

Every time creates particular inspirations
for rediscovering the future.



Jubilee brochure
to the 75th anniversary:

From Calor
to
ABB Calor Emag Mittelspannung GmbH.

"As an ex Calor man, I have a soft spot in my heart for this place."

From the smallest beginnings, Calor Emag has developed into a world-ranking company. From a small electrical workshop, a high-tech centre has grown up. And it all started seventy-five years ago. Between the start-up and the present day there have naturally been a few low points. In most cases these were closely connected with the events of the times. It was thanks to the strong identification of employees and their commitment that Calor Emag was able to continue its successful history. Today ABB Calor Emag Mittelspannung GmbH is one of the key contributors and model companies in our Group.



Success is always the result of hard work. ABB Calor Emag is one of the most innovative companies in the ABB Deutschland Group. On the export side it has also been a pioneer. The granting of licences to foreign partners has paid off. And the establishment of joint ventures is also a successful element in our export strategy.

As an ex Calor man, I have a soft spot in my heart for this place. So I am particularly keen to express my congratulations to ABB Calor Emag and wish it continued success in its business.

Dr. Horst Dietz
Chairman of the Executive Board
ABB Deutschland



We look back with pride on our seventy-five-year history. Many hazards and hurdles have had to be passed to keep our Calor Emag on a successful course, and this was not always easy. But we have all contributed to making ABB Calor Emag the worldwide market leader in the field of medium voltage today. One reason why the Calor plays a special role in the ABB Group. Vacuum interrupters, for example, are produced by the ABB Group only in Ratingen.

An essential requirement for progress is speedy reaction. This is the only way we can successfully meet the challenges of the future. Calor Emag wants to achieve further growth and expand its market leadership. Together we will overcome in the years which lie ahead of us. Because the company's wealth lies in the minds of its employees: and this is precisely what decides today the successes of a company tomorrow.

Bernd Mühe
Chief Executive of ABB Calor Emag
Mittelspannung GmbH, Ratingen



Sincere congratulations on this outstanding milestone! With its seventy-five years of tradition, ABB Calor Emag Mittelspannung GmbH is certainly one of the most important companies in our global business. The company has developed large-scale and comprehensive customer-oriented approaches in many important markets. This success was achieved through innovative strength, leadership in know-how and the professional approach of all employees.

We live in challenging times in which deregulation and privatisation processes in many traditional industries are fundamentally changing the local and global markets. Rapid developments in the field of information technology - the best example today is e-commerce - are adding to the speed of this process of radical change. The global ABB Business Area of Medium Voltage Equipment has complete faith in the ability of the employees of Calor Emag to meet these challenges successfully through their creativity and productivity. We are happy to know that Calor Emag is a key member of our ranks and, as members of the ABB family, to move forward into the new millennium together.

Dr. Andrew J. Eriksson
Business Area Manager
Medium Voltage Equipment

History in the making – the early days

It all started with a pioneering idea. Otto Dreyer, an engineering graduate, developed a new safety switch for electric motors. This special safety device prevented motors burning out because of excessive heat generation and having to be rewound. This invention brought the first success and the foundation stone was laid for a company which was still in its infancy. Calor GmbH was founded in Essen in 1922. The Latin word calor means heat. Today it is still the symbol for protection against overheating.

Success continued to follow the young company. The famous "Calor cartridge", a thermal safety device for high-voltage equipment, was invented. At the time this cartridge caused a minor technical sensation. The product innovation was patented under number DRP 323369. Other patents, for example the short-circuiter, followed. But patents alone do not bring business expansion. So production had to be started. As is often the case in the early days, the high level of development costs was completely disproportionate to the sales income. But, with elan and stamina, the young company made it.

The mood of the time was full of a sense of change. Many hardships were borne with humour and serious matters taken with a pinch of salt. Ironically comic descriptions like "hen run" and "mouse trap" did the rounds at the time. The "hen run" was a rusty spiral staircase used for access to a small annex on the top floor. The "mouse trap" referred to one of the safety switches which drove everyone mad with its constant breakdowns.

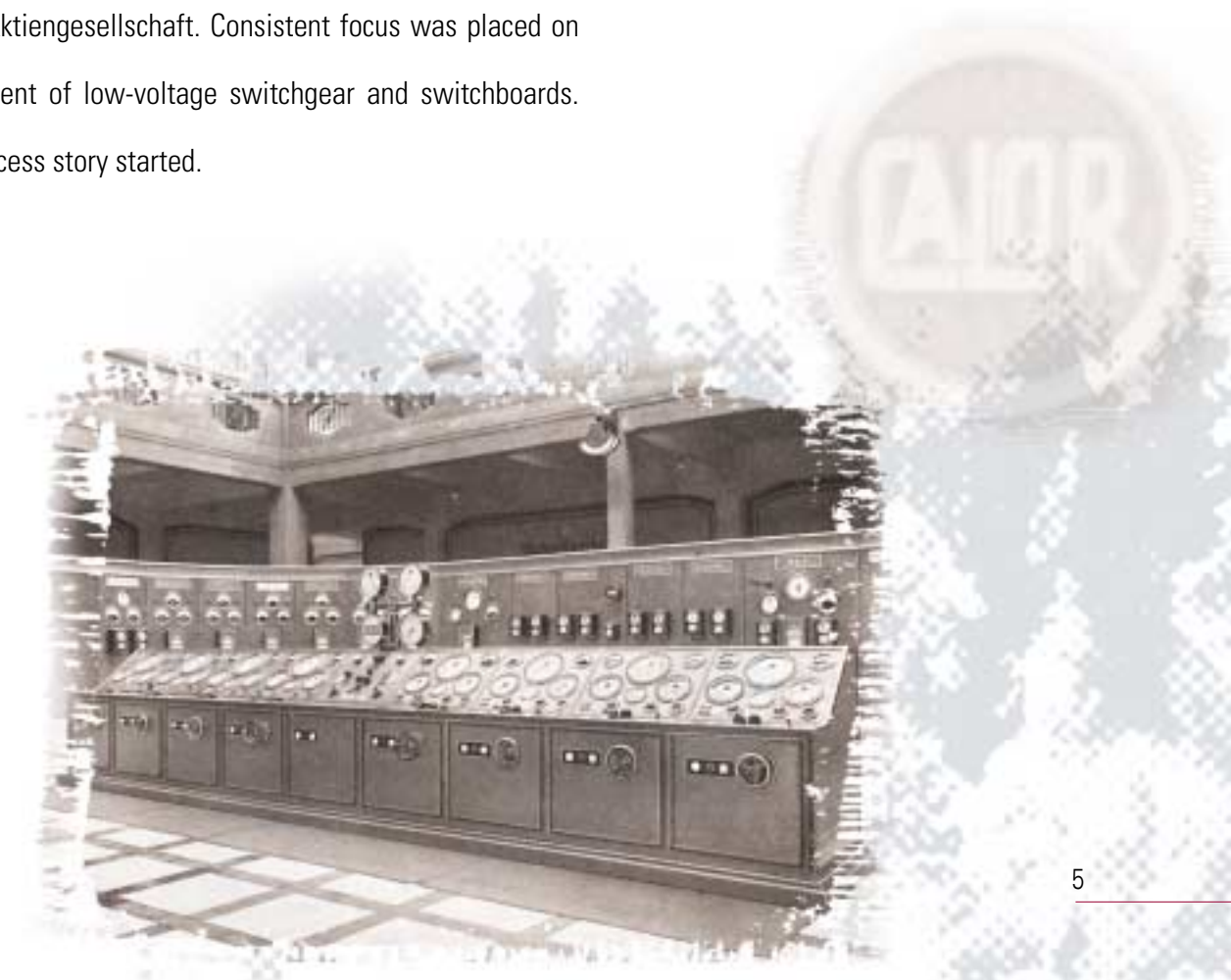
Slowly things got better. A decisive step forwards was marked by the move from Essen to Duisburg in 1925. At this time, the small Calor business was joined by a man who would have a key influence in shaping further developments: Dr. Alfred Haniel.

