

# Company Profile

## Retrofit



In 1980 the Eduard Hahn Engineering Co. which had been in existence since the 1950s became the **GSB – Gesellschaft für elektrische Ausrüstungen mbH** for the construction of special facilities, installation and service. Since then, the GSB has developed from a predominantly technical installation operation into a provider of universal, unique solutions and describes itself as a “production/engineering company”.

Due to a shareholder bill of exchange in 2001 the company’s legal status was changed to that of a GmbH & Co. KG (Limited liability company & limited partnership). In July of 2003, in order to accommodate the expanded operations, the company moved from Grevenbroich to its new business location in Rommerskirchen (western Germany).

The same year, the ABB Switzerland AG and the GSB founded the joint venture SVC (Service and Marketing Centre) for high voltage rectifier equipment. This cooperation provided the opportunity for us to grow from being a regionally oriented business into working in the international marketplace.

In 2004 another shareholder bill of exchange was carried out, and as a result, the GSB became an owner controlled family business at that time.

2004 and 2005 were characterized by a consolidation, in which we reconsidered the strengths of the company, and as a result integrated the subsidiary companies which had been established in the 1990s into the parent company, the GSB.

The following years saw us able to advance our geographical orientation, and enlarge our customer base, without losing sight of our regional origins.

Since 2008, we have become intensively involved with LED lighting technology. This provided us with the chance to install an initial pilot project for street lighting in Rommerskirchen. Further industrial applications are expected to follow!

The appointment of Dr. Lutz Bendel as CEO in 2009 has established a further milestone in the company’s development.

Our team includes:

- Graduated engineers technicians and master mechanics from the planning stages to the initial launch
- installers with international experience in construction supervision and operator functions (electricians, mechanics, welders) for a professional execution of your projects
- salespersons and office workers





## Our Service

Service is a cornerstone of the GSB philosophy. This includes analysis, conception, maintenance, diagnosis, retrofitting, launching with testing and verification.

Our clients regard us as engineering service providers, with supplementary capabilities for specific needs.

We see ourselves as general contractors for all electrical equipment that is necessary for a new installation, retrofitting, or automation of industrial complexes.

The autonomous profile as a flexible partner for tailor made trouble shooting, with ready service availability, Extensive successful relationships with regular core clients, and partnerships with other suppliers, have established the basis of our business dealings.

## Core Strengths

The core strengths of the GSB are founded on extensive experience, technical knowledge, and not least of all, the innovative skills which are indispensable in solving client problems. The GSB sees itself as a "learning organization", and supports the development of its personnel and procedures.

Our clients benefit not only from our skills at providing solutions to technically challenging problems, but also from the essential technical abilities for conducting an installation.

We solve problems with ideas drawn from competence, independent of the manufacturers, and provide individual solutions for a comprehensive range of technical problems.



## Retrofit as a strategic business unit...

"A solid company has to realise emerging market needs and chances, and has to respond with tailor-made and effective solutions." This guideline is an inherent part of our company's philosophy.

Especially in times of increasing harmonisation of markets and products it is not just crucial to realise customer wants and needs, but to adapt a company's strategy to changing demands.

Within the restructuring of the GSB to a business group for industrial engineering and automation we are now able to expand our retrofit activities and implement retrofit as a strategic business unit.

There are three major pillars that our retrofit business is based upon.

First, we look back on 20 years of experience not just in the retrofit business, but in the fields of electrical installations and switchgears – including construction, engineering, scientific calculation, production and installation.

Second, the business group employs experienced specialists with professional competence in technical engineering (domestic and foreign business).

Third, we are not only able to integrate different multivendor components (circuit breaker, relay) into a retrofit solution, but we also execute all subtasks within the retrofit process (i.e. design, engineering, production, installation, technical inspection and commissioning) with own staff and in-house.

# Retrofit for Medium-Voltage Installations

## Objectives & Customer Requirements

We understand retrofit as an upgrading of existing systems with state-of-the-art components. In most cases a complete replacement of existing technical units with new systems is not the best but most expensive solution.

The central idea of retrofitting is to ensure

- a high degree of System Availability and
- a high degree of Safety Standards with
- simultaneously minimised Investment Costs.

This objective can be fulfilled by using state-of-the-art components such as circuit breakers and instrument transformers in primary technology as well as the employment of the latest technology concerning protective and control systems in secondary technology.

