

# “WE STILL HAVE A LOT PLANNED”

## 150 years of Maschinenfabrik Reinhausen



Advertisement from 1901



MR's aircraft construction, around 1923



Brothers Scheubeck (left) and Dr. Bernhard Jansen

**The company is turning 150 this year. The early beginnings can be traced to the production of machines for woodworking. Is it true that Maschinenfabrik Reinhausen even worked in aircraft construction?**

That's right. In the past 150 years, MR has lived through nearly every radical industrial change. The MR airplane – which was not very successful by the way – was around back in 1923. It's a wonderful example of the inventive spirit that's still a part of our DNA. The company was already 55 years old then. But, as a precision machine shop, we were still in the middle of the first industrial revolution of mechanization. The “wake-up call” to get into the electrical world was still to come.

**That airplane was not very successful. This made the company's success that much more pronounced a few years later with the invention of the first high-speed resistor-type tap-changer for transformers – basically the “wake-up call” you described. How did that come about?**

In 1928, in the first half of the last century, rapidly advancing electrification was the driving force behind the second industrial revolution. The infrastructure

for the power grid was still very new and was suddenly confronted with many new consumers and individual load profiles as well as many electrical energy generators. This called for flexibility, which has also been the case recently with the integration of volatile renewable energy sources. The solution from Dr. Bernhard Jansen, then CTO of the local grid operating company, sounded simple, “Regulate the line voltage using non-interrupted changeover switching of transformers under load.” However, to this day, the revolutionary innovation of the high-speed resistor-type tap-changer is like a precision electromechanical clockwork for high voltages and currents which must function reliably under the most difficult conditions in the transformer tank. This was a challenge that could be mastered at the time only by the precision MR machine shop, and thus led to the collaboration between the inventor, Jansen, and the MR family-owned company. The production of tap-changers is still an important part of our business today.

We are currently on the verge of the fourth industrial revolution, digitalization, but we can learn from these critical lessons from the past. Innovation has to generate customer value, solve a problem, make a customer's pain point

**After the invention of the tap-changer, MR rapidly developed new tap-changer series as per requirements of our increasingly global group of customers, and set the standards along the way**



MR is turning 150  
this year – it is this  
unmatched wealth of  
knowledge that makes  
us highly qualified to  
guide our customers  
along the path to new  
technology

# MICHAEL ROHDE

Managing Director of Maschinenfabrik Reinhausen



The Power Quality (PQ) division at MR has been providing filter and compensation systems for clean low-voltage and medium-voltage grids around the world for 20 years