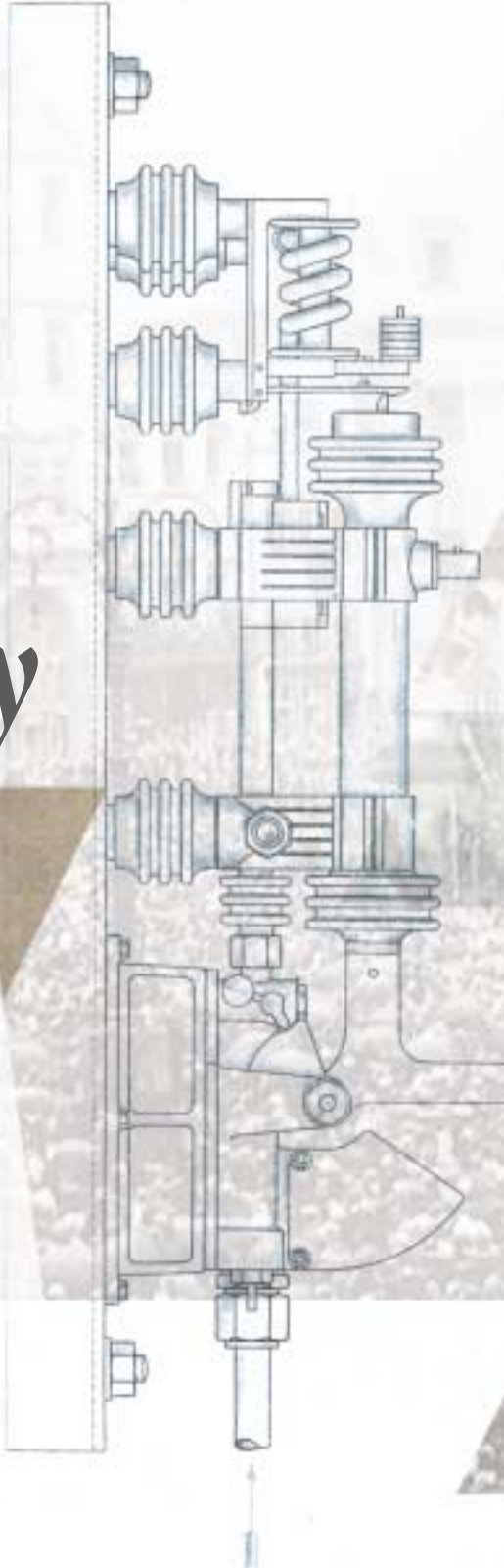
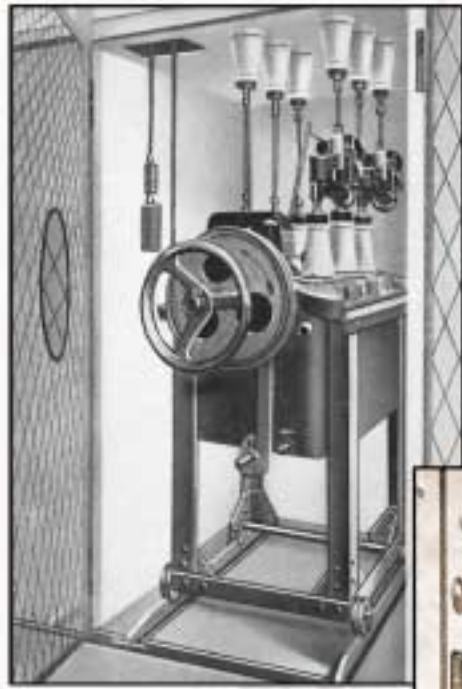




7th April 1925 The start of a successful future

Dr. Alfred Haniel was a forward-looking man who recognised at an early stage that electrical engineering was going to take off and what opportunities this offered. It all started with enlargement of the production facilities through the move to Duisburg. On 7th April 1925, Dr. Haniel took over Calor G.m.b.H. and converted the company into a joint-stock corporation, Calor Elektrizitäts-Aktiengesellschaft. Consistent focus was placed on the development of low-voltage switchgear and switchboards. The Calor success story started.





Triumph and Tragedy

of the "Golden Twenties" 1926-1933

April 1924

Rechn. Nr.	Art. Nr.	Name	Ort	Nr.	Σ
	14. 10428	Forst Komp.	Altenessen		14 40
1534	14. 10501	Kunze's Reichstein-3	Steinbach		240 -
	14. 10533	Binder	Bez. Ludam		39 50
	14. 10538	Schulze	Bez. Gindern		58 24
	14. 10545	Kunkelmann	Karlsruhe		39 74
	14. 10450	Hlg. Ekt. und Hekt.	Gerlmünde		184 35
	14. 10307	Immer. 2. u. 3.	München		5 33
	14. 10303	Forst Komp.	Altenessen		29 14
	14. 10367	Bellat Albomp.	Gandf		209 -
	14. 10350	Ein. Bauarbeiten	Bismarckhof		26 20
			Bismarckhof		27 55





"Black Friday" was the turning point

After just a few years Calor was able to offer its customers a comprehensive product range in the field of low voltage. The key focus was on products for heavy industry, mining, iron and steel works, and rolling mills. A period of rapid development started. The production facilities at Martinstrasse in Duisburg were no longer able to meet the latest production requirements. So the company moved to Pappenstrasse in 1930.

EMAG G.m.b.H. was founded in Frankfurt in 1910. The young company mainly produced oil switches and surge voltage suppressors for voltages up to 50 kV. In order to achieve a stronger capital base, the company was converted to a joint-stock corporation, EMAG Elektrizitäts-Aktiengesellschaft, in 1921. During the economic crisis, export orders dried up. The company got into financial difficulties.

Calor E-AG also felt the growing economic crisis at the end of the twenties. In the increasingly difficult economic conditions, it was not easy to carry out the necessary development work and keep production going at anything like the normal level.



Economic crises: Collapse of the New York Stock Exchange

The worldwide economic crisis was preceded by the collapse of the New York Stock Exchange. The 25th of October 1929 went down in history as "Black Friday". Even today this date still evokes the shudder which ran through the economy of every country in the world. In Germany the impact was particularly severe. Sales markets melted away. Production limped along and finally came to a halt. Mass redundancies followed. After a few months innumerable businesses had closed down. The grinding hardship of economic depression was reflected in the number of unemployed: more than 5 million in 1931, 6.1 million in 1932. This meant that a third of the population in Germany was dependent on public support.

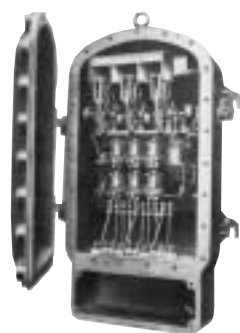
But Calor held out. It steered a successful course round all the rocks. Through the personal commitment of Dr. Haniel, Calor managed to survive.



Pioneering position through new, innovative products

DPFS switchgear

Explosion-proof motor control switch



Dead-tank circuit-breaker

Type OQAW/HS – 20-200

Step by step, substantial progress was made in the product range. The young Calor E-AG rapidly assumed a pioneering role in product development. It was always a fractionally ahead of its competitors at the time. At the Leipzig Trade Fair in 1926 a brush switch with MT relay was presented, together with a range of other new products: a three-phase current switch with the Calor cartridge, DPF and DPFS switchgear, new types of relay and single-pole switchgear. In 1928 the first explosion-proof switchgear was produced for coal mining. Even in these early days people talked with respect about the great innovative resourcefulness of Calor E-AG.

In its Frankfurt production plant, EMAG produced switchgear for power stations and substations up to 80 kV, high-power oil switches up to 45 kV and multitank oil switches up to 110 kV.



High-voltage switching station

with dead-tank circuit-breaker in a power supply company

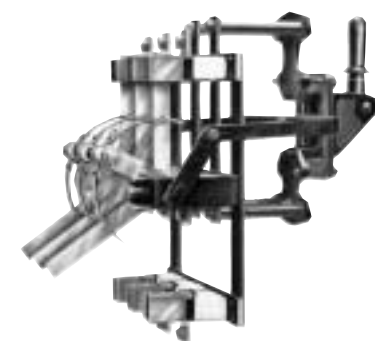


Outdoor surge voltage suppressors

Bendmann 50 kV system

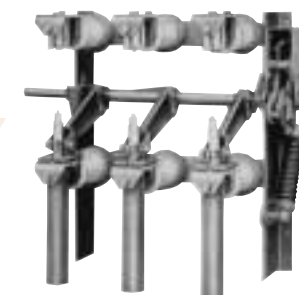
Distribution system

with switch and fuse box



Double-throw switch

Type HUvV with front drive, 200 A, triple pole



Air-blast load-break switch

Type CK1 for indoor use



Calor cartridge

Calor and Emag

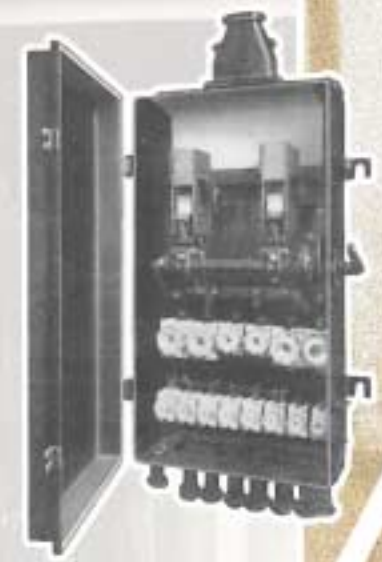
become

Calor-Emag E-AG

Emag E-AG, based in Frankfurt, was affected particularly severely by the economic crisis. Domestic orders fell, export business collapsed completely. In consequence, Emag E-AG had to file for bankruptcy in 1933. Business continued with a small workforce through a rescue company.

After intensive negotiations, Calor purchased Emag E-AG on 1 January 1934. This merger resulted in the formation on 15 October 1935 of CALOR-EMAG Elektrizitäts-Aktiengesellschaft with production facilities in Duisburg and Frankfurt. Calor had in the past manufactured products in the field of low-voltage switchgear. The integration meant that it was now able to supply equipment up to 36 kV.

