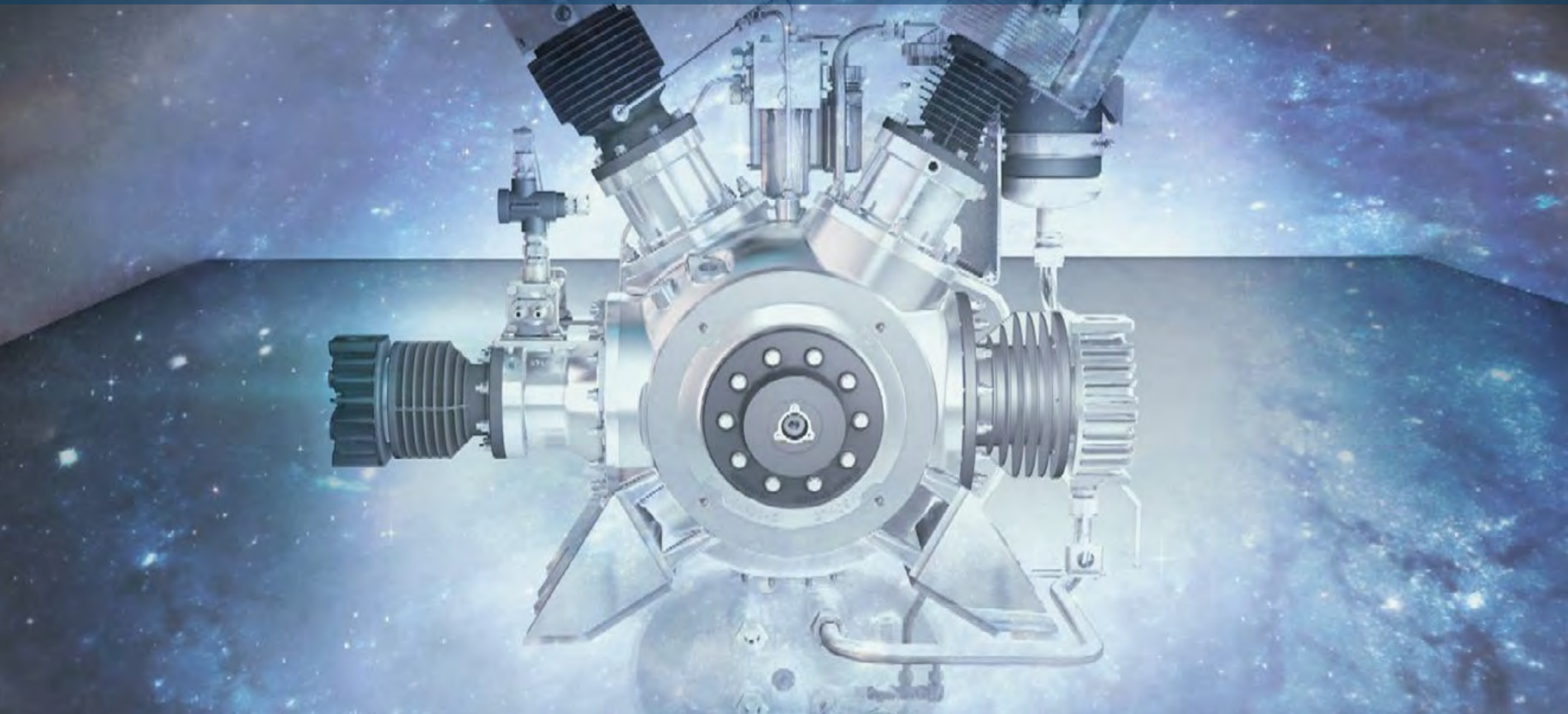


# 70 YEARS OF BAUER KOMPRESSOREN

High-powered performance



**BAUER**  
**KOMPRESSOREN**

Quality. Our DNA

# 70 YEARS OF BAUER KOMPRESSOREN

High-powered performance





Dr. Monika Bayat, Heinz Bauer, Philipp Bayat (from left to right)

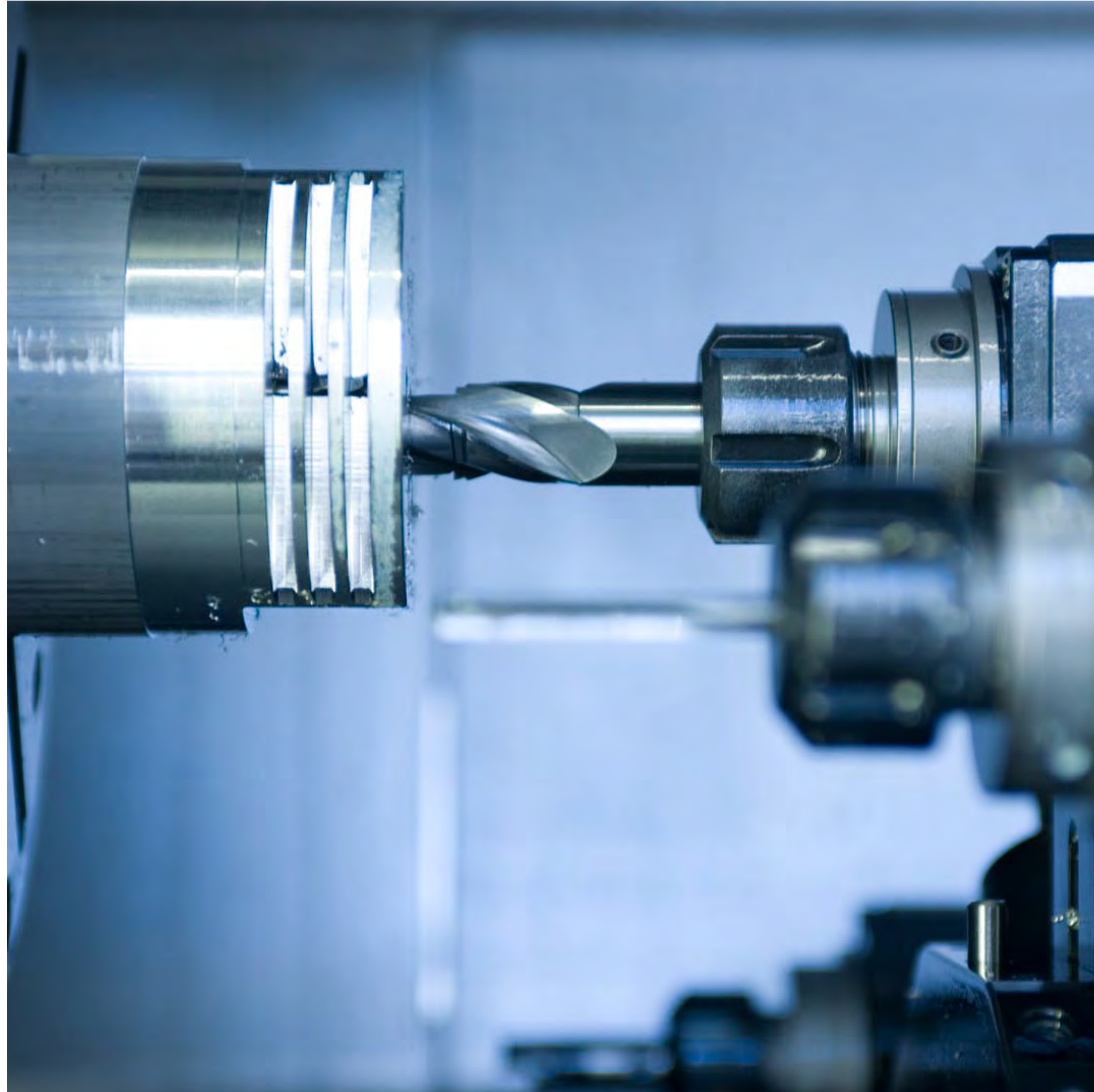
## FOREWORD

70 years ago, just one year after the end of the Second World War with Germany still in ruins, my grandfather Hans Bauer started to produce compressors at his parents' property. Not even in his wildest dreams could he have imagined that he was laying down the foundation for a global corporation. His overriding mission at the time was to produce technically optimal systems of outstanding quality. It is thanks to this uncompromising approach and the fact that BAUER KOMPRESSOREN early on adopted a global outlook that today, the company is one of the market leaders. And also because my father, Heinz Bauer, ran and systematically expanded the company with a great deal of creativity, technical vision and the same kind of focus on quality.

Today, the company, which began as a single-plant operation in Munich, has grown into a global technological company with subsidiaries in 20 countries. The basis of our success is that BAUER KOMPRESSOREN, despite its global outlook, has remained at its core a family-owned company. As the third generation, together with my husband Philipp Bayat, we will ensure the continuity to grow and innovate before handing over the reins to our children in time to come.

But our success has and will continue to be dependent on our dedicated, talented and qualified employees. Our long-standing workforce provided us with a wealth of experience and in-depth knowledge. And our young newcomers bring new ideas with them. As a team we together provide the valuable impetus that helps secure the future of the company. For this reason, my particular thanks at this point go to all our employees for our joint success.

