

# **WESTON ELECTRICAL INSTRUMENTS FOR AIRCRAFT**

Weston Aircraft Instruments are supplied to the Air Ministry and to leading military and civil aircraft manufacturers throughout the world.

Sangamo Weston Ltd. are Design Approved by the Ministry of Supply, and the engineers at our Works and at our Branches are always available to discuss any problems or to give any assistance which may be required in connection with these instruments. Enquiries at any of our addresses will receive immediate attention.

## **MOVING COIL RELAYS**

*Information contained in this manual affecting safe operation and maintenance has been verified and approved by the Air Registration Board in accordance with Chapter A6-2 of British Civil Airworthiness Requirements.*

*Amendments to this publication invalidate the approval statement unless issued by the manufacturers with the concurrence of the Air Registration Board in accordance with Chapter A6-2 of British Civil Airworthiness Requirements. 14.12.56.*

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## AMENDMENT RECORD SHEET

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## MOVING COIL RELAYS

### MODELS S.54, S.115, S.124, S.170

#### INTRODUCTION

SANGAMO WESTON Moving Coil Relays have been designed to function as highly sensitive circuit controllers. Where the current to be carried by the contacts is within reasonable limits, the relay may be placed in the circuit so that it is directly operated.

When it is not possible to do this, it is normal practice to use the instrument as a Servo-Relay to operate a further, circuit controlling, relay.

When the relay is placed in an inductive circuit, some form of spark quenching becomes necessary. The effectiveness of spark quenching must be such that when the contacts are viewed through an eyeglass under a subdued light, no spark is visible at the moment of contact "break". Very satisfactory results can be obtained with a half-wave selenium rectifier. This must be connected to present its reverse resistance to the direction of current flow, and the back voltage rating of the rectifier must not be less than the source voltage. Reference to the Wiring Diagrams given in this publication shows how this should be done.

#### AIRCRAFT APPLICATIONS

It must be stressed at the outset that these relays are considered suitable for use in aircraft only when the circuit in which they are to be used, and the conditions under which they will be working, have been checked and approved by SANGAMO WESTON engineers. Various types of our relays are functioning satisfactorily in both Civil and Military aircraft because these provisos have been adhered to, but A.R.B. or Military approval must be sought for every application.

#### ACCURACY

Relay accuracy varies according to the type of application. Refer to manufacturer for details. Please quote model code number.

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## MAINTENANCE AND REPAIR

This range of relays is considered to be non-repairable except for minor items such as the replacement of covers, cover glass, terminal screws and so on.

Recommended spares are as follows:—

### MODEL S.54, S.124, S.170

Cover,  
Cover Glass,  
Terminal Screws,  
Back Plate.

### MODEL S.115

Base,  
Bottom Plate,  
Top Cover,  
Fixing Nuts.

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## INSPECTION

Inspection periods for these instruments vary according to their application.

Reference should be made to the manufacturer to obtain the required information. Please quote code number of model.

Reference should also be made to manuals dealing with equipment in which these relays are installed.

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## CONFORMITY TO BRITISH STANDARD G.100

As previously stated, certain of these relays have passed A.R.B. tests and have been given A.R.B. approval. It is, however, necessary to obtain A.R.B. approval for applications other than those already covered.

Reference should also be made to manuals dealing with equipment in which these relays are installed.

## S.54

It is fitted with precious metal contacts and has a high torque which ensures a positive contact pressure. Two forms are available, with different physical outlines and connecting arrangements.

The current carrying capacity of the contacts depends upon the sensitivity of the relay, and is affected by the constants of the local circuit. In general, the rating varies between 0.5 and 1.5 watts for voltages between 6 and 250 volts.

Maximum permissible working voltage between the moving coil and the load circuit is 350 volts A.C. or 500 volts D.C.

In relays with dually wound coils, the limit is 50 volts D.C. between coils.





