

SELECTORS 200 AND 206 TYPES

AND

BANKS 10 AND 26 TYPES

1. GENERAL

- 1.01 This section covers 200 and 206 type selectors and 10 and 26 type banks and replaces Section A468.002, Issue 1-D.
- 1.02 Reference shall be made to Section A400.001 covering General Requirements and Definitions for additional information necessary for the proper application of the requirements listed herein.
- 1.03 Part 1, "General" and Part 2, "Requirements" form part of the Western Electric Co. Inc. Installation Department handbook.
- 1.04 Before making any of the inspections or readjustments specified herein, ascertain whether or not it is necessary to make any of the circuits busy. Circuits which are so affected should be made busy in the approved manner and the necessary relays should be held operated or non-operated to isolate the selector circuit.
- 1.05 The Feeder Brush Position and Feeder Brush Tension requirements covered in this section apply to single piece feeder brushes of the bank or detachable type (one forked feeder brush spring being provided for a pair of rotor brush springs) and to detachable two piece feeder brushes (two bowed feeder brush springs being provided for a pair of rotor brush springs).
- 1.06 Steady and Uniform Operation A selector operates steadily and uniformly when it operates regularly for not less than 10 revolutions. A slight hesitation or momentary change of speed at or about the time the rotor brushes engage the feeder brushes is not objectionable if it recurs regularly. A distinctive click indicating the failure of the pawl to latch up over a tooth shall not be present. When, on the application of this test, there is a disagreement as to whether the operation of the selector is steady and uniform, it shall be satisfactory to rotate the selector for approximately 1 minute and to judge its operation by 10 consecutive revolutions thereafter.
- 1.07 Selector Circuit The selector circuit referred to herein ordinarily consists of the selector magnet coil. However, when a relay or a 44 type resistance, or a relay in parallel with a 44 type resistance is wired into the circuit so as to be in series with the selector coil during normal circuit operation it shall be considered as a part of the selector circuit. For the low voltage operate test "A" and the high voltage operate test "B" and for the interrupter contact test, the selector circuit shall be extended to include the interrupter contacts with spark protection.
- 1.08 High or Low Voltage refers to the potential drop or closed circuit voltage across the selector circuit with the test set connected to the interrupter spring which is strapped to the magnet coil. The specified potential drop must be regulated as far as possible by the use of the battery cells in the voltage supply. A series resistance may be used to obtain the correct potential when necessary, but this resistance must always be less than that which would be sufficient to correct for a difference of one cell.
- 1.09 Bank Feeder Brushes are those feeder brushes which are a part of the 10 or 26 type bank.
- 1.10 Detachable Feeder Brushes are those feeder brushes which are detachable and are fastened in position by the top selector mounting screw.
- 1.11 The Standard Point of Measurement is a point on the driving arm beneath the pawl spring to which the driving pawl is fastened.
- 1.12 Variable Requirements, for individual selectors are given on the charts, pages 11 to 17 incl., and are referred to in the following paragraphs 2.01 to 2.27 incl., as "the specified maximum (or minimum) tension", "the specified voltage", etc.

1.13 Non-Variable and Special Requirements

In addition to the variable requirements, the following paragraphs 2.01 to 2.27 incl. specify certain standard, non-variable requirements which in general apply to all selectors. Special requirements will be given in the numbered notes shown on pages 9 and 10 and will be indicated by the reference "See Note " appearing on the charts, pages 11 to 17 incl., in the box opposite "Spl. Reqs." and in the "Test" and "Readj." column, under

the particular selector to which the requirement applies.

1.14 Selectors which do not meet the test requirements for operation on high and low voltage, speed, or step test shall be exercised for approximately one minute and then, if necessary, they shall be cleaned and relubricated and then retested for these requirements. If they still fail to meet the test requirements they shall be readjusted in accordance with the readjust requirements.

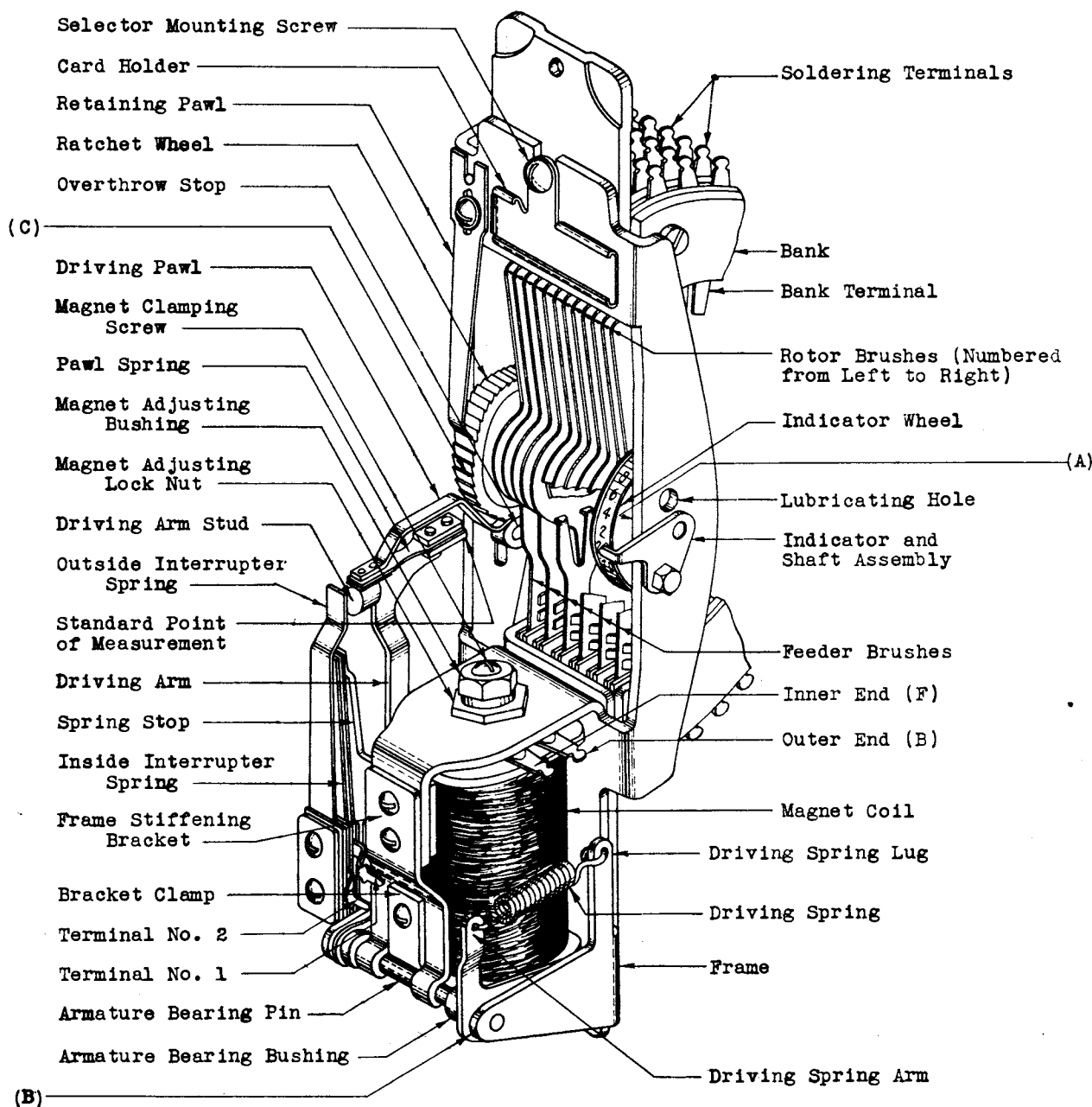


Fig. 1

1.15 Unless otherwise specified, all requirements shall be met with the parts in the position which they assume after being operated electrically.

1.16 All rotor brush requirements shall be met on both ends of the rotor brush assembly.

2. REQUIREMENTS

2.01 Cleaning Approved methods only shall be used for cleaning the ratchet wheel, armature bearings, interrupter contacts and air-gap between armature and core. After being cleaned, the selector shall be allowed to dry and then be relubricated.

2.02 Lubrication

- (a) Fig. 1 (A) and (B) - The rotor bearings and the armature bearings shall be adequately lubricated with Western Electric Lubricating Compound No. 3. When lubrication is necessary, two applications of the lubricant shall be made to each of the rotor bearings and armature bearings with the No. 4 artist's sable rigger brush.
- (b) Fig. 1 (C) - The surfaces of the ratchet wheel teeth shall be adequately lubricated with Western Electric Lubricating Compound No. 3. When lubrication is necessary, three applications of the lubricant shall be made to the ratchet wheel teeth with the No. 4 artist's sable rigger brush while the selector is operating.
- (c) After turnover, it is recommended that the ratchet wheel teeth and the armature bearings be lubricated at intervals of one year and the rotor bearings at intervals of two years. These intervals may be extended if periodic inspections have indicated that local conditions are such as to insure that requirements (a) and (b) will be met during the extended period.

2.03 Record of Lubrication During the period of installation, a record shall be kept, by date, of the lubrication of the selector and this record shall be turned over to the Telephone Company with the equipment. If no lubrication has been done the record shall so state.

2.04 Notes and Special Requirements When specified, a selector shall meet any special requirements given on pages 9 and 10.

2.05 Alignment of Tips of Rotor Brushes

(a) Fig. 2 (A) - The tips (trailing

edges) of all non-bridging brushes shall be in approximate alignment. Gauge by eye.

(b) Fig. 2 (B) - The tips of the bridging brushes shall overlap those of the non-bridging brushes by 1/64". Gauge by eye.

2.06 Centering of Rotor Brushes on Terminals

(a) Fig. 2 (C) - With the rotor in any normal position of rest, bridging brushes shall not contact with adjacent terminals. Gauge by eye.

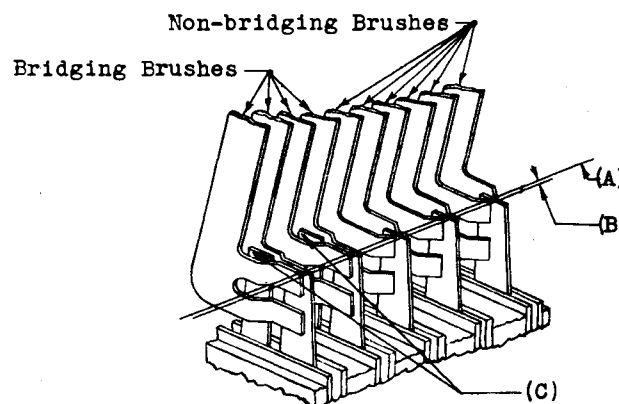


Fig. 2

(b) Fig. 3 (A) - The tips (trailing edges) of non-bridging brushes shall be 1/64" (approximately the thickness of a terminal) from the edges of their respective terminals when the rotor brush assembly is rotated backward far enough to take up all the play between the retaining and the driving pawls and the ratchet wheel teeth. This shall be checked on terminals in three positions on the bank (top, bottom and middle). Gauge by eye.

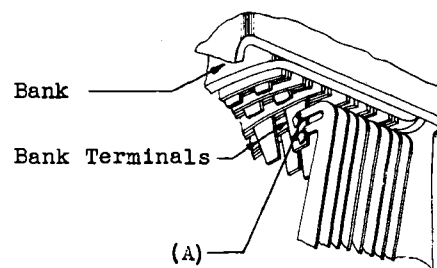


Fig. 3

2.07 Rotor Brush Alignment - Fig. 4 (A)

The junction between each pair of rotor brush springs shall line up with the center line of the associated bank feeder brush within .014", when the brushes are in the position in which they are about to pass onto the feeder brushes. Gauge by eye. The feeder brushes and bank terminals are .014" thick.

NOTE In case the bank feeder brushes have been cut away this requirement shall apply to the first row of bank terminals.

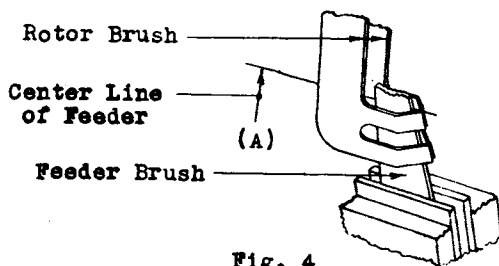


Fig. 4

2.08 Feeder Brush Position

(a) **Fig. 5 (A) - Single Piece Type Only** When the feeder brush is pushed away from the rotor with pressure applied on the center line of the feeder brush and close to the crotch, the two prongs shall leave the rotor at the same time. Gauge by eye.