Dr. Monika Bayat



## CONTENTS

|                    |   |
|--------------------|---|
| 1946–1955          | A rough start ___ 6                           |
| <b>TECHNOLOGY</b>  | How a compressor block works ___ 8            |
| 1956–1965          | On the road to success ___ 10                 |
| <b>DIVING</b>      | BAUER breathing air ___ 12                    |
| 1966–1975          | New products for new markets ___ 14           |
| <b>NATURAL GAS</b> | BAUER natural gas ___ 16                      |
| 1976–1985          | Focus on the world ___ 18                     |
| <b>INNOVATION</b>  | Innovation as a recipe for success ___ 20     |
| 1986–1995          | BAUER accelerates ___ 22                      |
| <b>INVOLVEMENT</b> | BAUER gets involved ___ 24                    |
| 1996–2005          | A vigorous start to the new millennium ___ 26 |
| <b>WORLDWIDE</b>   | Success thanks to a worldwide presence ___ 28 |
| 2006–2015          | BAUER becomes a global player ___ 30          |
| <b>PRODUCTION</b>  | A new plant is opened ___ 32                  |

## A ROUGH START

**B**AUER KOMPRESSOREN began, like many other medium-sized German companies, shortly after the war, more precisely in 1946. Germany had capitulated just one year previously. Hans Bauer, the company's founder, took advantage of the German economy's so-called "Zero Hour" – a time of great challenges and opportunities – to start his own business.

**1946** Having worked as an engineer at the Sendlinger Motorenfabrik engine factory he had a wealth of technical knowledge, and as a human being was a visionary, with boundless energy. He recognised the economic potential of compressors, and his technical knowledge as a design engineer meant that he was able to design them, because a piston compressor and a motor are constructed similarly. He started production at his own home, initially with three employees.

The first product was a compressor block, positioned on the back of a tractor and used to inflate the tyres while out on the fields if necessary. What proved difficult at the beginning was getting hold of the materials. Those in short supply after the war and needed to manufacture compressors, such as bronze and ball bearings, could officially only be acquired with ration coupons. As a result, alongside the official economy there flourished a lively and informal barter economy.

**1950** The company won its first big export order for 50 low-pressure compressors from Greece. Portugal followed with an order for 150 units. Compressors were big business at the time. Germany's cities lay in ruins and had to be rebuilt. The workforce accordingly grew rapidly, and in 1956 the number of employees exceeded 50. Additional production halls were built in the surrounding area. Staff affectionately referred to this loose network of manufacturing facilities as the "United Smelting Works". Right from the start,

“I want to build machines that provide 100% performance at all times. Each percentage point less means 10% less turnover.” **HANS BAUER**

### FAMILY TRADITION

If there is a core factor that underlies the company's ongoing success and its unique corporate culture, it's the family tradition: Since its foundation in 1946, BAUER KOMPRESSOREN, now in its third generation, has been a purely family-run business. This has allowed it to develop the brand into the strong brand that it is today on the basis of long-term, quality-oriented thinking rather than short-term sales-driven activism.



Hans Bauer



This is what Munich looked like after the War – with the first BAUER compressor used for the clearing work.

Hans Bauer insisted on an uncompromising approach to quality according to his maxim: "I want to build machines that provide 100% performance at all times. Each percentage point less means 10 % less turnover."

### WHAT ELSE HAPPENED

**1949**

Proclamation of the People's Republic of China by Mao Tse-tung

**1954**

The Miracle of Bern: Germany's young post-war football team won the World Cup against favourites Hungary.

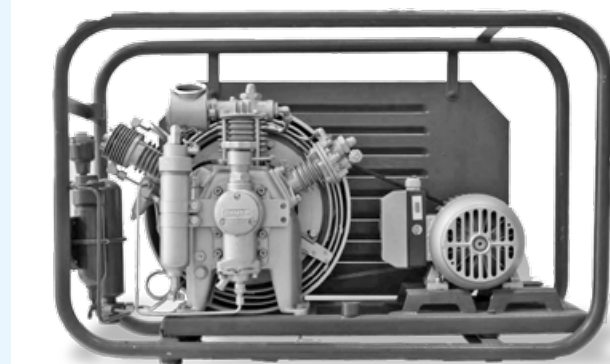
**1955**

The one millionth Volkswagen Beetle rolled off the production line in Wolfsburg.

**1953** Hans Bauer received an unexpected visit from the French representative of an American group interested in high-pressure compressors for diving. He declared he would buy a thousand of them. With this enticing order in sight, the company's designers feverishly started working on the design. After initial difficulties – the company first had to carry out a large number of tests and trials in order to gain the technical expertise required with respect to the control of high-pressure compression – just one year later, the first production-ready model – the UTILUS – was launched.

**1954** Turnover exceeded the magic million mark for the first time. The money was invested in new production facilities and the production range systematically expanded. In 1955, the first mobile diesel compressors went into production.

### THE UTILUS THE FATHER OF ALL HIGH-PRESSURE COMPRESSORS



Based on the Latin word "utilis" (useful), the name was at the same time an acronym of BAUER's German slogan "Unseren Tauchern Immer Luft und Sicherheit" ("Air and safety for our divers at all times"), and over time its double meaning has come to be a guiding principle for all BAUER product development work.

## HOW A COMPRESSOR BLOCK WORKS

The compressor block is the heart of every BAUER unit. It ensures that the delivered gas, be it air, nitrogen, natural gas or inert gas, is so highly compressed that the gas amount is reduced in the most extreme case, at 500 bar, to just 1/500 of its original volume.

Controlling this compression process calls for enormous engineering know-how by block designers, as many technical challenges remain at such high pressures: The strong frictional heat must be effectively cooled down, water and oil condensate must be discharged, and lubrication of the moving parts under extreme pressure and at very low tolerances ensured. Following decades of research and development, BAUER has created compressor blocks that easily master these challenges and which thanks to their durability and reliability have earned a legendary reputation.

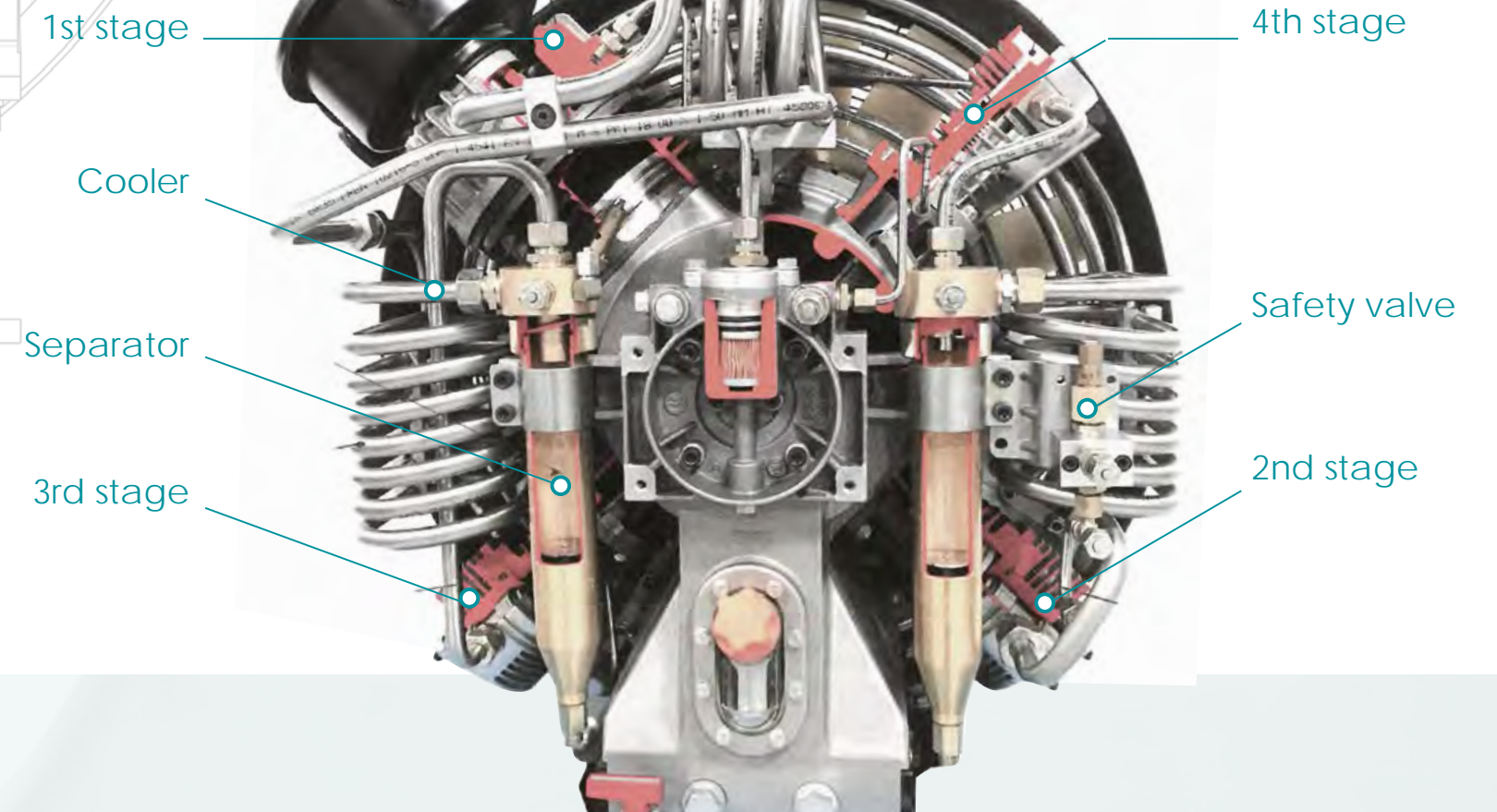
High pressures of over 20 bar can only be achieved with a multi-stage reciprocating compressor. The higher the achievable pressure, the more compressor stages that are needed, because the resulting frictional heat limits the pressure increase in the individual stages. How such a compressor block works is shown below using a 4-point IK 150 block with 350 bar final pressure: The crankshaft and the connecting rods actuate the pistons in the cylinders in an upward and downward movement. An oil pump ensures the necessary lubrication of parts. In the cylinder head there is a suction and a pressure valve.

