL version (Short Take-Off and Vertical Landing) for the new aircraft carrier class.



Kiel: Home of Sauer Compressors

"We live where other people go on holiday". This is the claim that the residents of Kiel like to make, particularly on summer days when the capital city of Germany's northernmost state reveals the full extent of its maritime charm. It owes this charm to its location on the Kiel Fjord, which extends from the Baltic Sea for 17 kilometres, right into the city.

When it comes to leisure activities, locals and tourists alike are spoilt for choice. Bathing on Kiel's extensive beaches? Strolling round the city and the harbour? Or a trip as far as the locks along the Kiel Canal, the world's busiest artificial waterway?

The sun may not shine every day – but you can almost always count on the wind. That is why Kiel is a mecca for fans of all kinds of watersport. Most public attention focuses on the many international sailing competitions in Kiel's waters, including the annual "Kieler Woche" festival, the world's largest sailing event.

Kiel is the hub of Baltic shipping and the gateway to the North – with deep water for shipping right into the port, state of the art terminal facilities in the heart of the city and high-speed transport links, Kiel is a very attractive option for cargo and passenger shipping alike. You can marvel at massive hulks and magnificent cruise ships on a daily basis. Meanwhile, the excellent ferry links mean that many destinations in Scandinavia are just a short trip away for Kiel residents.

Kiel is also a lively city away from the port. In addition to its cultural attractions – museums, casinos, galleries, literature and music festivals – it has an excellent range of entertainment venues and restaurants. This is a good thing, as around 31,000 of Kiel's 240,000 inhabitants are students at the city's three universities.

The supply of well-qualified graduates benefits the Kiel economy, which still has a maritime focus in this historic port city. Kiel's know-how is revealed in products such as submarines, the gyro compass, sonar and – let's not forget – Sauer compressors. The company headquarters in the Northern district of Friedrichsort is just a hop and a skip away from one of Kiel's most popular beaches. A very nice place to head to after a hard day's work.



Far left:
Locks at the Kiel-Holtenua waterways and shipping control centre.

Left:
View over the "Kleiner Kiel" towards the city hall and opera house

Right:
The Friedrichsort lighthouse, just a few hundred metres from Sauer Compressors.



Sauer Easy Service: Tailored service for industry

Since last year, all customers buying our TORNADO and HURRICANE high pressure series have been able to benefit from a brand new maintenance concept. With Sauer Easy Service, Sauer Compressors offers tailored maintenance kits for all products in the two series.

Different compression media such as air, nitrogen, helium or natural gas require specific parts for maintenance of the compressors. Sauer Easy Service provides targeted coverage of individual requirements. Sauer has put together three or four different maintenance kits for the TORNADO and HURRICANE series, guaranteeing an optimum service solution. Depending on the scope of the maintenance work to be carried out, the kits are available in Small, Medium, Large and in some cases Extra Small.

Sauer recommends that the kits are used at intervals of 2,000 operating hours or one year. The content and scope of the maintenance work is based on our many years' experience with industrial applications. However, as we are constantly looking to optimise our maintenance kits, we are definitely open to ideas and suggestions from customers. Just contact us.

Also if you have any questions about specific maintenance intervals and the use of the new maintenance kits, either contact your dealer or contact the Sauer Compressors after-sales team in Kiel directly.

service@sauercompressors.de

Sauer
Easy Service





Sauer
Easy Service

Easy Service L Maintenance Kit W
Version 6769

Pos. Qty. Item No. Genuine Sauer Pa

1.	1	051885	Gasket
2.	1	060266	Cylinder Head Gasket
3.	1	069175	Set of gaskets valve moun
	1	064051	- Cylinder Head Gasket
	1	037526	- O-Ring
4.	1	069242	Set of gaskets
	1	065034	- gasket
	1	036185	- Packing ring
	1	036199	- O-Ring
5.	1	069243	Set of gaskets
	1	062949	- Gasket
	1	036186	- Packing Ring
	1	036199	- O-Ring
6.	1	034983	Lamellar Valve
7.	1	037156	Lamellar Valve
	1	036196	Concentric Valve
	037860	Concentric Valve	
	037817	Piston Pin	
		Piston Ring	
		N-ring	
		O-ring	
		Snap Ring	
		Needle Bearing	
		Piston Pin	
		Ring	

Sauer Compressors

Sauer Project Engineer Arne Kelm spends his free time racing

For eleven years, Arne Kelm has been working as a Project Engineer in the Design Office at Sauer Compressors. He started in the Industry team, where he was responsible for the first containers for seismic applications, such as the research ship Maria S. Merian. He has since moved to the Navy team.



In his free time, there's a very different side to Arne Kelm. He's a real enthusiast for a rather unusual sport – namely sand yachting. Whenever there's a convenient space in his schedule, he's off to train in his sail wagon, racing across the beach on three wheels.

He took up beach sailing as a hobby at the age of eleven. His father bought a sand yacht out of pure curiosity and Arne Kelm immediately became addicted to the high-speed sport. He took part in his first regattas at the age of just 15. He showed such talent and was so successful that in 2000 he was able to step up to Class 3 – the "Formula 1" of sand yachting. The yachts in this class reach speeds of up to 120 kilometres per hour.

Since then he has competed every year in the European and World Championships in changing venues, achieving some impressive results. The absolute highlight for him came in 2013. That was the year he was crowned German champion and also finished in 9th place in the race for the world championship.

After such a successful year, Arne Kelm decided to cut back on his hobby in favour of his professional career, which continues to be his priority. He started a distance learning "Masters in Sales and Marketing" course in 2013 and that doesn't leave much time for his favourite sport. But at the end of 2015 he'll finish his course, and then he can start racing again.

Arne Kelm also enjoys the more conventional kind of sailing. At the Plöner See Wednesday regatta, he enjoys swapping sand and his wagon for water and a boat.

Info on modern Class 3 sand yachts:

Sail area:	7.45 m ²
Mast height:	6.10 m
Material:	Carbon fibre
Maximum speed:	120 km/h



Competing on some of Europe's nicest beaches, the combination of speed, technology and – like in my job – contact with people from different countries are what I find so attractive about sand yachting.

Missed a "Manometer" issue?

www.sauercompressors.com/en/latest/manometer-magazine/archive/

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12/2015 [suw | ace]



Dependable up to 500 bar – anywhere, anytime.