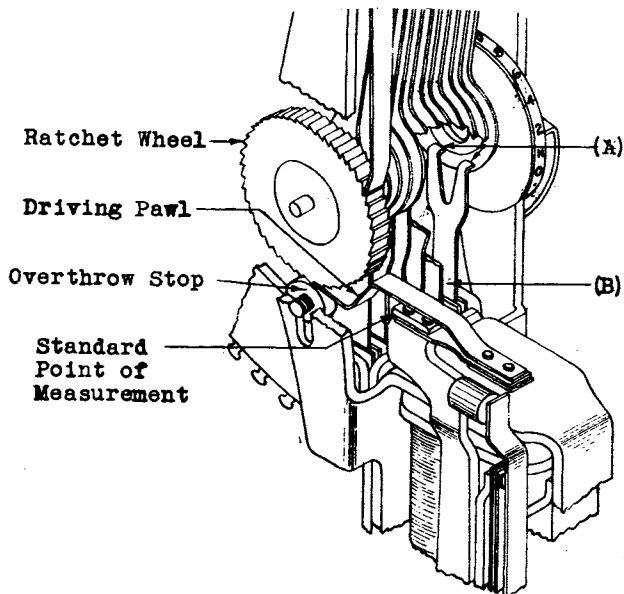


Fig. 5

- (b) **Fig. 5 (A) - Single Piece Type Only** Both prongs of the feeder brush shall make contact with the rotor over their entire contacting surfaces and shall not interfere with the spacing washers on the rotor at any point in the revolution of the rotor. Gauge by eye.
- (c) **Single Piece Type Only** Except where otherwise specified, there shall be an appreciable clearance (min. .005") between all parts of the feeder and rotor brushes except contacting surfaces thereon. Gauge by eye.
- (d) **Fig. 5 (B) - Bank Single Piece Type Only** That part of the bank feeder brush over which the rotor brushes pass shall be in alignment with the bank terminals within .010". Gauge by eye.
- (e) **Detachable Feeder Brushes Only** When one end of the non-bridging brushes is climbing up on the feeder brushes, the brushes on the opposite end of the rotor shall not be in contact with the bank terminals. Gauge by eye.
- (f) **Fig. 6 (A) - Detachable Feeder Brushes Only** The contacting surfaces of both prongs of the single piece type, and both contacting edges of the two piece type brushes shall be parallel to the face of the rotor brush hub throughout the revolution of the rotor hub and they shall be min. 1/64" from the outside edge of the hub. Gauge by eye.

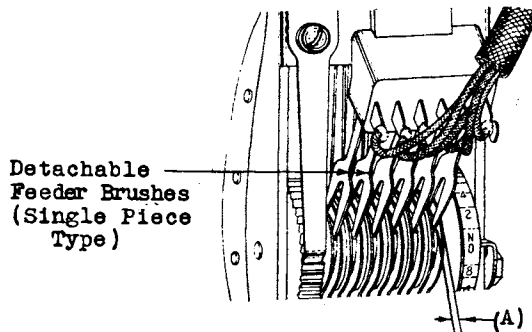


Fig. 6

- (g) **Detachable Feeder Brushes Only** With one end of the rotor brushes resting on the 5th row of bank terminals the center line of each feeder brush shall line up with the junction of the associated pair of rotor brush springs within .010". The single piece type feeder brushes are .014" thick, and each spring of the two piece type feeder brush is .007" thick. Gauge by eye.

2.09 Feeder Brush Tension

(a) Fig. 7 (A) - Single Piece Type Only The tension of each feeder brush against the associated rotor hub measured at a point on the center line of the feeder brush and close to the crotch shall be:

Test - Min. 65 grams, max. 90 grams

Readjust - Min. 70 grams, max. 90 grams

This requirement shall be checked with the rotor in its normal position with respect to side-play. Use the No. 70-E gauge.

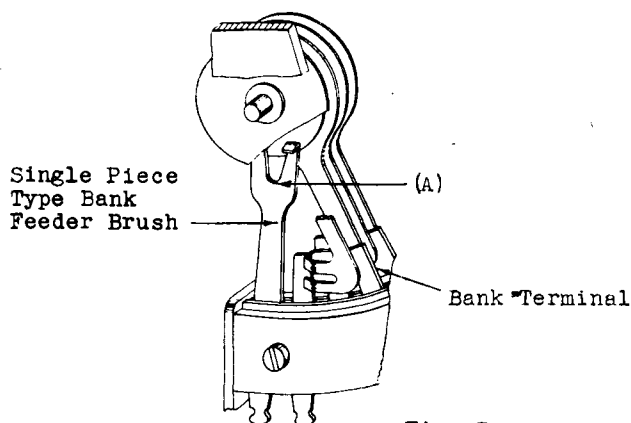


Fig. 7

(b) Two Piece Type Detachable Feeder Brushes Only With the adjacent brushes held away the spread of the contact ends of two piece

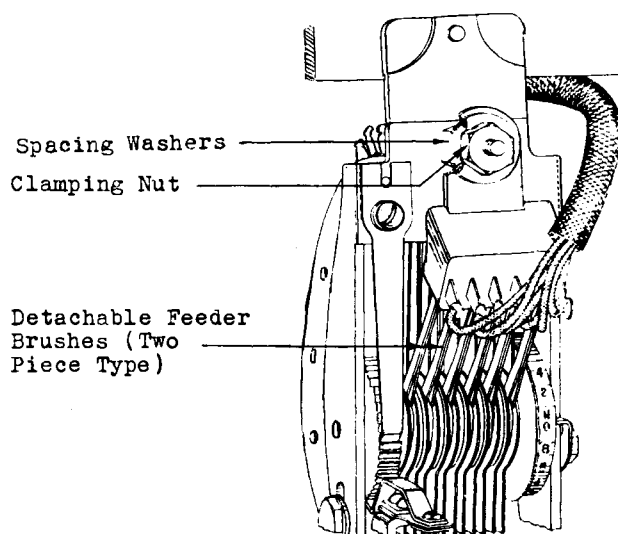


Fig. 8

type brushes should be approximately ($\pm 1/16$ ") $3/8$ ". Gauge by eye. This requirement may be checked for by the Telephone Company if they require it before the Installation Department has mounted the feeder brush unit on the selector.

2.10 Rotor Brush Tension - Fig. 9 (A) - The tension of each brush member measured at a point approximately midway between the prongs of the brush member, with the brushes on the topmost row of terminals, shall meet the specified minimum and maximum limits. Use the No. 70-D gauge.

NOTE On selectors equipped with detachable feeder brushes, it will be satisfactory to check this requirement with the brushes on the detachable feeder brushes instead of on the topmost row of terminals.

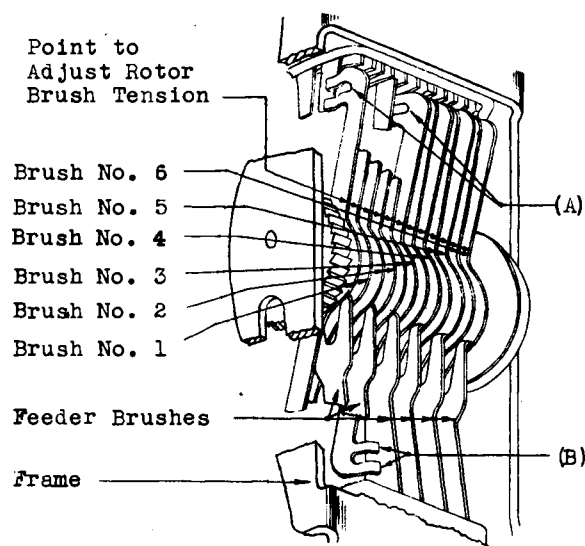


Fig. 9

2.11 Rotor Brush Prong Contact - Fig. 9 (B) At least one prong of each individual brush member shall make contact with the associated bank feeder brush. The other prong shall not be away from the feeder brush more than:

Test - Max. .005"

Readjust - Max. .003"

Gauge by eye.

NOTE In case the bank feeder brushes have been cut away this requirement shall apply to the first row of bank terminals.

- 2.12 Toeing of Bridging Brushes - Fig. 10
(A) - The trailing edges or tips of the bridging brushes shall "toe out", but the maximum separation between tips of each pair of brushes shall not exceed .010" when the brush members are making contact with each other. Gauge by eye.

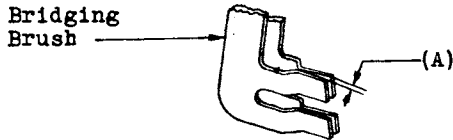


Fig. 10

- 2.13 Heel Spacing
(a) Fig. 11 (A) - There shall be min. 1/32" clearance between brush members of adjacent pairs when the brushes are in contact with the bank terminals. This requirement shall be checked on the top-most row of terminals. Gauge by eye.

NOTE On selectors equipped with detachable feeder brushes it will be satisfactory to check for this requirement on the detachable feeder brushes.

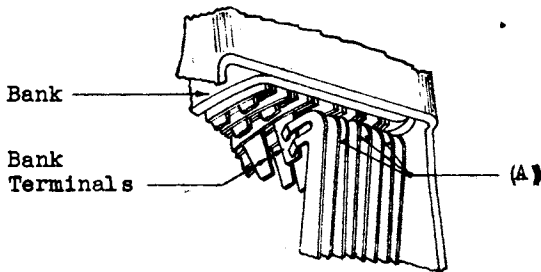


Fig. 11

- (b) Fig. 12 (A) - The heels of the rotor brush members shall clear the sides of the bank feeder brushes by min. 1/64" (approximate thickness of a terminal) just before the brushes engage the feeder brushes. Gauge by eye.

NOTE In case the bank feeder brushes have been cut away this requirement shall apply to the first row of bank terminals.

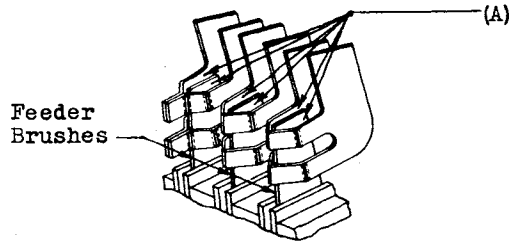


Fig. 12

- 2.14 False Contacting
(a) Fig. 13 (A) - Non-Bridging Brushes

There shall be a clearance of min. 1/64" (approximate thickness of a terminal) between the heels of non-bridging brush members and their associated bank terminals, when their contacting edges are in contact with each other between the bank feeder brush and the 1st bank terminal, the 11th and 12th terminals and the 2nd and 3rd terminals from the top of the bank. Gauge by eye.

NOTE In case the bank feeder brushes have been cut away this requirement shall apply between the 1st and 2nd bank terminals.

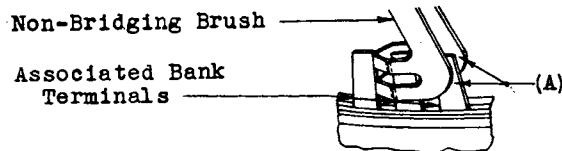


Fig. 13

- (b) Bridging Brushes - Fig. 14 (A) - On all selectors equipped with single piece narrow type bank feeder brushes, the heels of bridging brushes shall clear the first terminal by min. 1/64" (approximate thickness of a terminal) just before the rotor brushes engage the feeder brushes. Gauge by eye.

NOTE In case the bank feeder brushes have been cut away this requirement shall apply to the second row of terminals.

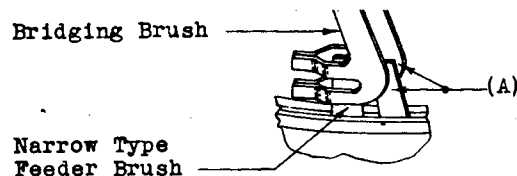


Fig. 14

- 2.15 Clearance Between No. 1 Brush and Driving Arm There shall be a clearance of min. $1/64$ " between the No. 1 brush and the driving arm with the rotor brush assembly in the position it assumes after being operated electrically and with the side-play of the armature taken up to the right as viewed from the front. Gauge by eye.

2.16 Driving Spring Tension

- (a) Fig. 15 (A) - When a maximum tension is specified the driving spring shall have not more than the specified tension measured at the "Standard point of Measurement" as the driving pawl falls over a ratchet wheel tooth. Use the No. 79-B gauge.
- (b) Fig. 15 (A) - The driving spring shall not have less than the specified minimum tension measured as above. Use the No. 79-B gauge.
- (c) Fig. 15 (B) - The outside interrupter spring shall not be in contact with the rubber stud when these requirements are met. Gauge by eye.

