

SELECTOR WIPERS AND CORDS

Examination and Overhaul

[Maintenance Routine Instruction (M.R.I.) No. R 116]

★1. **General.**—Worn wipers and frayed cords are a frequent cause of service difficulty in automatic exchanges. Faults on these items are due to gradual wear, and an examination made at intervals is necessary to reduce such service troubles. So far as is possible, therefore, an inspection should be made with a view to remedying not only actual defects existing when the inspection is made, but also any incipient faults which are likely to cause service difficulties before the next inspection is made. When estimating the residual life of wipers and wiper cords, consideration should be given to the periodicity of the inspections and to the fact that early-choice selectors carry greater traffic than those of later choice.

When making an inspection, the points mentioned in the following paragraphs should receive attention. The selector should be busied throughout the inspection and overhaul, and the release circuit should be disconnected. When bank cleaning and wiper inspections are performed as consecutive operations on the same selector, the banks should be cleaned first.

Any re-adjustments of the wipers shown by the inspections to be necessary should be made in accordance with the appropriate M.A.I. (see TELES., Auto., B 5001).

General instructions on wiper cords are given in TELES., Auto., B 3101.

2. General Inspection of Cords.

(a) *Soldering.*—Examine the soldering of cord connexions for dry or unsatisfactorily-soldered joints.

(b) *Wear.*—Examine the cords for evidence of wear and fraying, particularly on selectors fitted with a vertical-marking bank. Frayed and worn cords should be changed.

(c) *Other matters.*—Check that the cords hang uniformly, also that they are sufficiently long, and are clear of the bank when the selector is operated and released; this clearance may be checked by lifting the shaft of the selector. Check also that the positioning of the cord ties is satisfactory.

3. General Inspection of Wipers.—(All types — line and P, vertical-marking, and P.B.X. arc.)

(a) *Cleaning.*—Clean the wiper tips. A small piece of "Leather, Chamois" held over the tip of a "Screwdriver, Instrument, No. 1" will be found suitable.

(b) *Tip formation.*—Examine each wiper for distorted tip formation. If the distortion is likely

to lead to a fault, the wipers should be changed.

(c) *Wear.*—Examine each wiper for wear.

(i) *Pre-2000-type.*—An inspection mirror will be found useful when making this examination. If a wiper shows signs of cracking or is worn to the extent that a notch has developed it should be changed.

★(ii) *2000-type.*—Wipers should be changed if they have developed a hole or show signs of cracking. To avoid making holes in wipers already worn very thin, "feeler" devices for detecting holes must not be used.

4. Adjustment Check — Line Wipers and P-Wipers Only.

(a) *Pre-2000-type selectors.*

(i) *General.*—Check that the correct type of wiper is being used, viz., "Wipers No. 7" for single privates, "Wipers No. 8A" for line wipers and "Wipers No. 8B" for double privates, except for Siemens exchanges where contractors wipers are used.

★(ii) *Wiper tension.*—Step the selector, by hand, to level 5, contact 1. Apply a tension gauge to the angular set of each wiper (except for Siemens Nos. 50 and 51, when it should be applied to the wiper tip), and check that the tension required to lift each tip clear of the bank-contact lies between the following limits:—

Type of selector	Line wipers and double P-wipers	Single P-wipers or C-wipers
Siemens No. 16 ...	20-40 gm.	20-40 gm.
Siemens No. 50 & 51 ...	20-40 gm.	15-35 gm.
All other selectors ...	25-45 gm.	20-40 gm.

(iii) *Clearance of bank during vertical movement.*—Check, by moving the shaft up and down, by hand, and with the cup spring held against the normal post, that the wipers clear the bank during vertical movement.

(iv). *"Cutting-in"*.—Raise the shaft, by hand, to levels 1 and 0 and check that, when rotated to the first contact on the level, the wipers enter the bank smoothly, without appreciable rise or fall in the general level of the wiper assembly. If slight variations in the bank between levels

1 and 0 are noticed, the test should be made on level 5 and be followed by a check on levels 1 and 0, to ensure that "cutting-in" is satisfactory, although accompanied by a slight rise or fall, as the case may be.

(v) *Alignment on contacts.*—Step the selector, by hand, to the first contact on level 1 and then to the last contact on level 1, and check that the wipers lie centrally on the bank contacts. Repeat the test on level 0. If reasonably-accurate alignment cannot be obtained on both first and last contacts, a mean adjustment should be made.

