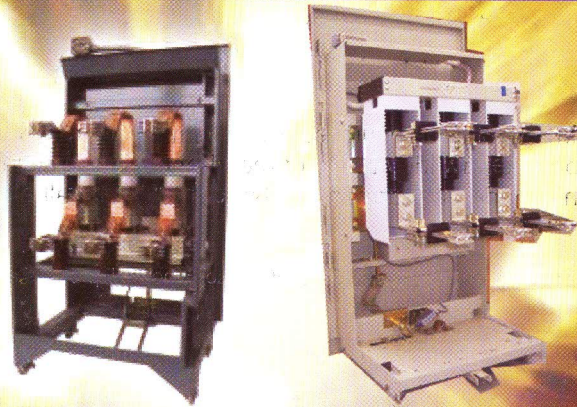
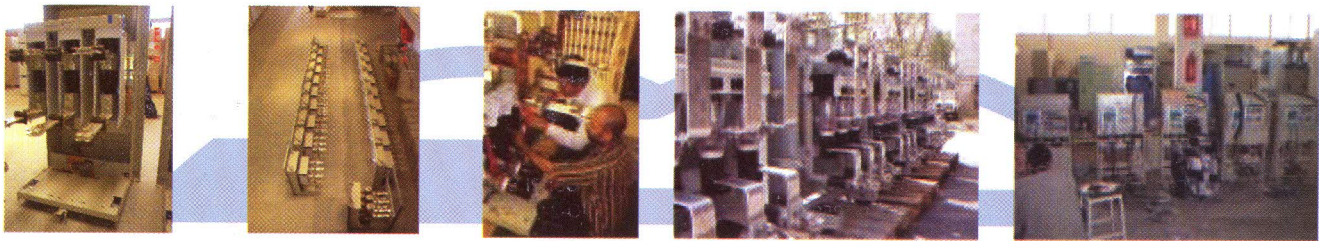


ISO 9001:2008 certification



Power engineering the natural way

GENERAL



Globalization of the world economy has led to dramatic changes in the power industry. The electrical utilities are no longer state property, but are being privatized to become profit-orientated companies.

The current financial situation of the electrical utilities requires them to reduce their operating expenses and to make their operations profitable. Given their financial constraints, the electrical utilities seek every opportunity to increase the quality of supply to their customers for the lowest possible investment. Thus, instead of replacing systems, they are looking for ways to upgrade and replace components in their existing systems.

Retrofitting is the updating of existing systems with modern components in order to improve their technical performance, safety and cost efficiency. It appeared in the late 1920s as an alternative to a new installation and has now gained popularity in many countries throughout the world.

ADVANTAGES

From practical experience, the parts of switchgear that are subject to intensive wear are the contact assemblies and operating mechanisms of circuit breakers as well as the electromechanical relays. Metal enclosures, busbar arrangement, supporting frames, insulators, secondary wiring and transformers age less radically and their remaining lifetime is comparable to that of a new installation.

Replacement of worn-out components with more modern, sophisticated ones provides not only failure-free operation but improved system performance.

Retrofitting has the following advantages, compared to the demolition of the old substation and erection of a new one:

- One-fourth the price of a new installation;
- No demolition and construction investment;
- No substation redesign work;
- No approval procedures;
- Minimum idle time;
- Short fulfillment time.

Furthermore, the retrofit solution is almost equal to a new installation in terms of functionality, operator safety, maintenance and warranty period, as well as environmental impact.

The introduction of vacuum switching techniques enables the electrical utilities to avoid environmental pollution caused by oil leaks, oil and gas emissions during switching operations of oil circuit breakers, and reduces noise in the event of air-blast circuit breaker replacement.

In addition, metal enclosures, partitions and other remaining devices, as well as switchgear structures can be locally refurbished to look as good as a new substation.

DESIGNS

Electrical Relays Factory Co. now offers a retrofit service for MV switchgear equipped with minimum oil and bulk oil, air-blast and even vacuum type circuit breakers. Retrofit solutions comprise a wide variety of metal-enclosed cubicles as well as open-type design substations made in Eastern and Western Europe, the former USSR and the UK. In all, almost 60 designs are available for both fixed and truck-mounted installations.*

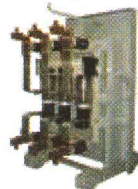
* Please, ask for a "Electrical Relays Factory Co. Retrofit Product Guide" that gives you comprehensive information about all projects available.

