

TYPE GA LEVER LOCK
AND
CIRCUIT CONTROLLER

THE SIEMENS AND GENERAL ELECTRIC
RAILWAY SIGNAL COMPANY LIMITED

TYPE GA COMBINED LEVER LOCK
AND CIRCUIT CONTROLLER.

GENERAL DESCRIPTION

The base is a heavy iron casting stiffened by longitudinal webs with lugs arranged to carry the lock and controller units, and serving also as guides for the lock slide and lock dog.

The electro-magnet and lock assembly, with proving contacts if fitted, forms one unit, and the circuit controller an independent unit. Both units have individual fixings to the base casting. This arrangement facilitates the addition or removal of either unit at any time should a change in requirements occur.

Mounting.

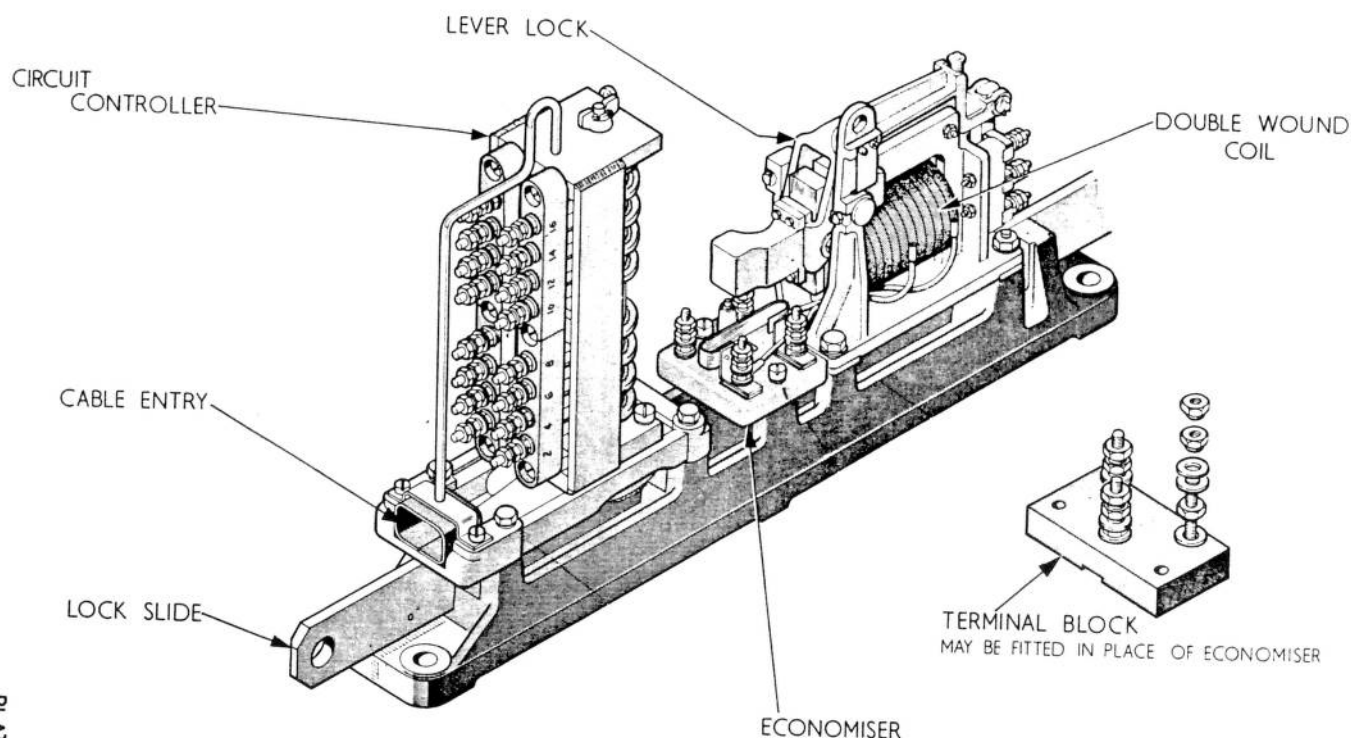
The bases are arranged for mounting side by side at not less than 4 in. lever centres on two parallel horizontal bars. If fixed with the lock slide working vertically the lock must be at the top. Plate 5 gives the overall dimensions. The four fixing holes are 11/16 in. diameter.