On moving downwards, the piston sucks in uncompressed air or gas, and the spring-loaded suction valve opens automatically through the vacuum or differential pressure. When the piston moves upward, the suction valve closes again, and the pressure valve opens through the over-pressure.

The pre-compressed gas flows into the next cylinder with a significantly lower (stroke) volume, where this process is repeated. The pressure increases from cylinder stage to cylinder stage in a ratio of about 4:1. The resulting compression temperature is, depending on the type of the compressed gas and the intake temperature, around 180°C. Before recompression, the hot gas between each compressor stage is cooled down again using a downstream



The manufacture of a combined high-pressure-stage guide/compression piston calls for state-of-the-art manufacturing technology and the highest-possible engineering expertise.



cooler to a temperature that is around 10 to 15°C above ambient levels. This effectively prevents the thermal overloading of materials such as lubrication oil in the subsequent stage.

Water that condenses when the gas cools in the coolers collects in traps, which are either manually emptied at given intervals or automatically emptied using an automatic condensate drain.

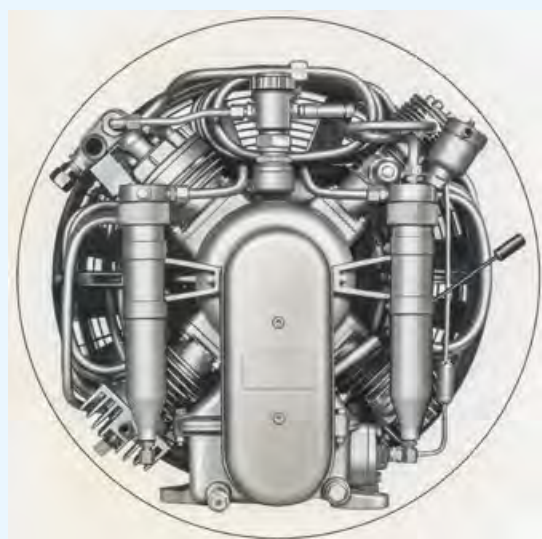
Safety valves after each compressor stage protect the pressurized components and engine bearings against overloading. They jump into action when the intermediate pressures or the final pressure exceed the permissible value by more than ten percent.

# ON THE ROAD TO SUCCESS

**W**hile the first ten years were characterised by improvisation and a struggle against adverse conditions, the young company's second decade was incredibly dynamic, thanks to Germany's accelerating economic recovery. BAUER quickly developed a wide product range, opened a new plant and grew rapidly.

**1956** In the American Space Center in Cape Canaveral, a BAUER compressor was used for the first time – in a particularly security-sensitive area: The pipes through which the high-explosive rocket fuel for the Jupiter space rocket was pumped had to be 100% leak-proof. They were therefore extensively tested for leaks before the rocket launch using helium, which was compacted to 200 bar to detect even the smallest leaks from the compressor. Thanks to their reliability, BAUER units were chosen for use there, and later on, also in the Kennedy Space Center, where they were used for decades, until the space programme was brought to an end.

## THE K14 THE FATHER OF THE BAUER BLOCKS



For decades it was the K14's special design that made it the company's most successful model: The four cylinder stages of the block were arranged in a cruciform opposite each other, thereby ensuring the optimal balancing of forces between the steps and particularly efficient compression. As a result, the block achieved a hitherto unprecedented smoothness and durability.

## WHAT ELSE HAPPENED

**1957**

With Sputnik, Russia successfully sent its first satellite into space.

**1961**

The Communist government of East Germany began construction of the Berlin Wall on the night of 12/13 August, describing it as an "anti-fascist protective wall" on its western border.

**1962**

The Cuban Missile Crisis kept the world in suspense and brought the nuclear powers, the USA and Russia, to the brink of war.

**1958** The famous K14 block was introduced into the market. The originally three-stage block, which was used in the UTILUS, had been developed into a four-stage high-pressure block. At a pressure of 225 bar, it compressed 200 litres a minute. To this day, it has remained one of BAUER's most successful blocks and was the inspiration for the distinctive BAUER block logo.

**1959** South of Munich, a new plant was opened in Geretsried-Gartenberg. Over the following twelve years, mobile and stationary low-pressure compressors with pressures between 7-15 bar and large boiler units with outputs of up to 55 kilowatts were manufactured here. The modern assembly plant was already largely vertically integrated with its own frame construction division and a paint shop.

**1964** The export share was already an impressive 80 percent. The new concept of mobile diesel units had proved to be real export hit, and contributed greatly to BAUER KOMPRESSOREN's rapid international growth. Mobile three-stage BAUER units were used, for example, to check for leakages in the tens of thousands of kilometres of pipelines laid across the vast Russian taiga to transport gas from the newly-developed natural gas fields of the Urals.

“BAUER's number one guiding principle is and remains as Reliability. We have to support our customers.” **HEINZ BAUER**



1959 – The BAUER team at "Bauma", the world's largest construction trade fair, in Munich. Powerful site compressors were an important revenue driver in the 50s and early 60s for BAUER.



BAUER expands rapidly and builds another plant south of Munich.



A block assembly line at the plant in Wolfratshausen Strasse.

### BAUER TRANSFORMED DIVING INTO A POPULAR SPORT

The development of diving into a popular sport only began after World War II. Previously, the underwater world had primarily been the domain of scientists and the military.

The introduction of helmet diving equipment and diving bells in the 19th century marked the beginning of the conquest of the underwater world. Around 1926, Dräger invented the first breathing apparatus able to absorb CO<sub>2</sub> from exhaled air using soda lime and to mix the remaining air with new oxygen from external bottles. As this was a very expensive technology, it was not yet suited for use in popular sports.

The breakthrough came in 1943-44 with the development of the diving regulator by engineer Emile Gagnan – a prerequisite for the use of compressed air from pressure cylinders for diving.

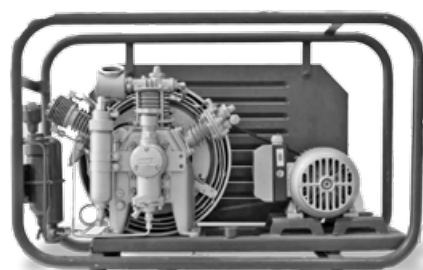
In 1955, to help finance his expeditions, German research diver Hans Hass offered the first diving safaris on board his ship "Xarifa", heralding the era of diving tourism. A BAUER UTILUS supplied the breathing air. Its older brother, the four-stage K14, secured the air supply for Jacques Cousteau's research dives on the research ship "Calypso". His television programmes had aroused the interest of audiences worldwide in this previously unknown underwater world and thereby set off a diving boom.



1957 – Diving pioneer Sigi Köster tests the newly developed UTILUS compressor.



A KA 15-B breathing air compressor in use on a dive base in the late 60s.



UTILUS

### FROM THE UTILUS TO THE JUNIOR

The UTILUS, the legendary original modern diving compressor, was unique in the market. Compact and light, it was equipped with an effective air purification system.

It was followed by the even more compact PURUS compressor, which proved immensely popular with diving clubs, as hobby divers could afford to buy it.

The VARIUS was introduced onto the market as a version with a replaceable drive motor. It combined a delivery capacity of 65 l/min with compact exterior dimensions and a very low weight. Thanks to its clever design, the motor and block could be separated by hand without the use of tools,



This diving poster from the 80s illustrated the point perfectly: Air from a BAUER compressor is cleaner than the ambient air.

BAUER diving compressors were becoming more powerful and at the same time smaller. In 1995, the JUNIOR was introduced onto the market, and remains to this day the world's best-selling mobile diving compressor.

At the beginning of the 80s, BAUER totally redefined the stationary diving compressor with the development of the VERTICUS: The vertical system concept combined previously unknown ease of use with extremely low noise levels and a very small footprint – a quantum leap in compressor technology.

Together with its little brother the MINI-VERTICUS today it forms the backbone of BAUER's stationary system range, and as an indestructible workhorse continues to reliably serve countless diving bases.

making it easier to transport. It paved the way for the more compact JUNIOR. Its new TRIPLEX filter system ingeniously combined the filter and final separator in one housing.

