

25th. November 1937

BALLARAT ELECTRIC TRAMWAYSAUTOMATIC SIGNAL SYSTEMGENERAL INSTRUCTIONS.

The signal system is operated by the contact of trolley wheel with insulated strips called contactors; those in the position of a tram about to leave a loop are known as setting contactors, and those near the entering end of the loop are restoring contactors. The necessity of the trolley wheel remaining in contact with the trolley wire when running through the contactors, requires that the speed of the tram shall not exceed 6 m.p.h., and to avoid arcing, power should be cut off at controller.

The arrangement of the signal is such that when a RED light is showing at one end of a single track section, there must be a GREEN light showing at the other end, and vice versa. It is necessary for motormen to clearly understand that these signals are a self operated system and give only an indication of the condition of the section of single track concerned. When no light is showing it indicates that the section is empty of trams. When a RED light is showing it indicates that there is a tram in the section moving towards the RED signal. When a GREEN light is showing it indicates that there is a tram in the section moving away from the GREEN signal.

It is to be understood that a motorman arriving at a loop finding a RED or GREEN light showing, is not free to proceed any further until the tram in the section concerned restores the signal to blank (no lights). When the signals are blank (no lights), the movement of the tram under the contactor near the leaving end of the loop gives the GREEN signal and the motorman is then all clear to proceed to the next loop. A Motorman must not proceed into a section of single track controlled by signals unless he himself sets the GREEN (all clear) signal.

The location of contactors and signal boxes is arranged so that, should the GREEN signals not be obtained or a RED signal light up, the tram can be stopped before arriving at the

points at the leaving end of the loop. In the former instance, no light would indicate one of the two faults:--

1. Trolley wheel did not make the necessary contact with contactor.
2. That the signal circuit is out of order.

To prove which fault exists, the car must be reversed so that the trolley wheel runs back into the contactor. If still no signal, this would indicate a fault in the signals and the tram cannot proceed. In this case word should be sent at once to the traffic office, and providing no RED light shows up meantime, it may be possible to obtain the services of a passing motorist to act as pilot to the tram over the faulty section.

If in passing over the contactor a RED signal appears, this indicates that another tram has entered into the section from the opposite end first, and inasmuch as the tram has passed the setting contactor it will be necessary to return to the contactor so that a signal be obtained as soon as the other tram arrives and clears the RED signal.

In connection with trams running in duplicate, such as to and from the depot, in which case the first tram will operate and clear the signal, the general rule to be observed is that no Motorman will follow another tram through a single track section unless he is within 100 yards of the preceeding tram and has advised the Motorman of the preceeding tram accordingly. If a greater distance separates trams, the second tram must wait until the first tram clears the signal before it enters and obtains its own proceed signal. Thus the showing of a GREEN light does not give all clear unless it is switched on by the tram entering the section, or as stated, the second tram is within 100 yards of the tram which did operate the signal.

If power goes off, all signals are immediately put out and in this respect the resumption of power requires special consideration. When a tram is in a signal controlled section and power goes off, the motorman must realise that the RED signal will not be showing at the loop he is approaching, and with continuous use

of gong around any curves and blind spots, and by extremely cautious driving, he will resume his progress through the section. There must be no attempt at this juncture to make up any lost time.

Similary the Motorman of any tram not in a signal controlled section when power goes off, must, upon resumption and approach to signal controlled section, make as certain as possible that there is no tram in the section he is about to enter by referring to time schedule, and as to where other trams are normally passed. If possible make use of a passing motorist to act as pilot through the section and proceed very cautiously, and by use of gong and reduced speed in blind areas, be prepared to stop at the shortest notice.

In order that all motormen be aware that power has been off, the power if interrupted, will not be restored in less than $1\frac{1}{2}$ minutes in day-time.

To meet special requirements of trams running to Victoria Park only, and Haddon Street only, the circuits are arranged so that the tram returning to the City from the intermediate terminus restores the signal originally set when passing from the Victoria Park loop or Haddon St. Loop as the case may be.

Additionally, to meet the requirements of trams running to and from the depot, the circuit between the Tram Sheds loop and Gardens North loop is arranged so that:--

1. Trams from Gardens restore the signal near depot entrance so that when the tram does not go further than the depot the signal is cleared.
2. Trams from Tram Sheds loop clear the signal near the entrance to the depot so that if "running in" the signal is cleared, but if continuing to the Gardens the signal is re-set after passing the points. A supplementary signal box is installed at the depot entrance to govern the tram's progress beyond the depot, to the Gardens. This signal which is in circuit with the boxes at the Tram Sheds loop and Gardens also governs trams commencing from the depot and running out via Sturt Street West.

It is important to remember that a tram to Depot only Via Drummond Street North or Ripon Street must not clear the signal at the Depot entrance if following a service tram running to the Gardens. Therefore, should the motorman of a Depot tram at the Tram Sheds loop observe that the GREEN signal is already showing, he must change the trolley pole when turning the points so as not to interfere with the signals already set for a service tram preceding him and travelling to the Gardens.

Trams running out from the Depot Via Drummond Street North do not operate any signal until leaving the Tram Sheds loop.

The Victoria St. and Mt.Pleasant routes are signal controlled between Grenville St. and the loops at King St. and Grant St. For trams from the City, the contactors are situated near the points at Grenville St. and an additional signal is incorporated for the section from Grenville St. to Main Road.

A selector switch which can be operated without leaving the tram is placed on the centre pole at Grenville Street. This has three positions, Victoria St., Off, Mt.Pleasant. Motormen of trams to the East routes are required to set the switch to their respective route, and for trams only shunting at Grenville St. motormen must set the switch to the "off" position so that no signal is operated.

On the North side of Bridge St. are two signal boxes, the upper box being the Victoria St. signal, the lower box, Bridge St. only. On the South side pole is the Mt.Pleasant signal. No tram must proceed to the East against a RED signal in the Bridge St. box which indicates a tram coming through Bridge St. but so long as both the Bridge St. box and the route box required are clear, the tram can get its signal and proceed. The arrangement of circuits is that the Bridge St. signal is cleared near Main Road, and the other signal at the loop concerned according to route.

On the trip into the City, the usual signal will be obtained at the outer loop, but at Bridge St. the signal there

will indicate the condition of this street. If box is clear, a proceed signal is obtained from setting contactors suitably placed and later restoring contactors clear the outer loop signal. Near Grenville St., the Bridge St. signal is cleared by a restoring contactor.