MR's oil tap-changer type M

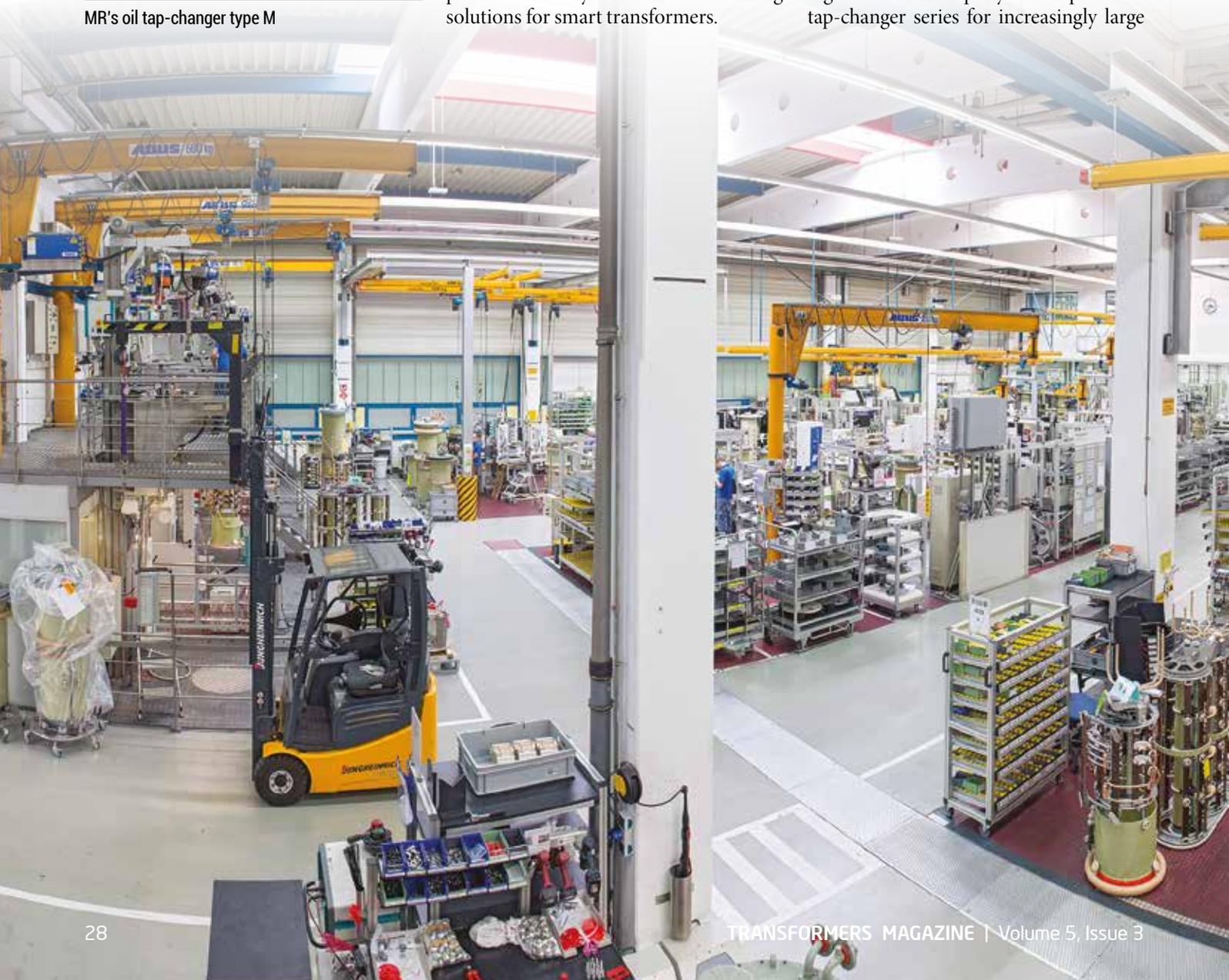
## Our portfolio for the smart transformer includes intelligent sensors and a modular hardware and software platform for control, monitoring and connectivity, as well as regulation and analysis

disappear. This way of thinking shapes the direction of our innovation to this day, powered by customer proximity and system understanding. We almost cannot wait to implement solutions to new challenges for our customers: Extensive data support, automation and communication networking need to provide intelligent assistance for network operators at network nodes and on substation equipment like transformers – for the network operation and asset management of tomorrow. At the same time, transformer manufacturers need our support in reducing the costs of their processes and systems and in realizing solutions for smart transformers.

On the whole, the perfect task for MR as a leader in innovation and technology.

**You see the leadership in technology and innovation as part of your DNA. How would you exemplify that? What technologies did you take to the market first?**

Since the invention of the tap-changer by Dr. Jansen, we haven't just gradually responded to broad requirements of global markets. Rather, we have also consistently spearheaded the technological development of tap-changers and voltage regulation. MR rapidly developed new tap-changer series for increasingly large



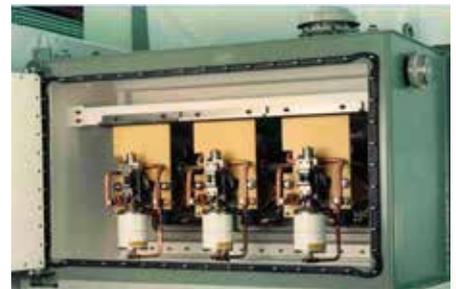
switching capacities in accordance with the requirements of our increasingly global group of customers. MR set the standards along the way. The legendary type M oil tap-changer series from the early 70s, for example, is still built today after countless refinements. It has become a common term in the market (a term that, incidentally, even our competitors reference). Like Kleenex® for tissues for example. At the same time, the pioneering type MK series of analog-electronic and later digital-electronic voltage regulators was developed, known today as TAPCON®. MR introduced a semiconductor-based tap-changer back in 1974. At the end of the 1990s, MR again entered new technological territory by implementing the first high-speed resistor-type tap-changer using vacuum tap-change technology – a revolution in customer value due to an increased number of tap-change operations combined with dramatically reduced maintenance requirements. Others only entered into this advanced technology