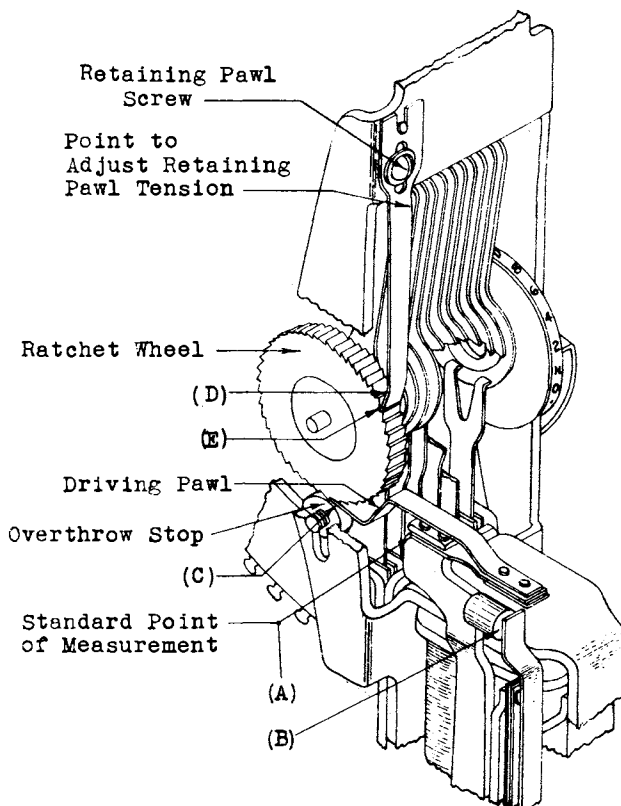


Fig. 15

2.17 Armature Back Stop

- (a) Fig. 16 (A) - When turned over to the Telephone Company the armature back stop shall be assembled on the selector so that the stop will tend to move in a clockwise direction and the straight portion of the stop extending from the point of greatest overthrow to the point opposite the mounting screw shall incline to the right. Gauge by eye.

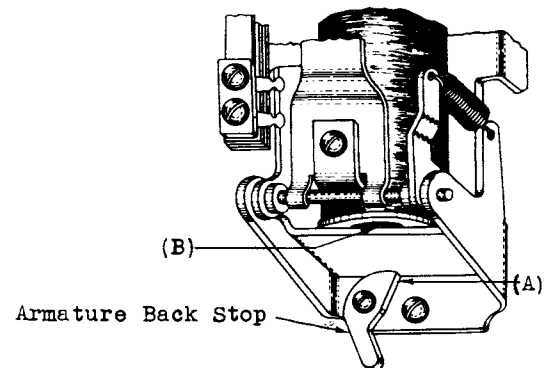


Fig. 16

- (b) Fig. 15 (C) - The back stop shall have a position such that the driving pawl, in its rest position does not bind on the overthrow stop (minimum requirement). Gauge by eye.
- (b1) The gap between the driving pawl and the overthrow stop shall not be sufficient to allow more than an appreciable amount ($1/32$ " of rotary motion of the rotor brush assembly (maximum requirement). Gauge by eye.
- (b2) It is satisfactory to check the minimum requirement in four positions of the ratchet wheel approximately 90° apart, and to check the maximum requirement on both ends of the rotor brush assembly.

2.18 Retaining Pawl Tension and Position

- (a) Fig. 15 (D) - Unless otherwise specified the retaining pawl tension against the ratchet wheel teeth, measured at the bend in the pawl, shall be min. 50 grams, max. 70 grams. Use the No. 79-C gauge.
- (b) Fig. 15 (E) - When the armature is operated and released electrically on not more than the specified low voltage, the retaining pawl shall just clear each ratchet wheel tooth. Gauge by eye.
- (b1) The position requirements shall be checked with the ratchet wheel in at least 4 positions, approximately 90° apart. Gauge by eye.

2.19 Armature Air-Gap - Fig. 16 (B)

- (a) The gap between the armature and

2.19 Continued

the magnet core shall be such that the driving pawl will engage all ratchet teeth throughout a complete revolution when the magnet is energized with not more than the specified voltage in a manner to advance the selector step-by-step. Gauge by eye.

- (b) In addition to meeting the above requirement, the air-gap shall be such that the driving pawl shall not engage any tooth of the ratchet wheel when a .004" gauge is placed between the armature and the magnet core and the selector is energized with the specified voltage. Use the No. 74-D gauge.
- (c) Fig. 17 (A) - In meeting the above requirements, 2.19 (a) and (b), the overthrow or "whip" of the driving arm shall be eliminated by pressing lightly against the lip of the outside interrupter spring with the finger.

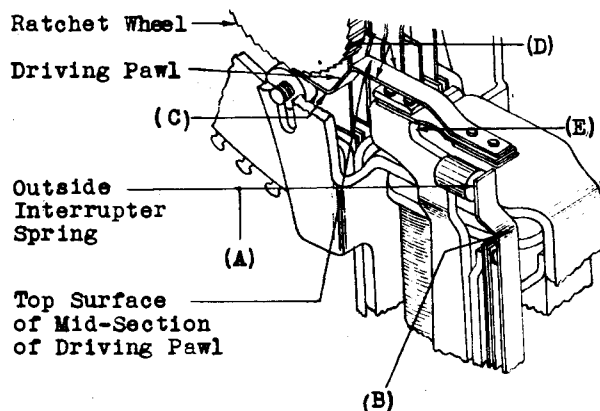


Fig. 17

- 2.20 Outside Interrupter Spring Tension - Fig. 17 (B) - The tension of the outside interrupter spring shall meet the specified minimum and maximum limits. Use the No. 79 type gauge.

- 2.21 Driving Pawl Tension and Position
 (a) Fig. 17 (C) - Driving Pawl Tension The tension of the driving pawl against the ratchet wheel, measured at the bend near the driving end of the pawl just as the pawl leaves the bottom of the ratchet wheel tooth with the selector armature in the operated position shall be:

Test - Min. 80 grams, max. 150 grams

Readjust - Min. 90 grams, max. 150 grams

Use the No. 79-C gauge.

- (b) Fig. 17 (D) - Driving Pawl Position - The edges of the driving pawl along its length shall be parallel with the sides of the ratchet wheel and the top surface of the mid-section shall be parallel with the base of the ratchet wheel tooth. Gauge by eye.

- 2.22 Magnet Pull Test - Fig. 17 (E) When specified, the selector magnet shall be capable of drawing up the armature so that the driving pawl falls into the next tooth when the pull of the driving spring is supplemented by at least the specified pressure, applied with a push gram gauge at a point opposite the "Standard Point of Measurement", and when the magnet is energized in the "Selector Circuit" with not more than the specified voltage. Use the No. 79 type gauge.

- 2.23 Step Test - Fig. 18 (A) The selector shall be capable of taking a full step onto the feeder brushes when the load on the driving spring is artificially increased by the application of the specified tension at the "Standard Point of Measurement" in a horizontal direction opposed to the pull of the driving spring. This requirement shall be met on both ends of the rotor brushes. Use the No. 79 type gauge.

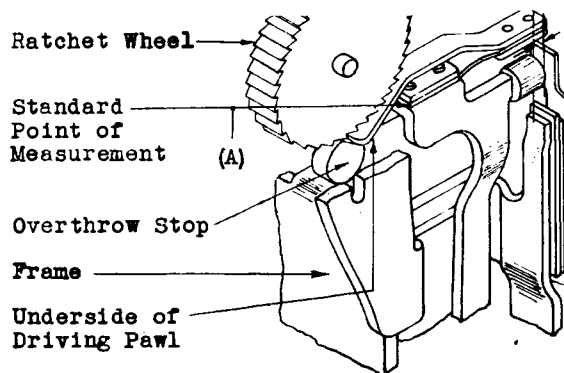


Fig. 18

- 2.24 Low Voltage Operate Test "A"
 When specified, the selector shall start from its normal position and continue to operate steadily and uniformly under self-interruptions when not more than the specified low voltage is applied across the "Selector Circuit". If the selector is wired so that it cannot be rotated under self-interruptions, it shall be rotated under control of the relay wired to its interrupter contacts.

- 2.25 Speed When specified, the rotating element of the selector shall pass not less than the specified number of terminals per second when not more than the specified low voltage is applied across the "Selector Circuit".
- 2.26 High Voltage Operate Test "B" When specified, the selector shall start from its normal position and continue to operate steadily and uniformly under self-interruptions when not less than the specified high voltage is applied across the "Selector Circuit".
- 2.27 Interrupter Contact Test
 (a) When specified, a selector shall operate steadily and uniformly in the selector circuit with the specified voltage when a gauge of the specified thickness is held between the lip of the outside interrupter spring and the driving arm stud. Use the No. 74-D gauge.
 (b) All interrupter operation requirements shall be met with the same interrupter adjustment.

Notes and Special Requirements for 200 and 206 Type Selectors

Note 1 Interrupter Spring Clearance The clearance between the driving arm stud and the outside interrupter spring shall be
 Min. .040"
 Max. .050"
 Use the No. 112-A gauge.

Note 2 Requirements cover uses other than as sender selector and district selector in district and suburban sender selector circuit.

Note 3 Requirements cover uses as sender selector and district selector in district and suburban sender selector circuits.

Note 4 Requirements cover use as a numerical register switch in offices where the rated voltage is 45 to 50 volts.

Note 5
 (a) The clearance between the driving arm stud and the outside interrupter spring shall be:

Test	-	Max. .012"
Readjust	-	Min. .004", Max. .012"

Use the No. 74-D gauge.

(b) When the outside interrupter spring contacts are not connected in a circuit the test requirements for "Interrupter Spring Clearance" may be omitted.

Note 6 Requirements cover use in offices where the rated voltage is 45 to 50 volts.

Note 7 Requirements cover use as a numerical

register switch in subscriber's sender circuits.

Note 8 Requirements cover use as a hunting switch in local tandem sender circuits.

Note 9 Requirements cover use as a party test switch in 2 party message rate district circuits. (Test and Readjust) When the selector is so wired in circuit that it cannot be completely rotated under self-interruptions, the following requirement shall be substituted for requirements 2.24, 2.26 and 2.27. The selector shall be rotated partly step-by-step and partly under self-interruptions on the specified low voltage.

Note 10 Requirements cover uses other than as party test switch in 2 party message rate district circuits.

Note 11 Requirements cover use in offices where the rated voltage is 40 to 56 volts.

Note 12 Requirements cover use in offices where the rated voltage is 20 to 25 volts.

Note 13
 (a) The normally open interrupter contact shall close before the break contact opens. This requirement may be omitted if the contact is not used in the circuit.

(b) The movable spring shall have a tension against the stop of
 Min. 40 grams
 Max. 60 grams
 measured approximately 3/64" from the contact end. Use the No. 79-C gauge.

(c) The contact pressure on the make contact spring when the selector is operated shall be
 Min. 50 grams
 Max. 150 grams
 Use the No. 79-C gauge.

Note 14 The selector shall operate steadily and uniformly on self-interruptions with maximum voltage across the "Selector Circuit" when a .003" gauge is inserted between the micarta insulator and the contact adjusting lug directly behind the contact on the inside interrupter spring. Use the No. 74-D gauge.

Note 15
 (a) The selector shall operate steadily and uniformly on self-interruptions with minimum voltage across the selector circuit and with no gauge placed between the outside interrupter spring and the rubber stud on the armature, but shall not operate smoothly and uniformly with a .003" gauge placed between the outside interrupter and the rubber stud on the armature.

(b) The driving pawl tension shall be
 Min. 90 grams
 Max. 125 grams
 Use the No. 79-C gauge.

Note 16 With the selector held operated with minimum voltage across the "Selector Circuit" the contacts of the interrupter and outer springs shall not open with a .002" gauge inserted between the outer spring and its spring stop. Use the No. 74-D gauge.

Note 17
 (a) The contact pressure of the outer spring against the spring stop measured at the contact shall be
 Min. 100 grams
 Max. 200 grams
 (b) The air-gap between contacts of the interrupter and outer springs shall be
 Min. .005"
 Max. .010"
 when the armature is at rest.
 (c) These requirements shall be met at the same time as requirement 2.20. Use the No. 79-C gauge and the No. 74-D gauge.

Note 18 The selector shall operate steadily and uniformly on self-interruptions with maximum voltage across the "Selector Circuit" when a .002" gauge is inserted between the micarta insulator and the contact adjustment lug directly behind the contact on the inside interrupter spring. Use the No. 74-D gauge.

Note 19 There shall be a clearance of 1/32" (approximately twice the thickness of a terminal) between the heels of the No. 6 rotor brush and the terminals of the corresponding row when the contacting surfaces of the brush are between the terminals. Gauge by eye.

Note 20
 (a) The contact pressure of the operating spring measured at the contact shall be
 Min. 45 grams
 Max. 65 grams
 Use the No. 79-C gauge.
 (b) The clearance between the rubber stud and the operating spring shall be

Min. .030"
 Max. .040"

Gauge by eye.