## S.115

The model S.115 is a miniature permanent magnet moving coil relay fitted with a seven-pin base. A chassis or panel mounting socket with a wire retaining clip is supplied with this relay. Owing to its high sensitivity and small contacts it is usually necessary to employ this model in conjunction with a relief relay, such as the Post Office Type 3,000.

In certain circumstances the scope of this model may be extended, but before this is done, customers should contact the manufacturers giving the various details of the proposed application.

### CONTACT CAPACITY

The contacts may be employed to control a substantially non-inductive load provided that the following values A.C. or D.C. are not exceeded. These values are 50 volts, 100 milliamperes, 1 watt.

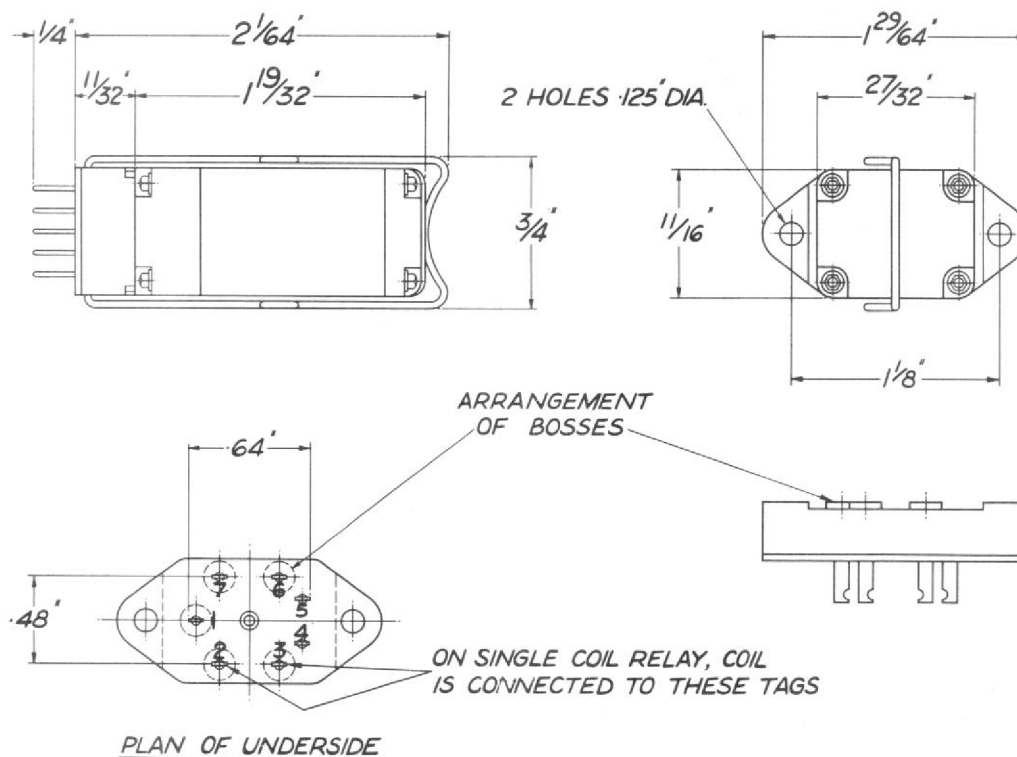
For preference the voltage of the load circuit should be in the region of 25 to 50 and it should be noted that the accuracy is likely to be impaired if the voltage is below 6 or the resistance less than 50 ohms.

### SPARK QUENCHING

Spark quenching on this model is necessary when it is used in an inductive circuit or when the voltage is above 12.

### WORKING VOLTAGE

The maximum permissible working voltage between the moving coil and the load circuit is 250 volts A.C. or 350 volts D.C. In relays with dually wound coils the limit is 50 volts D.C. between coils.



