

Introduction of Products

EXPANSION TYPE LOAD BREAK SWITCHES DELIVERED TO TSUNOKAWA POWER PLANT, THE KANSAI ELECTRIC POWER COMPANY

Expansion type load break switches are oil-less insulator type switches serving for interrupting of small current below the rated value or load current of transformer. They are also used, with H-H fuse, in place of circuit breakers.

The above mentioned breaker delivered to Tsunokawa Power Plant of the Kansai Electric Power Co. is designed for the rating of 11.5kV 1,000 A suitable for the purpose of synchronize-switching of alternator and interruption of exciting current of transformer (13,000kVA); Its construction and performance is featured as follows.

- i) The quenching medium is a non-inflammable liquid containing water.
- ii) No noise in case of interruption.
- iii) In the interruption of small current (exciting current of transformers) no abnormal voltages are generated.
- iv) Arc duration time is constant, independent to current value.
- v) Simple construction and inexpensive.
- vi) Easy maintenance and inspection.

I. CONSTRUCTION AND OPERATION

Fig. 1 illustrates the appearance of the load break switch, Fig. 2 the moving parts and Fig. 3 dimensions.

As shown in the illustration, arc extinguishing chambers of cylindrical shape and moving parts are supported by insulators. Contact rods make linear movement by means of link mechanism. Current is led to the guide rod through conical rollers. Closing operation is done by pneumatic drive, while opening operation by breaking spring fitted on the frame.

II. PERFORMANCE

1. Closing and interruption tests

The rating of this apparatus is 11.5kV 1,000A. Operating voltage is 100 V. D.C., operating pressure is 7kg/cm. The closing time is 0.15 seconds. If the operating voltage changes from 75 V to 110 V, and operating pressure from 5.25 kg/cm² to 7.7kg/cm², the closing time is within 0.15 ~ 0.18 seconds. The test results of interrupting exciting current are very good as shown in Figs. 4 and 5.

2. Temperature rise tests

The temperature rise of contact parts, when

current of 1,000 A flows through there, is 20°C ~ 28°C. When short-time current is passed (10,700A 1.85 sec), the temperature rise of every part is about 2°C and nothing wrong is noticed.

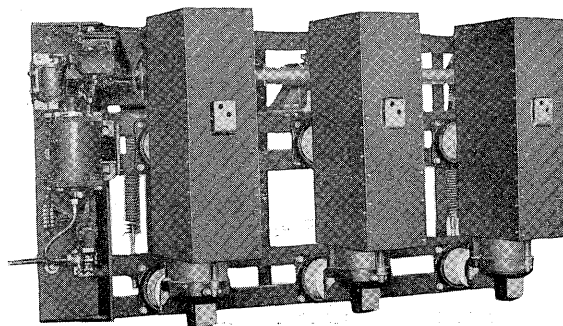


Fig. 1. Expansion type load break switch type R 612III/10/1000 D

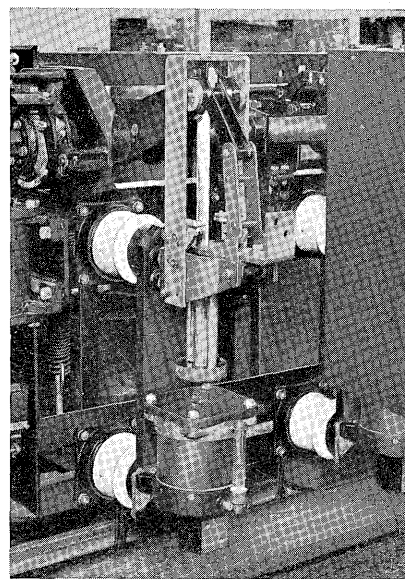


Fig. 2. Moving part and arc chamber

Table 1. Exciting current interrupting test result.

Testing Voltage kV	Frequency	Circuit current A	Arc-time C	Whole circuit time C	Remarks
11	46.5	50	1.7	6.2	Short circuit factor 3.6% Recovering Voltage 105%
11	46.5	50	1.7	6.2	„ (Fig. 5)
10	46.5	66.5	1.75	6.25	