Lock Slide

This is a substantial bright drawn mild steel bar which is notched on one edge in positions as desired for engagement by the lock dog.

Near the other end the same edge is skew cut to form a rack to gear with a toothed sector driving the circuit controller shaft.

Holes are drilled at four points into which case-hardened forced-drop pins are fitted where needed. Unless otherwise specified locks are despatched with uncut lock slides and loose forced-drop



TYPE GA 813 COMBINED LEVER LOCK AND
CIRCUIT CONTROLLER
(8IN STROKE)

THE SIEMENS AND GENERAL ELECTRIC
RAILWAY SIGNAL COMPANY LIMITED

pins, but notching of lock slide and fitting of pins can be done in our works to customers' requirements.

Small depressions at two points on the side of the lock slide serve to trip the economiser contact, if fitted, at each end of the stroke. The lock slide is also drilled for two split pins which limit its movement while being handled in transit; on removing these pins and releasing the lock the lock slide can be drawn straight out.

The locking dog is machined from solid steel and fitted with a case-hardened force-down nib which engages hardened pins projecting from the side of the lock slide to throw the dog positively into the locking notches. See Plate 2.

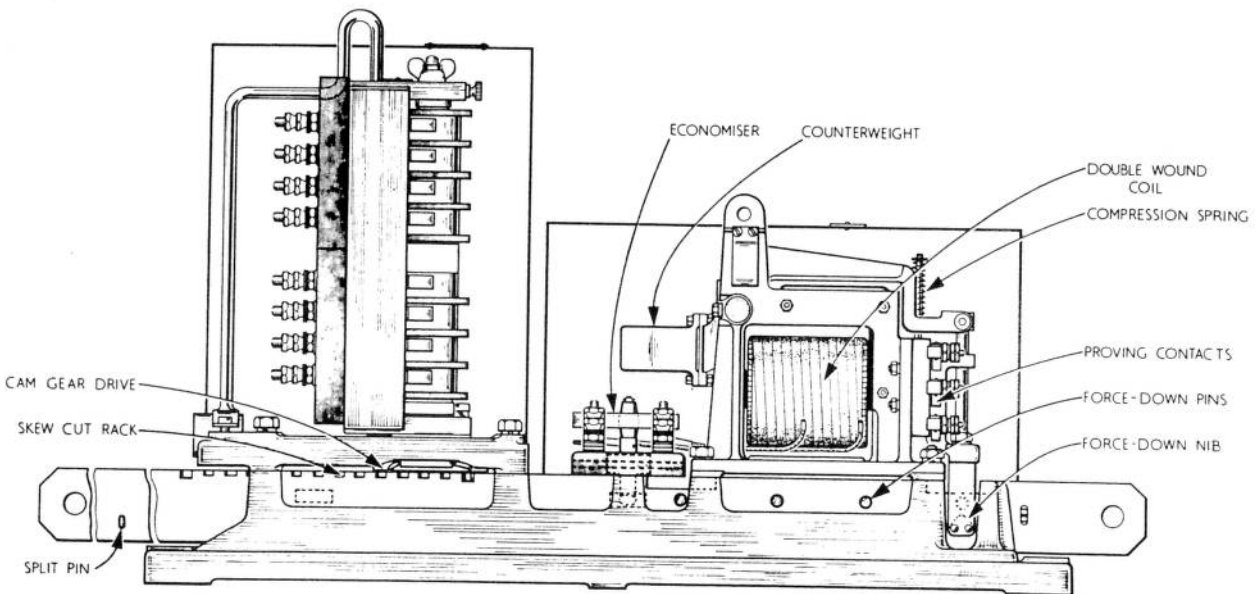
The dog is connected through an adjustable pull rod and non-magnetic operating lever to the armature of an electro-magnet which upon energisation pulls the dog out of the locking notch to release the lock.

The operating lever is fitted with a carefully designed counterweight to throw the dog by gravity into the lock slide notches whether in the vertical or horizontal positions. A light compression spring assists the gravity return and prevents the dog from being shaken out under severe vibration.