JUNIOR II



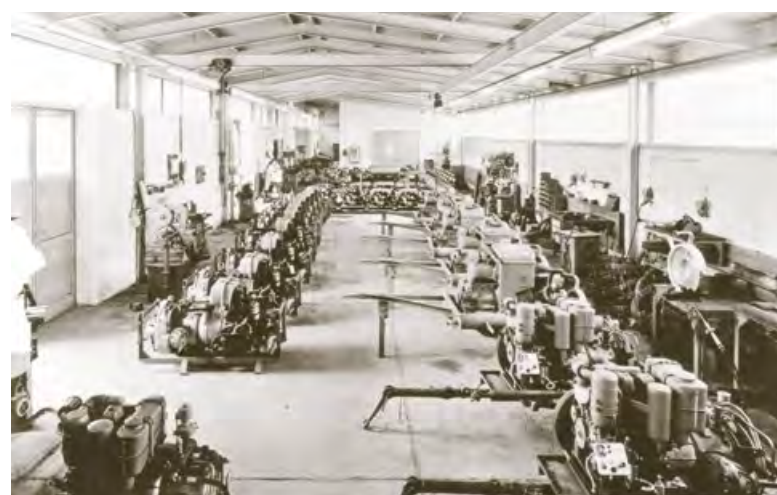
Affordable compressors, such as the UTILUS U10 shown here, enabled each diver to own their own compressor.



# NEW PRODUCTS FOR NEW MARKETS

After rapid growth in the 1960s, the 1970s for BAUER were years of consolidation and the targeted expansion of its product range. Thanks to the quality and reliability of its products, BAUER had by now achieved an excellent reputation, which helped it win prestige projects such as supplying compressors for the construction of Egypt's Aswan Dam.

“When we start a project, we always think in terms of systems and the user benefits.” HEINZ BAUER



Mobile systems being assembled at Plant II in Geretsried-Gartenberg in the early 1960s

**1970** The twelfth and last turbine for the Aswan Dam went into operation after a construction period of ten years. The massive structure was almost four kilometres long and 111 metres high. At its heart, BAUER compressor units precisely controlled and regulated the angle of the twelve mighty turbines, thus ensuring that the waters of the Nile could be safely restrained. In addition to power generation, the Aswan Dam was intended to protect the water requirements of Egyptian agriculture during drought periods, while protecting against the annual Nile flooding. Today it covers ten percent of Egypt's electricity needs.

**1971** BAUER built its largest ever high-pressure compressor unit – the cryptically-named DA 180 H-180. The large-scale unit consisted of a combined high and low pressure compressor block, powered by a 180 hp diesel motor.



A BAUER high pressure compressor at Munich airport supplies the air to start the turbine.

The unit was constructed for use on the exploration ship "Pol-lux" belonging to the specialist company Prakla-Seismos, used to find submarine oil fields. To detect oil-bearing rock layers, pressure pulses were sent to the depths using an "air-gun" (air pulse method). Seismic waves reflected by the sub-surface were then evaluated, providing information on the possible presence of deposits. The DA 180 with its delivery capacity of no less than 8000l/min supplied the huge amount of high-pressure air required for this.

**1972** BAUER KOMPRESSOREN built a new plant in Wolfratshausen. At the same time, the Geretsried-Gartenberg plant was sold together with the drive systems programme. At the new site in Wolfratshausen, production was focused on stationary screw compressor units up to 220 kW and pressures up to 18 bar, while the Munich plant housed the development, production and assembly of high-pressure compressors.



A female diver with a portable BAUER compressor

## WHAT ELSE HAPPENED

**1969**

The Apollo 11 lunar mission saw Neil Armstrong becoming the first man to set foot on the moon.

**1969**

At the legendary American Music Festival in Woodstock, over the course of three days 32 bands played in front of 400,000 peaceful visitors.

**1973**

Cuts in oil production by the OPEC countries led to the oil price doubling within one year, heralding the start of the oil crisis.

## THE SILENT A QUANTUM LEAP IN TERMS OF NOISE PROTECTION



Before the introduction of the SILENT, the systems available on the market were incredibly loud. BAUER devoted a great deal of resources to the development of the new SILENT site compressor. With its noise level of just 62 dB/A, it set completely new technical standards. Its internally-developed centrifugal clutch worked reliably even in extremely cold conditions, making it ideal for use in places like Siberia.

## NATURAL-GAS FILLING STATIONS – A SUCCESS STORY FOR BAUER AND THE ENVIRONMENT

In 1862, long before there were cars with petrol or diesel engines, Frenchman Etienne Lenoir succeeded in developing the first gas-engine vehicle. In 1930s Italy in particular there were many natural-gas-powered vehicles, instantly recognisable by their roof-mounted gas cylinders. Natural-gas filling stations started off small in the United States. Having delivered its first filling station to Kansas City Gas in 1976, BAUER COMPRESSORS/Norfolk was a player right from the start. The range of vehicles was initially very limited, with only the Toyota Hiace and the Fiat Panda available. At the start of the 1980s, thanks to government subsidies the natural-gas vehicle market began to expand. With 25 percent lower CO<sub>2</sub> emissions, 60 percent lower CO emissions and the complete absence of particles, public attention started to shift to natural gas as a possible fuel.

In 1996, BAUER supplied a natural-gas filling station to the BMW plant in Dingolfing for initial fuelling of its new natural-gas vehicles. With its high-pressure gas processing system for pure and dry gas, BAUER was technically a step ahead of the competition. Thus, BAUER quickly established itself as a quality leader in the highly competitive natural-gas market and acquired numerous premium customers, such as the energy group E.ON.

By redeveloping its BK block range, BAUER opened up another market segment. In 2008 it secured a major coup: Following an international tender by the Abu Dhabi National Oil Company (ADNOC) for a national gas-station network, BAUER won the contract worth 100 million dollars. The first filling station in Abu Dhabi was opened by German Chancellor Angela Merkel during an official visit to the country. BAUER has presented the best-system design for coping with the extreme climatic conditions – ambient temperatures of up to 60 °C, sandstorms, and salty and humid air.



ADNOC large gas filling station with a gas storage station in Khalifa City/ Abu Dhabi



As far back as the end of the 90s, BAUER developed the prototype for a hydrogen compressor.



The COMPACT model from the new filling station range is striking on account of its functionality and good design.

In 2013, Russian gas giant GAZPROM ordered gas stations for use in Siberia in extreme temperatures down to minus 40 °C.

That same year, the new X-FILL-range was launched onto the market after a development period of just two years. Thanks to the development cooperation between BAUER USA and Munich, the company succeeded in incorporating the system technology into a particularly slim and compact unit. With the M-SERIES and COMPACT series, the unit concept was expanded in order to be able to meet all future demands – from compact gas stations to powerful large-scale systems. Following the launch of the new unit range, BAUER COMPRESSORS became the No.1 premium manufacturer in the American market, with "Fortune 100" companies such as Coca-Cola, British Airways, General Motors and Caterpillar ranking among its customers.

In 2014, ten thousand kilometres away in Australia the company also celebrated a first: The first BK 52 large blocks were installed by the largest local gas company, AGL, in gas stations in Sydney.

Since 2016, BAUER has been actively shaping the future of energy: When natural gas is produced in biomethane plants or is synthetically produced, it is not only low in harmful substances but also completely carbon neutral.

In a pilot large-scale plant in Pune near Mumbai, BAUER units are compressing biogas obtained from household waste for use as a fuel, including for vehicles. India's Prime Minister Modi attended the opening of this project in person due to its strategic importance to the country.

France, too, has decided to advance climate protection by promoting biomethane, and in the next few years will subsidise the construction of 300 biomethane filling stations. Filled with biomethane, LPG vehicles drive just as "cleanly" as electric cars.

In building up their gas-station infrastructure, the gas multinational Air Liquide and the gas-station company TOTAL are both relying on BAUER's technical expertise. The first BAUER units are already in operation.

# FOCUS ON THE WORLD

**B**AUER during this decade grew into a global company. Hans Bauer recognised the importance of being present in global markets for further growth early on. Consequently, from the mid-70s onwards, he focused on global expansion. Following the foundation of BAUER COMPRESSORS in the US, other subsidiaries were founded one after the other in Europe and Asia, with the new plant in Munich providing the production capacity required in response to the rapidly growing sales.

**1976** BAUER COMPRESSORS was founded in Norfolk, Virginia (USA), marking the start of BAUER's expansion into international markets. The site near America's largest naval base was strategically chosen in order to open up the entire American continent from the Atlantic coast. Subsequently, numerous regional offices were opened. In the adjacent plant, customised units were manufactured to meet the needs of the local market using BAUER blocks from Munich.

**1978** By relocating to the newly built plant in Drygalski-Allee, BAUER lay the foundation for its global growth in the subsequent decades. At the time of opening, the manufacturing lines were state-of-the-art. For the first time, CNC machines were used in the prefabrication process. The new plant marked the transition of the company

from a "workshop" into a factory, with for the first time only high and medium pressure systems being manufactured there.

