EGEMAC

Egyptian German Electrical Manufacturing Co.

GL 314

Live tank circuit breakers

245 kV

ALSTOM

GL 314

Live tank circuit breakers for 245 kV

EGEMAC is always looking forward to developing its strength through agreements with international companies. Thus, an agreement was signed with Alstom Grid which is at the cutting edge of development in new technologies for high voltage live tank circuit breakers.

Quality

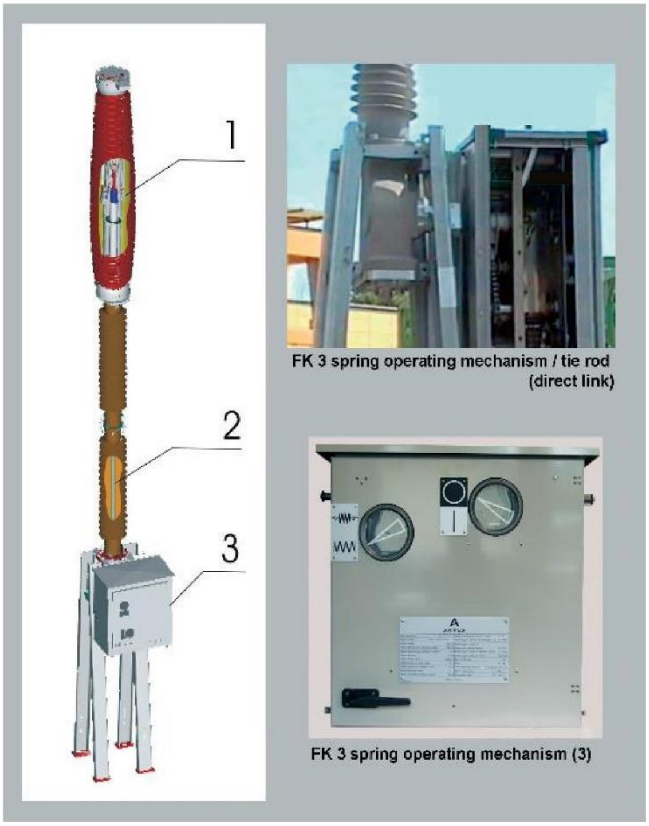
Our units are certified ISO 9001, ISO 14001 and ISO 18001. This means that throughout the entire production process, all employees, all equipment and all of our operations are dedicated to quality and permanent improvement.

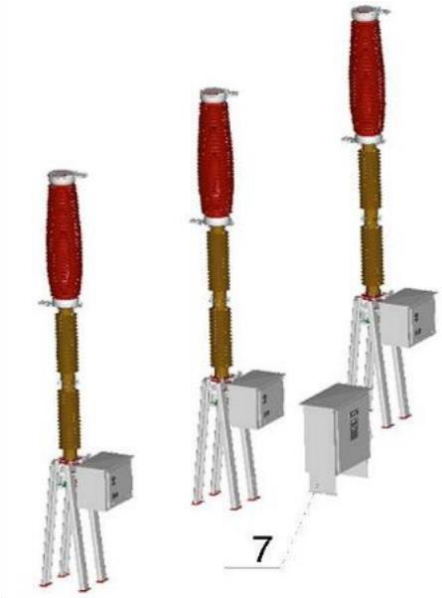
In addition to the numerous standardised quality checks such R&D, type tests, purchasing quality, conformity tests on our suppliers' parts, routine circuit breaker tests, packing, transportation, installation and commissioning, we are constantly improving our quality process through the application of the following:

- Supplier evaluation and selection flowchart
- Supplier type tests on samples

Customer benefits

- **Highest reliability thanks to the FK3's fully spring-operated mechanism and field-proven unique breaking chamber type.**
- **Quick and easy on-site installation thanks to the direct link between spring-operated mechanism and tie rod**
- **High mechanical endurance and restrike probability according to IEC 62271-100 Class M2 & C2 requirements**





Breaking chamber (1)

Identical breaking chambers equip the whole range:
•Single chamber for 245 kV
To attain the highest performances while reducing spring mechanism energy, the following has been achieved:
•Perfecting the arcing contacts design
•Developing and enhancing the thermal effect
•Optimising the puffer effect thanks to a specific guiding nozzle

Insulated tie rod (2)

As this is one of the most sensitive components - which links the spring mechanism to the interrupting chamber - each insulated tie rod is factory tested for strength and dielectric partial discharge. To permit a quick, easy and safe on-site installation, this circuit breaker is equipped with spring-operated mechanisms that are directly linked with the tie rod, thus avoiding additional on-site adjustment.