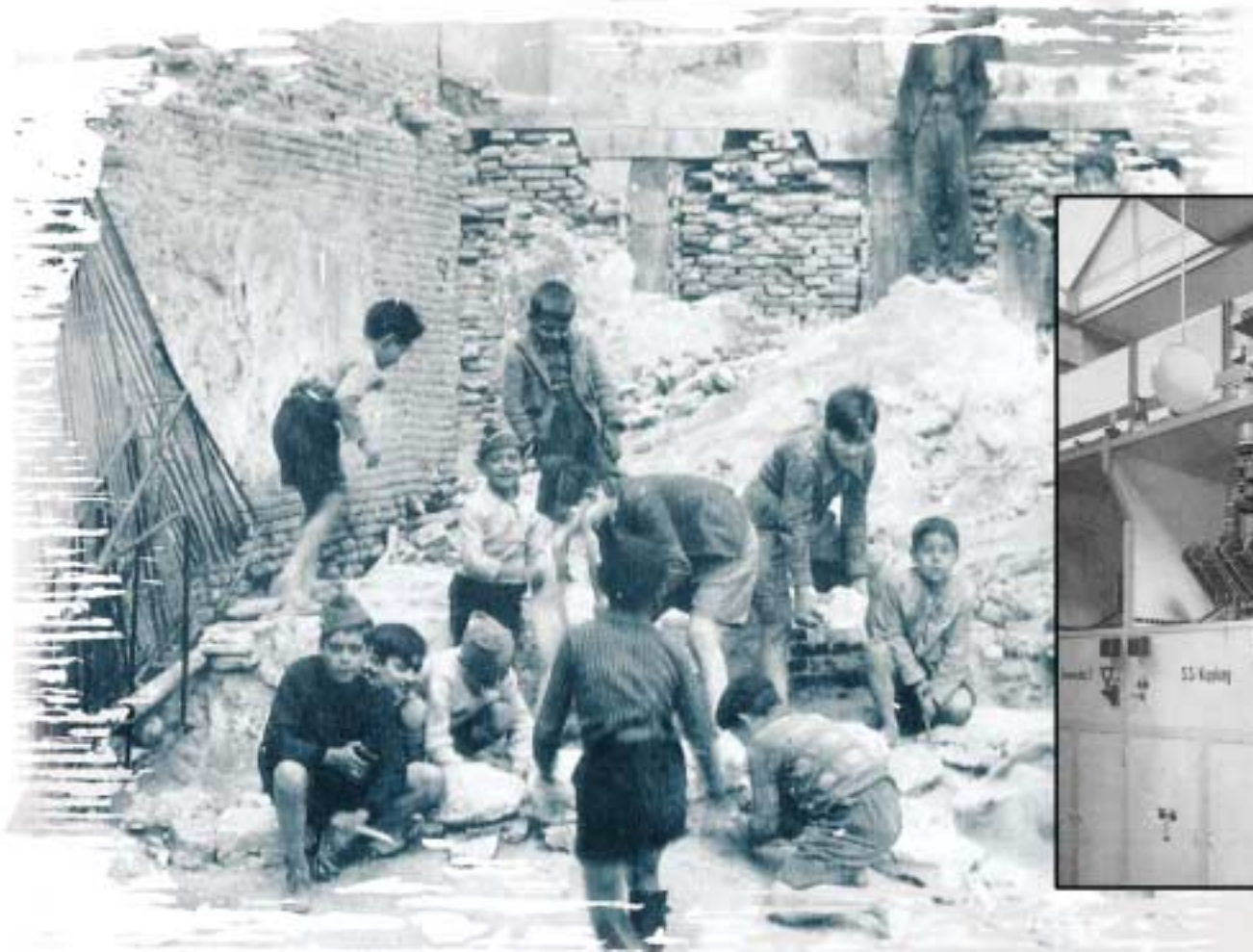
In the autumn of 1936, the Duisburg facilities were moved to Bahnstrasse in Ratingen. At the same time Ratingen became the location of central administration. Success was even then guaranteed.



Economic upturn

despite hard times.

1937-1945





The company was also very successful outside Germany. The Leipzig Trade Fair provided an ideal opportunity to present the company's excellent products to a wider circle of users.

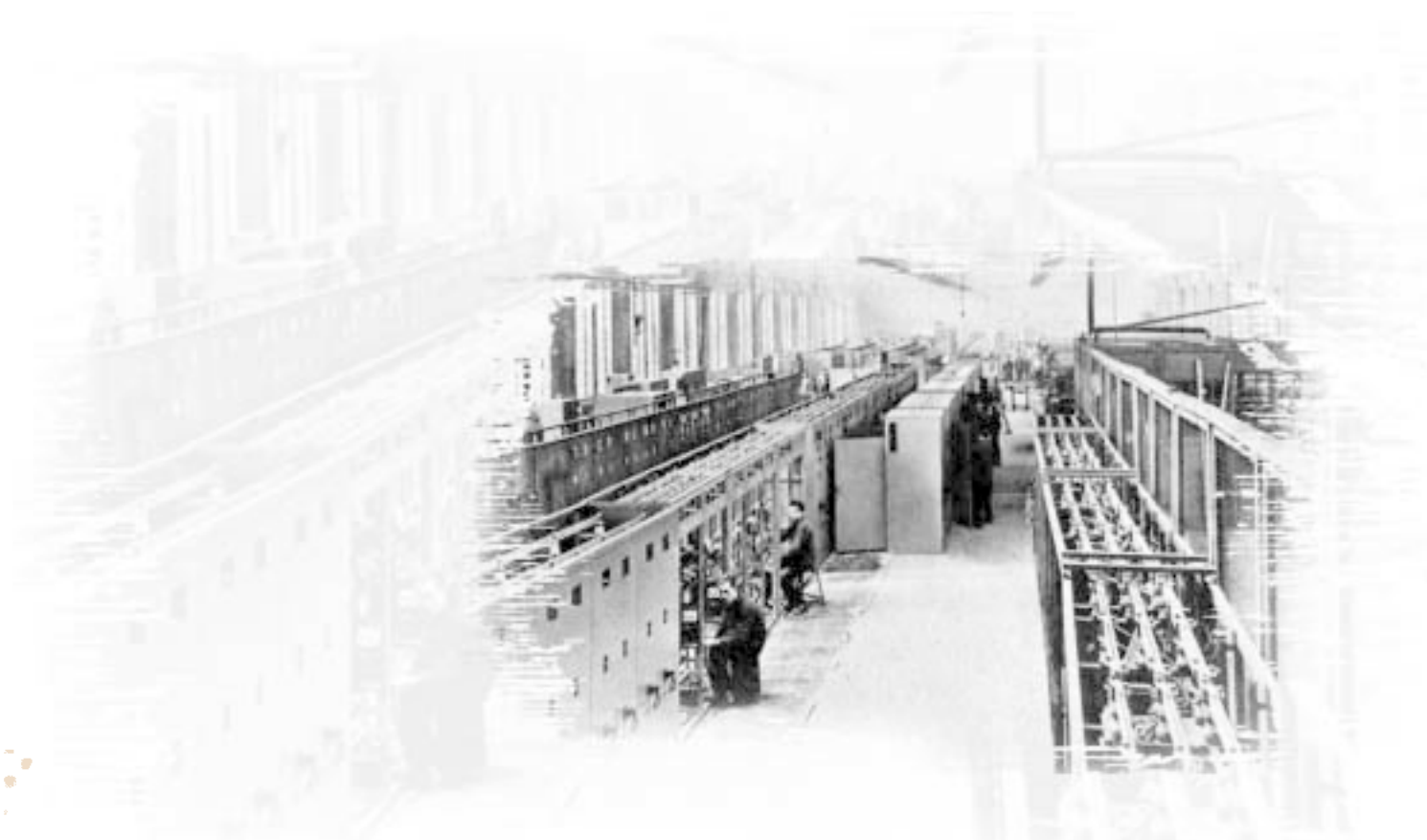
Ratingen and Frankfurt

heading for success

In Ratingen the company had found a production site which offered a range of expansion possibilities. Its location on the edge of the Ruhrgebiet also proved to be extremely favourable. The necessary changes to the buildings took account of the gradual expansion of business and were completed in 1939.

The growing demand for CALOR-EMAG products, the expansion of the product range and increases in production capacity soon produced the desired success. Order receipts grew from year to year to a high point of 14.5 million Reichsmarks in 1941.

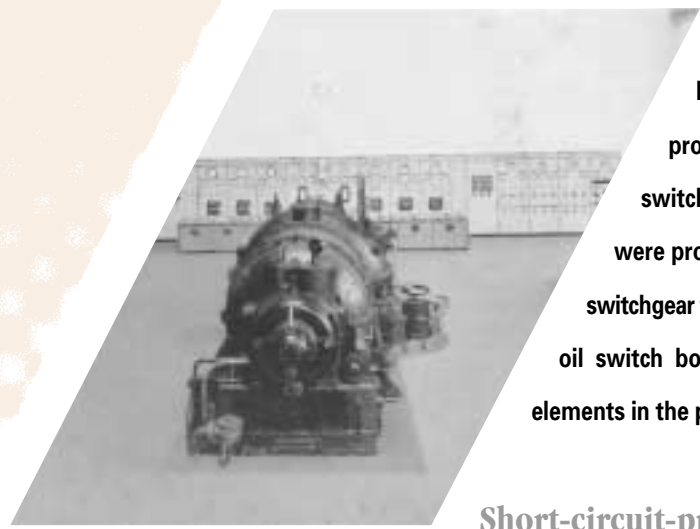
In the following years, World War II had an increasingly severe impact on CALOR-EMAG. Highly-qualified employees were drafted for military service. The centrally planned economy imposed tough requirements. Shortly before the end of the war, the increasingly severe air attacks brought production to a halt. At the start of the war the company employed 1,500 people. In 1945, only 400 remained.