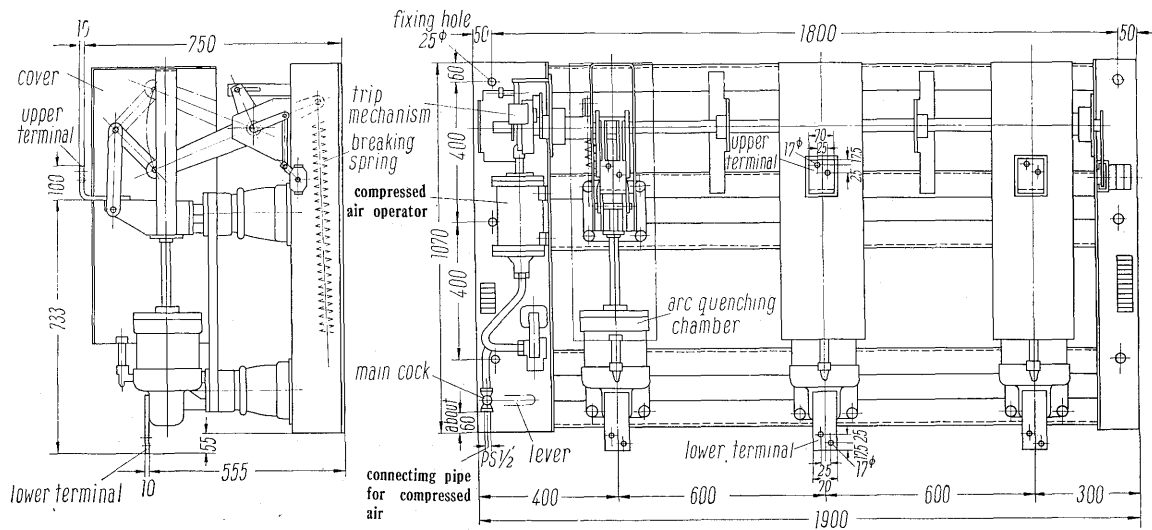


Fig. 3. Expansion type load break switch, type RF 612 III/10/1000 D

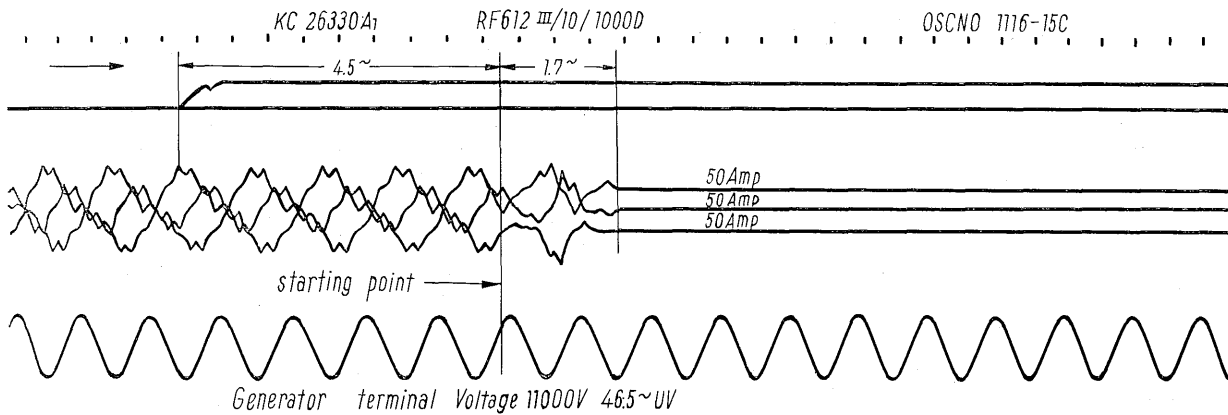


Fig. 4. Closing test oscillogram of expansion type load break switch

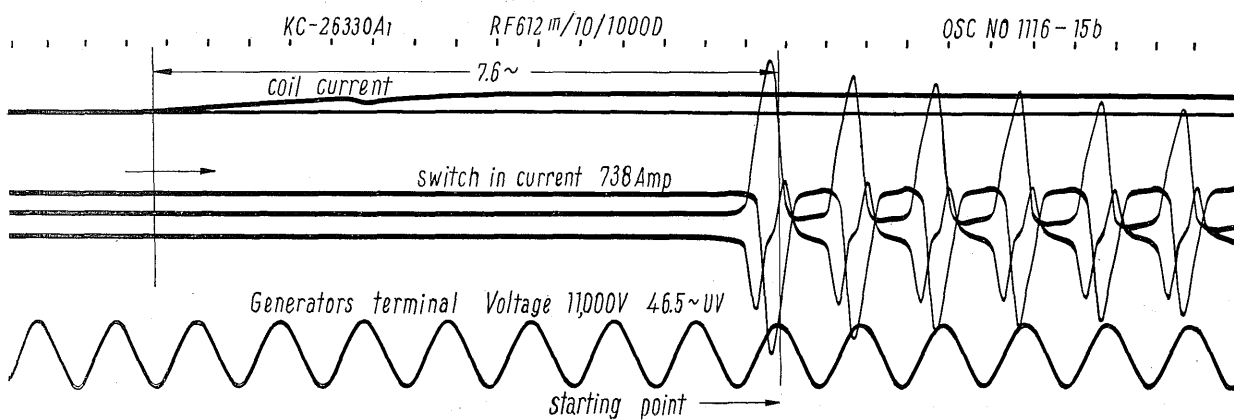


Fig. 5. Exciting current interrupting test of expansion type load break switch