Saudi Arabia 7.2-12 kV

SWITCHGEAR TYPE:
CIRCUIT BREAKER TYPE:
SUPPLIERS:



KRU 2-10, K-12, K-13
VMP-10K, VMPP-10, VMPEH-10



K-12, K-26, K-37
VMP-10K, VMPP-10, VMPEH-10



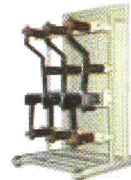
KM-1, KMV, K-59, K-47, K-63, K-104
VK-10, VKEH-10

Saudi Arabia 7.2-24 kV

SWITCHGEAR TYPE:
CIRCUIT BREAKER TYPE:
CB MANUFACTURER:



K3-02
AK 10/800/20, AK 10/1250/20



CELP SA
IO-24/630



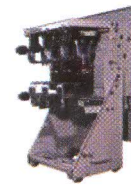
CSIM 1-20/500
SCI 1-20/630/500
VEM, GDR

Saudi Arabia

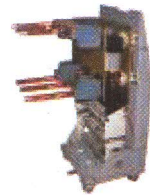
SWITCHGEAR TYPE:
CIRCUIT BREAKER TYPE:
CB MANUFACTURER:



ST7
WMPWZ/S-12/06/16



RSW10/I
WMSWPI-10/6/3.5



Rade Koncar
M12-25-12SE

Saudi Arabia 12-24 kV

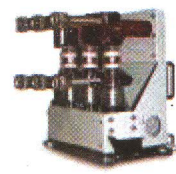
SWITCHGEAR TYPE:
CIRCUIT BREAKER TYPE:
CB MANUFACTURER:



8BK-20
3AF, 3AH
Siemens, Germany



D-12
VD4
ABB, Germany



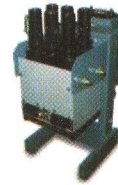
ENO
VD4
ABB, Germany

Saudi Arabia 11 kV

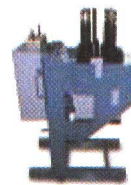
SWITCHGEAR TYPE:
CIRCUIT BREAKER TYPE:
CB MANUFACTURER:



LMT 2
LMT 400
A.Reyrolle & Co., the UK



BVP 17
BVRP 17/400
GEC Distribution Switchgear, the UK



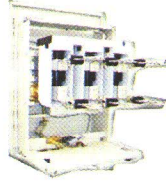
C4X, D4X Low silhouette
D4XD/400
Hawker Siddeley, the UK

**Saudi Arabia
12 kV**

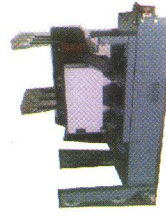
SWITCHGEAR TYPE:
CIRCUIT BREAKER TYPE:
CB MANUFACTURER:



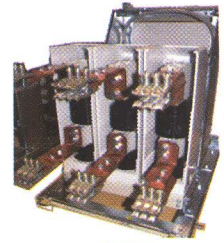
LMT 2
LMT 400
A.Reyrolle & Co.



3CBO44
Vd4
ABB



HKK12/812
ASEA



8BD1
Siemens, Germany

SOLUTIONS

ElectricalRelays Factory Co. retrofit solutions are based on a prefabricated retrofit kit of components designed for a particular type of switchgear. Depending on the type, it usually consists of:

- One indoor switching module and one control module;*
- Connecting buses, electro-mechanical interlock mechanisms, support insulators, control cable, mounting hardware, a position indicator and manual trip facility, together with an installation and operating manual;
- Surge arresters (optional).

* Please, refer to 'VCB Instruction Manual, Ver.05, 01.02.07'.