Fixing Diagram



## S.124

This is a miniature, magnetic "pull-in", permanent magnet moving coil relay, which has an extremely high sensitivity. Operation is effected with a minimum power input of 0.004 microwatts. The contacts are held together by magnetic attraction, thereby making the relay self-locking. Resetting is effected either electrically or manually.

For high sensitivities the relay is available only in a short scale single contact version.

For lower sensitivities it is available with either single or double contacts. With double contacts the relay has an unenergised centre zero. Single contact versions have an unenergised right-hand zero.

## LOAD INTERRUPTING CAPACITY

The contacts will close or interrupt (manually or electrically) a substantially non-inductive A.C. or D.C. load provided the following values are not exceeded. These values are 120 volts, 100 milliamperes, 6 watts.

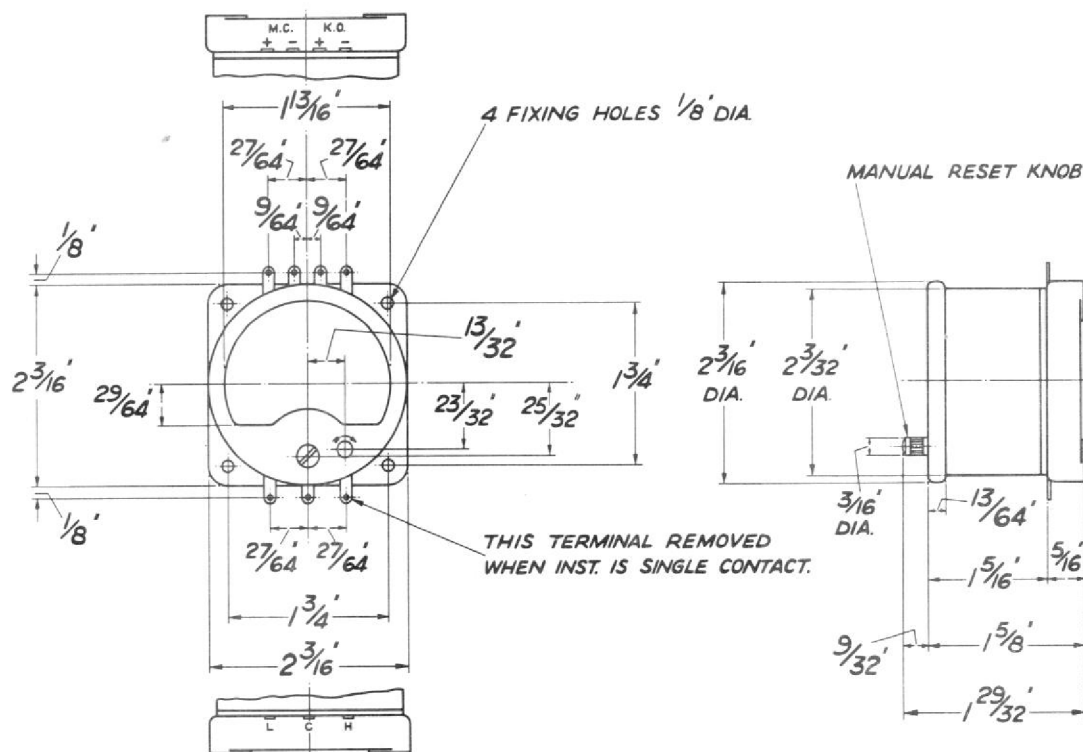
On inductive loads it is absolutely essential that a spark quench similar to that already mentioned is incorporated.

## ELECTRICAL AND MANUAL RELEASE

The relay can be supplied with a self-contained means for electrical release and a means for manual release. Power required to operate the electrical release is approximately 1.5 watts which needs only to be momentarily applied.

## INSULATION

The contact circuit is insulated from the operating circuit. This insulation is tested at 50 volts D.C.