**1979** At the old site in Munich in Wolfratshauer Strasse, another new subsidiary was founded: It, under the label ROTORCOMP, manufactured screw compressors and screw modules. What was special about them was the fact that the "rolling profile" of the coil, developed by the company itself, had for the first time in the company's history been designed according to bionic standards. Starting with the 15k W compressor blocks, over the years the range was expanded into a full series, and currently extends from 2.2 kW to 450 kW.

**1982** A large order from the Middle East took up the company's entire production capacity and called for a huge logistical effort: A total of 15 high-pressure compressor units with a reducing station and 164 three-axle Mercedes vehicles with large high-pressure reservoirs had to be completed in just nine months. Completing the order proved to be a huge challenge. At the beginning, BAUER's range didn't include a compressor block able to provide the required amount of high-pressure air. The K25-type block to be used in the units had up until that point only existed in the minds of developers, and was developed into a market-ready product at breakneck speed in just six months!



BAUER COMPRESSORS in Norfolk/USA – The company's first overseas subsidiary marked the beginning of BAUER's global expansion.



Here, the construction cranes are still in use on the company's new main site. Soon, however, compressors will be manufactured here for the global market using state-of-the-art CNC processing centres.



A bird's-eye view of BAUER's completed plant in Drygalski-Allee



Heinz Bauer in front of the Air Servicing Unit for the Middle East

## THE IK28 BLOCK BAUER'S WORKHORSE



A growing demand for ever higher delivery volumes led to the development of the new IK series. The I stands for industry, and it was designed as a modular system for 3- and 4-stage 220, 350 and up to 500 bar blocks. Later, the series was expanded to include 5-stage blocks up to 500 bar. The extremely robust blocks still in use today form the backbone of the air-cooled industrial plant series, with its most powerful representative still being the IK 28 block.

### WHAT ELSE HAPPENED

**1978**

What was previously thought virtually impossible, Reinhold Messner succeeded in doing: He is the first person to climb Mount Everest alone without oxygen equipment.

**1981**

The Space Shuttle made its maiden voyage, heralding a new era in space exploration.

**1983**

In America, the Motorola 8000X was the first mobile phone to come on to the market.

## INNOVATION AS A RECIPE FOR SUCCESS

The man behind BAUER's success: Innovation has been the company's driving force across all generations. Without this desire to constantly improve the products and the willingness to tread totally new paths, it is unlikely that BAUER would have attained its current size and leading market position in its field.

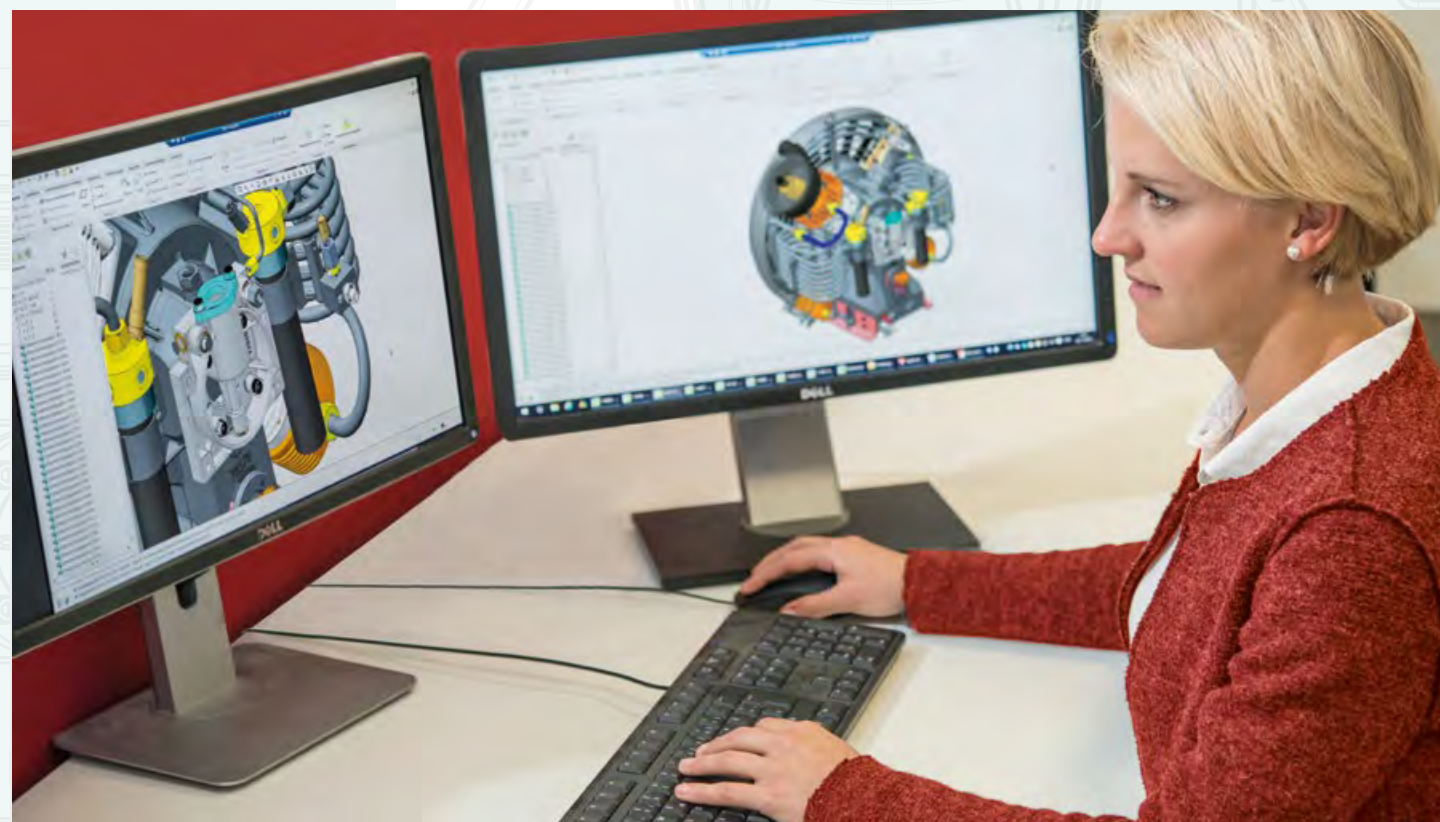
In BAUER's early years, site compressors were an important revenue generator, but were very noisy in use. Why not equip the mobile systems with effective noise protection?, thought company founder Hans Bauer, paving the way for the development of the soundproofed SILENT series, at the time a revolution in the market.

In the mid-1950s, BAUER courageously ventured onto completely new and unknown territory with its high-pressure technology. The innovativeness of the technology ensured that BAUER immediately secured a leading position in this field. Unlike many other competitors, BAUER recognised the need for good air purification in breathing air compressors. To keep the filter containers especially compact and thus easy to maintain, the necessary components such as separators and filter containers were cleverly constructed into each other as rings, similar to a Russian doll: The result: the revolutionary TRIPLEX filter system, half the size and half the weight of a conventionally constructed filter with comparable performance! The new piston worked in secret and consequently all the more effectively. It moved freely (no tilt) in the high-pressure stage cylinder bore, thus ensuring the legendary longevity of BAUER compressors.

Sometimes nature is the best model for new designs: With BAUER, that was the case on developing the new BK compressor block series, which was designed according to bionic standards: A ball is the best shape for withstanding pressure due to its small surface. Accordingly, the pressure-resistant housing of the BK 24 block and all subsequent models were spherically-shaped, which ensures low vibration and a service life up to an incredible



Back then, still using the slide rule: Hans Bauer carrying out measurements for the first compressors.



Today BAUER creates systems using state-of-the-art CAD programs

60,000 hours. In addition, the oil lubrication system was totally revamped and moved outwards into a likewise spherically-shaped container, which ensures lubrication even with large inclinations of up to 45 degrees.

A successful design meets the requirements for functionality and aesthetics alike, as seen with the new natural-gas unit series. Whereas filling stations were previously housed in boring rectangular steel containers or concrete buildings, the new series COMPACT, M-SERIES and X-FILL have modern designs, and simultaneously incorporate proven BAUER technology in as compact a shape as possible.

Safety has been a core concern for BAUER for all product lines since the company was founded. It is therefore no wonder that the company focuses on product and operator safety in all developments. In the field of breathing air production, the market is increasingly demanding continuous monitoring of compressed air and gases for harmful substances. Rather than wait for statutory regulations, BAUER decided to take the lead by introducing the B-DETECTION range – a series of online measuring devices that carry out ongoing state-of-the-art measurement of pollutants regulated by the DIN EN 12021 breathing air standard, such as carbon dioxide, carbon monoxide and moisture carried in the air.

But this alone would be insufficient in terms of safety: Thus, BAUER together with its subsidiaries in Germany, the USA and France has for the filling of breathing air cylinders developed a comprehensive safety architecture to protect the operator that not only monitors the purity of the breathing air, but also, as with the UNICUS IV, protects the operator from bursting bottles using integrated safety filling cells. The filling operations and the achieved air and gas quality are also documented using a traceable RFID code, which is printed on a sticker attached to the breathing air cylinder and stored in Cloud.