Lever Lock

Three proving contacts and a force-down feature are standard on the lever lock, which is fitted with a special electro-magnet for operation on alternating or direct current as required, by changing the electrical connections.

THE SIEMENS AND GENERAL ELECTRIC RAILWAY SIGNAL COMPANY LIMITED



TYPE GA LEVER LOCK AND CIRCUIT CONTROLLER

The operating voltage is the same whether the lock is mounted horizontally or vertically. If necessary for the lock to be a.c. immunised an alternative coil and slug can be supplied.

Economiser Contact

This consists of a manganese bronze rocking lever, the bottom end of which engages depressions machined in the side of the lock slide.

At the end of each stroke the lever moves, opening two silver-tipped contacts.

The rocking lever and contacts are mounted on an insulated block which carries 0 B.A. terminals to which the magnet coil leads are connected. The economiser contact terminals are marked P1. and P2 and the line terminals R1 and R2. The electrical connections are shown in Plates 4 and 6.

If the economiser contact is not required it is removed as a complete unit and replaced by a terminal base.

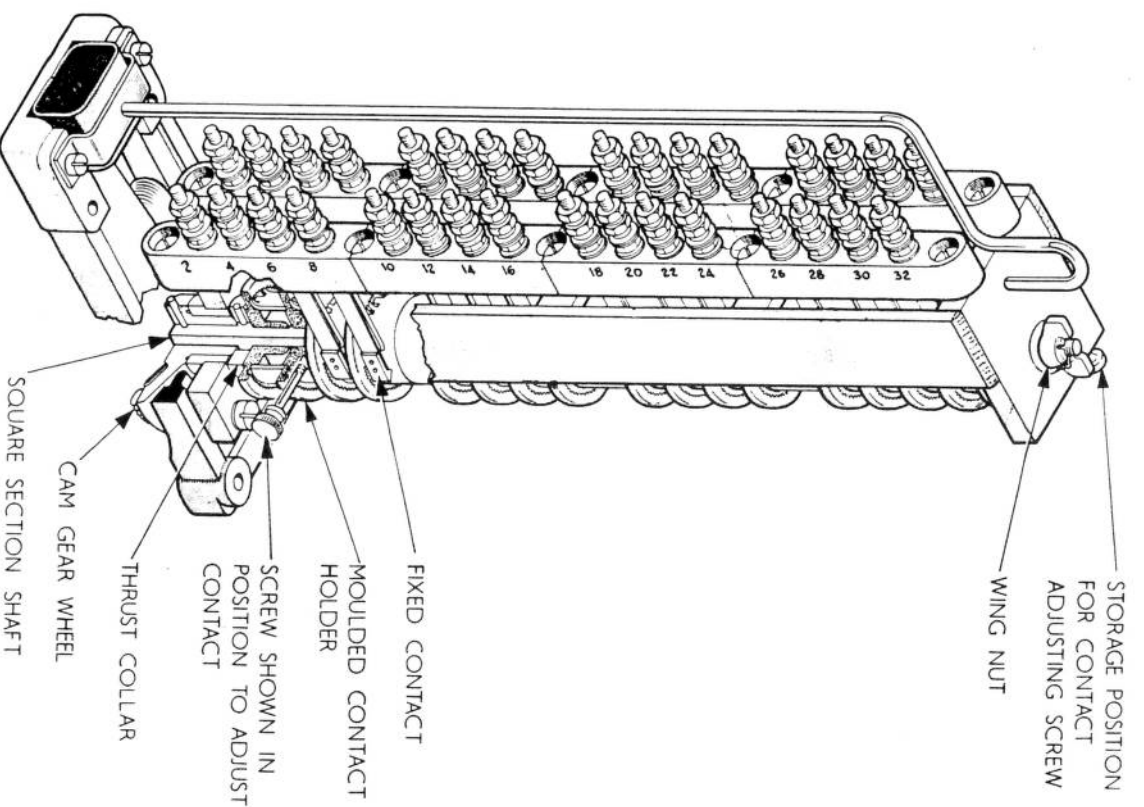
Lock Terminals

When an economiser contact is not fitted, three coil terminals of the 0 B.A. nutted pattern to BS.442 are provided, on a small insulating base. The outer two are marked R1 and R2, the centre one which is unmarked is used only for the common leads when the two coil sections are series connected.

