

FEATURES & ADVANTAGES OF THE R.P.S. SWITCHGEAR 'LM' RETROFIT CIRCUIT BREAKER

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INTRODUCTION

RPS Switchgear, (formerly Reyrolle Pacific), has been supplying retrofit vacuum circuit breakers for the Reyrolle LM switchgear range for almost forty years, with more than 4,000 retrofit units in service worldwide. The removal of the existing oil circuit breakers and their replacement with our modern vacuum replacement trucks is an easily implemented solution that can be completed with minimum system disruption and bring significant benefits to network owners and operators.

In addition to the retrofit vacuum breaker, RPS Switchgear can also retrofit Type Tested safety enhancements to existing LMT switchboards to give internal arc withstand safety to the latest 62271-200 standard for 25kA for 1 second.

Retrofit Circuit Breakers of 630A, 1250A and 2,000A awaiting final inspection and test at the RPS factory



630A Retrofit Circuit Breakers on an assembly line at the RPS factory



DESIGN

The key features, benefits and advantages of the RPS retrofit solution have been categorised and listed below,

- Our vacuum Retrofit circuit breaker has the same design heritage as the original Reyrolle LMT switchgear, which ensures direct compatibility between the new Retrofit Vacuum Circuit Breaker and the existing LMT fixed portion and interchangeability of circuit breakers.
- The design is a complete, fully tested assembly, (to 62271-100), which does not use any recovered or refurbished LMT parts, all parts are new and manufactured to the latest standards,
- Our Retrofit VCB has a simple Vacuum Interrupter wear indication that allows the operator to inspect and assess the VI wear throughout the life of the switchgear. (Encapsulated interrupters do not allow this and usually have worse thermal performance.)
- The mechanism on our VCB is a simple, very low maintenance, robust design that has less than 30% of the components of the original LMT oil circuit breaker mechanism.
- The design allows easy access to the Vacuum Interrupter and associated main connections for inspection,
- For the auxiliary connections our VCB is available with two options:-
 - It can interface directly with the existing Secondary Isolating Contacts on the LMT switchgear or,
 - It can be provided with a new 24-way, interlocked plug & socket arrangement, that can easily be attached to the existing wiring,

PERFORMANCE

- The RPS vacuum Retrofit circuit breaker has been designed and tested in all ratings from 400A to 2500A to suit the ratings and requirements of the LMT switchgear range.
- The breaker is a 3-pole, 12kV, short circuit capacity up to 31.5kA, withstand duration 3 sec., impulse voltage 95kV, motor charged spring – all voltages, Opening & Closing release coils -- all voltages.
- The RPS Retrofit breaker is capable of re-strike free operation, operating within the required ratings,
- The circuit breaker can interrupt up to 50% dc component of the short circuit current at rating, in accordance with IEC62271-200, standard time constant for dc decrement. The opening time of the breaker therefore does not need to be delayed.
- The retrofit breaker is a long life, low maintenance breaker, capable of more than 10,000 full-load operations and in excess of 80 full-fault clearances,
- The retrofit breaker has been tested in conjunction with existing LMT switchboards to verify that the fault rating of the switchboard can be increased up to a maximum of 31.5kA once the breaker retrofit has been undertaken,

IMPLEMENTATION

- The RPS vacuum Retrofit circuit breaker critical dimensions and interfaces are identical to the LMT switchgear range, thereby ensuring that the retrofit is a direct, simple, fast replacement for the existing oil circuit breakers.
- The breaker can be easily installed into the existing LMT cubicles with no modifications to existing interlocks or shutter drive mechanisms.
- Experience over several decades has shown that a change out rate of two circuits per day is easily achievable,
- Secondary wiring changes and additional SCADA features can be easily accommodated with the new circuit breaker,
- All retrofit breakers of the same rating can be made interchangeable, giving maximum operational flexibility,
- The RPS vacuum circuit breakers have identical operational interfaces as the existing circuit breakers, as far as racking, interlocking and operation is concerned, to remove the need for different operating procedures once the retrofit has been done

SAFETY TO MODERN STANDARDS

The replacement of the oil circuit breaker with the RPS vacuum unit is obviously a significant improvement in operator safety and business risk, however there are other important tested safety enhancements that are needed and that RPS can install onto existing LMT switchboards to bring the old switchgear fixed portions into compliance with the latest standards for Internal Arc Safety.

- A very important operational area for people in the switch-room is the region in front of the switchgear: this is where operators spend more than 95% of their time. RPS can now retrofit an arc-proof front door that has been tested in accordance with the latest standard, (62271-200) to protect the operator for an internal arc fault in the breaker chamber for 25kA for duration of 1s with roof heights down to 2.8m.
- The above arc-proof front door allows the operator to rack the breaker into and out-of service without opening the cubicle door, thereby maintaining safety for the operator during racking operations.
- The retrofit of pressure relief flaps, switchboard end shields and a containment system to the rear of the switchboard to give a certified qualification for faults in all chambers to the latest standard, (62271-200) for 25kA for 1s, to achieve 3-sided safety on existing switchboards.

View of existing LMT1 switchgear retrofitted with RPS's 25kA, 1s arc-proof front door.

Arc-proof front doors are fitted with the racking through closed door feature.