From

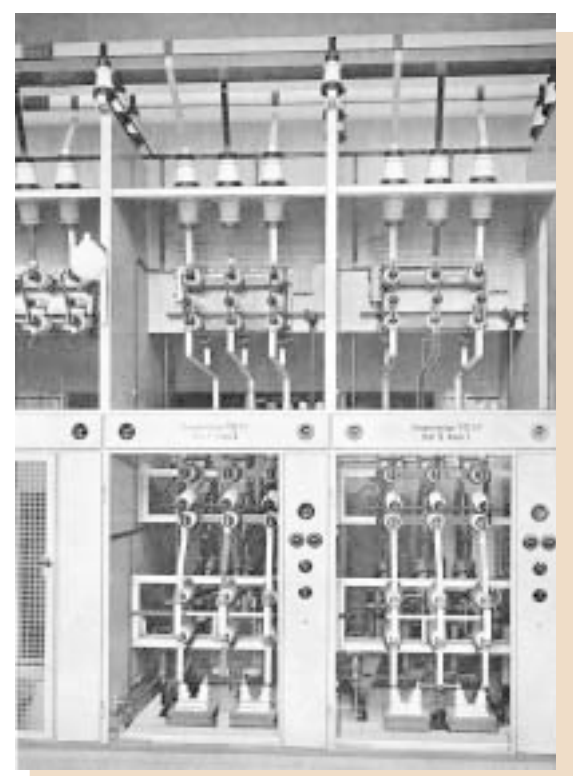
low voltage

to high voltage



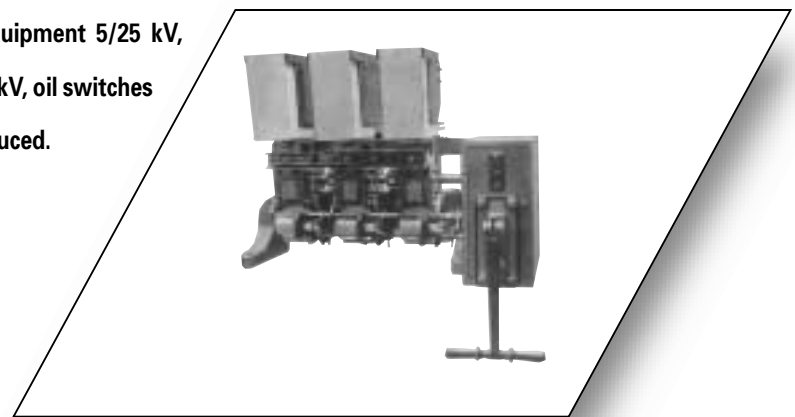
In the years before the war, technical development had progressed at high speed. Restart relays, station protection switches and machinery network switches for 600 A and 1000 A were produced. New relay boxes with ceramic insulation, track switchgear for colliery railways 200-2000 A, twist control switches, oil switch boxes and dispensing rail switches were the key elements in the product range.

Short-circuit-proof switchgear



Open medium-voltage switchgear for 5000 V

In the high-voltage field, transformer equipment 5/25 kV, outdoor substations for voltages up to 80 kV, oil switches and surge voltage suppressors were produced.

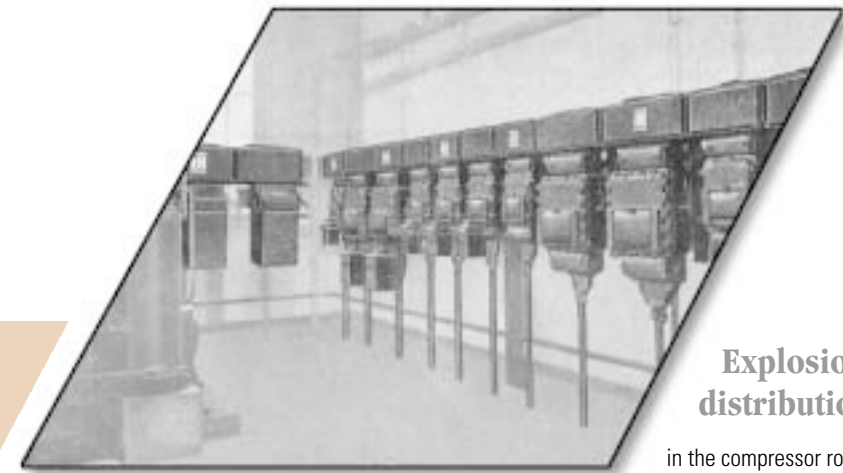


Low-voltage circuit-breaker



Switchgear with high current disconnecter

Even under the increasingly difficult conditions, employees continued to design, produce and research. Up to near the end of the war, new lever switches 200 A to 3000 A, busbar carriers and busbar boxes were launched on the market.



Explosion-proof distribution system in the compressor room of a fuel factory.

Hurrah. We're still alive.



New impetus to move ahead again

The post-war period started. A fatal ideology had left Germany in ruins. A new society formed under the rallying cries of "Zero hour" and "Prosperity for all".

CALOR-EMAG was on the verge of a new beginning. In Ratingen, only 57 employees were left and in Frankfurt, operations had closed down completely. Step by step, production was recommenced in Ratingen. In the Frankfurter works, reconstruction started immediately. Machinery renovation took place progressively from 1948. The first signs of stabilisation became evident.



Reconstruction starts.

The 1948 Export Trade Fair in Hanover marked a breakthrough. It was possible for the first time to re-establish contacts with foreign customers. The Scandinavian countries and Austria were the first customers for CALOR-EMAG products. They were soon followed by India and North/South America. In a remarkably short time the company recovered from its economic low point. Research and development soon returned to a position of key focus for the company.

It was precisely during this period that CALOR-EMAG developed the low-oil circuit-breaker (known as LOS in short). A pioneering idea which proved to be particularly successful. The first 10 kV switch-gear was included in the product range in 1949.

We're somebody again ...



1951-1968



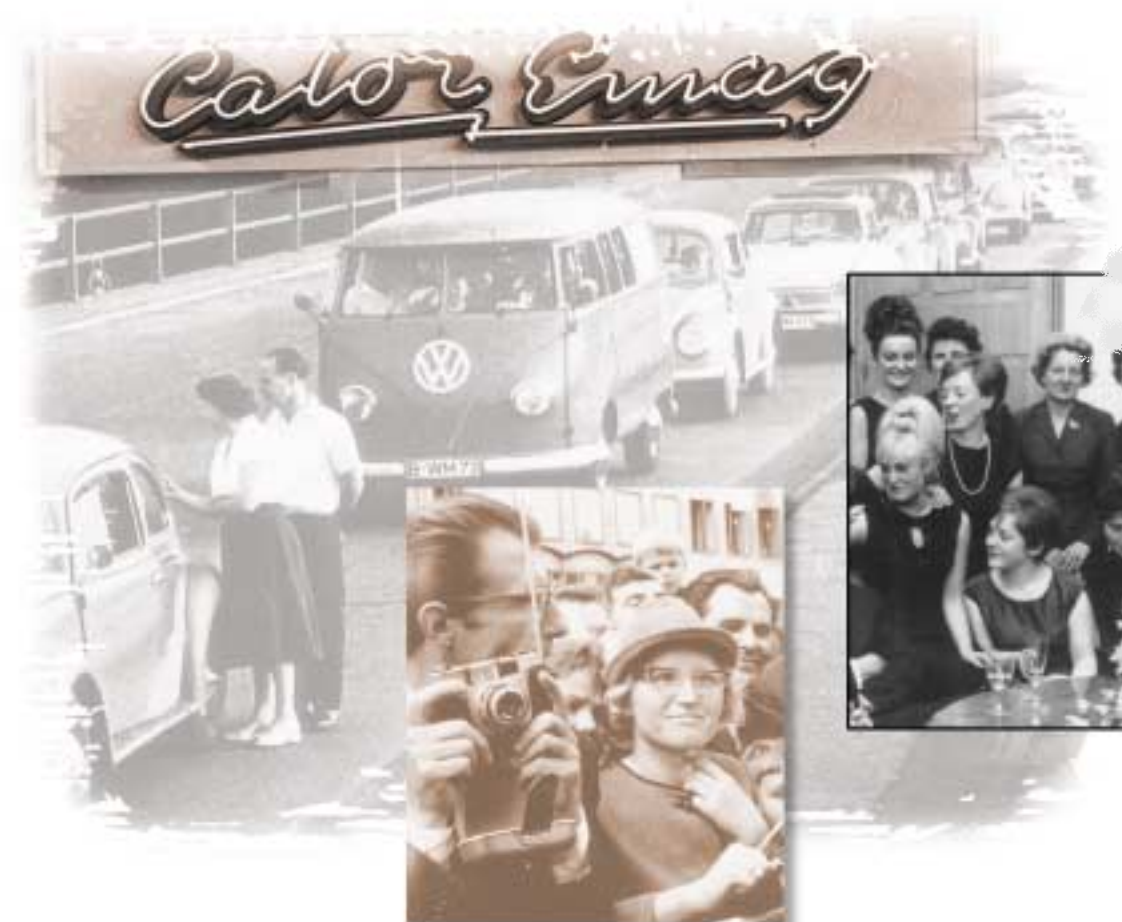
Start of the economic miracle Full employment in Ratingen and Frankfurt

In the following years, Germany developed into a modern industrial country with high growth rates. The first car, a nice home and secure employment – optimism spread through the country. People soon became accustomed to things getting better and better. Living standards were increasing but there was a long way for them to catch up.