Operation

When the two sections of the coil are connected in series the lock will operate from a supply of 10V. d.c. or 200/240V 50 c/s. a.c. with a good margin, should there be a line voltage drop.

: 3 :



TYPE GA CIRCUIT CONTROLLER

THE SIEMENS AND GENERAL ELECTRIC RAILWAY SIGNAL COMPANY LIMITED

For 110V. 50 c/s. the coil sections are connected in parallel when the lock can also operate from a 5V. d.c. supply.

Approximate power needed to operate the lock:-

Direct Current supply : 10V. 0.75A.

Alternating Current Supply: 110V. 50 c/s. 1.01A. when picking up, and falling to approximately 0.65A. when continuously energised.

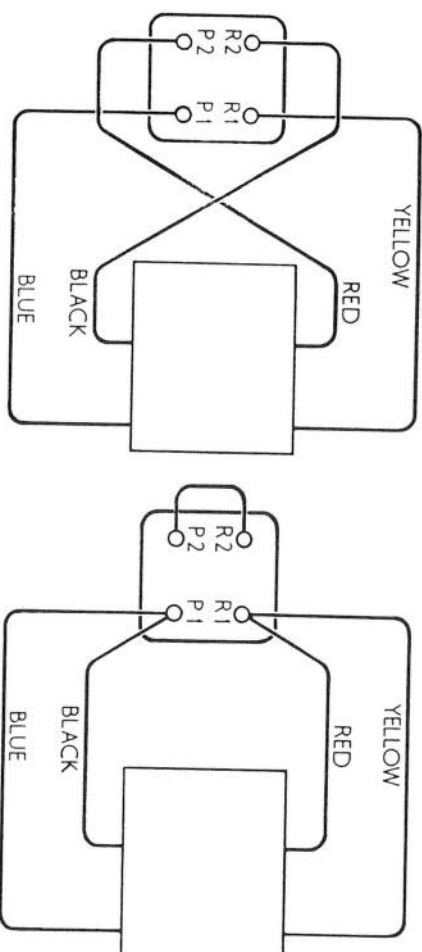
CIRCUIT CONTROLLER

The eight-way circuit controller is the standard arrangement but four, twelve, and sixteen way are available. The circuit controller has fixed contact springs with heavy tips contacting with copper rotating segments adjustable in very small steps. The cam gear drive which rotates the segments from the lock slide gives freedom from backlash and enables the lock slide to be withdrawn without removing the circuit controller unit, or the circuit controller unit itself to be readily removed and replaced. To ensure correct re-engagement of the cam gear drive, it is necessary that the slide should be at either end of its stroke when the gear is engaged. Should it be necessary to prevent over-travel of the slide bar, special stops can be fitted.

The rotating shaft is square in section, and drives the contact holders which are assembled end to end along the shaft. The complete assembly rotates through approximately 140° with full stroke of the lock slide.

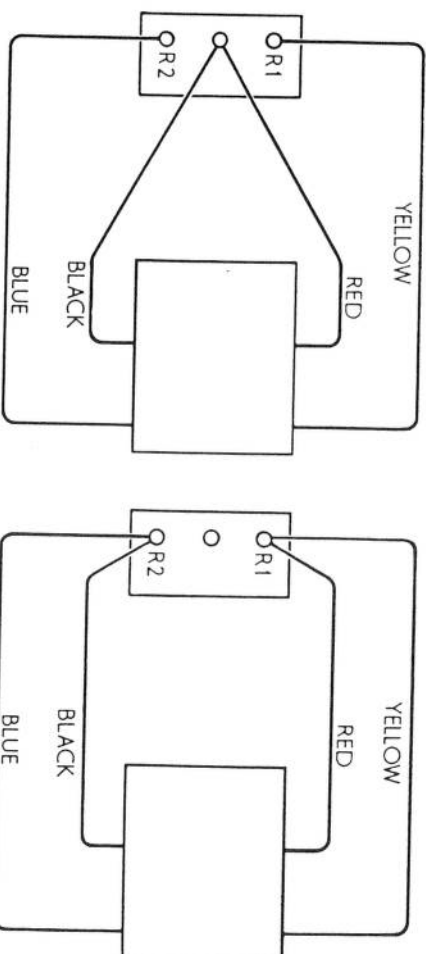
Unless otherwise ordered, contact segments Ref. No. 3309B capable of NA, RE, CD, etc. contacting are fitted. These can also be used as N, or NA, etc. by adjustment.