In comparison to a complete replacement of existing units retrofitting offers the following investment related advantages:

- minimised interruption time of the operating procedures
- a time-consuming planning and building permission procedure is not necessary
- investment in the infrastructure (accommodation roads, buildings, etc.) is not necessary

- cable terminal units are already existing
- short execution times
- significant minimised costs of investment

Beside these investment related advantages retrofitting offers the following advantages concerning the operating system:

- increase in personnel, control and operating safety issues
- lowering of operating costs
- extension of durability
- reduction of maintenance activities
- minimised down times
- reduced assignment of personnel by using latest technology
- supply and guarantee of spare parts and system units
- adaptation to updated and new IEC regulations (e.g. arc resistance)





## Retrofit

### Scope, Services & Supply

Retrofitting of existing technical systems is recommended in the case that:

- capital investment is limited
- present maintenance is too cost-intensive
- already existing infrastructure cannot be changed/adapted
- environmental issues have to be considered (noise pollution, oil contamination, etc.)
- failure rate should be minimised
- existing systems have to be adapted to new standards and regulations
- supply of spare parts cannot be guaranteed any longer

The following product-specific solutions are part of GSB's scope of service and supply.

In the field of **Primary Technology** we offer:

- employment of vacuum circuit breaker instead of low oil content circuit breaker (switch truck as well as permanent installation)

- employment of vacuum contactor in case of high switching rate (switch truck as well as permanent installation)
- employment of switch-disconnector instead of disconnector
- installation of earthing switch including interlock
- installation of new current-/potential transformer
- expansion of existing stand-by sections
- extension and upgrading of existing technical units
- retrofitting of busbar systems (new specification)
- disposal of used devices

In the field of **Secondary Technology** we offer:

- employment of state-of-the-art protection and control devices
- retrofitting of control and locking systems
- employment of counting and measuring devices
- employment of signalling technology in remote-controlled and telemonitored installations

# Retrofit

## GSB's approach

Based on a long-term experience in retrofitting we consider the following method of resolution as best practice.

### ■ Analysis

Based on the experienced situation of the existing installation on site our experts work out a systematic analysis.

### ■ Scientific Calculation

Computer based scientific calculations concerning primary technology regarding:

- load flow / over current discrimination
- short circuit current capability
- current carrying capacity
- arc resistance
- stableness in case of static and incident issues

### ■ Technical Concepts for Secondary Technology

Our specialists advice on modernisation issues and work out concepts for secondary technology regarding:

- protection
- control and locking systems
- counting and measuring devices
- signalling technology in remote-controlled and telemonitored installations

### ■ Cost Analysis – Economical Valuation of Determining Factors

Within the scope of the analysis we consider all cost issues of the different options and components. Concerning the choice of the different components (i.e. circuit breaker, relay, etc.) we are multivendor. Moreover we determine cost saving potentials regarding service & maintenance and spare parts.

### ■ Proposal

Expert advice on the tender offer with its different options in accordance with the client.

When the order is placed we work out detailed documentation for the order processing:

### ■ Construction Papers Concerning Primary Technology

### ■ Diagrams Concerning Secondary Technology

### ■ Time Schedule up to the Commissioning

### ■ Production

The integration of the different components takes place in own production facilities with GSB staff.

### ■ Installation and Commissioning

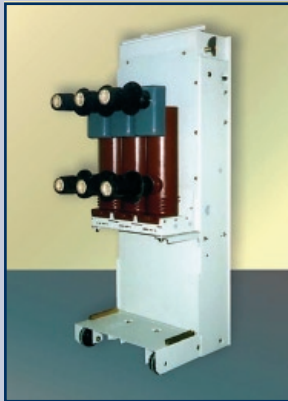
The installation is done by our experienced staff. The closing system checks and commissioning is also executed by own engineers and technicians with digital, state-of-the-art measuring and test equipment.

### ■ Documentation

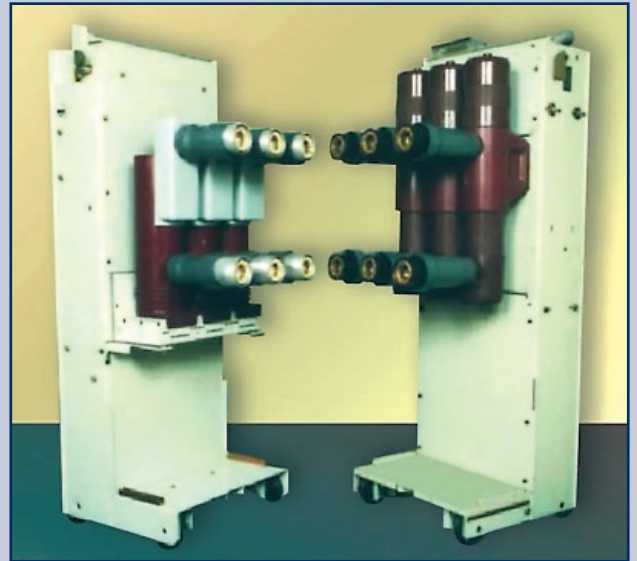
In order to secure a trouble-free operating we work out a overall documentation, predominantly in digital form.



