

## Chapter 33

### INERTIA SWITCHES (PISTON), Mk. 1 and 2

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#### Introduction

1. The Graviner piston inertia switch is a unidirectional single-pole, double-break switch, designed to operate at decelerations that would be produced by an aircraft crash-landing. There are two types: the Mk. 1, Type 8C (*Stores Ref. 27N/93*), which is set to operate at 3g (3 times the speed that would be caused by the normal force of gravity) and the Mk. 2, Type 10C (*Stores Ref. 27N/94*), which is set to operate at 4½g. They are intended primarily to operate fire-protection and other electrically operated aids to survival under crash conditions and are designed to pass 2 amp. at 28 volts.

#### DESCRIPTION AND OPERATION

2. The appearance and construction (*fig. 1*) of the two types is the same. The inertia element consists of a body containing an externally-fluted piston trip weight with a bias weight inside the trip weight, and the entire element is contained in a hermetically sealed transparent case. A spring contact bow, located over the open end of the body, bears on the crown of the piston. The different "g" settings of the two switches

depends on the strength of the respective contact bows. Leaf contacts are soldered to the terminal screws, and the re-setting plunger re-sets the switch after it has operated.

3. Operation of the switch is caused when the deceleration of the aircraft reaches 3g or 4½g for the respective switch. This deceleration produces an inertia force in the piston trip weight which overcomes the resistance of the bow contact and forces it to bridge the two leaf contacts. The electrical circuit is then completed, and the fire-protection and other crash survival equipment in the aircraft are brought into operation.

#### INSTALLATION

4. In aircraft other than helicopters, the switch is mounted horizontally with the mounting flange perpendicular to the level flight datum of the aircraft and with the terminal block pointing forward. It is usually fixed on a forward transverse structure adjacent the area of belly skin that would first contact the ground when the aircraft was

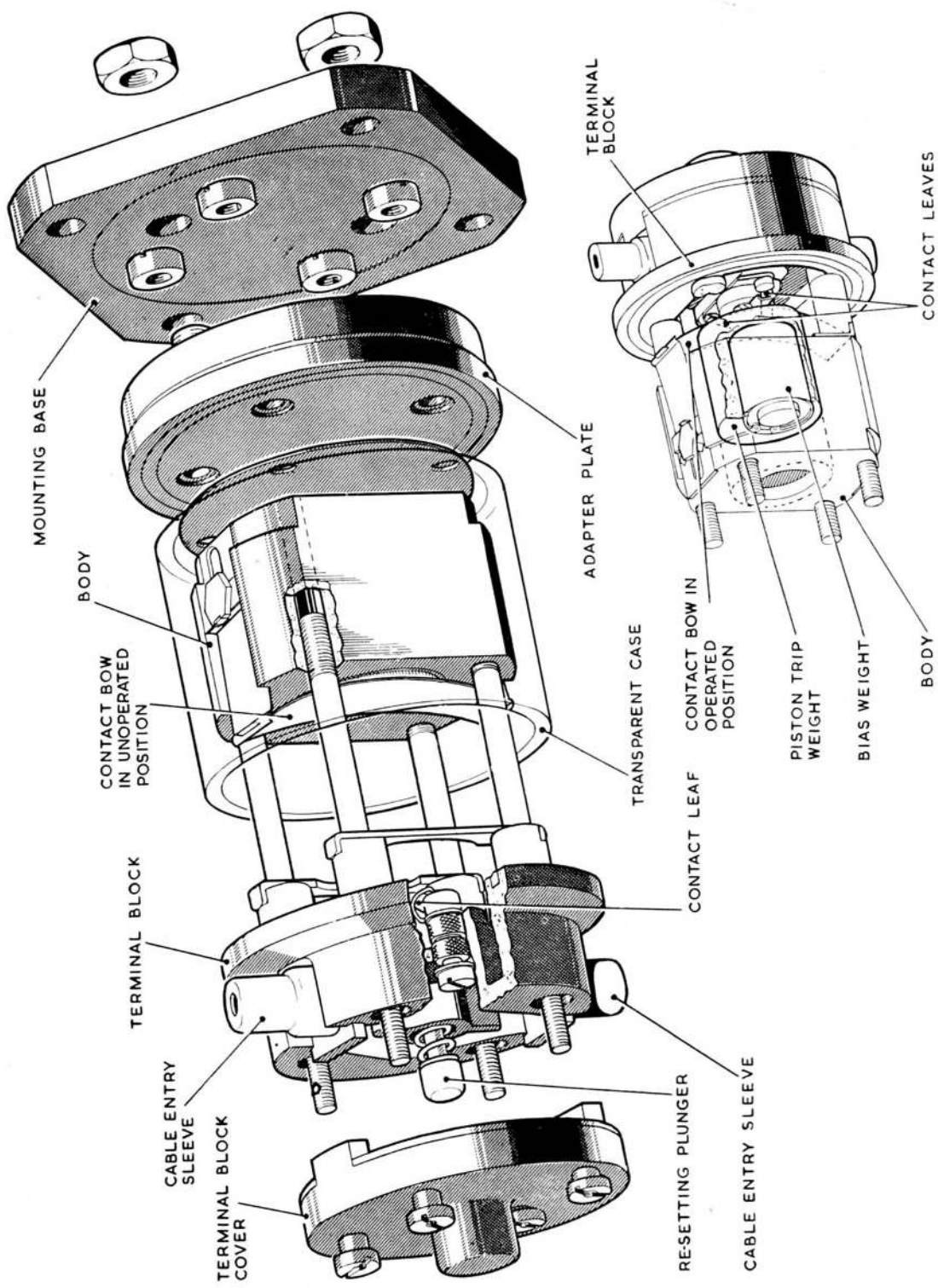


Fig. 1. Inertia switch (piston) Mk. 1 Type 8C, and Mk. 2 Type 10C

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in level flight attitude. This ensures operation of the switch in the event of a low-speed crash of moderate severity or even in a belly landing when the overall deceleration of the airframe would be less than 3g or 4½g for the respective switches.

#### SERVICING

5. It is possible to observe the inside of the switch through the transparent case, and if observation reveals any of the parts to be damaged or the presence of moisture, the switch should be replaced by a serviceable one.

#### Re-setting

6. Owing to the switch responding to sudden movement, it is possible for it to operate in transit or due to rough handling. Fig. 1 shows the switch in the operated and unoperated positions, and if observation through the case reveals it in the operated position, the switch may be re-set by removing the terminal block cover and pressing on the re-setting plunger until the contact bow springs back into the unoperated position. This also applies when the switch has operated in an aircraft, providing damage or suspected damage has not occurred. The terminal block cover must be refitted after the switch has been re-set.

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