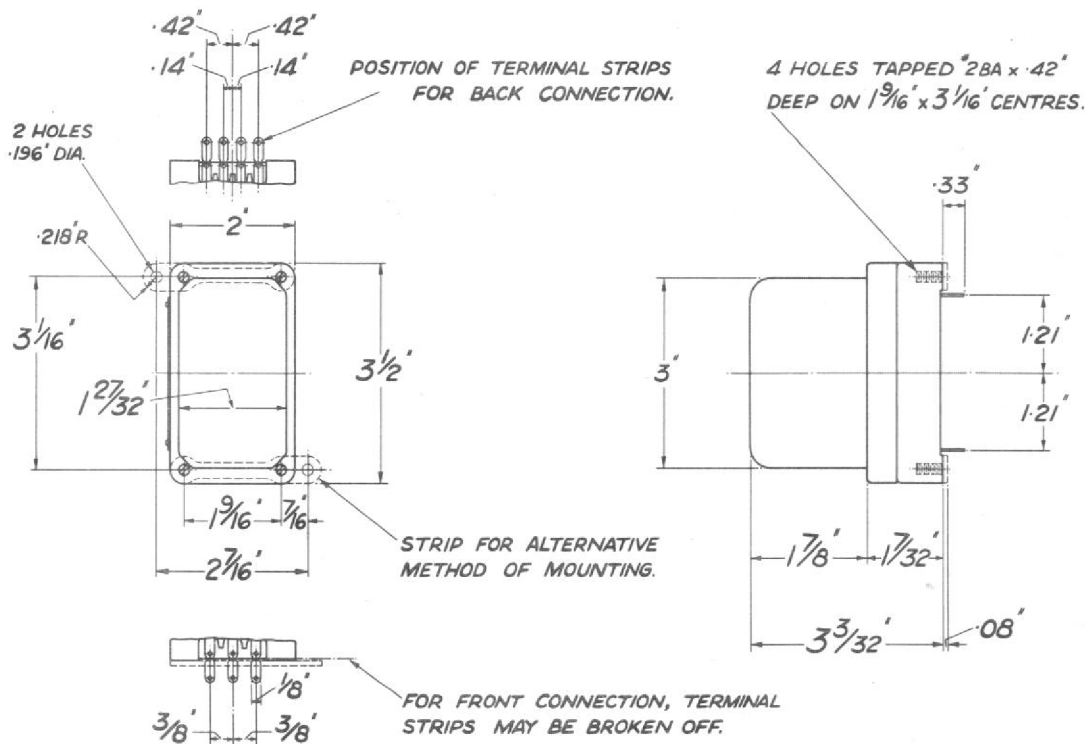


Fixing Diagram



## S.170

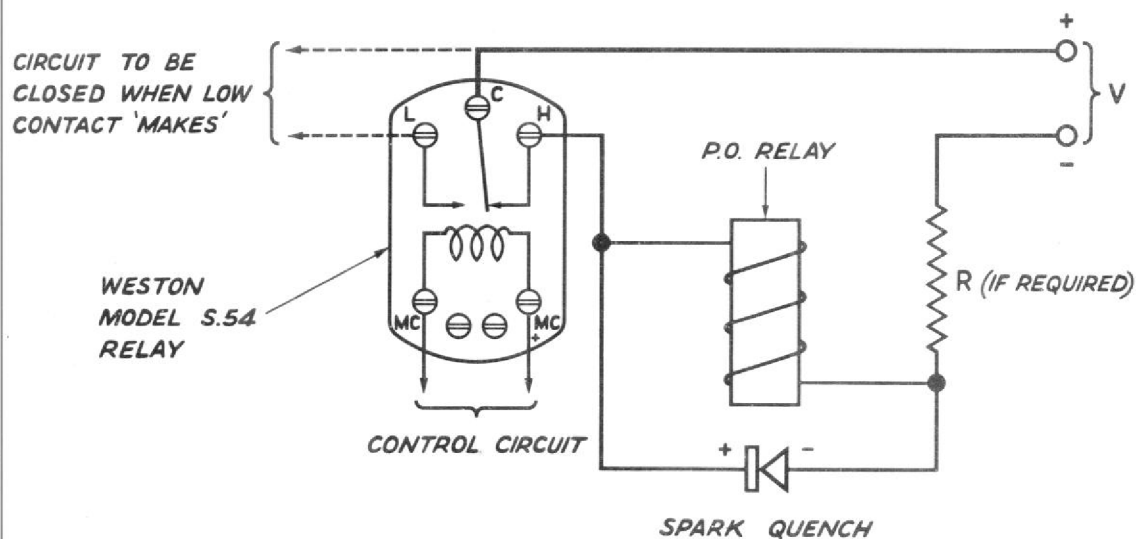
This relay utilises the same magnetic and moving coil system as the S.54 but is made so that the case is weatherproof. A different return ring is used on this model thereby making the physical dimensions much smaller.