At BAUER the future begins in the present.

# BAUER ACCELERATES

**D**uring this decade, the focus of expansion was on Europe. Numerous new subsidiaries were founded in neighbouring countries. Issues such as dying forests and the Chernobyl nuclear accident raised the public's awareness of the need for effective environmental protection – and BAUER supplied the requisite technology: In Germany, construction of the first natural-gas filling station began in Munich and the new "Fuel Gas Systems" division was set up.

**1986** Neighbouring France became an increasingly important key market for BAUER, with the company's first overseas office being opened here. And the industrial division grew so rapidly in the early 80s that it was decided in Munich to found BAUER COMPRESSEURS as a separate subsidiary. It focused mainly on the booming plastics market and successfully developed solutions for the exact dosing of the internal gas pressure area that were unrivalled in the market in terms of their precision.

**1987** Once again BAUER set a new standard for compressor units with the VERTICUS. Why not place the drive under the block?, thought the designers to themselves. The compact design saved a lot of space, and at the same time important controls were moved to grip- or eye-height. A quantum leap in terms of ergonomics, and a development subsequently frequently copied by the competition. The silent housing also reduced the unit noise down to sensationally low values.



At its site in Drygalski-Allee, BAUER ran one of the first public CNG filling stations in Munich, with a BMW 3 Series is shown here being refuelled.

” No energy revolution without BAUER “ PHILIPP BAYAT

## WHAT ELSE HAPPENED

### 1986

In Chernobyl, Russia, an industrial accident triggered the most serious nuclear accident in human history. As a result of the core meltdown, radioactivity spread across Europe.

### 1989

After the collapse of the communist system in Russia, the citizens of East Germany gained their freedom peacefully through mass demonstrations.

The Berlin Wall came down, and one year later Germany celebrated its reunification.

### 1990

Beneath the English Channel, British and French drilling crews met at the tunnel breakthrough. This represented the first-ever land connection between the European continent and the British Isles.



With the acquisition of offshore specialists SAS in England, BAUER successfully expanded its activities in the oil and gas sector.

**1994** In Vicenza in northern Italy, another subsidiary was born: BAUER COMPRESSORI initially focused on the firefighting, diving and marine application areas. One year later, BAUER acquired SAS, a partner company based in England near Liverpool. This represented a strategically excellent acquisition, because the specialist in the oil and gas sector brought with it large customers such as Schlumberger and BP to BAUER.

**1995** The first of 800 BAUER natural-gas filling stations went into operation. Three years earlier, public awareness of natural gas had increased following the Earth Summit in Rio: With 25 percent less CO<sub>2</sub> emissions, 60 percent lower CO emissions and the complete absence of particles, the gaseous fuel promised a significant improvement in the air climate. Following the summit, subsidy programmes were launched that laid the foundations for the installation of a nationwide filling-station programme over the next few decades.

## THE VERTICUS THE VERTICAL COMPRESSOR



Unlike traditionally designed units in which the block was mounted on a base next to the drive, the VERTICUS with its vertical housing required very little space. The filling units could be used standing up and the controls were ideally positioned at eye level. One ingenious detail: The electric drive was mounted on a movable rocker and tensioned the fan-belt using its own weight. A sophisticated sound guidance system inside the unit and special insulation materials meant quiet operation.

## BAUER GETS INVOLVED

Where the air supply even under the harshest conditions is crucial for the success of a scientific project, and where extreme environments require uncompromising unit reliability, the decision is generally taken to use BAUER compressors. BAUER for its part sees itself as having corporate responsibility in the sports, social and education areas when it comes to the realisation of socially important projects.

Since the box office success of "The Big Blue", people have been fascinated by free divers who attempt to break records by plunging into the midnight-blue depths of the seas without using external air from scuba tanks. The German free diver Heimo Hanke was one of them, and a particularly successful one at that: In 2000, he broke the **world record** in the "no limits" discipline by reaching a depth of 112 metres. The safety divers that oversee every record attempt are extremely important. An on-site BAUER compressor supplied the breathing air needed for the preparation of the special air mix (Trimix) for dives down to a depth of 70 metres.

In light of recent events, fire services are currently being reorganized to react efficiently to disaster events. An important element in this are coordinated joint exercises such as the 2016 fire brigade training exercise in Wildflecken – a large-scale exercise in which 25 entire fire departments, the Red Cross and the German Armed Forces participated with a total of 240 people. BAUER supported the exercise by providing the on-site entire air supply. The final exercise simulated a helicopter crash. Fires had to be extinguished, the injured rescued, and the accident scene secured with full respiratory protection, in total darkness, and on inaccessible terrain

**Top-level university research** is helping to secure the future of the German economy. One such research project is called "Formula Student", and sees student teams from around the world competing against each other with self-built vehicles. The development and construction of the racing cars, which look like miniature versions of Formula 1 cars, using high-tech materials takes almost a year, and the project completion are highly dependent on



Free diver Heimo Hanke celebrates his new free-diving world record in the "no limits" discipline.



The Technical University of Munich's vehicle at the Formula Student race - supported by BAUER



A BAUER MARINER secures the air supply on the Polarstern expedition to study climate change in Antarctica.



At the diving camp at Helenensee, besides diving children from the Kepler School in Neukölln also learn social skills.

external resources. BAUER is supporting the team of the Technical University of Munich with a high pressure compressor unit that generates the required air for the pneumatic systems in the vehicle.

At the end of 2014, a team centred on biologist Ulrich Freyer headed off on the German research vessel Polarstern on a **diving expedition** that was to take place during the Arctic winter. The aim was examine to development of stocks of small crustaceans (krill) in the Antarctica in order to be able to draw conclusions about global climate trends. Holes were cut into the Arctic ice as dive entry points, and the dives were held under solid ice cover. Ice storms and dive temperatures down to 4 °C below zero placed huge demands on both the divers and their equipment. For a reliable air supply under these extreme conditions a specially equipped BAUER compressor was required.

At the Kepler School in Berlin's Neukölln district, teachers Viola and Joachim Sperling have for years been carrying out a voluntary youth project that teaches diving in theory and practice to children and teenagers at this **problem school**, a high percentage of whom have migrant backgrounds. Committed students are given the opportunity to acquire a regular diving licence at a summer diving camp. The aim is to teach them social competence, solidarity and team spirit. The Sperlings, the participating volunteer instructors and tutors sacrifice their holidays and largely funded the project themselves. Impressed by this exemplary commitment, BAUER had donated a JUNIOR II portable diving compressor to provide diving-air supply purposes during the training.

# A VIGOROUS START TO THE NEW MILLENNIUM

The years around the turn of the millennium also marked a big change for BAUER: the leap from a factory to a company. BAUER prepared for the challenges ahead by building the ultramodern UNICCOMP component factory. And the small units area was expanded massively with the arrival of the JUNIOR and PROFI-LINE compressors.

**1996** At an official ceremony, BAUER celebrated its 50th anniversary with employees and partners. For the Munich-based company this was not an excuse to rest on its laurels, however. The tiger economies of South-East Asia were on the verge of taking off. By setting up BAUER COMPRESSORS Asia in the bustling metropolis of Singapore, BAUER was quick off the mark when it came to tapping into the South-East Asian market. Surrounding countries such as Indonesia, Malaysia, Thailand and Vietnam required large numbers of reliable and durable German-quality compressors in the wake of rapid growing industrial production and booming tourism.

## THE PROFI-LINE

POWERHOUSES WITH A MODERN LOOK



When redesigning the mobile breathing air range for professional use, weight and dimensions were high up on the agenda. The PROFI-LINE featured the new BK 12.14 block, use of aluminium in the frame, and many other improvements, rendering it a worthy successor.

## WHAT ELSE HAPPENED

**1997**

For the first time, artificial intelligence beat a human in a head-to-head duel: IBM's chess computer won a match against Russian grandmaster Garry Kasparov under tournament conditions.

**1997**

The former crown colony of Hong Kong was handed back to China after 156 years of British rule, and given the status of a Chinese special administrative region with far-reaching autonomy.

**2002**

Twelve years after reunification, the Germans said goodbye to an old friend: The German Mark was replaced by the Euro as the official currency.

**1997** BAUER obtained DIN ISO 9001 certification – official external proof of its uncompromising quality standards when it came to its processes and products.

**1998** The JUNIOR II came onto the market. It stood in the tradition of the UTILUS and combined a delivery capacity of 100 l/min with much more compact dimensions and a weight of just over 40 kilos. It immediately became the most successful and best-selling compressor in its class, and in the diving sector it has become synonymous with portable diving compressors.

**1999** In the natural gas area, a new and very successful product concept was also being developed: With the Compact Fuel Station, CFS in short, BAUER offered a turnkey refuelling solution which, with its smart engineering, constituted a powerful and complete system consisting of a high-pressure compressor, gas processing unit and storage in an extremely compact housing.