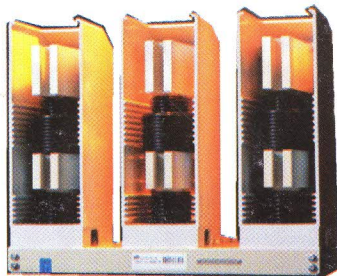
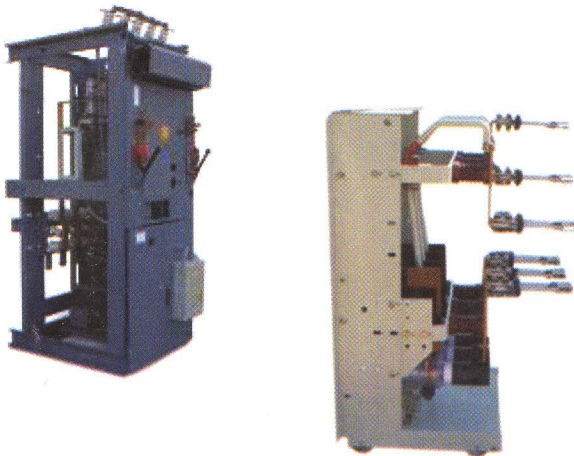
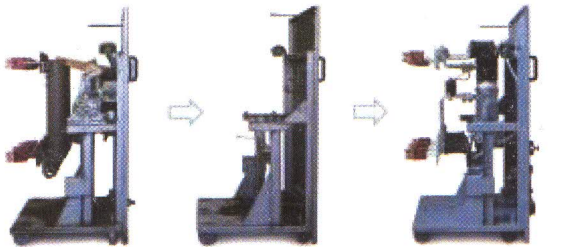
CONCEPT

The retrofit is carried out in such a way that the spring or solenoid mechanism and contact assemblies of an old breaker are removed and a retrofit kit is installed using the same connections and mounting holes. The main structure of the circuit breaker truck is retained, therefore eliminating the need for re-alignment and re-establishment of the current handling capabilities of the fixed mating contacts.

The interlock mechanisms, which prevent improper operation and withdrawal of the breaker, are retained and may be augmented by the addition of electro-mechanical mechanisms as appropriate to enhance the safe operation of the unit.

This principle is also employed in the replacement of the switchgear in open-type substations. In fact even less time is required to retrofit this type, as its switchgear arrangement is simpler and has plenty of room for mounting a circuit breaker, switch-disconnector and protection units.

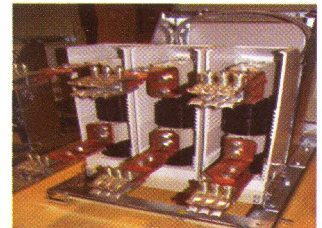
The control modules, which replicate the auxiliary interface of conventional circuit breakers, eliminate the need for serious engineering work on the secondary wiring. At the same time the modules are equally applicable to both electromechanical and modern μP relays and can be easily incorporated into a remote switching scheme or SCADA.



PACKAGES

The retrofit packages provided by Electrical Relays Factory Co. include any combination of the following:

- Turnkey installation;
- Supply of the retrofit kit for the particular type of switchgear to be installed on site;
- Supply of digital or electromechanical protection and control units;
- Contract supervision and/or commissioning and starting-up;
- Transfer of technical documentation for retrofit kit manufacturing;
- Development and engineering of a customized retrofit solution;
- Assistance in setting-up of a local retrofit shop;
- Assistance in carrying out type tests of completed switchgear;
- Training program and after-sales service.



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ص. ب. ١٠١٧٠٩ الرياض ١١٦٦٥



BENEFITS

Retrofitting provides many benefits:

- Reliable, safe and environmentally friendly switching medium;
- Switching module operation utilizes unique magnetic actuator technology;
- Main structure of the switchgear and busbar arrangement, isolation systems and cable connections are left undisturbed;
- Interlock mechanisms can be augmented to improve operability and safety considerations;
- Additional signal outputs can be provided to monitor operation of the circuit breaker and interlock mechanism;
- Retrofitted trucks can be made to be completely interchangeable with existing hardware;
- The insulation system, the magnetic actuator and the vacuum interrupter assembly form a maintenance free assembly. No preventative maintenance is specified or required for the retrofitted circuit breaker;
- Retrofitted circuit breaker may be used as a high-speed recloser;
- Up-to-date microprocessor based relays may be installed to upgrade protection capability and enable circuit breakers to be remotely controlled through a range of media including most existing SCADA systems.

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