THE SIEMENS AND GENERAL ELECTRIC RAILWAY SIGNAL COMPANY LIMITED



10 volts D.C. or 200/240 v. a.c. 50 cycles.
(series connection) and fitted with economiser contact.

5 volts D.C. or 100/120 volts, 50 cycles.
(parallel connection) and fitted with economiser contact.



10 volts D.C. or 200/240 volts, 50 cycles.
(series connection) without economiser contact.

5 volts D.C. or 100/120 volts, 50 cycles.
(parallel connection) without economiser contact.

COIL CONNECTIONS FOR TYPE GA LEVER LOCK

All connections are brought into the circuit controller through a rectangular insulating bush of $1\frac{1}{2}$ inch. by 1 inch. aperture and are there divided, those for the lever lock passing into a duct through the base, the others going directly to the circuit controller terminals adjacent to the entry. The duct ends under the circuit controller cover where wires emerge close to the economiser contact and lock coil terminals; the wires passing on to the lock proving contacts are held by a special cable clip provided on the lock frame.

INSTALLATION

The bases are intended to be mounted at not less than 4 inch centres, on two horizontal bars. If fixed with the lock slide working vertically, the lock must be at the top. Plate 5 gives the overall dimensions. The four fixing holes are 11/16 inch diameter.

Both ends of the lock slide are normally drilled for a $\frac{5}{8}$ inch driving pin, but $\frac{7}{8}$ inch holes are drilled if required.



The lever tail should be coupled to the lock slide with an adjustable coupling and suitable rodding. Before the lock slide can be moved through its full travel it will be necessary to remove a split pin from each end of the slide; these split pins are shown in Plate 2 and are intended to prevent the lock slide being withdrawn while in transit.

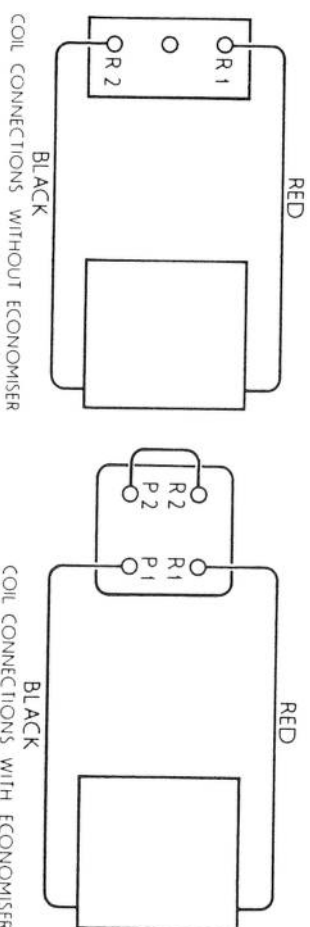
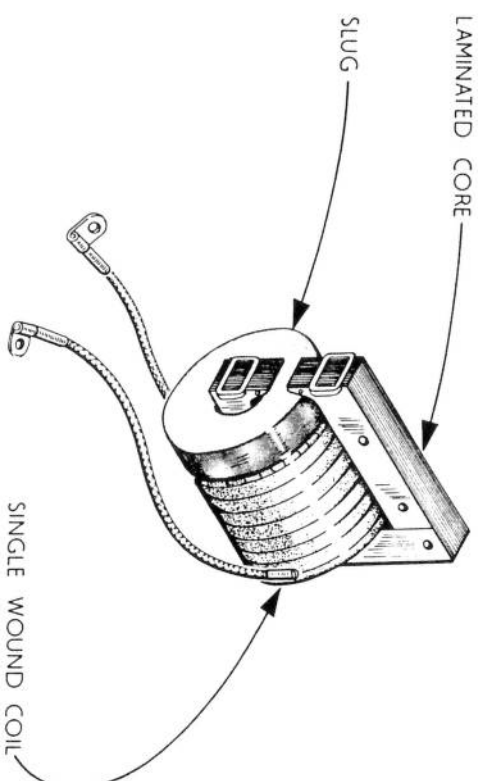
If the slide has been supplied ready for use with the notches cut, in our Works, it is important to check that the lever is capable of moving the lock slide through its full travel i.e. either 8 ins. or 5 ins.