CALOR-EMAG soon started to make the necessary investments for the future. By the middle of the fifties, for example, a high-power testing ground with 500 MVA short-circuit capacity had been built. This was a very brave step because the costs of the testing ground were in excess of the company's equity at the time.

The company continued its successful history. In 1952 it increased its sales of switchgear by 30% compared with the previous year. Technical offices were opened together with thirteen agencies in Germany, fourteen independent agencies in Europe and eleven agencies in overseas countries. A company-owned office was set up in Singapore. In India, CALOR-EMAG set up a joint-venture company together with the Jyoti Group in Baroda for project management and marketing of electrical engineering products.

The capacity of the works was fully utilised. With a workforce of 1,750, absolute full employment was guaranteed. When Dr. Haniel died on 6 February 1964, CALOR-EMAG enjoyed an excellent international reputation supported primarily by the company's competitive strength.



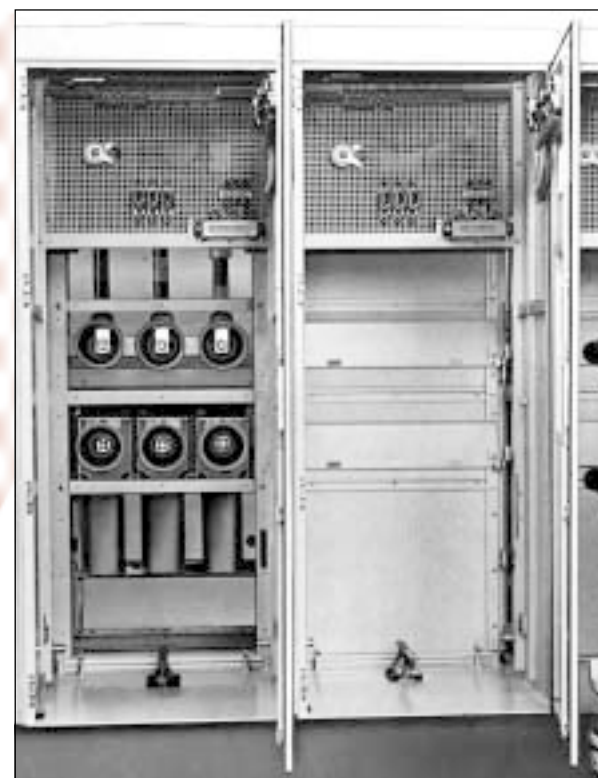
Product innovations ensure continued growth



Minimum-oil circuit-breaker

Type OD1

Since its formation CALOR-EMAG had always enjoyed a high reputation for innovation among customers in Germany and other countries. Products from Ratingen were clearly thought through to the finest detail and tailored to customer requirements.



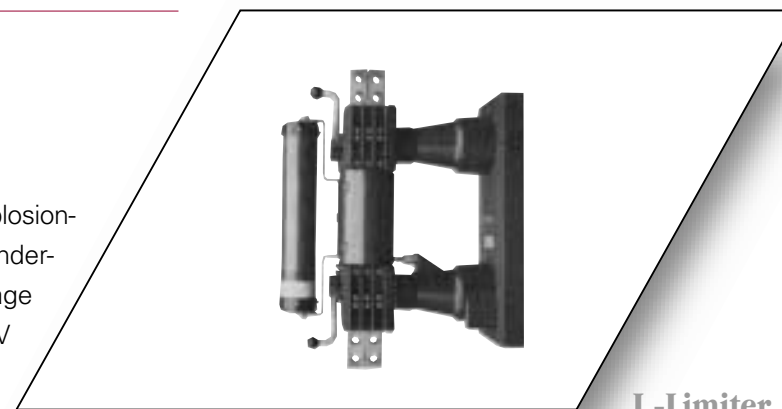
CALOR-EMAG was the first company to deal on a systematic basis with the effects of internal arcs in high-voltage switchgear. The results provided the basis for new equipment designs in the voltage area up to 36 kV. The company also demonstrated its ability as a problem solver. With the I_s-Limiter, the fastest high-voltage switchgear was offered. The I_s-Limiter is even faster than the short-circuit.

ZE Switchgear

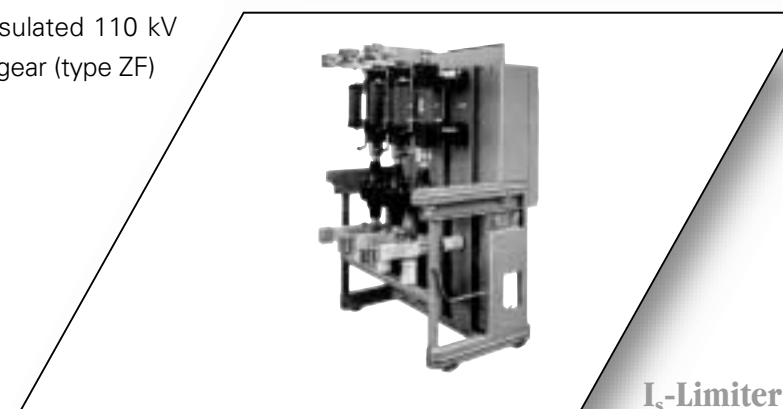
Metal-clad high-voltage switchgear for indoor use

For mining, CALOR-EMAG developed explosion-proof high-voltage switchgear panels for underground use. An air-insulated medium-voltage switchgear (type ZE) for 12kV to 36 kV came onto the market. CALOR-EMAG also moved successfully into technically new territory:

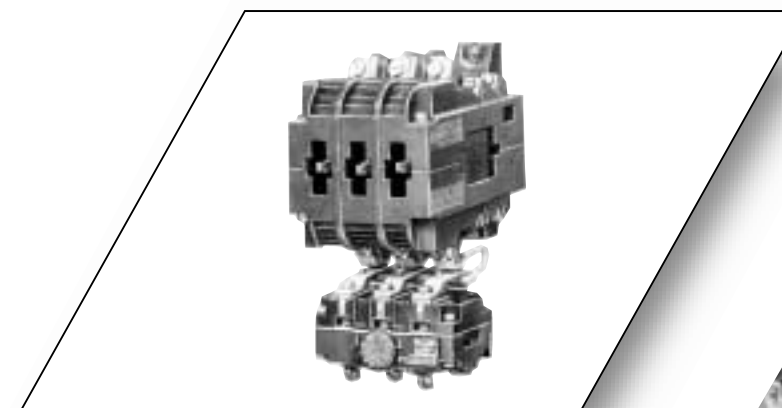
The first SF₆ gas-insulated 110 kV high-voltage switchgear (type ZF) was built.



I_s-Limiter



I_s-Limiter on switch truck



Motor-circuit switch

Roller-type converter



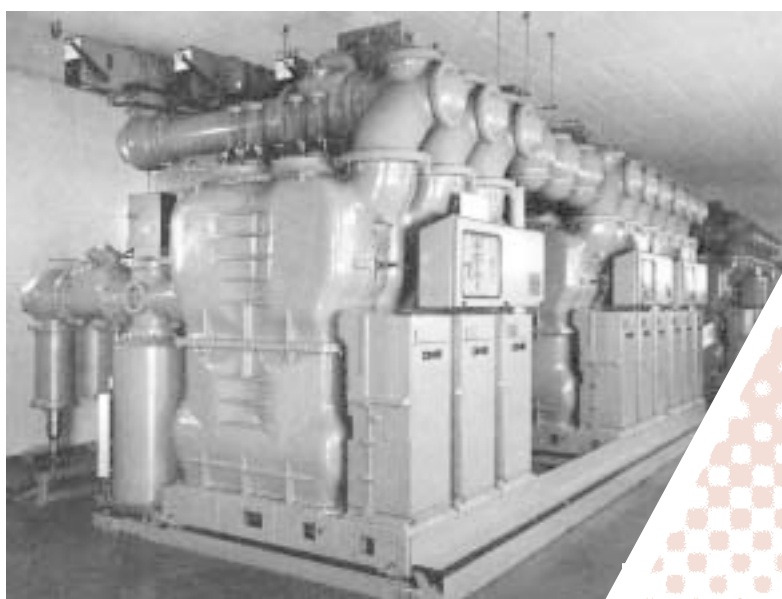
World premiere:

First SF₆ switchgear
presented in Hanover in 1965



SF₆ switchgear, type ZF

The first SF₆ switchgear is presented at the Hanover Fair in 1965.



SF₆ switchgear, type ZF

Essen-Rüttenscheid 1967

As early as the nineteen-sixties, voltages up to 30 kV were no longer sufficient to carry energy from the edges of major cities to their centres. CALOR-EMAG presented to a surprised specialist public a completely new technology: the first SF₆-insulated metal-clad switch panel for 110 kV. A new technological breakthrough had been achieved. The SF₆-insulated switchgear required only a tenth of the space previously required. This was the first equipment which could be used in interior areas. Development was followed by testing. When it was ensured that there were no doubts about operating safety, the first switchgear with eight panels and five circuit-breakers was commissioned in Essen on 10 October 1967. Today it still fulfils the requirements - with system-based expansion in accordance with the most recent technological standards.

In this period, the success of CALOR-EMAG was closely associated with progress in circuit-breaker design. The space-saving minimum-oil circuit-breaker, type OD1/OD2, which functions in accordance with the LOS principle, was created.