years later. As with the M type, the MR brand name VACUTAP® for our vacuum-type series became the common term in the industry. In addition to regulation for large power transformers, MR also sets the pace for distribution transformers. In 2012, our invention of the voltage regulation distribution transformer presented a solution for the challenges of the energy revolution, which is currently being realized with the smallest high-speed resistor-type tap-changer in the world (ECOTAP®VPD). We have also set standards for transformer accessories, such as the first ever maintenance-free dehydrating breather. These are just a few examples from the last 150 years. In total, this innovative power has generated nearly 800 patent applications and, more importantly, the trust of thousands of customers.

**The digital transformation you mentioned poses a significant challenge for every company. MR is still family-owned today.**



First semiconductor-based tap-changer worldwide



First MR vacuum-type tap-changer





Smallest high-speed resistor-type tap-changer ECOTAP®VPD



MR is an Industry 4.0 company

## HIGHVOLT Prüftechnik, the global leader in testing technology for most important components in the energy supply industry, also belongs to the Reinhausen Group

**What effect is that having in this phase? What does it mean for your customers?**

We have deliberately remained a family company that is not publicly traded. We don't have to create nice quarterly reports for analysts. Instead, we can promote the right issues with our customers over the long term and think through solutions together in full. For our customers, this means mature, well-designed products and services right from the start. We don't push our customers into expensive digital experiments. Rather, we achieve direct customer value in a cooperative process with innovative customers. This has allowed us to develop a solution

portfolio for the smart transformer: Intelligent sensors for the transformer and its components, a modular hardware and software platform for control, monitoring and connectivity, as well as regulation and analysis engines for assisting with asset management and grid operation. Neutral and manufacturer independent. With completely open interfaces.

**Over more than 90 years, you have earned a reputation as a high-quality premium manufacturer in the global energy supply industry. What concrete advantages and, particularly, added value do you offer your customers?**



Reinhausen Power Composites



MR Test Center – High-tech laboratory for on-load tap-changers

## Based on by far the largest installed base of tap-changers, we are constantly expanding our expertise and developing concepts for the transformer of the future with our partners in the TRANSFORM platform

The driver behind our premium quality is not the age of our company, but rather the nearly unbeatable advantage from the accumulated operating years of our devices at customer facilities. Constant learning – even from mistakes. Feeding this knowledge back into process improvements and quality standards. Our customers get this experience with each product they purchase. At the same time, we have developed a global network of service specialists who bring this experience right to the customer. Like pilots, these employees regularly undergo testing within the company – and have to attend subsequent training if they do not provide a satisfactory solution to the practical test exercise. But we don't just rely on that. We are constantly expanding our expertise in service and developing concepts for the transformer of the future with

our partners in the TRANSFORM platform. Where necessary, we expand our knowledge base through strategic partnerships. In this way, we continue to develop step by step from a component manufacturer into a system supplier for transformer manufacturers and solution provider in primary substations.

**One keyword here is globalization. You began founding global subsidiaries early. Why?**

The answer is almost contained in the question itself. Global electrification has stretched energy networks around the world, and we go where our customers are, both to determine their needs and because local availability of high-quality service is important for our customers who operate critical infrastructure. This is why the first subsidiaries were formed in

the 80s and an exceptionally dense sales and service network with unsurpassed customer proximity exists today.

**These days, you don't see service as just the maintenance of tap-changers; you also offer a complete range of transformer services. How does your portfolio look in this area?**

We offer services from installation and commissioning to maintenance and repair as well as diagnostics and status assessment for transformers and cables. Our experts also support customers in service, modernization, retrofitting and consulting within the scope of turnkey projects. We are becoming more and more of an innovative solution provider in this area, as well.