Spring-operated mechanism (3)

The most recent state-of-the-art evolution was the launch of the FK **3** spring-operated mechanism*:

- The FK **3** is tested and homologated for 10,000 operations (class **M2** IEC **62271-100)**
- Closing and opening springs are incorporated
- Balanced and simple kinematics permit fully stable operating times (at **800** kV, two FKs per phase work in synchronisation)
- No adjustments required during the installation phase
- Aluminium IP 55
- Direct link between FK **3** axle and circuit breaker insulated tie rod

Type description

GL 314 (X)

Gas-insulated circuit breaker

Live Tank breaker design

3rd generation breaking chamber

14 for 245 kV or 300 kV

X: for high breaking capability

Equipment for extreme conditions

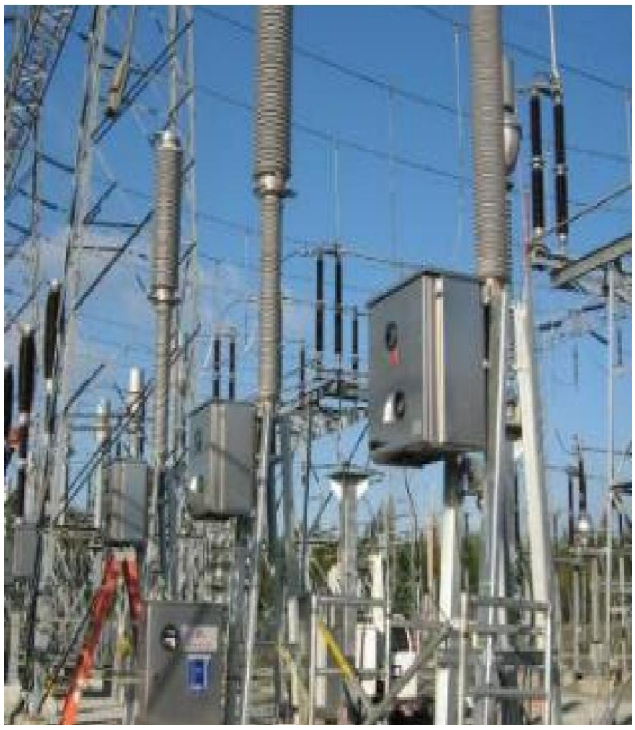
The GL series can be used in a wide range of operating conditions such as:

- Low temperatures to -50° C
- Seismic withstand: up to 0.5 g IEC / IEEE / ENDESA demonstrated by shaking table tests
- High pollution levels: 25 mm/kV standard creepage distance. Available also for very high pollution level regions
- High insulation level: for altitude installation.
- The GL range development evolved from the previous Alstom Grid range of circuit breakers. The main focus was to increase:
- Overall circuit breaker performances
- Reliability (reducing spring-operated mechanism power).

Thanks to the breaking chambers and spring - operated mechanisms, we now propose an extended range of circuit breakers for rating performances up to 63 kA and 800 kV. As an example of extended performance, we can achieve 420 kV / 50 kA / -30°C with 2 chambers without capacitors.

Another key strength is our strict compliance with the latest IEC 62271-100 standard covering the most severe class concerning line capacitive switching (class C2) and mechanical endurance (class M2: 10,000 CO).

In all ranges, the porcelain insulators can be replaced by composite insulators on request.



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Technical characteristics

» Breaker type		GL314
Number of breaks / phase		1
Rated normal voltage	kV	245
Rated normal current	A	3150
Rated dielectric withstand (up to 1000 m) »At power frequency	kV	460/530*
»At lightning impulse (1,2 / 50 ps wave)	kV (peak)	1050/1200*
At switching impulse	kV (peak)	NA
Rated short-circuit breaking capacity »Periodic component (r.m.s. value)	kA/3s	50
First pole-to-clear factor		1.5
Peak short-circuit withstand current	kA (peak)	170
Rated line-charging capacitive switching		Class C2
Mechanical endurance		Class M2
Break-time / opening or closing	cycles	2

Characteristics given for 50 Hz for information. 60 Hz versions also available.
* Non-standard value for specific application. For other values, please consult us.

Production

Production line technical employees have proven experience in HV CB assembly:
. For each step of production, detailed operational instructions are at workers' disposal
. Complete tracability is achieved by means of monitoring sheets, labels, marks...

Installation & commissioning

For each project, a complete instruction manual is created for the client: it describes how to erect, commission, operate and maintain the circuit breaker:
. Specific erection and commissioning tools are provided with the circuit breaker
. The Alstom Grid global network of technical experts is available to supervise and accompany the client during this crucial stage
. The GL range has been designed to optimise the work needed for installation making it shorter, easier and safer
. There is no mandatory supervision required on the GL314(X)
. Final site testing completes the validation of each circuit breaker and concludes our total quality production process.

Routine tests

All assembled circuit breakers are individually and routinely tested according to a dedicated procedure, based on the strictest IEC &ANSI standards:

. Alstom Grid has special technicians piloting and controlling our automatic testing equipment (mechanical bank, tightness module, dielectric laboratories, ...)

. Relevant acceptance criteria have been defined based on detailed analysis of previous test results, experience on circuit breaker life and as a complement to international standards

. All delivered circuit breakers respect 100% of these criteria . Customers wishing to witness this process and to visit our production lines, are most welcome to do so.

Circuit breaker life

Alstom Grid circuit breakers are designed and manufactured for an extremely long life-cycle under the most difficult conditions.

Through our commercial and service networks, our specialists remain at our customers' disposal to offer support throughout the circuit breaker life-cycle.

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