

REGISTERED OFFICE: QUEENS HOUSE,
KINGSWAY, LONDON, W.C.2.

TELEPHONE: BRADFORD 9260/4.
TELEGRAMS: "ENELECTICO, BRADFORD."



THE ENGLISH ELECTRIC COMPANY LIMITED.

ALL COMMUNICATIONS TO BE ADDRESSED
TO THE COMPANY, NOT TO INDIVIDUALS.

BRADFORD.

The Melbourne & Metropolitan Tramways
Board,
c/o Messrs. Heap & Ryley,
34, Victoria Street,
Westminster,
LONDON, S.W.1.



OUR REFERENCE P.393/TWS/WMB.
YOUR REFERENCE

29th June, 1938.

Dear Sirs,

Act. 5-7-38
With reference to the visit of Mr. Bell and Mr. Spencer to our Bradford Works on the 12th ultimo, we have pleasure in attaching hereto a docket containing the information which these gentlemen asked us to supply.

We would like to comment on some of the points mentioned.

Tramcar Motors.

The docket also contains a discussion on 300 volt motors versus 600 volt, both from the point of view of the motors themselves and of the control gear.

Tramcar Controllers.

The docket contains a specification and photograph of the English Electric type CDB.2 form G camshaft controller, and also a copy of Publication No. Q40 and photographs of the E.E. type "Z" form DB.1 tramcar controller.

Both these controllers are suitable for modern tramcars with a normal performance, that is, having the initial acceleration of 1 to 1.5 m.p.h.p.s., and a balancing speed of 25 to 30 m.p.h. They give series parallel control being capable of handling a total output of 140 h.p. whilst the "Z" controller is slightly larger and can handle up to a total of 160 h.p.

Both controllers are fitted with the English Electric patented quick break line contactor which breaks the main current when switching off, and thus relieves the normal contacts. With this quick break contactor it is impossible to procure a slowly opening contact however slowly the controller handle is brought to the "off" position.

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It will be noted that the "Z" controller has cam operated contacts for the line and brake contactors with normal drum type contacts for the resistance notches.

The rheostatic brake switch is cam operated, and is only thrown on moving the controller handle from the "off" position towards the first brake notch, thus reducing the wear on the brake contacts to a minimum.

Notch Regulators.

All English Electric standard tramcar controllers are fitted with a new type of notching mechanism. The old and new forms of this mechanism are shown on drawing No. P.11323MO20A which is attached hereto.

It will be seen that with the old type mechanism the spring which controls the position of the catch pawl obtains its reaction by pushing against a boss on the cam wheel which is fixed to the main drum, hence every time the controller is operated this spring tends to throw the drum forward. The drum does not actually move forward due to the friction of the contact fingers, but it is possible with this arrangement to miss a notch. With the new type mechanism the only thing that is altered is this catch pawl spring. Instead of having one end anchored to the cam wheel it is self-contained, therefore, the tendency for the spring to push the drum forward at every operation is eliminated. It will be readily understood from this that the correct functioning of the notch mechanism with the new arrangement no longer relies on finger friction on the drums, and it is, therefore, impossible to miss a notch when notching up the controller.

Multi Notch Remote Control.

The multi notch remote control tramcar equipment described in the docket is, you will note, on very similar lines to the remote control equipments of our design which are in operation on your system. The equipment described was, however, specially designed for a high performance tramcar fitted with four 50 H.P. motors. Under normal service conditions it is capable of giving an initial acceleration of approximately 4 m.p.h.p.s. to the vehicle, with a balancing speed in the region of 40 m.p.h.

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In addition the equipment is designed to give a safe and stable rheostatic brake on the lines of our modern trolleybus equipments. This brake utilises the shunt field of the motor, and, therefore, does not require a multi notch control to ensure satisfactory operation. Actually only two brake notches are required.

As will be seen this scheme gives 18 accelerating notches to the full field position with a further 3 weak field notches. It will, of course, be quite easy to reduce the number of accelerating notches to line up more with the remote control tramcars at present in service on your system, but this, of course, will reduce the initial acceleration possible with the equipment.

In view of the high acceleration, and the short time on which the motors would be accelerating through the resistance notches, it is not considered advisable to have series parallel control, as the added complication which this would entail, far outweighs any advantages which could be obtained by virtue of the saving in current from series parallel control.

In order to avoid additional complication of the equipment it is necessary that the motors be connected in pairs in series, i.e. 300 volt motors instead of 600 volt. This is due to the special form of rheostatic braking which requires a separate resistance for each brake circuit, and with the 300 volt motors only needs two resistances per equipment.

Trolley Slider Heads.

The docket contains a description of the English Electric trolley slider head fitted with a carbon insert shoe, but it should be realised that to obtain satisfactory results from this type of collector gear it is essential not to inter-run with the ordinary wheel type of head.

Due to the sparking which takes place between the wheel and the overhead line, the line is kept in a rough condition, which condition naturally results in excessive wear of the slider shoe. We would advise you that even with a completely new overhead line excessive wear of the shoes will be experienced until all irregularities have been smoothed out,

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and a skin has been formed on the line in a similar manner to that of the motor commutator.

We are, as requested, sending a sample slider head to the Acting Secretary at Melbourne. The cost of these heads is £5.16. 0 each, spare bronze slider shoes being 18/- each, while spare carbon inserts vary from 10/6d. a dozen for quantities of 1000, to 17/- a dozen for quantities of 100.

With regard to the life to be expected from these parts, the bronze shoes should last for about six months under normal service conditions. The carbon inserts at present give a life of between 500 and 1000 miles, depending rather on weather conditions. The carbon manufacturers are still endeavouring to produce a carbon which will give a longer life than this, and also a carbon which will be unaffected by the wet weather.

Whilst the carbon insert only gives a life of some 500 to 1000 miles, the cost of the replacement is very cheap, and would, over a lengthy period, probably approximate to the replacement cost of the wheel type heads. Furthermore, it has been found in practice where slider heads have been used that the wear on the overhead wire has been so much reduced as to show a considerable decrease in the cost of overhead maintenance.

Whilst not so important for a tramcar undertaking we would advise you that slider heads are silent in operation, and it was this fact that primarily decided the London Passenger Transport Board to change over to this form of current collection for their trolleybuses. It is since this changeover that they have found the additional advantages in reduced maintenance costs and also in dewirements.

Bow Collectors.

We do not manufacture this type of collector gear for tramcars, and have, therefore, been in touch with Messrs. Brecknell Willis & Co. Ltd., who manufacture a bow collector as shown on their drawing No. E.1899/440K. This drawing shows a bow collector suitable for reversing by means of ropes operated by hand.

The main castings are of malleable iron, whilst the bow frame and cross stays are of tubular steel. The tension on the overhead line can be adjusted by rotating the springs when locking them in position with the nuts as shown.