**Another key concept is the installed base. How many tap-changers have you sold to date?**

We have the largest installed base in the world by far. The operating experience which it provides is continuously being integrated into our development. This irreplaceable knowledge is highly valued by our customers.



MR supports extremely worthwhile grid digitalization

**And of that installed base, how many are still in operation today?**

To our knowledge, more than 80 percent. The oldest tap-changer we know about has been working without fault for more than 60 years.

**Not many know that you produce almost all of the parts needed in your machine shop and even make your own Glass-Fibre-Reinforced Composite-Tubes (GFRC) for oil compartments in your factory. Why?**

This production depth helps us ensure our high quality requirements, as well as flexibility in delivery times. And highly integrated production processes as well as employees with excellent training make it possible for premium “Made in Germany” quality to be manufactured

competitively for our global customers even at the high-cost location of Germany. Our politicians don't always make it easy on us, however. By the way, our subsidiary Reinhausen Power Composites has meanwhile become the global No. 2 supplier of GFRC-composite-insulators for manufacturers of HV circuit breakers, bushings, CTs, PTs, etc.

**HIGHVOLT Prüftechnik in Dresden also belongs to the Reinhausen Group. How do the companies complement each other? How do your customers benefit?**

HIGHVOLT is the global market leader in testing technology for the most important components in the energy supply industry. Manufacturers of cables, transformers, bushings, gas-

insulated switchgear (GIS) and the like all rely on testing technology from Dresden at their plants or in their research and development. This is also true of many universities, research institutes and testing institutes. Testing systems from HIGHVOLT are also used in tap-changer testing at MR. MR benefits from HIGHVOLT's expertise in high-voltage testing and measuring technology.

In addition to stationary testing systems, HIGHVOLT is also the market leader in mobile testing technology for use in the station – MR uses these systems in its service operations, such as for on-site transformer testing.

**Modern energy networks are highly sensitive – a failure can have catastrophic consequences. For this**

**reason, network operators rely on tried and tested technology. Why is it nevertheless worth it to already invest now in the digitalization of equipment?**

The expanded energy networks were historically designed for unidirectional load flows (from top to bottom). Dynamic stability comes from large power stations; national or transnational transmission capacities are limited, because near-load generation used to prevail. This has radically changed with the energy revolution (not just in Germany). The utilization of the last redundancies and reserves through extensive work by network operators currently still enables stable operation under increasingly volatile conditions. The necessary network expansion has been delayed (not just in Germany). As I mentioned earlier, in this situation, extensive data support, automation and communications networking have to support the work of network operators intelligently at network nodes and on the equipment.

It is extremely worthwhile to work on this

NOW – otherwise, the lights will go out.

**What capabilities do you have to offer for this?**

Well, similar to the automotive industry, new technology (that is, electromobility) will not replace the combustion engine immediately. But is this new technology inevitable? Certainly not. Likewise, the transformation of energy networks has already begun. Intelligent solutions will be incorporated more and more – but transformers functioning according to the Faraday principle, for example, will still be around for a long while.

MR is 150 years old and has collected 90 years of experience in the “electrical” reality of customers – that is, the reality of network operators and transformer manufacturers. This unmatched wealth of knowledge makes us highly qualified to guide our customers along the path to new technology, with knowledge and sound judgement – with tap-changers with even more innovation **AND** a solution portfolio for ‘intelligent’ technol-

ogy. Neutral. Manufacturer-independent. With completely open interfaces.

**When you look back at the company's history, what do you predict for the future?**

Not all of our lofty plans will end successfully. Airplane construction, for example, taught us that. But we learned our lessons and moved forward into new areas with the same fervor. Successfully. I hope we carry this firm belief in our own strengths into the coming decades. We still have a lot ahead.

**Michael Rohde** joined the management team of MR in 2005. Before, he worked for an international electrical company in Germany and abroad. He holds honorary positions in the council of the Regensburg University of Applied Sciences and as Vice-President of FGH, a non-profit research-association founded in 1921. He is member of the German Cigré-committee and he is an Engineering Graduate.