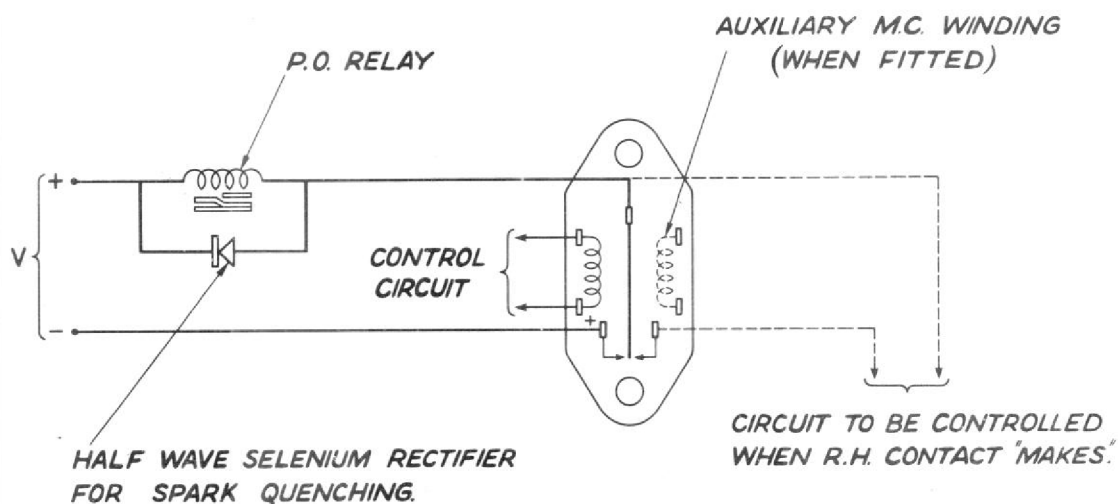
Fixing Diagram

Information regarding testing instructions for this range of relays may be obtained upon application to the manufacturers. Please quote code number of model.