(b) *2000-type selectors.*

★(i) *Wiper tension.*—With the wipers out of the bank, check that the wiper blades are not twisted, that there are approximately equal gaps between each blade and the separating insulator, that the tip domes are opposite to each other, and that there is a gap of 12 to 20 mils between the contact tips. (Any adjustments to correct the gap should be made on the straight portion, immediately in front of the collar.) Depress the upper blade with a "Screwdriver, Instrument, No. 1", at the same time pressing vertically upwards on the collar. Check that the blade restores freely to the inner edge of the collar when the pressure on the blade is reduced. The bottom blade should be similarly checked by pressing the collar downwards and raising the blade. This test checks that the required contact pressure will be obtained with the specified tip gap.

(ii) *Clearance of bank during vertical movement.*—Check that the wipers clear the bank on ascent and on descent of the carriage assembly, and also during restoration on the normal level. It is necessary that the wiper carriage should be hand-controlled throughout this test; its position during the upward movement is determined by the rotary cam bearing on the comb plate, and in the downward movement by the rotary detent engaging the short face of the penultimate rotary notch.

(iii) *"Cutting-in"*.—Raise the shaft, by hand, to levels 1 and 0, and check that, when rotated to the first contact in the level, the wipers enter the bank smoothly and without appreciable rise or fall in the general level of the wiper assembly. If slight variations in the bank between levels 1 and 0 are noticed, the test should be made on level 5 and be followed by a check on levels 1 and 0 to ensure that "cutting-in" is satisfactory, although accompanied by a slight rise or fall, as the case may be.

(iv) *Alignment on contacts.*—Step the selector, by hand, to level 1 and check that the wipers

rest on a point between one-third and one-half of the way on each of contacts 1, 6 and 11. If there is any difference in the positions taken up by the wipers on contacts 1 and 11, a mean adjustment should be obtained. Repeat the test on level 0. *It is especially important that private wipers should not rest on a point more than one-half of the way on a contact because of the possibility of causing double switching.* If it be found impossible to obtain a reasonable adjustment on both levels 1 and 0, the bank alignment should be checked (see TELES., Auto., B 5163). As, however, only a limited number of "Gauges, Selector Bank, No. 1 and No. 2" are available on loan, demands for these tools should normally be withheld until a number of banks require attention.

5. Adjustment Check. — Vertical-marking Wipers Only.

(a) *Position on contacts.*—Check that the wiper tips rest on the vertical bank contact for a distance of not less than a quarter of the length of the contact when the selector is in the normal position. Repeat the check with the selector on the tenth level.

(b) *Alignment of wipers.*—Step the selector to the fifth level, and check that the wiper tips rest slightly below the centre line of the sixth contact.

★(c) *Wiper tensions.*

(i) *Pre-2000-type wipers and Wipers No. 13.*—Check that the tension required to lift the tip clear of the bank is within the limits of 20 to 40 gm. The tension need be measured on only one wiper spring.

The following are the points to which the gauge should be applied:—

Siemens type—at tip of wiper
Wipers No. 13—behind ball of tip
Other types—at angular set of wipers.

(ii) *Wipers No. 23.*—With the wipers removed from the vertical bank, check that the wipers are approximately straight from the spring-fixing screw to the collar, that each spring is clear of the separating insulator, that the tips are opposite to each other, and that there is a gap of 25-40 mils between the contact points. (Any adjustments to correct the gap should be made on the straight portion immediately in front of the collar.) Depress one blade with a small screwdriver, at the same time pressing the collar in the opposite direction. Check that the blade restores freely to the inner edge of the collar when the pressure on the blade is reduced. The other blade should be similarly checked. This test checks that the required contact pressure will be obtained with the specified gaps at the wiper tips.

6. Adjustment Check — P.B.X.-Arc. Wipers Only.

(a) Position on contacts.

(i) Step the selector to the first contact of a level, then to the last contact of the level, and check that the wipers lie centrally on the contact screws. If the wipers do not lie centrally on both contact screws, a mean adjustment should be made.

(ii) Check that the wiper tips rest on the bank contact screws within the limits of one-third and two-thirds of the length of the screws.

(b) Wiper tension.—With the wipers in the bank, check that the tension required to lift the wiper clear of the contact screw is between 15 and 25 gm. In this test the tension gauge should be applied to the tip of the wiper.

References:—TELES., Auto., B 3101, B 5001, B 5163
(Tp 2/4)

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