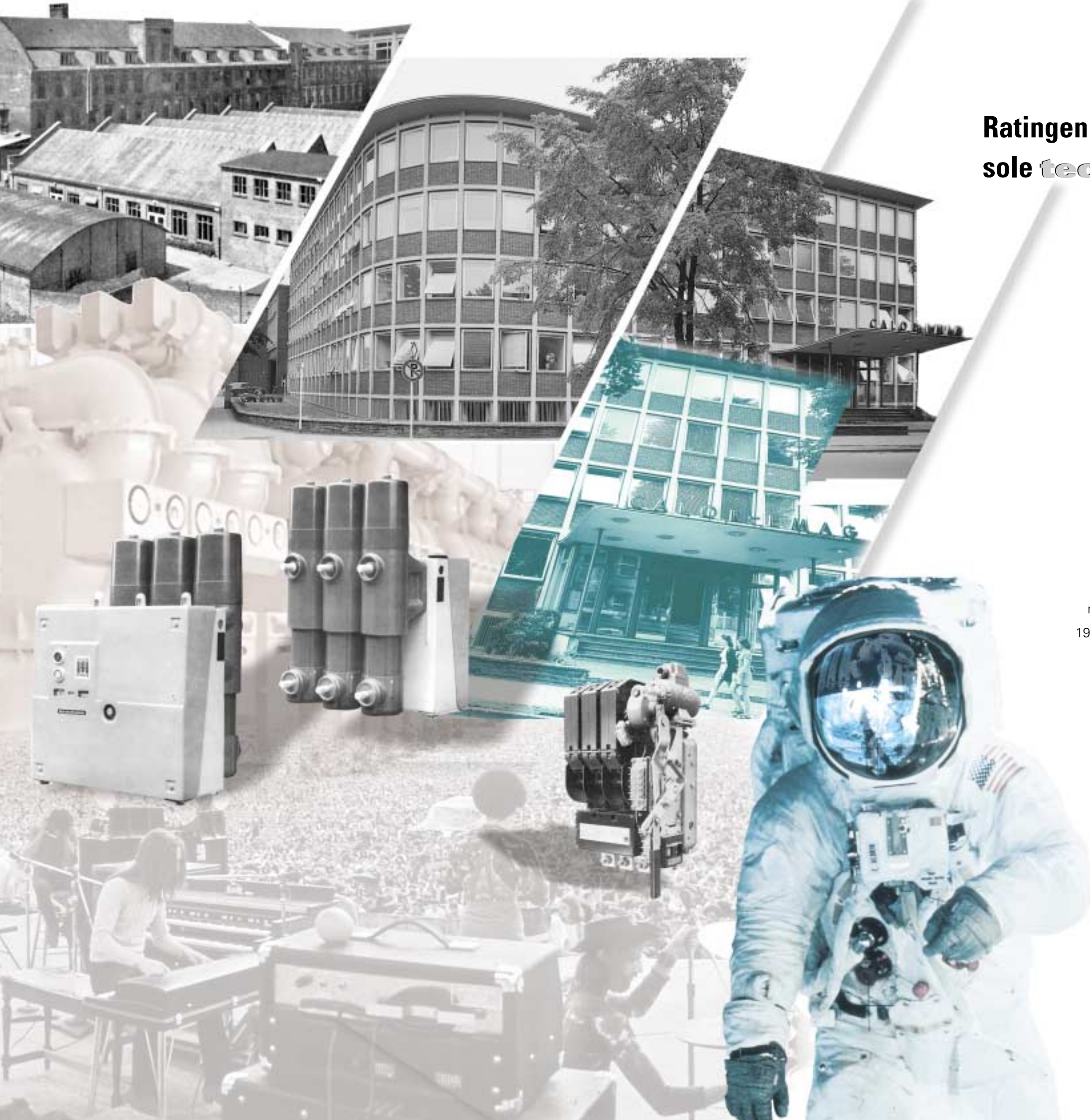
**Solid-insulated switchgear
ISOCOMPACT**



Ratingen as sole technology centre

Up to the middle of the sixties there was steady growth in Germany. The economic downturn brought this to an end. Economic performance fell, unemployment rose and more and more businesses collapsed. At the same time American astronauts walked on the Moon looking in wonder at the rise of the Earth.

CALOR-EMAG was not effected by this first economic recession. But, in order to remain competitive in the long term, it exhausted every opportunity to rationalise. The wide product range of switchgear and switchboards and the manufacturing divisions were subjected to close scrutiny. As a result, all production operations were transferred to Ratingen in 1969 and the old works in Frankfurt was closed.



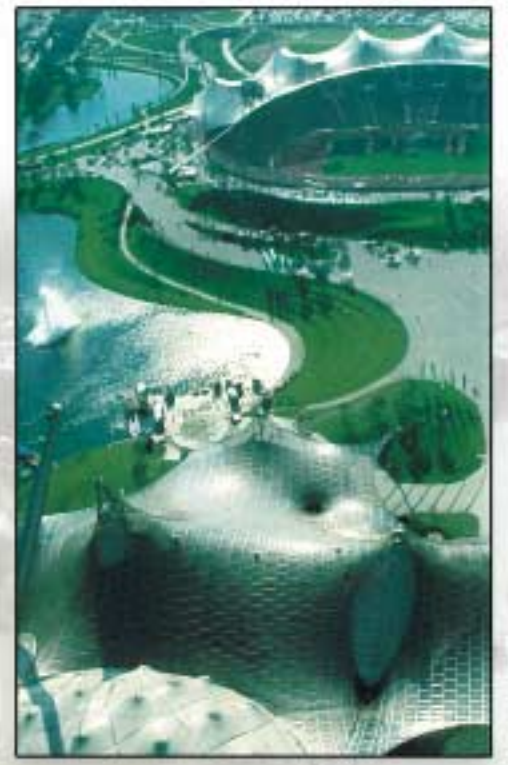


This was a time which rang the changes for fundamentally new directions. Under the motto of "daring a new democracy", great social and economic reforms were instigated in the new Federal Republic. So these years represent a turning point in economic and social development. It was found, however, that there are limits to economic growth. A reversal was very suddenly experienced when the Arab states cut down their oil supplies and reduced their exports to the Western world, causing an economic and financial crisis in Western countries. Only with great effort was it possible to counter the effects of these actions. Cars had to stay in the garage on Sundays. Cyclists held races on the motorways.

CALOR-EMAG takes a part in the Olympic Games in Munich.

For CALOR-EMAG there was a rich pay-off for the fact that it had been active in foreign markets at an early stage. Exports at this time accounted for 25% of total sales. A large order from Singapore, for example, ensured that the order situation remained positive. Type OD3 brought the minimum-oil circuit-breakers into line with technological progress. The OD3 was conceived primarily for the ZE switchgear.

And the company was active at the Olympic Games in Munich in 1971. It offered high-performance electrical technology for sport. SF₆-insulated metal-clad 110 kV switchgear (type ZF) helped to guarantee power supplies to the Olympic site.



CALOR-EMAG

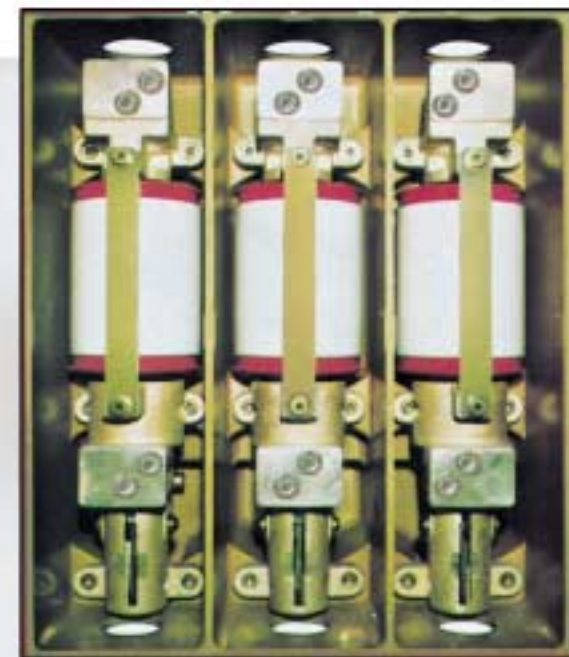
and **BBC**

The start of a partnership-based future

For a considerable time there had already been a close relationship with the swiss manufacturer Brown, Boverie & Cie in Mannheim and CALOR-EMAG E-AG based on detailed exchanges of experience. So it was logical that these two companies which cooperated closely with each other should get together to exploit new opportunities in their mutual interest. On 14 November 1973, BBC took a majority shareholding in CALOR-EMAG.

The objective of the two companies was clear: to consolidate and expand their market position. Under a dual-brand strategy, BBC and CALOR-EMAG continued to offer their successful product ranges under their own responsibility through their respective marketing organisations. In 1973 CALOR-EMAG employed 1,800 people and achieved sales of DM 105 million. The key focus in Ratingen was on development, production and marketing of high and medium voltage switchgear.





Visa-free
to Fiji

1974-1990



No borders in Europe

The recession continued. Although there were signs of a recovery at the start of the eighties, the number of unemployed continued to rise. A heated debate arose between the opposing sides whether social benefits were too high and jeopardised Germany's competitiveness as an industrial centre.

In the private sphere, the "electronic household" had become a reality. Video-recorders, CD players had become a matter of course. Many homes now had a computer, although because of their low storage capacity they only had two functions: word-processing and games. Later there was one in colour, with cool design and no DOS. It could be used for word-processing, games and communication.