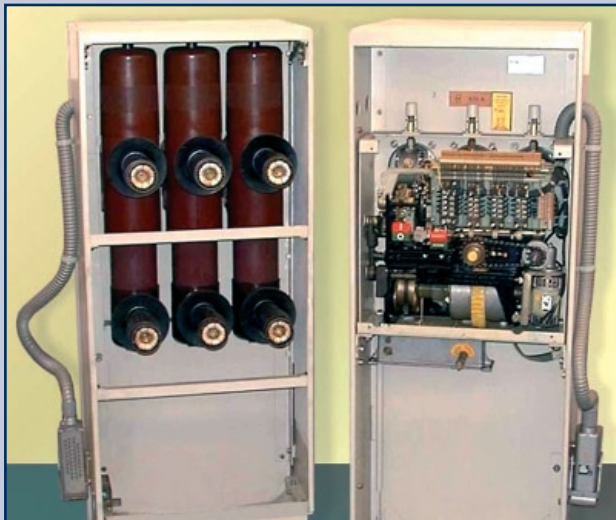
# Retrofit Examples



12 kV switch truck type ZE 4 with vacuum circuit breaker VD 4 .... 1250 A .... 31,5 kA instead of low oil content circuit breaker OD 3



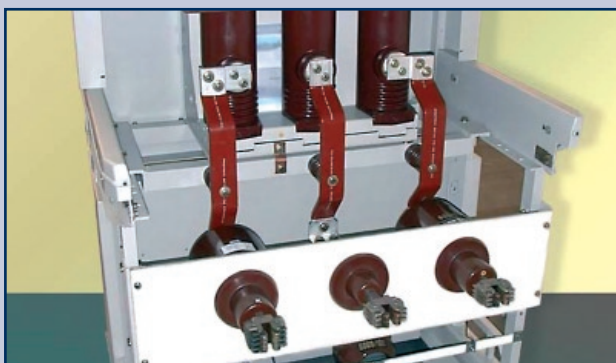
left (after retrofitting)  
vacuum circuit breaker VD 4 .... 1250 A .... 31,5 kA  
right (before retrofitting)  
low oil content circuit breaker OD 3 .... 1250 A .... 31,5 kA



Before retrofitting:  
12 kV switch truck type ZE 5 with low oil content circuit breaker OD 3 .... 1250 A .... 25 kA



After retrofitting:  
12 kV switch truck type ZE 5 with vacuum circuit breaker VD 4 .... 1250 A .... 31,5 kA



After retrofitting:  
12 kV switch truck type ZK 4 with vacuum circuit breaker VD 4 .... 1250 A .... 31,5 kA instead of low oil content circuit breaker OD 1

## Retrofit

### References

- Natel – Electrical Division, Kingdom of Saudi-Arabia  
extension for DUBA power station, ZW4, 36 kV, 1250 A
- Jedac, Bemco-group, Kingdom of Saudi-Arabia  
extension for DUBA power station, ZW4, 36 kV, 1250 A
- RemCon Electrical, United Arab Emirates  
extension of cable compartment, ZV2, 36 kV, 1600 A
- Ministry of dewatering, Egypt  
plant Elmex, OD2 to vacuum contactor, 6,6 kV, 1250 A
- Power authorities Vienna, Austria  
retrofitting switch truck BBC to VD4, 24 kV, 1250 A
- Kali & Salz, Steam power plant Hattorf  
1 unit, retrofitting switch truck type V&H to OD3, 12 kV, 2500 A
- Hoechst AG, Frankfurt  
3 units, retrofitting switch truck type ZK4 to VD4, 12 kV, 1250 A



- Pirelli Tyre Plant GmbH, Hoechst  
3 units, retrofitting switch truck type ZK4 to VD4, 12 kV, 630 A
- Power Authorities Stuttgart  
3 units, new development switch truck type BBC to VD4, 24 kV, 630 A