(c) When the armature is operated there shall be a clearance of approximately 1/16" between the front contact spring of the back contact and the rear contact spring of the front contact. Gauge by eye.

Note 21 The retaining pawl tension shall be
 Min. 70 grams
 Max. 100 grams
 Use the No. 79-C gauge.

Note 22 Requirements cover use as a numerical register switch in offices where the rated voltage is 40 to 56 volts.

REASON FOR REISSUE - CHANGES IN REQUIREMENTS

1. To add requirements for detachable feeder brushes. (Previously contained in addendum to issue 1-D).
2. To omit notes covered by revised definition of "Selector Circuit". (2.04)
3. To omit notes covering stepping selector step-by-step during Low Voltage Operate Test "A". (2.04)
4. To add note 21. (2.04)
5. To make minor revisions in special requirements to agree with latest manufacturing information. (2.04)
6. To revise requirement for Low Voltage Operate Test "A". (2.24)
7. To revise requirement for Interrupter Contact Test. (2.27)
8. To add requirements for 206-BK, 206-BL, 206-EM, 206-BN, 206-BP and 206-BR selectors.

45 to 50 Volt Selectors																								
The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01, 2.02, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21																								
No.	Requirements	Unit	206-A Sel.		206-B Sel.		206-C Sel.		206-D Sel.		206-E Sel.		206-F Sel.											
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max										
2.04 Spl. Reqs. See Note			Nos. 2 & 14		Nos. 3 & 14								No. 5		No. 6									
2.10 Rotor Brush Tension	Br. No.1	Gram	20	40	25	40	30	50	15	35	20	35	20	45	25	45	20	40	25	40				
	Br. No.2	Gram	20	40	25	40	20	40	25	40	15	35	20	35	20	45	25	45	20	40	25	40		
	Br. No.3	Gram	20	40	25	40	20	40	25	40	25	45	30	45	15	35	20	35	20	40	25	40		
	Br. No.4	Gram	20	40	25	40	20	40	25	40	25	45	30	45	15	35	20	35	20	40	25	40		
	Br. No.5	Gram	20	40	25	40	20	40	25	40	15	35	20	35	15	35	20	35	20	40	25	40		
	Br. No.6	Gram	20	40	25	40	20	40	25	40	15	35	20	35	15	35	20	35	20	40	25	40		
2.16 Driving Spg. Tension		Gram	800		800		800		800		800		800		500	600	500	600	550	650	550	700	700	700
2.19 Armature Air-Gap		Volt	45		44		44		44		44		44		45		44		44		44		45	44
2.20 Out.Int.Spg. Tension		Gram	100	400	100	400	100	400	100	400	100	400	100	400	100	400	100	400	45	65	45	65	100	400
2.22 Magnet Pull Test		Volt	45		44		44		44		44		44		45		44		45		44		45	44
		Gram	50		50		45		50		50		300		225		250		44		300		150	150
2.23 Step Test		Gram	150		300		150		300		150		300		75		150		300		150		100	200
2.24 Low Volt.Opr. Test "A"		Volt	45		44		45		44		44		44		45		44		44		44		45	44
2.25 Speed		T.P.S.	20		20		20		20		40		40		50		51		50		50		30	30
2.26 High Volt.Opr. Test "B"		Volt	50		51		50		51		50		51		50		51		51		50		51	51
2.27 Int. Contact Test		Volt	45		44		45		44		44		44		45		44		44		45		45	44
		Inch	.003		.003		.003		.003		.002		.002		.002		.002		.002		.002		.002	.002
(a) Gauge for 206 Type																								
(b) Gauge for 200 Type																								

45 to 50 Volt Selectors														
The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01, 2.02, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21														
No.	Requirements	Unit	206-G Sel.		206-J Sel.		206-K Sel.		206-L Sel.		206-M Sel.		206-N Sel.	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2.04	Spl. Reqs. See Note		30	50	15	35	20	35	20	40	25	40	20	40
2.10	Rotor Brush Tension	Gram	20	40	15	35	20	35	20	40	25	40	20	40
		Gram	20	40	15	35	20	35	20	40	25	40	20	40
		Gram	20	40	15	35	20	35	20	40	25	40	20	40
		Gram	20	40	15	35	20	35	20	40	25	40	20	40
		Gram	20	40	15	35	20	35	20	40	25	40	20	40
		Gram	20	40	15	35	20	35	20	40	25	40	20	40
2.16	Driving Spg. Tension	Gram	750	750	500	600	500	600	500	700	800	800	300	300
2.19	Armature Air-Gap	Volt	45	44	45	44	45	44	45	44	45	44	45	44
2.20	Out.Int.Spg. Tension	Gram	100	400	100	400	100	400	100	400	100	400	100	400
2.22	Magnet Pull Test	Volt	45	44	45	44	45	44	45	44	45	44	45	44
2.23	Step Test	Gram	45	50	225	250	135	150	50	50	50	50	50	50
2.24	Low Volt.Opr. Test "A"	Gram	150	300	75	150	75	150	150	300	150	300	150	300
2.25	Speed	T.P.S.	45	44	45	44	45	44	45	44	45	44	45	44
2.26	High Volt.Opr. Test "B"	Volt	50	51	50	51	50	51	50	51	50	51	50	51
2.27	Int. Contact Test	Volt	45	44	45	44	45	44	45	44	45	44	45	44
	(a) Gauge for 206 Type	Inch	.003		.002		.002		.002		.002		.003	
	(b) Gauge for 200 Type	Inch	.002		.002		.002		.002		.002		.002	
Requirements for 200 and 206 Type Selectors and 10 and 26 Type Banks														

45 to 50 Volt Selectors																					
The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01,2.02,2.03,2.05,2.06,2.07,2.08,2.09,2.11,2.12,2.13,2.14,2.15,2.17,2.18,2.21		206-N Sel.				206-P Sel.				206-S Sel.				206-R Sel.				206-S Sel.			
		200-R Sel.		200-S Sel.		206-A or D Bank		200-S Sel.		206-A or D Bank		200-S Sel.		206-A or D Bank		206-S Sel.					
		206-F Bank		206-E Bank		206-D Bank		206-C Bank		206-B Bank		206-A Bank		206-R Bank		206-S Bank					
		206-G Bank		206-H Bank		206-I Bank		206-J Bank		206-K Bank		206-L Bank		206-M Bank		206-N Bank					
		206-O Bank		206-P Bank		206-Q Bank		206-R Bank		206-S Bank		206-T Bank		206-U Bank		206-V Bank					
		206-W Bank		206-X Bank		206-Y Bank		206-Z Bank		206-AA Bank		206-AB Bank		206-AC Bank		206-AD Bank					
		206-AE Bank		206-AF Bank		206-AG Bank		206-AH Bank		206-AI Bank		206-AJ Bank		206-AK Bank		206-AL Bank					
		206-AM Bank		206-AN Bank		206-AO Bank		206-AP Bank		206-AQ Bank		206-AR Bank		206-AS Bank		206-AT Bank					
		206-AU Bank		206-AV Bank		206-AW Bank		206-AX Bank		206-AY Bank		206-AZ Bank		206-BA Bank		206-BB Bank					
		206-BD Bank		206-BE Bank		206-BF Bank		206-BG Bank		206-BH Bank		206-BI Bank		206-BJ Bank		206-BK Bank					
		206-BL Bank		206-BM Bank		206-BN Bank		206-BO Bank		206-BP Bank		206-BQ Bank		206-BR Bank		206-BS Bank					
		206-BT Bank		206-BU Bank		206-BV Bank		206-BW Bank		206-BX Bank		206-BY Bank		206-BZ Bank		206-CA Bank					
		206-CC Bank		206-CD Bank		206-CE Bank		206-CF Bank		206-CG Bank		206-CH Bank		206-CI Bank		206-CJ Bank					
		206-CK Bank		206-CL Bank		206-CM Bank		206-CN Bank		206-CO Bank		206-CP Bank		206-CQ Bank		206-CR Bank					
		206-CS Bank		206-CT Bank		206-CU Bank		206-CV Bank		206-CW Bank		206-CX Bank		206-CY Bank		206-CZ Bank					
		206-DA Bank		206-DB Bank		206-DC Bank		206-DD Bank		206-DE Bank		206-DF Bank		206-DG Bank		206-DH Bank					
		206-DI Bank		206-DJ Bank		206-DK Bank		206-DL Bank		206-DM Bank		206-DN Bank		206-DO Bank		206-DP Bank					
		206-DQ Bank		206-DR Bank		206-DS Bank		206-DT Bank		206-DU Bank		206-DV Bank		206-DW Bank		206-DX Bank					
		206-DY Bank		206-DZ Bank		206-EA Bank		206-EB Bank		206-EC Bank		206-ED Bank		206-EE Bank		206-EF Bank					
		206-EG Bank		206-EH Bank		206-EI Bank		206-EJ Bank		206-EK Bank		206-EL Bank		206-EM Bank		206-EN Bank					
		206-EO Bank		206-EP Bank		206-EQ Bank		206-ER Bank		206-ES Bank		206-ET Bank		206-EU Bank		206-EV Bank					
		206-EW Bank		206-EX Bank		206-EY Bank		206-EZ Bank		206-FA Bank		206-FB Bank		206-FC Bank		206-FD Bank					
		206-FE Bank		206-FG Bank		206-FH Bank		206-FI Bank		206-FJ Bank		206-FK Bank		206-FL Bank		206-FM Bank					
		206-FN Bank		206-FO Bank		206-FP Bank		206-FQ Bank		206-FR Bank		206-FS Bank		206-FT Bank		206-FU Bank					
		206-FV Bank		206-FW Bank		206-FX Bank		206-FY Bank		206-FZ Bank		206-GA Bank		206-GB Bank		206-GC Bank					
		206-GD Bank		206-GE Bank		206-GF Bank		206-GH Bank		206-GI Bank		206-GJ Bank		206-GK Bank		206-GL Bank					
		206-GM Bank		206-GN Bank		206-GO Bank		206-GP Bank		206-GQ Bank		206-GR Bank		206-GS Bank		206-GT Bank					
		206-GU Bank		206-GV Bank		206-GW Bank		206-GX Bank		206-GY Bank		206-GZ Bank		206-HA Bank		206-HB Bank					
		206-HD Bank		206-HE Bank		206-HF Bank		206-HG Bank		206-HI Bank		206-HJ Bank		206-HK Bank		206-HL Bank					
		206-HM Bank		206-HN Bank		206-HO Bank		206-HP Bank		206-HQ Bank		206-HR Bank		206-HS Bank		206-HT Bank					
		206-HU Bank		206-HV Bank		206-HW Bank		206-HX Bank		206-HY Bank		206-HZ Bank		206-IA Bank		206-IB Bank					
		206-ID Bank		206-IE Bank		206-IF Bank		206-IG Bank		206-IH Bank		206-II Bank		206-IL Bank		206-IM Bank					
		206-IN Bank		206-IO Bank		206-IP Bank		206-IQ Bank		206-IR Bank		206-IS Bank		206-IT Bank		206-IU Bank					
		206-IV Bank		206-IV Bank		206-IV Bank		206-IV Bank		206-IV Bank		206-IV Bank		206-IV Bank		206-IV Bank					
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		206-IV Bank		206-IV Bank																	

45 to 50 Volt Selectors																											
No.	Requirements	Unit	206-W Sel.				206-Y Sel.				206-AA Sel.				206-AB Sel.				206-AD Sel.				206-AE Sel.				
			200-AE Sel.				200-AF Sel.				200-AG Sel.				200-AH Sel.				200-AK Sel.				200-AM Sel.				
			Min	Max	Read.j.	Test	Min	Max	Read.j.	Test	Min	Max	Read.j.	Test	Min	Max	Read.j.	Test	Min	Max	Read.j.	Test	Min	Max	Read.j.	Test	
2.04	Spl. Reqs. See Note																										
2.10	Rotor Brush Tension	Br. No.1	Gram	15	35	20	35	30	50	35	50	15	35	20	35	20	40	25	40	20	40	25	40	20	35	25	35
		Br. No.2	Gram	15	35	20	35	20	40	25	40	15	35	20	35	20	40	25	40	20	40	25	40	20	35	25	35
		Br. No.3	Gram	15	35	20	35	20	40	25	40	15	35	20	35	20	40	25	40	20	40	25	40	20	35	25	35
		Br. No.4	Gram	15	35	20	35	20	40	25	40	15	35	20	35	20	40	25	40	20	40	25	40	20	35	25	35
		Br. No.5	Gram	15	35	20	35	20	40	25	40	15	35	20	35	20	40	25	40								
		Br. No.6	Gram	15	35	20	35	20	40	25	40	15	35	20	35	20	40	25	40								
2.16	Driving Spg. Tension	Gram	500	600	500	600	800				500	600	500	600	800			800						550	650	550	650
2.19	Armature Air-Gap	Volt	45	44			45	44			45	44			45	44			45	44			45	44			
2.20	Out.Int.Spg. Tension	Gram	100	400	100	400	100	400	100	400	100	400	100	400	100	400	100	400	100	400	100	400	100	400	100	400	
2.22	Magnet Pull Test	Volt	45	44			45	44			45	44			45	44			45	44			45	44			
2.23	Step Test	Gram	150	150			150	150			150	150			150	150			150	150			150	150			
2.24	Low Volt.Opr. Test "A"	Volt	44	43			43	44			44	43			45	44			45	44			45	44			
2.25	Speed	T.P.S.					20	20																			
2.26	High Volt.Opr. Test "B"	Volt	50	51			50	51			50	51			50	51			50	51							
2.27	Int. Contact Test	Volt	45	44			45	44			45	44			45	44			45	44							
	(a) Gauge for 206 Type	Inch	.002				.002				.002				.002				.003								
	(b) Gauge for 200 Type	Inch	.002				.002				.002				.002				.002								