With the lock slide coupled to the lever (if slide has been supplied uncut) the position of the slots can be marked off ready for cutting. If the driving pin is then removed the slide can be withdrawn from the base for the slots to be cut, the hardened forced drop pins which are supplied loose with uncut lock slides, should be pressed in at the same time.

When re-assembling the slide it will be necessary for the cam gear drive of the circuit controller to be engaged by hand with the rack on the edge of the lock slide. The slide must be set at either end of its stroke for the gear to be correctly engaged. The controller should then be checked for correct operation after replacing the slide.

Electrical Connections

All wiring to the unit should be brought in through the cable entry provided in the circuit controller base, and divided, wiring to the circuit controller going directly to the terminal blocks, and wiring to the lever lock passing through the duct in the base under the circuit controller. A special clip is provided at the top of the lever lock to secure the lock proving contact leads.



COIL AND SLUG FOR TYPE GA LEVER LOCK

AC IMMUNISED 24VOLT DC OPERATION

Diagrams of coil connections for a.c. or d.c. working (with or without economiser) are shown in Plate 4. When it is necessary for the lock to be a.c. immunised a special coil fitted with a slug will be provided. This coil and its connections are illustrated in Plate 6.

Sheet metal drop-on covers are normally supplied with Type GA lever locks and circuit controllers, but a split cover can be supplied to special order for use on the circuit controller where head room is so limited that standard covers cannot be used.

CONTACT ADJUSTMENT

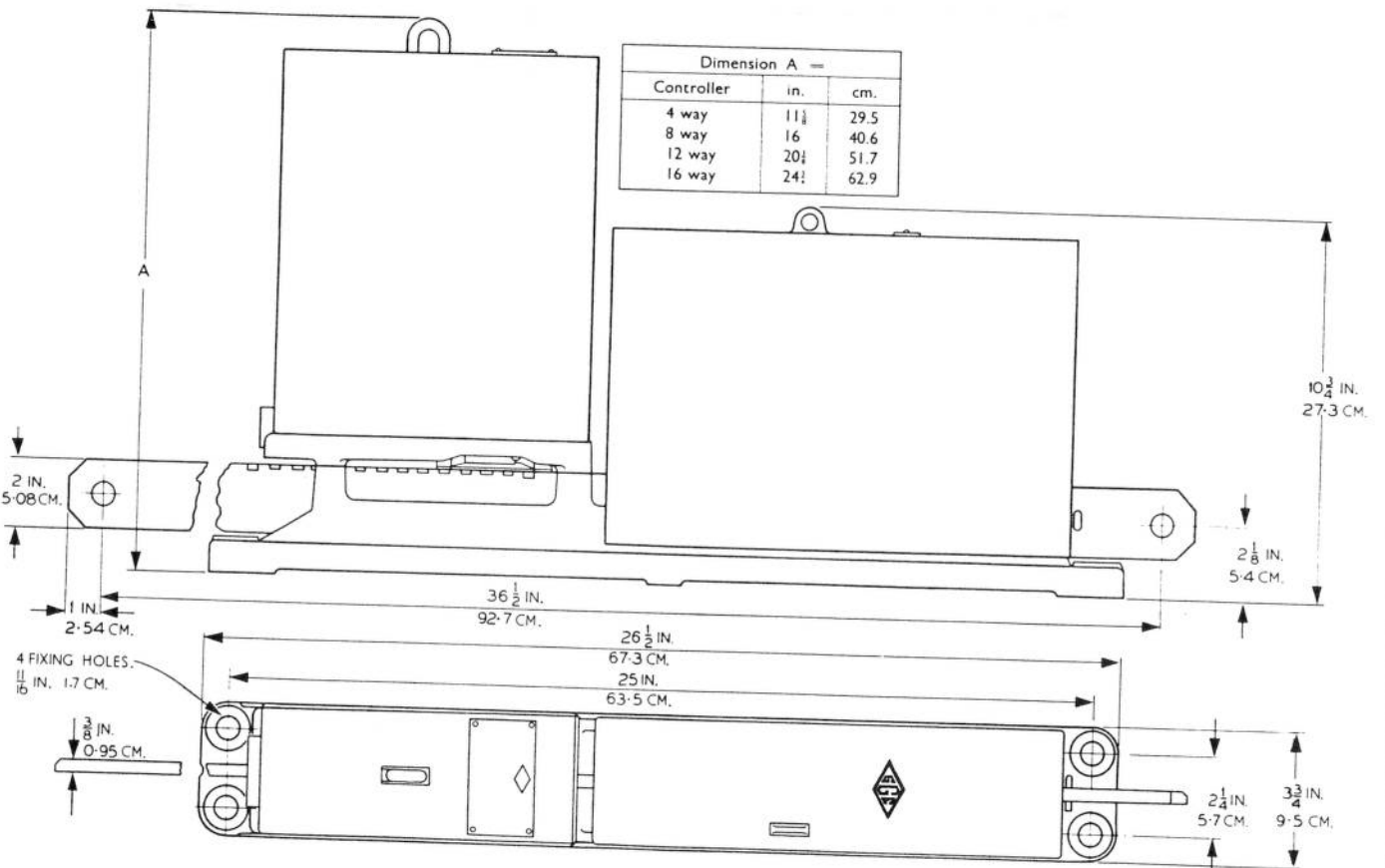
A special screw is provided to facilitate adjustment of the contacts of the circuit controller. Plate 3 illustrates the use of this screw and also shows the storage position provided at the top of the circuit controller frame.

