Chapter 6

CIRCUIT BREAKERS, ROTAX D6500 SERIES

LIST OF CONTENTS

ILLUSTRATION

LEADING PARTICULARS

Voltage	28-V. d.c.
Coil resistances at 20 deg. C.	
Pull-in	2·9 ohm ± 10 per cent
Hold-in	64 ohm ± 10 per cent
Minimum pull-in voltage	16-V. d.c.
Minimum hold-in voltage	5-V. d.c.
Rating	Continuous
Operational temperature range ...	—65 deg. C. to + 50 deg. C.
Operational ceiling	30,000 ft. (without de-ionizing grid) 50,000 ft. (with de-ionizing grid)
Length	6·750 in.
Width	3·000 in.
Height	3·093 in.
Weight	3·31 lb.

Fig. 1. Typical D6500 series circuit breaker

Introduction

1. The Rotax D.6500 series comprises a range of single-pole circuit breakers, designed for use in 28-volt circuits, with provision for manual and, in most units, thermal-overload tripping. All the units are provided with a pair of auxiliary contacts and an economy winding to reduce the current required to hold the main contacts closed after the initial pull-in.

2. All units in the series are basically similar; the principle differences between individual units are summarized below, viz.:—

(1) Units with current ratings of 22 amperes, 60 amperes, 90 amperes and 120 amperes are included in the series.

(2) Some units are not fitted with a bi-metal element for thermal overload tripping.

(3) In some units the auxiliary contacts are normally closed, while in the remainder they are normally open.

(4) Some units are fitted with a de-ionizing grid for the main contacts while others are not.

(5) Some units have a "rear entry" for one of the main terminals, i.e., the terminal projects from the underside of the mounting base.

For details of a particular circuit breaker in the series, reference should be made to the appropriate chapter in A.P.4343B, Vol. 1, Sect. 10.

DESCRIPTION

3. The circuit breaker is built on a moulded mounting base. The main moving contact is pivoted between the two side plates of a switch frame, which are bolted to the base, and is operated by the action of a toggle linkage. The main fixed contact is set in the moulded base. The auxiliary contacts are mounted on the outside of the left-hand side plate and are operated by an extension of the centre toggle hinge pin.

4. A vertical support plate is bolted to the end of the switch frame, and this plate carries the operating solenoid coil, with its main axis horizontal. The operating plunger is linked to the centre hinge pin of the toggle linkage. Both pull-in and economy, or hold-in, windings are enclosed within the metal solenoid case and the coil economy switch is housed in a cylindrical moulding at the end of the coil. The economy switch is opened by a rod, which passes through the solenoid anvil into the plunger cavity, being struck by the plunger as it is pulled into its fully "in" position. The moving contact spring returns the switch and rod to normal when the plunger drops out. The coil terminals are also enclosed within the cylindrical moulding and are enclosed by a moulded cover.

5. The toggle linkage may be tripped with the plunger held in by the action of a trip rod, operated by a manual button at the top of the main cover, or a bi-metal element in the main circuit on the trip plate. The main contacts also open without further tripping when the coil is de-energized.

6. The main terminals are set in the base at the end remote from the operating coil and the auxiliary terminals are set between them and enclosed by a moulded cover. Connections to the terminals are made by copper conductor bars and leads under the base and these are enclosed by a moulded cover plate. The main cover, which is moulded, is secured by four screws. A de-ionizing grid is fitted to some units, being positioned over the main contacts and riveted inside the main cover.

Operation

7. When the pull-in coil is energized the plunger pulls in and the toggle linkage is pulled overcentre so that the main contacts close and the auxiliary contacts operate. As soon as the plunger reaches its fully in position, the economy switch opens so that the full hold-on winding of the solenoid is energized.

8. If the circuit breaker is tripped manually or thermally, the plunger remains held in so that the unit cannot be operated again until the coil is first de-energized. If the coil is de-energized, however, all contacts return to normal and the unit is reset for operation.

INSTALLATION

9. Four ·187 in. clearance holes are provided in the base for mounting. The fixing centres form a rectangle 3·687 in. by 2·500 in.

10. The main terminals (front entry or rear entry) are $\frac{5}{16}$ in. B.S.F. studs. The auxiliary and coil terminals are 4 B.A. combined screw and washer terminations.

SERVICING

11. Examine the circuit breaker for signs of damage. Ensure that all connections are secure and that the unit is secure on its mounting.

Coil resistance tests

12. Measure the resistance of the solenoid coil between the coil terminals. A reading of between 2·61 ohm and 3·19 ohm should be obtained (corrected to 20 deg. C.) with the economy switch closed and a reading of 57·6 ohm to 70·4 ohm (corrected to 20 deg. C.) should be obtained with the economy switch open.

13. Details of further servicing for a particular unit in the D.6500 series will be found in the relevant chapter in A.P.4343B, Vol. 1, Sect. 10.