Requirements for 200 and 206 Type Selectors

and 10 and 26 Type Banks

Requirements for 200 and 206 Type Selectors
and 10 and 26 Type Banks

45 to 50 Volt Selectors														
The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01, 2.02, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21														
No.	Requirements	Unit	206-AF Sel. 200-AF Sel. 26-A or D Bank 10-B or E Bank	206-AJ Sel. 200-AJ Sel. 26-E Bank 10-J Bank	206-AL Sel. 200-AL Sel. 26-F Bank 10-K Bank	206-AM Sel. 200-AM Sel. 26-G Bank 10-L Bank	206-AN Sel. 200-AN Sel. 26-H Bank 10-M Bank	206-AP Sel. 200-AP Sel. 26-I Bank 10-N Bank	206-AU Sel. 200-AU Sel. 26-J Bank 10-O Bank	206-AT Sel. 200-AT Sel. 26-K Bank 10-P Bank	206-AS Sel. 200-AS Sel. 26-L Bank 10-Q Bank	206-AD Sel. 200-AD Sel. 26-M Bank 10-R Bank	206-AE Sel. 200-AE Sel. 26-N Bank 10-S Bank	206-AF Sel. 200-AF Sel. 26-O Bank 10-T Bank
			Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
			No. 1	No. 1	No. 1	No. 1	No. 1	No. 1	No. 1	No. 1	No. 1	No. 1	No. 1	No. 1
2.04 Spl. Reqs. See Note	Br. No.1 Gram		30	50	30	50	30	50	30	50	30	50	30	50
2.10 Rotor Brush Tension	Br. No.2 Gram		20	40	20	40	20	40	20	40	20	40	20	40
	Br. No.3 Gram		20	40	20	40	20	40	20	40	20	40	20	40
	Br. No.4 Gram		20	40	20	40	20	40	20	40	20	40	20	40
	Br. No.5 Gram		20	40	20	40	20	40	20	40	20	40	20	40
	Br. No.6 Gram		20	40	20	40	20	40	20	40	20	40	20	40
2.16 Driving Spg. Tension	Gram		800	800	550	550	650	650	800	800	800	800	800	800
2.19 Armature Air-Gap	Volt		45	44	45	44	45	44	45	44	45	44	45	44
2.20 Out.Int.Spg. Tension	Gram		100	400	100	400	100	300	100	300	100	300	100	300
2.22 Magnet Pull Test	Volt		45	44	45	44	45	44	45	44	45	44	45	44
2.23 Step Test	Gram		50	50	50	50	50	50	50	50	50	50	50	50
2.24 Low Volt. Opr. Test "A" Volt	Gram		150	300	150	300	150	300	150	300	150	300	150	300
2.25 Speed T.P.S.														
2.26 High Volt. Opr. Test "B" Volt														
2.27 Int. Contact Test	Volt													
(a) Gauge for 206 Type	Inch													
(b) Gauge for 200 Type	Inch													
			.003			.003			.003			.003		

45 to 50 Selectors														
The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01, 2.02, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21														
No.	Requirements	Unit	206-AW Sel. 26-G Bank	206-BC Sel. 26-F Bank	206-BD Sel. 26-G Bank	206-BE Sel. 26-F Bank	206-BF Sel. 26-A Bank	206-BG Sel. 26-A Bank	206-BH Sel. 26-A Bank	206-BI Sel. 26-A Bank	206-BJ Sel. 26-A Bank	206-BK Sel. 26-A Bank	206-BL Sel. 26-A Bank	206-BM Sel. 26-A Bank
			Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
			No. 1	No. 1	No. 1	No. 1	No. 1	No. 1	No. 1	No. 1	No. 1	No. 1	No. 1	No. 1
2.04 Spl. Reqs. See Note	Br. No.1 Gram		30	50	30	50	30	50	30	50	30	50	30	50
2.10 Rotor Brush Tension	Br. No.2 Gram		25	45	25	45	25	45	25	45	25	45	25	45
	Br. No.3 Gram		25	45	25	45	25	45	25	45	25	45	25	45
	Br. No.4 Gram													
	Br. No.5 Gram													
	Br. No.6 Gram													
2.16 Driving Spg. Tension	Gram		800	800	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
2.19 Armature Air-Gap	Volt		45	44	45	44	45	44	45	44	45	44	45	44
2.20 Out.Int.Spg. Tension	Gram		100	300	100	300	100	300	100	300	100	300	100	300
2.22 Magnet Pull Test	Volt		45	44	45	44	45	44	45	44	45	44	45	44
2.23 Step Test	Gram		50	50	50	50	50	50	50	50	50	50	50	50
2.24 Low Volt. Opr. Test "A" Volt	Gram		150	300	150	300	150	300	150	300	150	300	150	300
2.25 Speed T.P.S.														
2.26 High Volt. Opr. Test "B" Volt														
2.27 Int. Contact Test	Volt													
(a) Gauge for 206 Type	Inch													
(b) Gauge for 200 Type	Inch													
			.002			.002			.002			.002		

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Requirements for 200 and 206 Type Selectors and 10 and 26 Type Banks

45 to 50 Volt Selectors										45 to 52 Volt Selectors												
The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01, 2.02, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21										The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01, 2.02, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21												
No.	Requirements	Unit	D-78143 Sel.		D-78677 Sel.		D-78142 Bank		D-78676 Bank		D-78143 Sel.		D-78677 Sel.		D-78142 Bank		D-78676 Bank		D-78143 Sel.			
			Test Min	Readj. Max	Test Min	Readj. Max	Test Min	Readj. Max	Test Min	Readj. Max	Test Min	Readj. Max	Test Min	Readj. Max	Test Min	Readj. Max	Test Min	Readj. Max	Test Min	Readj. Max		
2.04 Spl. Reqs. See Note			Nos. 1 and 21																No. 18			
2.10 Rotor Brush Tension			20	35	25	35	15	35	20	35	20	35	15	35	20	35	20	35	25	45	30	45
Br. No.1 Gram			20	35	25	35	15	35	20	35	20	35	15	35	20	35	20	35	25	45	30	45
Br. No.2 Gram			20	35	25	35	15	35	20	35	20	35	15	35	20	35	20	35	20	40	25	40
Br. No.3 Gram			20	35	25	35	15	35	20	35	20	35	15	35	20	35	20	35	20	40	25	40
Br. No.4 Gram			20	35	25	35	15	35	20	35	20	35	15	35	20	35	20	35	20	40	25	40
Br. No.5 Gram							15	35	20	35	20	35	15	35	20	35	20	35	20	40	25	40
Br. No.6 Gram							15	35	20	35	20	35	15	35	20	35	20	35	20	40	25	40
2.16 Driving Spg. Tension			550	650	550	650	500	600	500	600									950	45	950	44
2.19 Armature Air-Gap Volt			45	45	44	44	45	44	44	44									100	300	100	300
2.20 Out.Int.Spg. Tension			100	400	100	400	100	400	100	400	100	400							100	300	100	300
2.22 Magnet Pull Test Volt			45	45	44	44	45	44	44	44									50	45	50	44
Gram			50	50			180	200	150	150									75	150	75	150
2.23 Step Test Gram			75	150			75	150	44	44									30	30	30	30
2.24 Low Volt.Opr. Test "A" Volt																			52	53	52	53
2.25 Speed T.P.S.							50	51														
2.26 High Volt.Opr. Test "B" Volt							45	45	44	44												
2.27 Int. Contact Test Volt																						
{ a } Gauge for 206 Type Inch			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
{ b } Gauge for 200 Type Inch			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			.002		.002		.002		.002		.002		.002		.002		.002		.002		.002	

40 to 56 Volt Selectors										36 to 44 Volt Selectors												
The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01, 2.02, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21										The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01, 2.02, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21												
No.	Requirements	Unit	206-G Sel.		206-H Sel.		206-I Sel.		206-J Sel.		206-K Sel.		206-L Sel.		206-M Sel.		206-N Sel.		206-O Sel.			
Requirements			Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max		
2.04 Spl. Reqs. See Note			Nos. 11 and 14		No. 14		No. 14		No. 22		No. 22		No. 22		No. 22		No. 22		No. 22			
2.10 Rotor Brush Tension			20	40	25	40	20	40	25	40	15	35	20	35	15	35	20	40	25	40		
Br. No.1 Gram			20	40	25	40	20	40	25	40	15	35	20	35	15	35	20	40	25	40		
Br. No.2 Gram			20	40	25	40	20	40	25	40	15	35	20	35	15	35	20	40	25	40		
Br. No.3 Gram			20	40	25	40	20	40	25	40	15	35	20	35	15	35	20	40	25	40		
Br. No.4 Gram			20	40	25	40	20	40	25	40	15	35	20	35	15	35	20	40	25	40		
Br. No.5 Gram			20	40	25	40	20	40	25	40	15	35	20	35	15	35	20	40	25	40		
Br. No.6 Gram			20	40	25	40	20	40	25	40	15	35	20	35	15	35	20	40	25	40		
2.16 Driving Spg. Tension			Gram	750	750	750	750	750	750	500	600	500	600	550	550	800	800	600	700	600		
2.19 Armature Air-Cap			Volt	40	40	40	40	40	40	40	40	40	40	40	40	36	36	36	36	35		
2.20 Out.Int.Spg. Tension			Gram	100	400	100	400	100	400	100	400	100	400	100	300	100	400	100	300	100		
2.22 Magnet Pull Test			Volt	40	40	40	40	40	40	40	40	40	40	40	40	36	36	36	36	35		
2.23 Step Test			Gram	50	50	50	50	50	50	45	50	50	50	75	75	50	50	50	50	50		
2.24 Low Volt.Opr. Test "A" Volt			Gram	150	300	150	300	150	300	75	150	100	100	200	200	150	300	125	250	250		
2.25 Speed			T.P.S.	20	20	20	20	20	20	40	40	40	40	40	40	36	36	36	36	35		
2.26 High Volt.Opr. Test "B" Volt			Volt	56	56	56	56	56	56	56	56	56	56	56	56	44	44	44	44	45		
2.27 Int. Contact Test			Volt	40	40	40	40	40	40	40	40	40	40	40	40	36	36	36	36	35		
(a) Gauge for 206 Type			Inch																			
(b) Gauge for 200 Type			Inch																			
			.003		.003		.003		.002		.002		.002		.002		.002		.002			
			.002		.002		.002		.002		.002		.002		.002		.002		.002			
Requirements for 200 and 206 Type Selectors and 10 and 26 Type Banks																						