Each contact segment has projecting teeth which engage with similar teeth moulded internally in the rim of the contact drum. All the contact drums are clamped together by a castellated wing nut situated at the top of the controller.

It is important that this wing nut is kept locked by means of a split pin.

To adjust a contact segment, the split pin should be removed and the wing nut slackened off a few turns so that the contact drums can be separated. The adjusting screw should be inserted into the tapped hole provided for the purpose in the contact segment. The segment can then be moved with respect to its contact drum, adjusted to the position desired and re-engaged with the drum.

Finally the wing nut must be tightened down and locked with the split pin.



OVERALL DIMENSIONS OF TYPE GA LEVER LOCK AND CIRCUIT CONTROLLER

THE SIEMENS AND GENERAL ELECTRIC
RAILWAY SIGNAL COMPANY LIMITED

MAINTENANCE

The lock slide must be kept well oiled and should move freely over the full length of its stroke. It is necessary to remove the cover of the circuit controller to obtain access to the two oil holes in the cam gear drive to the circuit controller. A few drops of oil occasionally should be applied to the bush at the top of the controller under the wing nut.

The armature of the lock with its operating lever, and the locking dog may be lubricated with a light oil, the dog should slip easily into the notches in the slide. Note that the light compression spring is intended not to engage the lock, but to prevent the lock disengaging under heavy vibration. The rocker arm of the economiser has two holes and needs regular lubrication.

The pole faces of the armature and electro-magnet must be kept clean and free from rust.

Contacts should be cleaned when necessary and emery paper must not be used for this purpose. Wear will be reduced if the contact segments are occasionally wiped with a clean rag and a smear of white vaseline is applied. Finally all wiring, terminals and fixings should be checked for tightness.

TYPE GA COMBINED LEVER LOCK
AND CIRCUIT CONTROLLER

Type		SCHEDULE OF TYPE GA REFERENCES					
Type	Lock and Controller	Lever	Lock only	Description	Circuit Controller only		
					GA411	GA412	GA413
4-way	8-way	12-way	16-way	GA411	GA911	GA912	GA913
				GA412	GA812	GA912	GA913
				GA413	GA813	GA913	GA913
				GA414	GA814	GA914	GA914
				GA415	GA815	GA915	GA915
				GA416	GA816	GA916	GA916
				GA417	GA817	GA917	GA917
				GA418	GA818	GA918	GA918
Circuit Controller only					GA100	GA900	GA109
Controller for 8 in. stroke.					GA400	GA800	GA909
Controller for 5 in. stroke.					GA409	GA809	GA909