And then on 9 November 1989 – preceded by many peaceful demonstrations – the borders between the East and the West were opened. A revolution by peaceful means brought the peoples of the two German states together again.

Even more CALOR-EMAG exports

CALOR-EMAG also increasingly felt the consequences of the economic situation. In 1976, domestic order receipts were 25% down on the previous year. But this was offset by increased exports. Production capacity continued to be fully utilised. But soon a cautious attitude to investment became evident in export markets. The pressure from international competitors became tougher and tougher. Ratingen continued to invest in the future. The test ground was expanded to 2800 MVA with a new short-circuit generator, a new galvanising plant was built, there was a major investment in NC technology, and the plant production shop was extended to 2,800 square metres. A clean room was built for the new vacuum technology and the first vacuum furnace was commissioned. In 1981, there was a further improvement in the economic position. A sales increase of almost 9% was a tangible sign.

During this period, there was an event of major importance for the future development of CALOR-EMAG. With effect from 1 January 1988, Swiss BBC merged with ASEA in Sweden to form Asea Brown Boveri, or in brief ABB. CALOR-EMAG presented itself for the first time as a member of the ABB Group at the Hanover Trade Fair in 1988.

For every problem
an appropriate solution



Stope switchgear unit
 in open-cast brown-coal mining

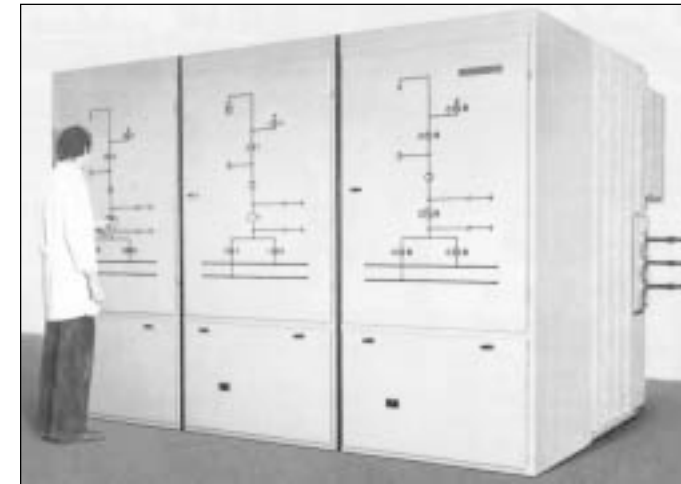
Since its formation CALOR-EMAG had followed one key principle: to keep ahead through innovation and mature, user-focussed technology. Through new product developments the company repeatedly aroused the interest of worldwide customers and competitors alike.

ZS – a new switchgear system for medium voltage – met customer requirements in terms of reliability, availability, safety and cost-efficiency with outstanding results.

In 1976, the rod-type switch-disconnector was presented at the Hanover Trade Fair and encountered great interest. In parallel, the company developed stope switchgear for brown-coal mining for 30 kV.



Air-insulated switchgear, type ZS1



Gas-insulated switchgear for 72.5 kV, type ENK

Developments for nominal voltages up to 72.5 kV type ENK were completed. At the Hanover Trade Fair in 1981, CALOR-EMAG presented the start of vacuum switching technology: the first vacuum circuit-breakers and the new low-voltage series of A7 circuit-breakers aroused great interest among trade visitors to the fair. A high-voltage system with explosion-proof switch panels was developed for mining.

At the 1990 Trade Fair in Hanover, the slogan of CALOR-EMAG was: "Leadership in vacuum circuit-breakers and bay control and protection for medium voltage".



Flameproof switch panels, type ZE
 in underground mining

Always a step ahead

An essential requirement for progress is speedy reaction. This is the key criterion to achieve a competitive lead in the future. In the following years, vacuum circuit-breakers were adjusted in line with technological developments. In the case of SF₆-insulated switchgear the key focus was on ZV2 and ZL4 switchgear.

Over this period, however, the product range was also rationalised. A fact of particular importance was that minimum-oil circuit-breakers were discontinued. At the Hanover Trade Fair in 1988, operating experience with SF₆-insulation technology over more than twenty years was highlighted. Apart from this, the key focus was on a range of new developments: the air-insulated switchgear with plug-in technology, type ZS1, the vacuum interrupters, the vacuum circuit-breaker VD4. The ZS switchgear were now also already available with vacuum or SF₆ circuit-breakers.



Gas-insulated compact switchgear, type ZL4



Vacuum circuit-breaker, type VD4



Gas-insulated switchgear, type ZV2 in salt mine



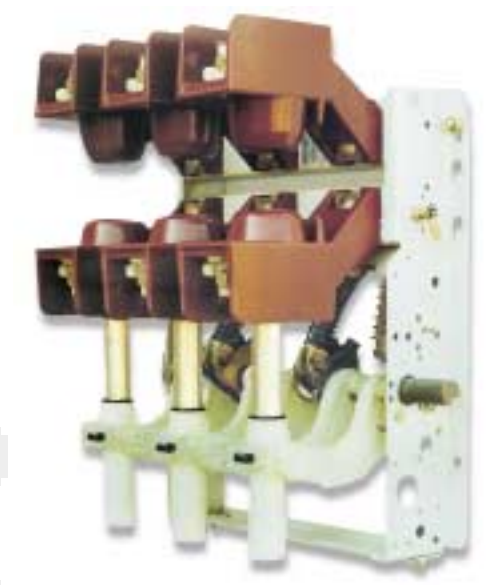
Vacuum interrupter, type VA1

A real professional: CALOR-EMAG Mittelspannungstechnik GmbH in Ferch

This professional commenced operations on 2 January 1991 when production started initially in Werder near Potsdam. Following a short construction period, a new building in Ferch was then commissioned. What had appeared impossible just a few years before was now transformed into reality in the new production facility.

Through communal effort, supported by the commitment of Calor Emag and many local initiatives, a state-of-the-art production facility was created. Customers were very quickly convinced by its performance and by the high quality of its products.

CALOR-EMAG Mittelspannungstechnik GmbH produces switch-disconnectors and switch-gear with the related components in the lower power range of medium voltage.

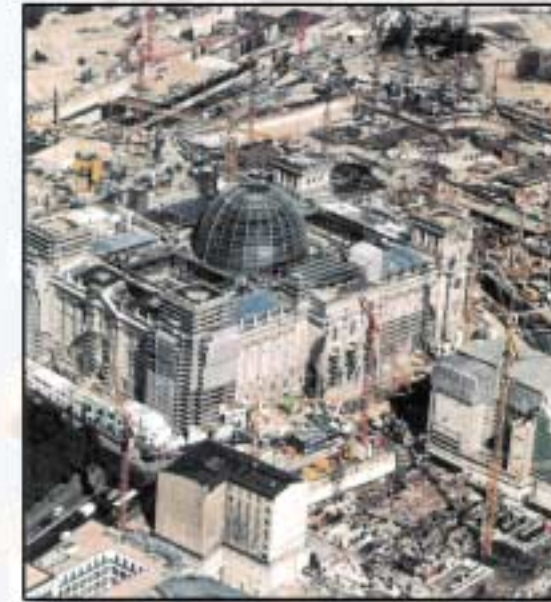


Ferch

1993-1998

**The Euro
is coming -**

the stock
exchange rejoices



Competitiveness remains secure.

In the middle of the nineteen-nineties, the major problems seemed to be of a social and economic nature. No lasting solutions and no end to the recession appeared evident.

In Germany, people showed great interest in the agreements on European economic and monetary union, permitting a single European currency from 1999. There was heated discussion, however, about whether the German Mark should be replaced.

At the start of 1994 CALOR-EMAG took over the company Hochspannungstechnik Peters & Thieding GmbH in Wentorf near Hamburg.

CALOR-EMAG got a new name. Together with its subsidiaries CALOR-EMAG Mittelspannungstechnik GmbH and Peters & Thieding, it merged with ABB Schaltanlagen GmbH of Mannheim with retroactive effect from 1 January 1994 to form ABB Calor Emag Schaltanlagen AG. This name also continued to stand for progressive technology, highest quality and cost-efficiency. Through the quality products and well-defined infrastructure in marketing, production and development, the Ratingen company took an established place with wide autonomy within the ABB Group.

The core areas of competence in Ratingen production include vacuum interrupters, vacuum circuit-breakers, current-limiting switchgear and gas and air-insulated medium voltage switchgear. From the start, Calor Emag was successful in research and development. The result: throughout the world 27 licensees with 44 licences manufacture products developed by Calor Emag.

On 1 April 1998, building work started on the "STAR project". Under the motto "Building tomorrow's world today", a new forward-looking production facility was to be built on the outskirts of Ratingen.



Equipped for the future with product innovations

At the start of the nineties, VD4 vacuum circuit-breakers, the air and gas-insulated ZS1, ZS8, ZL4 and ZV2 switchgear were Calor Emag's key products.



Switch-disconnector, type C4

Over the following years, the company set an impressive record of constant product innovation. With the microprocessor-controlled bay control and protection unit SCU – later description REF542 – it was possible to offer users intelligent panel units.