**2001** The construction of a new component plant in the south of Munich represented another important building block for BAUER in its corporate expansion. Prior to this, the company's production facilities couldn't keep up with the rapidly growing demand for BAUER units. In building the new plant in Geretsried south of Munich, the company took advantage of the opportunity to build a state-of-the-art manufacturing facility with plenty of room for future expansion. From then on, this is where core compressor components such as blocks, filter systems and separators were manufactured, before being assembled into complete units at the site in Munich.

“ With UNICCOMP we now have the entire quality process, from raw materials to the finished compressor block, under control. ” HEINZ BAUER



A BAUER natural-gas filling station for bus refuelling on the premises of the public utility company in the Swiss town of Grenchen.



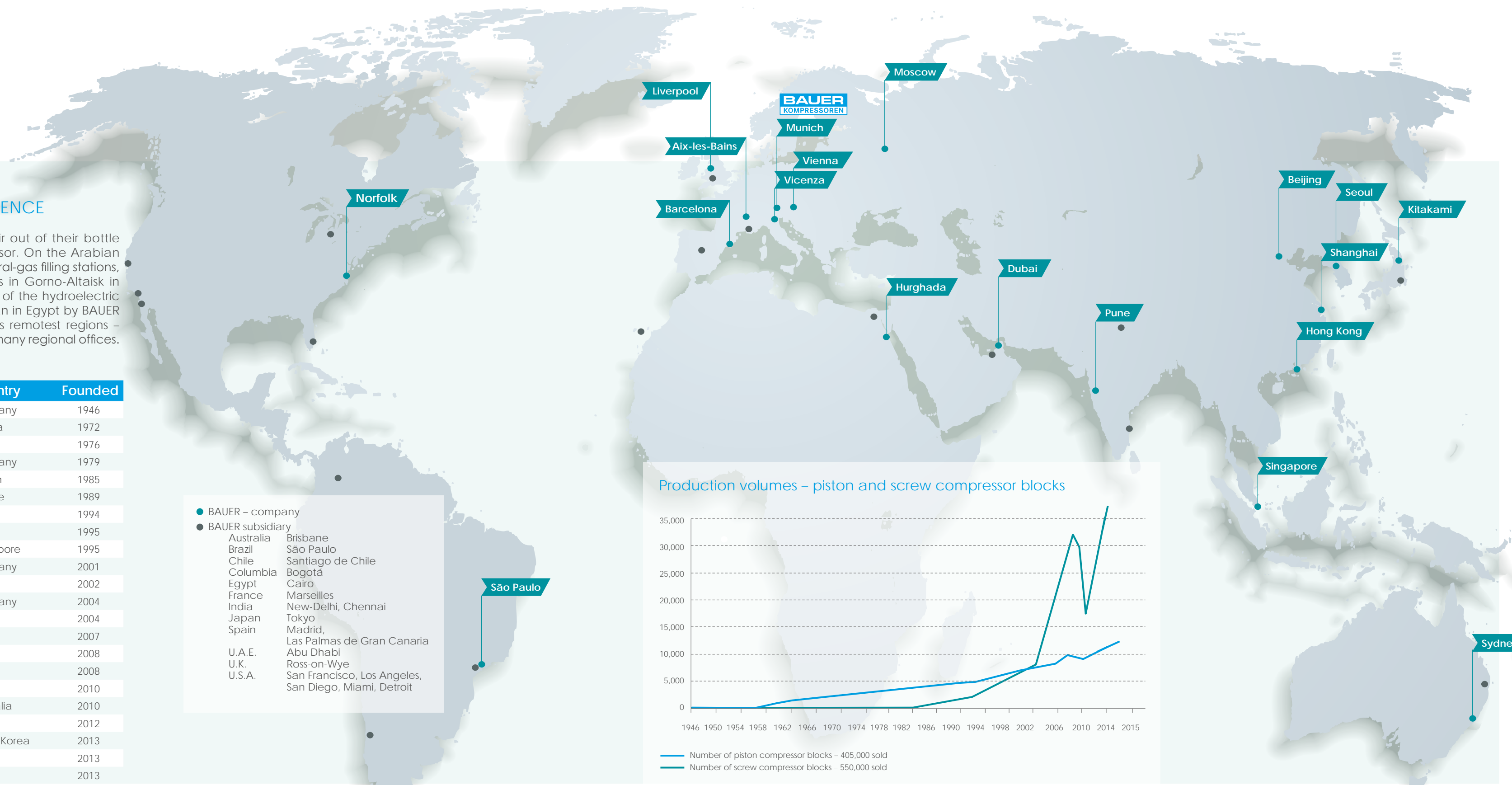
With the new UNICCOMP component plant south of Munich, BAUER at a stroke doubled its production capacity.

### SUCCESS THROUGH A GLOBAL PRESENCE

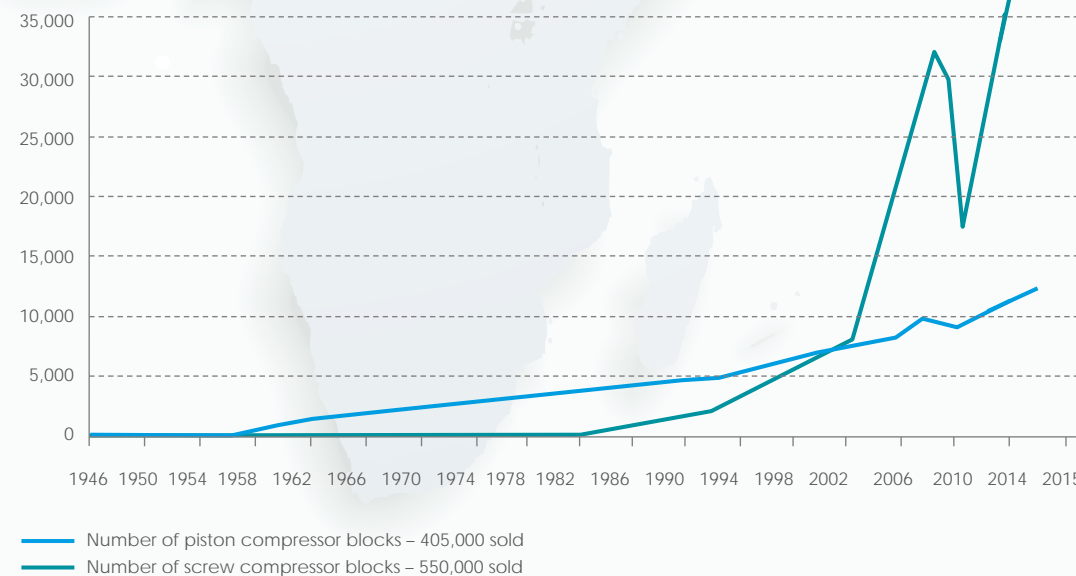
Whether a diver or a fireman, the breathing air out of their bottle more than likely comes from a BAUER compressor. On the Arabian Peninsula, cars in Abu Dhabi refuel at BAUER natural-gas filling stations, as do buses in Melbourne, Australia, and trucks in Gorno-Altai in Siberia. And in Krasnoyarsk in Russia, the turbines of the hydroelectric power plants are controlled like the ones in Aswan in Egypt by BAUER compressors. BAUER can be found in the earth's remotest regions – thanks to its global network of 21 subsidiaries and many regional offices.

| BAUER – company                        | Country     | Founded |
|--|-------------|---------|
| BAUER KOMPRESSOREN GmbH                | Germany     | 1946    |
| BAUER KOMPRESSOREN Ges.m.b.H.          | Austria     | 1972    |
| BAUER COMPRESSORS Inc.                 | U.S.A.      | 1976    |
| ROTORCOMP Verdichter GmbH              | Germany     | 1979    |
| BAUER COMPRESSORS Co. Ltd.             | Japan       | 1985    |
| BAUER COMPRESSEURS S.A.S.              | France      | 1989    |
| BAUER COMPRESSORI S.r.l. Unipersonale  | Italy       | 1994    |
| BAUER KOMPRESSOREN UK Ltd.             | U.K.        | 1995    |
| BAUER COMPRESSORS Asia Pte. Ltd.       | Singapore   | 1995    |
| UNICCOMP GmbH                          | Germany     | 2001    |
| BAUER KOMPRESSOREN China Ltd.          | China       | 2002    |
| BAUER COMP Holding GmbH                | Germany     | 2004    |
| BAUER KOMPRESSOREN GCC FZE             | U.A.E.      | 2004    |
| BAUER KOMPRESSOREN Shanghai Ltd.       | China       | 2007    |
| BAUER KOMPRESSOREN India Pvt. Ltd.     | India       | 2008    |
| BAUER KOMPRESSOREN Egypt Ltd.          | Egypt       | 2008    |
| BAUER KOMPRESSOREN OOO                 | Russia      | 2010    |
| BAUER KOMPRESSOREN Australia Pty. Ltd. | Australia   | 2010    |
| BAUER KOMPRESSOREN SERVICE, S.L.       | Spain       | 2012    |
| BAUER KOMPRESSOREN Korea Ltd.          | South Korea | 2013    |
| Bauer COMPRESSORES Brasil Ltda.        | Brazil      | 2013    |
| BAUER KOMPRESSOREN Beijing Ltd.        | China       | 2013    |

- BAUER – company
- BAUER subsidiary
  - Australia Brisbane
  - Brazil São Paulo
  - Chile Santiago de Chile
  - Columbia Bogotá
  - Egypt Cairo
  - France Marseilles
  - India New-Delhi, Chennai
  - Japan Tokyo
  - Spain Madrid, Las Palmas de Gran Canaria
  - U.A.E. Abu Dhabi
  - U.K. Ross-on-Wye
  - U.S.A. San Francisco, Los Angeles, San Diego, Miami, Detroit



Production volumes – piston and screw compressor blocks





## BAUER BECOMES A GLOBAL PLAYER

**B**AUER continued to grow at breathtaking speed in the decade between 2006 and 2015. Two plants were built, and the company became increasingly international: Between 2008 and 2013, seven new subsidiaries were founded – in Egypt, India, China, Australia and Russia, followed by Spain, Brazil and South Korea. A major contract for natural-gas filling stations in Abu Dhabi marked a new dimension in the booming filling station business, paving the way for "Fuel Gas Systems" to grow into one of BAUER's most strategically important future fields.