Requirements for 200 and 206 Type Selectors and 10 and 26 Type Banks

The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Reg. 2.01, 2.02, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21																				
No.		Requirements		Unit	20 to 25 Volt Selectors															
					206-E Sel.			206-F Sel.			206-AC Sel.			D-78683 Sel.			D-87398 Sel.			
					200-F Sel.			200-G Sel.			200-AJ Sel.			10-L Bank			28-G Bank			
					26-D Bank			26-D Bank			26-D Bank			10-L Bank			28-G Bank			
					10-K Bank			10-K Bank			10-K Bank			D-78684 Bank						
					Test			Test			Test			Test			Test			
					Readj.			Readj.			Readj.			Readj.			Readj.			
					Min			Max			Min			Max			Min			
					Max			Min			Max			Min			Max			
					No. 12			No. 13			-			-			-			
2.04 Spl. Reqs. See Note					30	50	35	50	30	50	35	50	30	45	35	45	30	45	35	45
2.10 Rotor Brush Tension					20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40
					20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40
					20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40
					20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40
					20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40
					20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40
2.16 Driving Spg. Tension					700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700
2.19 Armature Air-Gap					20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
2.20 Out.Int.Spg. Tension					100	400	100	400	150	300	150	300	100	400	100	400	100	400	100	400
2.22 Magnet Pull Test					20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
					135	150	150	150	135	150	150	150	135	150	150	150	135	150	150	
2.23 Step Test					100	200	200	200	100	200	200	200	100	200	200	200	100	200	200	200
2.24 Low Volt.Opr. Test "A" Volt					20	30	30	30	20	30	30	30	20	30	30	30	20	30	30	30
2.25 Speed					30	30	30	30	25	25	25	25	30	30	30	30	25	25	25	
2.26 High Volt.Opr. Test "B" Volt					25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	
2.27 Int. Contact Test					20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
(a) Gauge for 206 Type					.002			.002			.002			.002			.002			
(b) Gauge for 200 Type					.002			.002			.002			.002			.002			
					.002			.002			.002			.002			.002			
					.002			.002			.002			.002			.002			

20 to 28 Volt Selectors																								
The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01, 2.02, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21																								
No.	Requirements	Unit	206-AG Sel.			206-AH Sel.			206-AK Sel.			206-AN Sel.			206-AR Sel.			206-AS Sel.						
			Min	Max	No. 14	Min	Max	No. 14	Min	Max	No. 14 and 15	Min	Max	No. 1	Min	Max	No. 14	Min	Max	No. 14				
2.04	Spl. Reqs. See Note																							
2.10	Rotor Brush	Gram	30	50	35	50	30	50	35	50	15	30	20	30	30	50	20	40	25	40	30	50	35	50
	Br. No.1	Gram	25	45	30	45	30	50	35	50	15	30	20	30	25	45	30	45	20	40	30	50	35	50
	Br. No.2	Gram	25	45	30	45	30	50	35	50	15	30	20	30	25	45	30	45	20	40	30	50	35	50
	Br. No.3	Gram	25	45	30	45	30	50	35	50	15	30	20	30	25	45	30	45	20	40	30	50	35	50
	Br. No.4	Gram	25	45	30	45	30	50	35	50	15	30	20	30	25	45	30	45	20	40	30	50	35	50
2.16	Driving Spg. Tension	Gram	800				600	700	600	700	650	700			800									
	2.19 Armature Air-Gap	Volt		20		19		20		19		20		19		20		19		20		19		20
2.20	Out.Int.Spg. Tension	Gram	100	300	100	300	100	300	100	300	200	300	200	300	100	300	100	300	100	300	100	300	100	300
2.22	Magnet Pull Test	Volt		20		19		20		19		20		19		20		19		20		19		20
		Gram	50		50		150		150		200		200		200		50		50		50		50	
2.23	Step Test	Gram	100		200		75		150		75		150		150		150		150		150		150	
2.24	Low Volt.Opr. Test "A" Volt	T.P.S.	20		20						20													
2.25	Speed	T.P.S.	20		20						28		29											
2.26	High Volt.Opr. Test "B" Volt	Volt	28		29		28		29		28		29		28		28		29		28		28	
2.27	Int. Contact Test	Volt		20		19		20		19														
	(a) Gauge for 206 Type	Inch		.003		.003		.003		.003												.003		
	(b) Gauge for 200 Type	Inch		.003		.003		.003		.003												.003		
																							.003	

Requirements for 200 and 206 Type Selectors and 10 and 26 Type Banks

The Following Variable Req. for
200 and 206 Type Sel. shall be
Applied in Addition to Common
Req. 2.01, 2.02, 2.03, 2.05, 2.06,
2.07, 2.08, 2.09, 2.11, 2.12, 2.13,
2.14, 2.15, 2.16, 2.17, 2.18, 2.19,

[illegible]

The Following Variable Req. for
200 and 206 Type Sel. shall be
Applied in Addition to Common
Req. 2.01, 2.02, 2.03, 2.05, 2.06,
2.07, 2.08, 2.09, 2.11, 2.12, 2.13,
2.14, 2.15, 2.17, 2.18, 2.21

20 to 28 Volt Selectors																							
206-BH Sel.				206-BK Sel.				206-BM Sel.				206-BN Sel.				D-80701 Sel.				D-80882 Sel.			
26-D or J Bank		26-C Bank		26-A Bank		26-F Bank		26-G Bank		26-H84 Bank		26-A Bank		26-G Bank		26-H84 Bank		26-A Bank		26-G Bank			
Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.		
Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max		
No. 14				No. 14				No. 14				No. 14				No. 14				No. 14			
30	50	35	50	20	40	25	40	20	40	25	40	30	50	35	50	20	40	25	40	20	40		
30	50	35	50	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40	20	40		
20	40	25	40					20	40	25	40	20	40	25	40	20	40	25	40	20	40		
Br. No.4	Gram	20	40	25	40			20	40	25	40	20	40	25	40					20	40		
Br. No.5	Gram	20	40	25	40			20	40	25	40	20	40	25	40					20	40		
Br. No.6	Gram	20	40	25	40			20	40	25	40	20	40	25	40					25	45		
	Gram	20	40	25	40			20	40	25	40									25	45		
2.16 Driving Spg.	Gram	900			550			900		900		900		900		700		700		900			
2.19 Armature Air-Cap	Volt	20	19		20	19		20	19	300	100	300	100	300	100	300	100	300	100	300	100		
2.20 Out.Int.Spg. Tension	Gram	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300		
2.22 Magnet Pull Test	Volt	20	19		20	19		20	19	20	19	50	50	50	100	100	100	100	50	50	19		
	Gram	50	50		50	50		50	50	150	150	150	150	150	150	150	150	150	150	150	300		
2.23 Step Test	Gram	150	300		200	19																	
2.24 Low Volt.Opr.Test "A"	Volt																						
2.25 Speed	I.P.S.																						
2.26 High Volt.Opr.Test "B"	Volt	28	28					28	29	19						28	29	19					
2.27 Int. Contact Test	Volt	20	19		20	19		20	19							20	19						
(a) Gauge for 206 Type	Inch	.003			.003			.003	.002								.003						
(b) Gauge for 200 Type	Inch	-			-			-	-							-	-						

Requirements for 200 and 206 Type Selectors
and 10 and 26 Type Banks

20 to 28 Volt Selectors																						
The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21		D-81007 Sel.				D-87337 Sel.				D-87399 Sel.				D-88325 Sel.								
		26-A Bank		26-B Bank		26-A Bank		26-E Bank		26-A Bank		26-A Bank		26-A Bank								
		Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.							
No.	Requirements	Unit	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Test	Readj.		
2.04 Spl. Reqs. See Note			No. 14				No. 1				No. 14				Nos. 14 and 20							
2.10	Rotor Brush	Gram	20	40	25	40	30	50	35	50	25	45	30	45	30	50	35	50				
Tension	Br. No.2	Gram	20	40	25	40	30	50	35	50	20	40	25	40	30	50	35	50				
	Br. No.3	Gram	20	40	25	40	30	50	35	50	20	40	25	40	20	40	25	40				
	Br. No.4	Gram	20	40	25	40	30	50	35	50	25	45	30	45	20	40	25	40				
	Br. No.5	Gram	20	40	25	40	30	50	35	50					20	40	25	40				
	Br. No.6	Gram	20	40	25	40	30	50	35	50					20	40	25	40				
2.16	Driving Spg. Tension	Gram	900	900			800	800			800	800			800	800						
2.19	Armature Air-gap	Volt		20		19		20		19		20		19		20		19				
2.20	Out.Int.Spg. Tension	Gram	100	300	100	300	100	300	100	300	100	300	100	300	100	200	100	200				
2.22	Magnet Pull Test	Volt		20		19		20		19		20		19		20		19				
		Gram	50	50			50	150	50	150	50	50		50		50		50				
2.23	Step Test	Gram	100	200			150	300			100	200		150		300						
2.24	Low Volt.Opr. Test "A"	Volt		20		19																
2.25	Speed	T.P.S.									20	20		19		20						
2.26	High Volt.Opr. Test "B"	Volt	28	29							20	20		20		29						
2.27	Int. Contact Test	Volt		20		19																
		Inch		.003																		
		(a) Gauge for 206 Type																				
		(b) Gauge for 200 Type																				

15 to 21 Volt Selectors														
The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01, 2.02, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21			206-BJ Sel.											
			Test		Readj.		Test		Readj.		Test		Readj.	
No.	Requirements	Unit	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2.04 Spl. Reqs. See Note			No. 14											
2.10 Rotor Brush	Br. No.1	Gram	20	40	25	40								
Tension	Br. No.2	Gram	20	40	25	40								
	Br. No.3	Gram												
	Br. No.4	Gram												
	Br. No.5	Gram												
2.16 Driving Spg. Tension	Br. No.6	Gram	650	750	650	750								
2.19 Armature Air-Gap		Volt		15		14								
2.20 Out.Int.Spg. Tension		Gram	100	300	100	300								
2.22 Magnet Pull Test		Volt		15		14								
2.23 Step Test		Gram	100	100										
		Gram	125	250										
2.24 Low Volt.Opr. Test "A"		Volt		15		14								
2.25 Speed		T.P.S.												
2.26 High Volt.Opr. Test "B"		Volt	21		22									
2.27 Int. Contact Test		Volt		15		14								
(a) Gauge for 206 Type		Inch		.003										
(b) Gauge for 200 Type		Inch		-										
Requirements for 200 and 206 Type Selectors and 10 and 26 Type Banks														

Requirements for 200 and 206 Type Selectors
and 10 and 26 Type Banks

3. ADJUSTING PROCEDURESTools

<u>Code No.</u>	<u>Description</u>
35	Screw-driver 3 1/2"
38-B	Lamp Socket with 802 Cord
179	Spring Adjuster
243	Wrench 3/16" and 5/8" Hex. Closed Double End Flat
245	Wrench 3/8" and 7/16" Hex. Open Double End Flat
256	Spring Adjuster
265-B	Contact Burnisher
303	Spring Adjuster
305	Wrench 7/16" Hex. Socket Offset
344	Screw-driver Offset
359	Magnet Core and Armature Cleaning Tool
363 (2 req'd.)	Spring Adjuster
376-A	Dental Mirror
379-A	Driving Spring Lug and Interrupter Back Stop Adjuster
417-A (or the re-placed 306)	Wrench 1/4" and 3/8" Hex. Open Double End Flat
425-A	Selector Holder
R-1760	Frame and Armature Adjuster
KS-6015	Duck-bill Pliers
KS-6320	Orange Stick
-	Bell System Cabinet Screw-driver - 3-1/2" per A.T.&T. Co. Drawing 46-X-40
-	No. 4 Artist's Sable Rigger Brush

Gauges

70-D	50-0-50 Gram Gauge
70-E	150-0-150 Gram Gauge
74-D	Thickness Gauge Nest

Gauges (Continued)

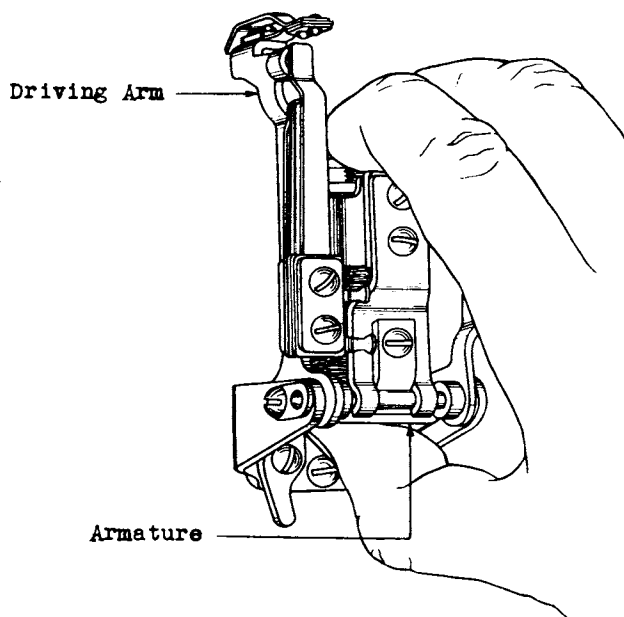
<u>Code No.</u>	<u>Description</u>
79-B	0-1000 Gram Push-Pull Tension Gauge
79-C	0-200 Gram Push-Pull Tension Gauge
112-A (or the re-placed R-2228)	.040" and .050" Double End Thickness Gauge

Materials

-	Western Electric Lubricating Compound No. 3
-	Carbon Tetrachloride (C.P.)
-	Toothpicks, hardwood, flat at one end and pointed at the other

Test Apparatus

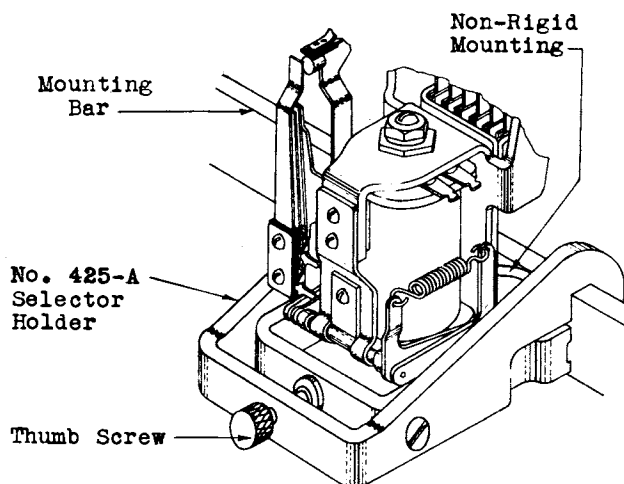
32-A	Extension Control Test Set
-	Portable test set for testing 200 and 206 type selectors - All Systems
-	Battery Control Test Set (Wagon Type) for testing 200 and 206 type selectors in panel offices
-	Portable test set for testing 200 and 206 type selectors in key indicator and step-by-step call indicator offices
3.001	Spring bending for tensioning should, unless otherwise specified, be done close to the base of the spring.
3.002	In all cases where it is necessary to move the rotor brushes by hand, this should be done by grasping the free ends of the rotor brush between the contact portion and the hub.
3.003	To step the selector manually, apply sufficient pressure to the bottom of the armature as shown in Fig. 19, to force it upward against the magnet core and then release the armature. In some cases it may be necessary to apply the force with a snap in order to obtain a slight whip of the driving arm so that the driving pawl will engage a tooth of the ratchet wheel. The selector should never be stepped manually by means of the driving arm.



