

# Section H, Part 26

## Type SA Color-Light Signals

*Supersedes Section H, Part 26, dated March 1930*

# Type SA Color-Light Signals

## *Foreword and General Ordering Information*

Due to its compact design, high efficiency and inherent safety features, the Type SA Color-Light Signal is well suited to the requirements of modern signaling. The signal has been developed to a very high state of perfection and is giving a thoroughly dependable service in many climates.

The optical construction of the Type SA Signal is illustrated by the diagram Figure 1, and is described briefly as follows:

A concentrated filament lamp is placed with its filament at the focal point of an ellipsoidal reflector which collects a large percentage of the light rays emitted from the lamp, projects and concentrates them at the second focal point of the reflector. At this second point, which is coincident with the

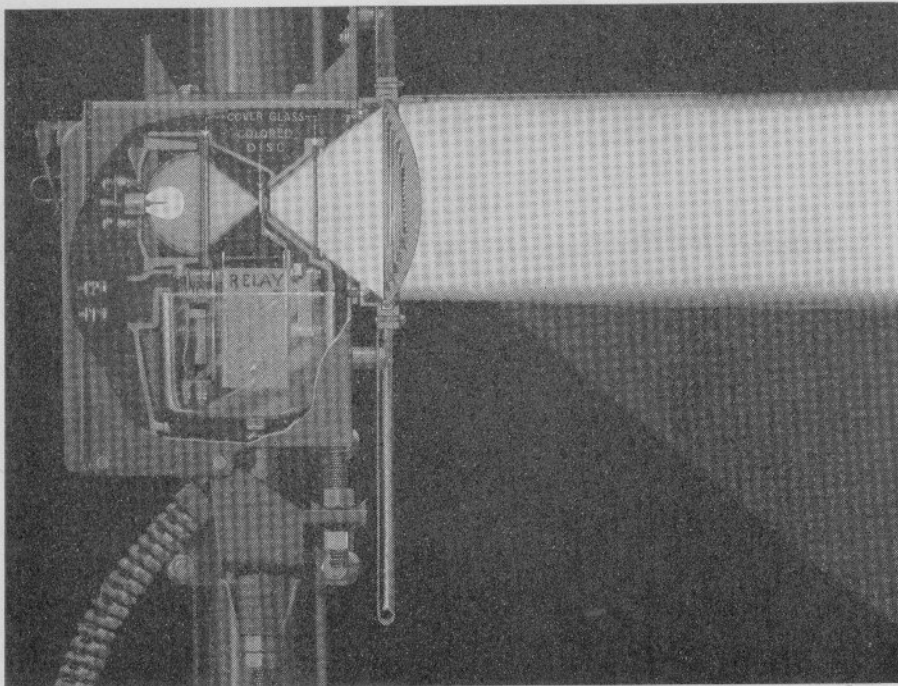


Figure 1

focal point of a clear optical lens, the light rays pass through a miniature colored roundel, fill the lens and emerge in a substantial colored beam.

Three of these miniature colored roundels are supported by the moving member of a three position relay, the position of the relay determining the color of the roundel through which the light passes—hence the color of the signal indications.

The advantages of this construction are:

1. Compactness permitting signal to be located where clearances are very limited and where other types of signals cannot be used.

2. Three indications are projected from one lens, thereby eliminating  $\frac{2}{3}$  of the lenses and lamps usually employed in color-light signaling. Not only is the installation and maintenance simplified but signal units may be located to better advantage with respect to the view of the engineer in the cab.

3. Efficiency is more than double that of the usual doublet lens type of signal, which means that a superior indication is obtained with less wattage.

4. The relay mechanism is biased by gravity to produce a danger indication when the control current is cut off.

5. No false phantom indication can occur since all light entering the signal, before being reflected, must pass through the colored roundel which is determining the indication of the signal, therefore producing the true indication of the signal. Thus the phantom characteristic of the color-light signal is converted from a defect into an advantage. The stronger the sunlight into the signal the stronger the indication. The indication produced by a locomotive headlight shining into the signal is readable even with the signal lamp burned out, thus a certain amount of "burned out" lamp protection.

6. The same lamp is employed to project three indications through one lens hence there is constant check on the ability of the signal to give its most restrictive indication, a safety feature of importance.

7. The signal may be controlled directly over the line, thus reducing the number of relays required and simplifying the circuits.

Type SA Signals are supplied for operation on direct or alternating current as follows:

4, 7.5 - 8, 10 or 12 volts d-c.

110 volts—50 or 60 cycles a-c.

55 volts—25 cycles a-c.

15 to 16.5 volts—25 or 60 cycles a-c.

These signals are equipped with either compound lenses, as shown on Plate H2635, or with stepped lenses, as shown on Plate H2631. The compound lens signal may be used with any wattage lamp suitable for the SA signal; and in view of its efficiency, may be employed on primary battery installations using low wattage lamps, such as 4 volt-3 watt, 8 volt-5 watt, or 10 volt-5 watt. The stepped lens signal should ordinarily not be used with a lamp of less than 10 watt rating.

The standard d-c. relay mechanism employs a permanent magnet so that no local energy is required. This makes it suitable for primary battery installations as well as the more usual installations employing storage battery. Older type mechanisms were furnished with local windings as shown on Plate H2641, and if desired these local coils may be replaced with permanent magnets.

Both compound lens and stepped lens signals may be equipped with additional roundels for use on curved track. The  $8\frac{3}{8}$ " diameter roundels, which may be used with either type of lens, are available for 15° and 30° spreadlite and 20° and 40° deflecting. The spreadlite roundels spread the beam equally either side of the axis, whereas the deflecting roundels are arranged to spread all of the beam to one side of the axis. Usually on curves of one direction, the 20° deflecting roundel is suitable for most locations, and for "S" curves, the 30° spreadlite roundel will usually cover the approach to the signal.

All Type SA Signal mechanisms are equipped with knife-edge bearings which require no lubrication and resist the most severe vibration, showing no appreciable wear after years of service.

Suggestions for the installation and maintenance of Type SA Color-Light Signals together with information relative to incandescent lamps and Lens combinations available for this signal are contained in our Bulletin 163 and Booklet No. 8. Copies of these will be supplied upon request.