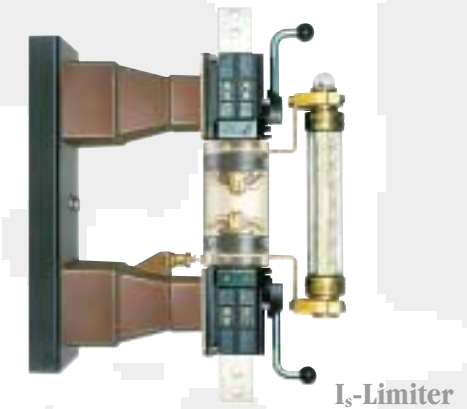


Worldwide market leader in the medium voltage field

They comprise the functions of protection, control, measurement, display and communication connection in one casing and therefore represent the brain of the switchgear. In vacuum technology, the company took the lead. In their product segment, C4 switch-disconnectors are distinguished by high switching capacity.



Vacuum interrupters



I_s-Limiter

VISIO-COMPACT

Presentation at Hanover Fair 1993.

New versatile products for medium voltage

In addition to the technically mature and practically-oriented ZS switchgear family with ZS1 and ZS8, the vision based on the "VISIO-COMPACT" prototype resulted in the product ZX1, a completely encapsulated, gas-insulated medium-voltage switch panel section with maximum functional integration. This pioneering equipment uses state-of-the-art technologies.

Expansion to cover higher current strengths and voltages is provided by the product ZX2: single or dual busbar, also in prefabricated form. All high-voltage conducting components are in gas-filled enclosures and maintenance-free as well.



A family presents itself

For requirements in the power grids of municipal utility companies and energy supply companies, in industry and public buildings, the ZX0 compact switchgear completes our family in the lower power category. This modern switchgear stands for economic and reliable energy distribution in a modular structure; practical, flexible and user-friendly.

In the area of vacuum switching technology as well, new approaches were developed on the basis of consistently pursued research and development work. The move from traditional spring-loaded operation to magnet operation, for example, took place in this way. All products are maintenance-free for their entire working life.

Mature product families with a high level of innovation allow individual customer wishes to be fulfilled - with speed and future reliability. All this has made Calor Emag the worldwide market leader.



The ABB Future Factory

High tech, know-how
and professionalism under one roof

The operations of ABB Calor Emag in the medium and high voltage area were transferred at the start of 1999 to two independent companies, ABB Calor Emag Schaltanlagen AG, Mannheim and Grossauheim, and ABB Calor Emag Mittelspannung GmbH. The latter continues to supply the complete range of modern medium voltage switchgear and products from Ratingen and Ferch.

The future has started: ABB Calor Emag Mittelspannung GmbH has built a new, forward-looking production facility. The new building, which opened its doors on 23 September 1999 after a construction period of only fifteen months, is located on the southern outskirts of Ratingen. Production technology and working procedures are determined by autonomous Competence Centres. These are interlinked with each other and with the directly related management functions.

The new production facility provides ideal conditions for efficient manufacturing processes. The very favourable traffic connections and availability of highly-motivated specialist personnel were the decisive points which continued to favour Ratingen as a business location.

In the production hall, which measures 130 by 110 metres, switchgear and all the related components are manufactured. The different areas, which are set up as independent profit centres, are all located under one roof and on one level. Each area is completely autonomous - including logistical handling. All the necessary test and development laboratories are located in another hall measuring 100 by 30 metres.



The ABB Future Factory

Calor Emag looks back over seventy-five exciting years, which were often characterised by scepticism and were not always easy but in the end were on the whole very successful. From the start, it has been part of the Calor management style that wide responsibility is given to each individual employee. Within the parameters of his or her area of responsibility, every employee is part of the decision-making process and contributes to the overall shape of things. This has made us what we are today.

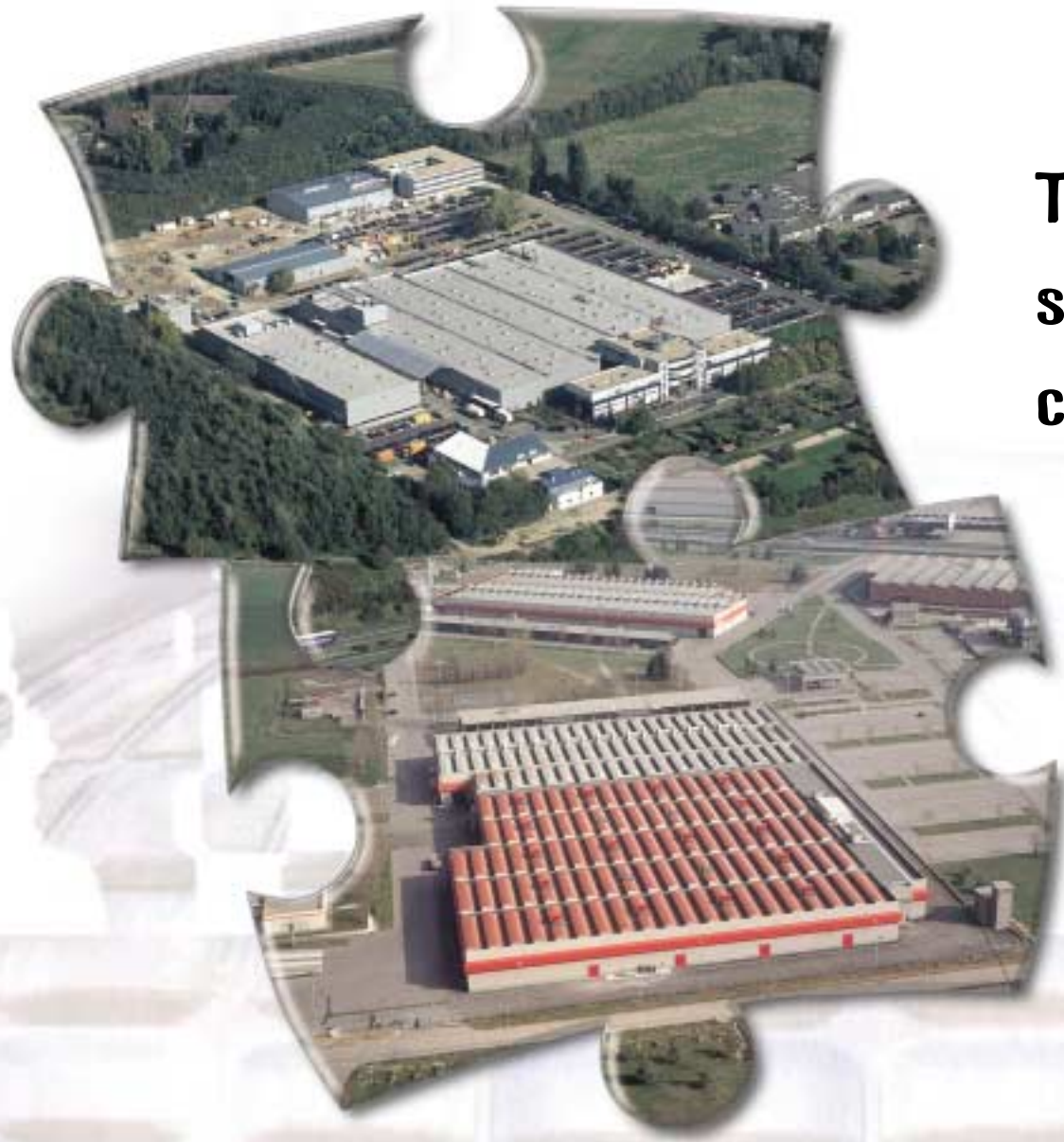
ABB Calor Emag Mittelspannung GmbH is celebrating its seventy-fifth jubilee. Dr. Alfred Haniel took over Calor G.m.b.H. in Duisburg and converted it into a joint-stock corporation on 7 April 1925. The foundation stone was laid for the high-tech company which is now recognised as a worldwide leader.

A period which is of very special importance for the company:

7 April 1925
to

7 April 2000





**The Calor
story
continues.**

**And how it continues,
depends on us.**

Constantly changing market situations and progressive globalisation mean that our company is presented with new challenges all the time. Only through a flexible and carefully targeted approach can the growing demands be met. We intend to counter the coming challenges with innovative developments on a partnership basis.

To ensure that the right course is set today for a successful future, two leading companies in the field of medium voltage have entered into a partnership. ABB Sace T.M.S and ABB Calor Emag Mittelspannung GmbH have joined together to form SaLor as a pioneering ABB project. The two companies retain their names and operating locations.

The ideas, expertise and experience of two innovative companies now develop in unison. In partnership-based collaboration, a start is thus made to ensure that our forward-looking growth concept results in shared success. The two companies will together demonstrate their strengths in the world markets.



PUBLISHER'S NOTE

We wish to thank all the employees who have helped our company to grow and achieve the respect which it enjoys today, those who through their commitment, hard work and skills have contributed to making ABB Calor Emag Mittelspannung GmbH the outstanding worldwide market leader which it is today.

We also thank everyone involved in producing this jubilee brochure.

The ABB logo consists of the letters 'A', 'B', and 'B' in a bold, sans-serif font. The 'A' is a solid block letter. The first 'B' has a vertical bar on its left side, and the second 'B' has a vertical bar on its right side, creating a stylized, symmetrical design.

ABB Calor Emag Mittelspannung GmbH

Oberhausener Strasse 33 Petzower Strasse 8
D-40472 Ratingen D-14542 Glindow
Phone: +49(0)21 02/12-12 30, Telefax: +49(0)21 02/12-19 16
E-Mail: calor.info@de.abb.com
Internet: <http://www.abb.de/calor>