## TYPICAL CIRCUIT APPLICATIONS

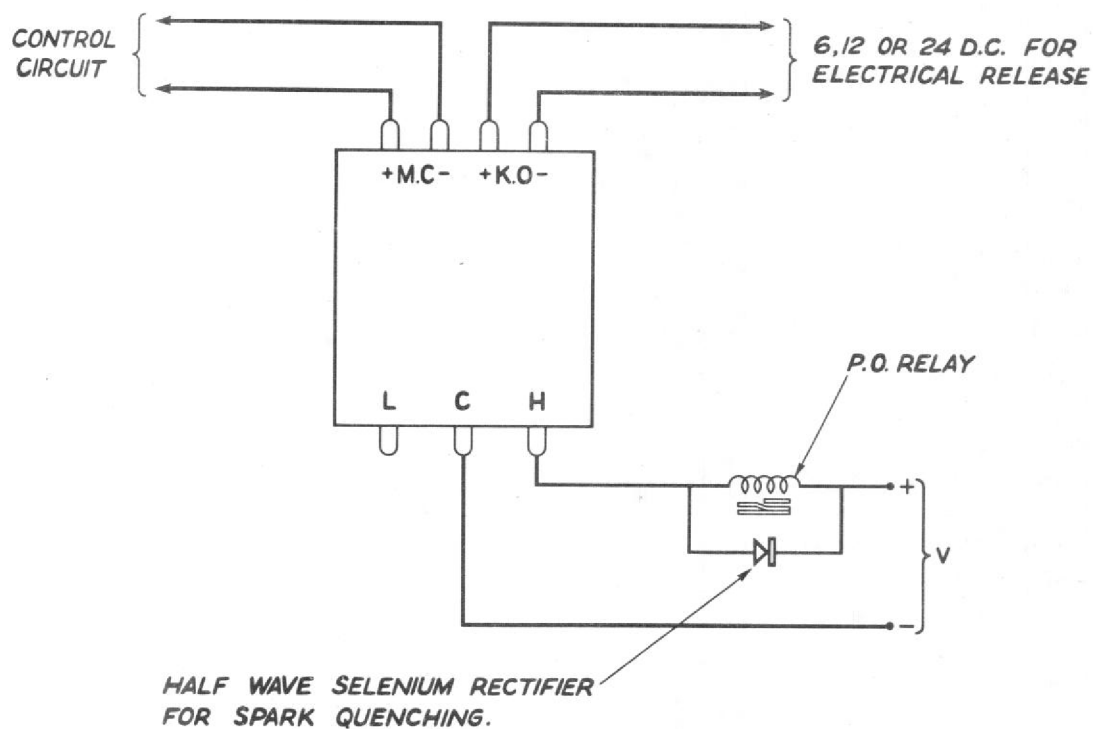


Model S.54 with Auxiliary Relay

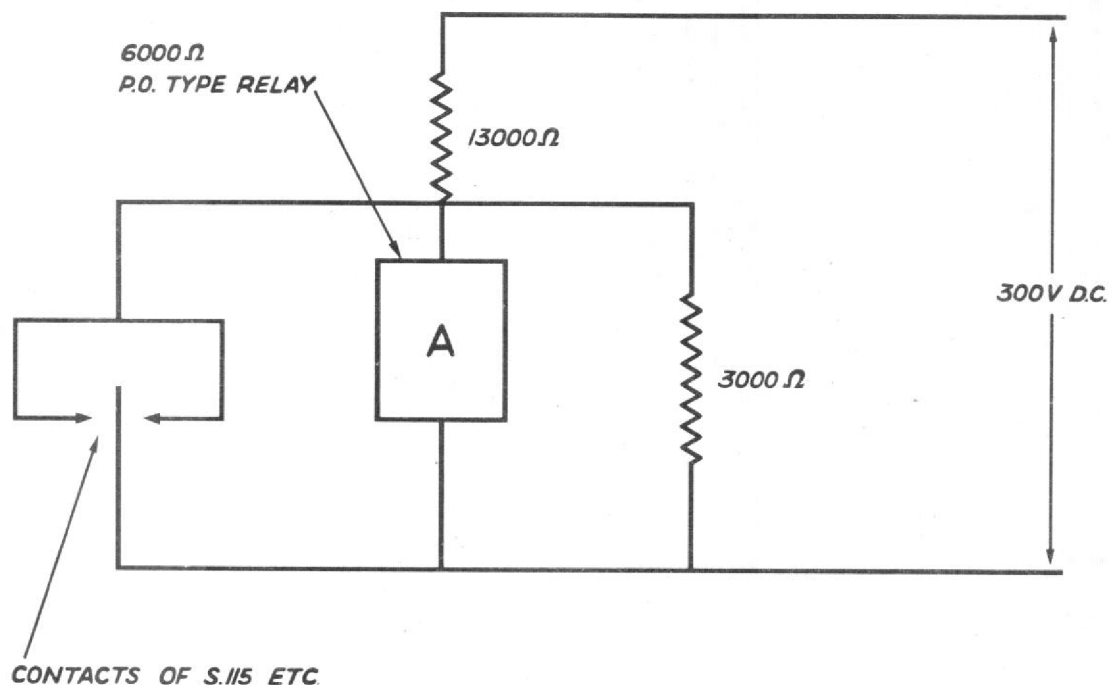


Model S.115 with Auxiliary Relay

## TYPICAL CIRCUIT APPLICATIONS (contd.)

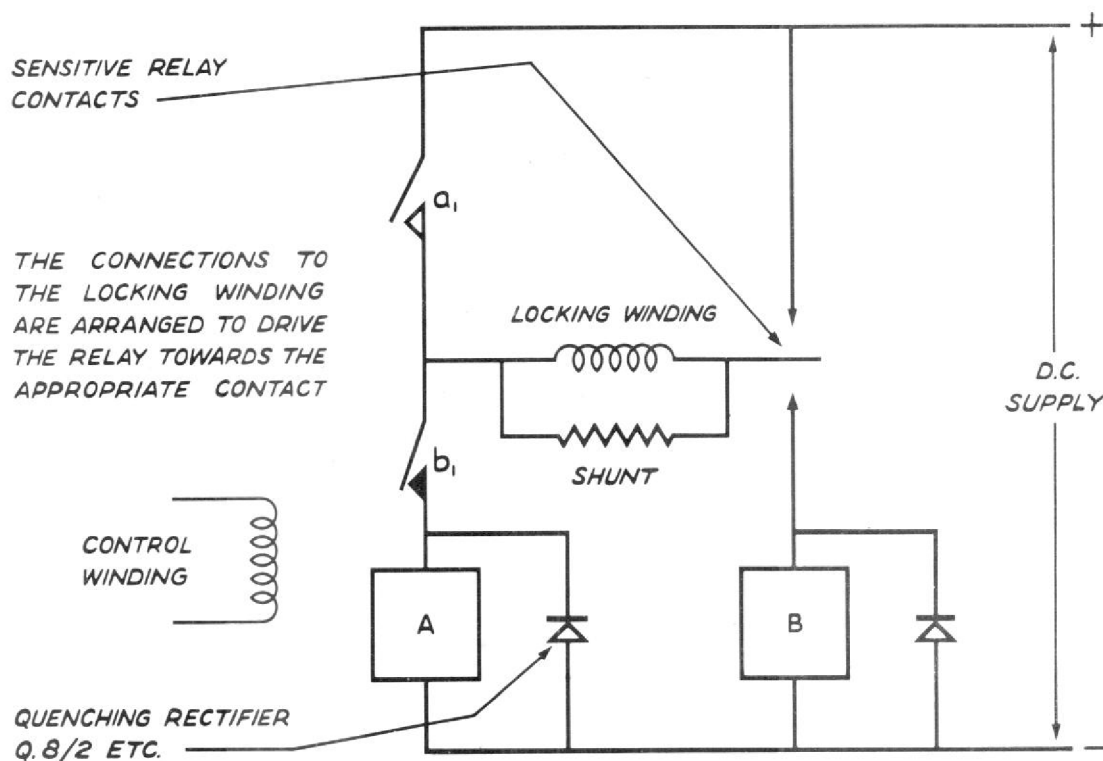


Model S.124 with Auxiliary Relay



Circuit which may be used where only a high voltage supply is available and the operation of the sensitive relay is required to de-operate the Slave Relay. Values quoted are only typical.

# TYPICAL CIRCUIT APPLICATIONS (contd.)



Aiding or Lock-In Circuit using Two Slave Relays. This circuit is shown only in its basic form. Many variations of a more complex nature are possible.

$a_1$  = normally open contact.

$b_1$  = normally closed contact.



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