## Design and manufacturing of switchgears

- Tailor made and type tested medium voltage switchgears (both, air – and gas insulated) manufactured for ABB Calor Emag, Ratingen, Germany
- Tailor made medium voltage switchgears according DIN VDE 0101 regulations
- Development and engineering of Is-limiters manufactured for ABB Calor Emag, Ratingen, Germany
- Manufacturing of low voltage switchgears according VDE 0100, 0660 regulations
- Retrofit of medium voltage switchgears
- Control units for power and automation installations
- Design, engineering and documentation with solid works (3D) and ESC-CAD
- Workshop testing according VDE 0100 part 610, 0660 regulations



## Testing, commissioning and scientific calculation

- Testing of time-over current relays, transformer differential protection relays and distance protection relay
- Operating tests of medium and low voltage switchgears, transformers and cables
- Inspection certificate for testing with OMICRON testing equipment
- Operating programs for protective relays of SIEMENS, ABB, ALSTOM and SEG
- Existing test equipment: OMICRON CMC 256-6, SVERKA 750
- Existing test equipment for high potential tests: HPG 50 H
- Scientific calculation of short circuit current, load flow and selectivity with CALPOS / NEPLAN

## Automation, visualisation, measuring and control

- Drafting of concepts and bidding documents
- Design, engineering and documentation
- Manufacturing, installation, routine tests and simulation, local inspection, testing and commissioning of programmable controller (SPS) - basis SIEMENS S7
- Visual display system with SIEMENS WIN CC
- Process control system SIEMENS PCS 7
- Bus connection
- Optical fibre systems





## Service and supply of high power rectifier

In cooperation with ABB Turgi, Switzerland, GSB offers the following range of service and supply in the field of high-power rectifiers:

- New systems including design, engineering, supply, "on site" construction and commissioning
- Service and maintenance
- 24-hours support

- Experienced specialists with professional competence in technical engineering are based in Rommerskirchen.

Through the years we have proven our skills in many national and international projects. We work for customers all over the world and sent our staff to projects in all five continents.

## International References

Installation rectifier transformers	ABB AS Norway, Oslo, Norway
Retrofitting procedure of a 33 kV GIS	Remcon, Abu Dhabi, United Arab Emirate
Delivery and installation DC bus	Vinythai, Rayong, Thailand
Engineering, delivery and installation DC bus	Solvay, Brussels, Belgium
Design, delivery and installation DC bus	Bayer, Shanghai, China
Retrofitting procedure of a 33 kV switching station	Jedac, Jeddah, Saudi Arabia
Installation of rectifier groups and Head-transformers	SGL Carbon, Banting, Malaysia
Installation rectifier groups	Nyrstar, Budel, Netherlands
Dismantling and Installation of rectifier groups	AKZO, Rotterdam, Netherlands
DC-bussing of a fluorine electrolyser	Solvay, Onsan, South Korea
Installation of transformer, rectifier, Filter and bus	Solvay, Rossignano, Italy
Start up of rectifier groups	Hydro Norsk, Norway

Further contracts for installation/start up services outside of Europe, including Argentina, Puerto Rico, Bahamas, South Africa, Algeria, Egypt, Saudi-Arabia,...





GSB is continually adapting to the constant industrial, social, and cultural modification of our environment. With the advent of the new century, and the introduction of an integrated SGU (SHE – Safety, Health, Environment) management system, new challenges have arisen regarding safety, health, and environmental protection.

The importance of the promotion of safety and health care for employees in the workplace, as well as the continual concern for our environment has grown significantly. The GSB has declared itself ready and willing to meet the constantly escalating demands of these measures with a positive outlook. With our profile as “Engineering service providers” we perform in the industrial energy community as a reliable partner for our clients.

We rely on the individual expertise in each division of our company for this. To:

- Achieve consistent quality and constant improvement of our goods and services
- ensure optimal cooperation between all involved persons and resources, and
- meet our legal obligations as detailed in § 3 ArbSchG (Paragraph 3, German Federal labour protection laws).



We have established an integrated management system in accordance with DIN EN ISO 9001:2000 and following SHE-guidelines.



If our profile seems interesting concerning the execution of your projects, please do not hesitate to contact us.

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- Technical services & engineering
- ABB Sales- and Service-Centre for high power rectifier
- Integrated project management
- Retrofitting
- Installation & implementation
- LED-based Industrial lighting
- LED-based streetlights
- Acquisition of new and used equipment, as well as technical products

Pictures:  
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Michael Reuter