Method of Stepping a Selector Manually

Fig. 19

- 3.004 Before making any adjustments on selectors which are non-rigidly mounted place the No. 425-A selector holder in place as shown in Fig. 20 and tighten the thumb-screw so as to hold the selector.



No. 425-A Selector Holder in Place on Non-Rigidly Mounted Selector

Fig. 20

3.005 Methods of Connecting Selectors for Testing, Regulating the Voltage and Operating the Test Sets Variation in the voltage is obtained by means of an auxiliary battery which forms a part of each test set. The test sets are equipped with means for connecting to one or more cells, rheostats for close adjustment of the voltage and a double-throw key which is used to connect the auxiliary battery either in series aiding or in series opposing with the central office battery and thus change the test conditions applied by the test set to high or low voltage as required. The test sets are also equipped with keys, jacks, plugs and cords for connecting to and testing the selectors under various circuit conditions. The designations "C/V", "F/V" or "B/V" will be shown in the "Test Set Preparation" column of the associated circuit requirement tables. These designations represent the following test set applications.

3.0051 "G/V" Ground Voltage Application (Cases where battery is permanently connected in the circuit to one side of the winding of the selector under test). Before preparing the test set for making tests on selectors having battery wired to one side of the windings, place all keys in their normal positions and rheostats (LV) and (HV) in their "off" positions. Connect the patching cords to the test set in the following manner. Connect the red, white and blue conductors of patching cord (D) to binding posts (AUX-BAT) designated (RED), (WH) and (BLUE) respectively. Supply the Central Office battery and ground to the test set by patching jack (BAT-G) to jack (A) in one of the frame jack boxes by means of patching cord (A). Where frames are not equipped with battery and ground supply jack, battery and ground is connected to the test set by means of binding posts (BAT) and (G). Connect the portable auxiliary dry battery to the test set by means of patching cord (D). After connecting the cord to the binding posts (AUX-BAT), attach the battery clip of the white conductor to the positive (+) pole of the battery, ((-) pole in offices using (-) grounded battery), attach the clip of the blue conductor to the point on the battery described in paragraph 3.0052, "Low Voltage Test" and attach the clip of the red conductor to the point on the battery described in paragraph 3.0053, "High Voltage Test". Insert the plug of patching cord (B) into jack (TEST) of the test set and attach the clip or socket end to the selector to be tested. When adjusting the voltage for step tests or when making step tests attach the clip end of cord (B) to the interrupter spring which is wired to

3.0051 (Continued)

the winding terminal of the selector. For making running tests attach the clip or socket end of the patching cord (B) to the interrupter spring which is not wired to the winding terminal so that the selector can operate under control of its interrupter.

3.0052 Low Voltage Test For low voltage regulation, operate the "V/M" and the "L/V" keys. The "V/M" key operated, connects the voltmeter so as to give the voltage drop across the selector circuit under test with the selector operated but not running. The "L/V" key operated, operates a relay in the test set, which connects the auxiliary battery through to the patching cords in such a manner that the auxiliary battery voltage opposes the voltage of the central office battery which is connected to the winding terminal of the selector. Connect the proper number of auxiliary battery cells into the circuit to give the voltage required using the blue conductor mentioned under 3.0051. If the exact voltage required cannot be obtained in this manner connect to the auxiliary cell which will bring the voltage above and nearest to the required voltage and obtain the exact voltage by adjusting the "L/V" rheostat. Care should be exercised to keep the variable resistance as low as possible because external resistance in the selector circuit has a decided effect upon the steady and uniform operation of the selector. After obtaining the correct voltage, the "V/M" key should be restored to its normal position.

3.0053 High Voltage Test The battery regulation for the high voltage test may be made in the same manner as the regulation for the low voltage test using the red conductor, except that the "H/V" rheostat and the "H/V" key are used in place of the "L/V" rheostat and the "L/V" key, thus connecting the auxiliary battery as a booster in series with the central office battery.

3.0054 "F/V" Fuse Voltage Application (Cases where, in order to test a selector, it is necessary to remove the individual circuit fuse and connect the test set between the bus bar and the fuse post) Connect jack "A" to the battery and ground supply jack "A" in the frame jack box by means of patching cord "A". Insert the plug of patching cord "C" into jack "T" and fasten the U shaped tip of the tip conductor (white) under the bus bar fuse and the U shaped tip of the sleeve conductor (red) under the fuse stud screw. Insert the plug of patching cord "B" in jack "C" and attach the clip or socket end of the cord to the selector as

previously described under paragraph 3.0051 and thus supply a ground for its operation. Operate the "FUSE" key connecting the auxiliary battery to the tip and sleeve of the jack "T", opposing or boosting the central office battery depending upon whether the "L/V" key or the "H/V" key is operated. Adjust the voltage as described in paragraphs 3.0053 and 3.0054. The "FUSE" key operated, also connects the voltmeter leads so that the drop across the selector will be read on the operation of the "V/M" key.

3.0055 "B/V" Battery Voltage Application (Cases where ground is permanently connected in a circuit to one side of the winding of the selector under test). Attach jacks and operate the rheostats and switches as previously described under paragraph 3.0051. In this case it is necessary to operate the "BAT" key. This key operated, connects the central office battery with the portable battery in series aiding or opposing, depending upon whether the "H/V" or "L/V" key is operated, to the sleeve of the "T" jack battery key and also connects the voltmeter leads so that the voltage across the selector may be read by operating the "V/M" key.

3.0056 Testing Selectors at a Distance from the Test Set When testing selectors on the top of the frame at a distance from the battery control test set, the 32-A test set may be used in place of the "L/V" and "H/V" keys, by inserting the plug of the test set into the "EXT" key jack. Depress the white button to make the low voltage tests and the red button to make the high voltage tests.

3.006 Method for Measuring the "Step Test", "Magnet Pull Test" and for the "A", "B" and Special Operate Requirements

3.0061 With the clip or socket end of the patching cord "B" attached to the interrupter spring terminal that is strapped to the winding terminal, operate the selector step-by-step in making the "Step Test", "Magnet Pull Test", the "Special Operate Test" and in stepping the selector to the 21st terminal by operating and releasing the "L/V" key. For the "A" and "B" requirements in which the selector is required to operate under self-interruptions, transfer the clip or socket end of the patching cord "B" to the interrupter spring terminal which is not strapped to the magnet coil in order to complete the testing circuit through the interrupter spring contacts.

3.0062 Before making the "Step Test" as specified in the following requirements, the rotor brush assembly should be stepped

3.0062 (Continued)

electrically (step-by-step and not under self-interruptions) to the position prior to which the worst brush load is encountered. (This is the position just preceding the one wherein the contacting edges of the rotor brushes will engage the feeder brushes. In stepping from this position to the next position the friction of the brushes is perceptibly increased, as the brushes, in addition to engaging the bank terminals, engage the feeder brushes. See requirement 2.23 on page 8). Stepping the selector electrically to required positions instead of manually is recommended because in stepping the selector manually there is danger of springing the driving arm so that the selector will fail to meet its requirements. However, if care is exercised, it will be satisfactory to advance the rotor brush element by hand after energizing the selector magnet.

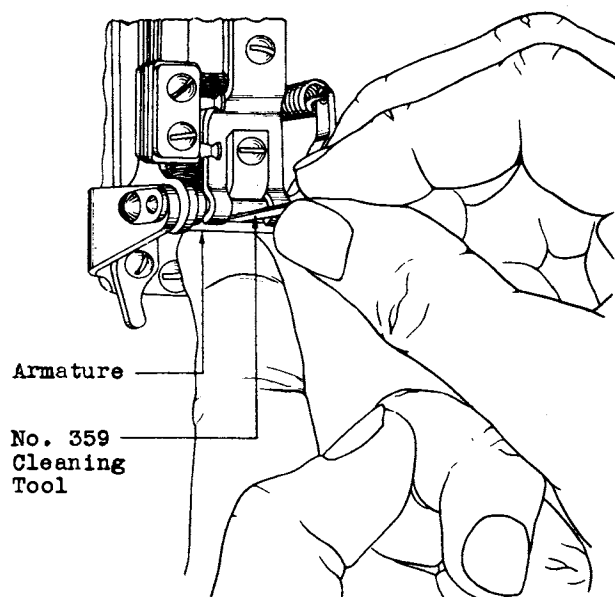
3.01 Cleaning (Rq.2.01)

M-1 Ratchet Wheel and Armature Bearings If upon inspection, there is found to be an accumulation of gummy oil or foreign matter on the selector ratchet wheel or armature bearings, carbon tetrachloride may be used very sparingly to soften this matter so that it may be removed. Only C.P. carbon tetrachloride shall be used and extreme care should be taken to keep it from coming in contact with the spoolheads of the selector magnet or with any part of the bank or rotor brush assemblies other than the ratchet wheel. All wearing parts of the switch such as the ratchet wheel or armature bearings must be allowed to dry and then be relubricated, if they are cleaned with carbon tetrachloride. Under no circumstances should carbon tetrachloride be used on the bank terminals or rotor brushes. Interrupter contacts should be cleaned when necessary by drawing the No. 265-B contact burnisher back and forth between the contacts five or six times with the surface of the tool flat against the surface of the contact disc. At the same time the contact point should be allowed to press against the other side of the burnishing tool. In cases where this method does not prove adequate, the contacts should be flushed with a drop of C.P. carbon tetrachloride applied with a toothpick. A clean toothpick must be used for each pair of contacts cleaned. After applying the carbon tetrachloride use the contact burnisher as above.

M-2 Bank and Bank Terminals The selector should be rotated a number of times under self interruptions or step by step, depending upon the wiring arrangement of the selector circuit.

Any loose dirt should then be carefully removed from the bank in a manner that does not affect the alignment of the terminals.

M-3 Magnet Core Gap Insert the No. 359 cleaning tool between the armature and the core and apply sufficient pressure to the bottom of the armature to force it upward against the cleaning tool, as shown in Fig. 21. Then forcibly withdraw the cleaning tool. Repeat the operation several times. This operation will remove dust and loose galvanizing scales that may have accumulated between the armature and the core.