### THE NEW 26-SP SERIES

HIGH DELIVERY PERFORMANCE IN A COMPACT DESIGN



The new 26-SP series combined a screw compressor with a 4-stage high-pressure booster in a compact unit. A total of five compressor stages in combination with a highly efficient water cooling system held the compression temperature at a very low level. As a result, the units required very little maintenance and had long service lives. At the same time, they were quieter than comparable air-cooled compressors.

**2006** Booming sales and rapid growth meant that the Universal Compressor Components (UCC) plant, completed just six years previously, needed to be expanded. Thanks to proactive planning there was space for the construction of a second production hall, in which the entire part-machining and prefabrication was then placed. The machinery was expanded further to include ultra-modern CNC machining centres, which allowed an even higher level of vertical integration. As a result, the new building doubled the production capacity of UNICCOMP.

**2007** In diving, the oxygen-enriched NITROX breathing gas began its triumphal march. It allowed more and longer dives on the same day. The higher oxygen percentage enabled divers to recover faster, however during compression handling was difficult, since oxygen and oil under pressure can react with each other. After intensive development, BAUER brought the secure B-NITROX system onto the market. As the first TÜV-certified system, it set a new standard in this area.

**2008** The Abu Dhabi National Oil Company (ADNOC) tendered the construction of a national natural-gas filling station network. BAUER won the prestigious contract for the construction of initially 16 filling stations on account of its superior quality and technical expertise. During an official trip to the country, German Chancellor Angela Merkel personally inaugurated the first gas station in Abu Dhabi at a ceremony in front of a high-level business delegation.

**2014** The largest working ship in the world, 300 metres long, was built at a shipyard in Korea, with BAUER compressors on board. The Pioneering Spirit, belonging to the Dutch offshore service provider Allseas, with its two massive hulls was designed to transport complete drilling platforms and install them on site. On lowering the platform, the ship needed huge amounts of high pressure air to stabilise it, reliably supplied by a total of 32 powerful BK 28 units.

**2015** BAUER's legendary high-pressure compressors had been manufactured at the Munich plant in Drygalski-Allee since 1979. With production volumes expanding continuously, it became increasingly difficult to cope with these increases at the old site due to the restricted amount of area available. Following the acquisition of a neighbouring plot of land next to UNICCOMP, the opportunity arose to build a new, state-of-the-art assembly plant and create more synergies through the close integration of components and systems assembly. The relocation of the entire plant to a new location without interrupting production was logistically and organisationally very challenging, yet we succeeded thanks to meticulous planning and the commitment of everyone involved.



The ground-breaking ceremony for the new, ultra-modern plant in Geretsried. Having the component factory and the unit factory on the same site ensures BAUER's future viability.

### WHAT ELSE HAPPENED

**2009**

In Dubai, the 828 metre-high Burj Khalifa was completed. The impressive structure, by far the tallest in the world, had an unique architecture.

**2012**

In New York, at Sotheby's auction house, the up until then most expensive painting in the world changed hands. The new owner of "The Scream" by Edvard Munch paid almost EUR 120 million for it.

**2015**

The solar-powered aircraft Solar Impulse 2 successfully took off on its maiden flight. The aim was to fly around the world using only the power of the sun. It had the wingspan of a Boeing A380 but weighed only 1/150th of its weight.



German Chancellor Dr. Angela Merkel personally inaugurates the first BAUER natural-gas filling station in Abu Dhabi.

## A NEW PLANT IS OPENED

For decades, the Munich unit assembly plant in the Drygalski-Allee had been the heart of the BAUER GROUP. Production volumes had grown in line with the rapid success of the company, until finally capacity limits were reached and the site offered no further expansion or optimisation possibilities. It became clear that a new plant had to be built. In Geretsried, south of Munich, a suitable site was acquired right next to the UNICCOMP component factory for the planned production relocation.

The new, ultra-modern assembly plant was to set new standards in terms of production, logistics, working environment and energy efficiency, and be flexible enough to meet future requirements and needs. An ambitious 30/30 target was therefore set: On a 30 percent smaller area, the production cycle times, compared with the old production environment, were to be reduced by 30 percent! From the outset, the focus in the planning process was on the realisation of an optimal material flow, modern intralogistics and the ergonomic design of the new workspaces.

The previous manual warehouse management was replaced by a highly efficient central warehouse. The use of a barcode system throughout the plant, from goods receipt to picking of the individual parts and components, resulted in a significant improvement in process quality and a reduction in warehouse logistics costs. On the production side, all the assembly lines were overhauled and optimised according to the latest lean concepts for clocked assembly. The assembly of small and large units, which previously took place at different sites, was brought together in the new production hall, allowing for the customised and flexible use of employees on all assembly lines. Just one year after the ground-breaking ceremony, the new plant was completed in February 2015.

The direct connection to the sister plant UNICCOMP means that previously necessary transports between the plants can now be dispensed with and optimises the flow of material through "just in time" delivery of the core components. A total of eleven test booths with different dimensions and customised testing technology ensure 100 percent testing and quality of all units, from the Junior to industrial-scale units.



A bird's-eye view of the production site in Geretsried



In the summer, the idyllic outside area of the cafeteria is the ideal place to take in the sun.



The new plant has been constructed according to the latest lean concepts for optimal material flow and modern intralogistics.



Lots of light and glass – when designing the new canteen the focus was on the quality of life of the employees.

The CIP process is implemented by means of daily meetings between the various departments at the "Pareto tables" in the production department, and ensures a continuous improvement process and sustainable quality of the in-house processes and the products.

A key part of the planning – the optimal design of the hall both in terms of energy and functionality – has been implemented through the use of cutting-edge building technology. A modern, CI-based visualisation concept with bright, cheerful colours and lean-oriented requirements for markings, signs etc. has brought orientation and order to the production hall. Concrete core activation for heating and cooling the production hall and the latest LED lighting technology save energy, and together with ergonomically-designed workspaces ensure a healthy and pleasant indoor and working climate.

Thanks to the design of the new production hall and the systematic implementation of the developed improvement potential, the ambitious 30/30 target has been achieved and in some cases exceeded, and the planned budget only slightly exceeded.

# OUTLOOK

On the preceding pages we have gone on a journey with you through the history of our company over the past seven decades. Now our focus is on the future with its challenges in the environmental, alternative energy, operational safety and Internet of Things. Our overriding aim is, with outstanding and innovative products, to build a better future for the future generations.

  
Heinz Bauer

  
Dr. Monika Bayat

  
Philipp Bayat



Three generations of the BAUER family stand for the continuity and the success of the family-owned business.

|  |   |
|--|---|
| <b>IMPRINT</b>   |   |
| <b>Publisher</b><br>BAUER KOMPRESSOREN GmbH<br>Stäblistr. 8<br>81477 Munich<br>bauer-kompressoren.de | <b>Photos/Copyright</b><br>Bauer Archive Page 6, 7, 10, 11, 12, 13,<br>14, 15, 19, 20<br>Martin Bolle Page 4, 8, 32, 33<br>Dominic Byrne Page 31<br>Alessia Curzi Page 34<br>Ralf Deichelmann Page 9, 16, 17, 18, 21, 24,<br>25, 26, 27, 30, 31 |
| <b>Editorial staff</b><br>Annette Adam, Ralf Deichelmann,<br>Richard Schmidt                         | Ulrich Freier Page 25<br>Jonas Groh Page 24<br>Enno Kapitza Page 2<br>Martin Kreuzer Page 32, 33<br>Thinkstock Page 22  |
| <b>Texts</b><br>Ralf Deichelmann, Richard Schmidt  |   |
| <b>Layout</b><br>Annette Adam  |   |
| <b>Printers</b><br>Offsetdruck Baumann<br>GmbH & Co. KG, Munich                                      |   |



**BAUER KOMPRESSOREN GmbH**

Stäblistr. 8

81477 Munich, Germany

**info@bauer-kompressoren.de**

**bauer-kompressoren.de**