Method of Cleaning the Magnet Core Gap

Fig. 21

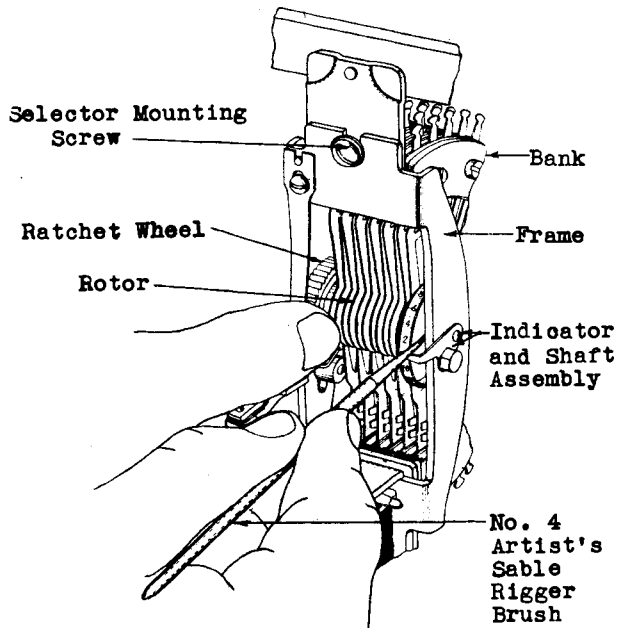
3.02 Lubrication (Rq.2.02)

M-1 Rotor Bearings To lubricate the rotor bearings dip the No. 4 Artist's Sable Rigger Brush into the Western Electric Lubricating Compound No. 3. Take up the end play of the rotor toward one side of the selector and apply the lubricant to the bearing by inserting the brush through the hole in the side of the frame. On selectors not provided with this hole apply the lubricant as shown in Fig. 22. Two applications of the lubricant should be made to this bearing.

M-2 Take up the end play of the rotor in the opposite direction and make two applications of the lubricant

3.02 (Continued)

to the other bearing as covered in M-1.



Method of Lubricating Rotor Bearing When Lubricating Hole is not Provided

Fig. 22

M-3 Armature Bearings To lubricate the armature bearings take up the end play and make two applications of the lubricant to each bearing at a point between the selector frame and the armature bearing bushing (Fig. 1) in a manner similar to that covered in M-1.

M-4 After the lubricant has been applied, rotate the selector several revolutions under self interruptions or step-by-step, depending upon the wiring arrangement of the selector circuit, in order to distribute the lubricant more evenly over the bearings.

M-5 Surfaces of Ratchet Wheel Teeth Before lubricating the ratchet wheel teeth, clean them if necessary as specified in procedure 3.01, M-1.

M-6 To lubricate the surfaces of the ratchet wheel teeth with Western Electric Lubricating Compound No. 3 dip the No. 4 Artist's Sable Rigger Brush into the lubricant and drain it once against the side of the container. Then apply the lubricant to the surfaces of

the ratchet wheel teeth just below the retaining pawl while the selector is rotating. After cleaning, three applications of the lubricant should be made. If cleaning is unnecessary less lubricant may be sufficient. Care must be exercised in applying the lubricant as an excessive amount in one spot on the ratchet wheel is liable to splash onto the brushes or bank terminals.

3.03 Record of Lubrication (Rq. 2.03) (No Procedure)

3.04 Notes and Special Requirements (Rq. 2.04)

M-1 Any special requirements which are applicable to the selector under test should be met. Tests and adjustments necessitated by such requirements shall be made in accordance with the methods given in this section.

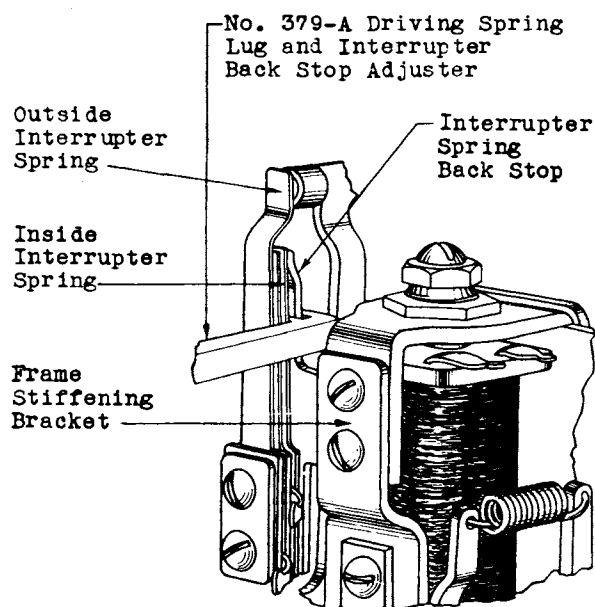
M-2 Before adjusting the clearance between the driving arm stud and the outside interrupter spring, observe how close the clearance is to the specified limits. When a considerable amount of adjusting is required, to bring the clearance within the limits adjust the spring stop with the No. 379-A driving spring lug and interrupter back stop adjuster, but when a slight adjustment is required, adjust the outside interrupter spring with the No. 303 spring adjuster. To use the No. 379-A adjuster apply it to the interrupter spring back stop from the side nearest the magnet coil as shown in Fig. 23 and adjust the interrupter spring back stop as required. In making this adjustment care should be exercised to keep from throwing the lip perceptibly out of parallel with the face of the armature stud.

M-3 When adjusting the spring stop an attempt should be made to obtain the correct adjustment with the least number of adjusting operations because the spring stop has a tendency to lose its adjustment if it is subjected to too many adjusting operations. The adjustment of the spring stop is not recommended on selectors not equipped with a frame stiffening bracket as this operation may change the armature air-gap.

CAUTION Positioning of the inside interrupter spring should not be done other than as specified in M-2 and M-3 above. Take care that the spring always rests flat against its insulator.

M-4 Special Requirements for D-80701 Selector These requirements shall be met at the same time as the interrupter contact requirements and with the same adjustment of the interrup-

3.04 (Continued)



Method of Adjusting Interrupter Spring Back Stop

Fig. 23

ter. To check the contact pressure of the interrupter spring against the spring stop apply the No. 79-C gauge to the spring at the contact point. To adjust the contact pressure of the outer interrupter spring apply the No. 179 spring adjuster close to the base of the spring and adjust as required. To check the air-gap between the contacts of the interrupter and outer spring insert the .005" blade of the No. 74-D gauge between the contacts when the selector is in the normal position. After checking for the minimum specified gap check the maximum allowable gap with the .010" blade of the No. 74-D gauge. To adjust the air-gap apply the spring adjuster close to the base of the spring stop of the back contact spring and adjust as required. To check for the proper adjustment of the back contact spring of the interrupter, insert the .002" blade of the No. 74-D gauge between the back contact spring and its spring stop, then operate the selector electrically and note that the back contact is still closed when the selector is fully operated. To adjust the back contact spring to meet this requirement apply the spring adjuster close to the base of the spring stop and adjust as required.

3.05 Alignment of Tips of Rotor

Brushes (Rq. 2.05)

3.06 Centering of Rotor Brushes on Terminals (Rq. 2.06)

Alignment of Tips of Rotor Brushes

M-1 A preliminary inspection of each end of the rotor brush assembly should show the tips of all non-bridging brushes in approximate alignment and the tips of the bridging brushes overlapping those of the non-bridging brushes by $1/64$ ". Should there be any noticeable deviation from the above, that would have a bearing on the requirements for centering, it would be an indication of loose rotor brush assembly, in which case, the rotor brush assembly should be replaced.

Centering on Terminals

M-2 To check whether or not the rotor brush assembly as a whole meets the requirement for centering of the rotor brushes on the terminals in the extreme forward position, loosen the retaining pawl with the $3-1/2$ " cabinet screw-driver, apply a sufficient amount of pressure to the end of the driving pawl to force it to the extreme end of its stroke and note the forward position of the rotor brushes on the bank terminals. To check the extreme rear position of the rotor brush assembly, apply a rotary motion to the rotor brush assembly to take up the play between the driving pawl and the ratchet wheel.

M-3 If the rotor assembly as a whole is found to be outside the specified limits, it can be centered as a whole by moving the overthrow stop up or down as required, but it should be particularly noticed that moving the overthrow stop in either direction will change nearly all of the other adjustments of the selector and for this reason this adjustment should not be attempted unless it is certain that it is essential. When necessary this adjustment should be made in the following manner:-

M-4 Loosen the armature back stop with the $3-1/2$ " cabinet screw-driver.

M-5 Loosen the overthrow stop by means of the No. 417-A double-end flat wrench just sufficiently so that it may be moved by tapping slightly.

M-6 Center the rotor brushes on a terminal by tapping the overthrow stop slightly up or down as required. Moving it down advances the position on the terminals in the direction of rotation, at which the brushes will stop.

3.05-3.06 (Continued)

M-7 Tighten the overthrow stop and readjust the retaining pawl and the armature back stop to meet the requirements specified under "Retaining Pawl" and "Armature Back Stop". After the rotor brush assembly has been centered it should be rechecked for this requirement.

- 3.07 Rotor Brush Alignment (Rq.2.07)
- 3.08 Feeder Brush Position (Rq.2.08)
- 3.09 Feeder Brush Tension (Rq.2.09)
- 3.10 Rotor Brush Tension (Rq.2.10)
- 3.11 Rotor Brush Prong Contact (Rq.2.11)

Rotor Brush Alignment

M-1 To check the brush alignment step the selector electrically to a position where one end of the rotor brush assembly is about to pass onto the bank feeder brushes or bank terminals when the feeder brushes are cut away, and note visually that the junction between each pair of brush prongs is in line with the center line of the associated feeder brush or bank terminal within the specified limit.

M-2 The 38-B lamp socket and cord may be used for supplying light when making this adjustment. To use this tool, hold it with the lamp turned to the front, insert it between the frames of adjacent selectors and then give it 1/4 turn to the left or right as required, attach one end of the cord to ground and the other end to the battery fuse panel. It should be ascertained that a lamp for use with the available voltage is being used in the lamp socket.

M-3 When the majority of the rotor brushes are found to be out of line with the bank feeder brushes or bank terminals and this misalignment is in the same direction, loosen the selector mounting screws and shift the selector to the right or left as required and then retighten the screws.

M-4 Adjust an individual rotor brush spring as required with the No. 363 spring adjuster. Care should be used not to produce any sharp bends or kinks or otherwise to distort the brushes.

M-5 Advance the rotor assembly electrically for a half revolution or until the opposite ends of the rotor brushes are about to pass onto the bank feeder brushes or bank terminals and repeat the above adjustment.

Feeder Brush Position

M-6 Any adjustments necessary to place the feeder brushes in their

proper relation with respect to the rotor may be made with the No. 363 spring adjuster or a pair of KS-6015 duck-bill pliers.

M-7 In the case of detachable units it may be necessary to loosen the mounting nut with the No. 245 wrench and shift the unit, making use of play in the mounting hole. If this does not permit the required adjustment remove the brush assembly from the mounting stud and change the number of spacing washers as required.

Feeder Brush Tension

M-8 To check the tension of single piece type feeder brushes apply the No. 70-E gauge to each feeder brush except the No. 1 brush at a point on the center line of the brush and close to the crotch. The gauge should be applied in a direction tending to lift the feeder brush away from the associated rotor hub and should register at least the minimum specified tension but not more than the maximum specified tension when the feeder prongs break contact with the rotor. When checking this requirement make sure that the rotor assumes its normal position by electrical or equivalent rotation. Also note that both prongs of the feeder brush break contact with the rotor at approximately the same time. The orange stick should be used for checking the No. 1 feeder brush for tension as the No. 70-E gauge is not suitable.

M-9 In adjusting single piece type feeder brushes, care should be used in making the adjustments not to distort them. The feeder brushes should usually be adjusted for tension by placing the No. 363 spring adjuster close to the base of the spring and applying a turning motion. If, however, the bow in the spring is such, that adjusting at this point will leave the part of the feeder brushes over which the rotor brushes pass more than .010" out of alignment with the first bank terminal, use the KS-6015 duck-bill pliers for this operation. When using duck-bill pliers grasp the spring above the point at which the rotor brushes contact and move the pliers toward the top, at the same time giving them a twisting motion in the direction of the desired tension.

Rotor Brush Tension

M-10 The selector brushes are referred to by number in specifying individual brush tensions. They are numbered from left to right facing the selector beginning with one. The adjustment for rotor brush tension should be done as follows:

3.07-3.11 (Continued)

M-11 Step the selector electrically to the top row of terminals in the bank or the detachable feeder brushes when installed and then apply the end of the No. 70-D gauge to each brush member in the upper end of the rotor brush assembly. The tension gauge should be applied to a point on the heel of the brush midway between its two prongs and in a direction tending to push the contact prongs away from the terminals upon which they are making contact. The gauge is provided with a stop which should be set at the minimum tension specified. The reed should leave the stop just before the brush spring breaks contact with the terminal. The 38-B lamp socket and cord may be used in making this adjustment as covered in M-2.

M-12 To adjust an individual rotor brush spring, apply the No. 363 spring adjuster to the base of the brush spring close to the shaft of the rotor brush assembly. In the case involving detachable feeder brushes it may be necessary to advance the selector one or two steps to adjust the springs close to the shaft of the rotor brush assembly after which the rotor assembly should be returned to its previous position to check the adjustment. Take care in adjusting the brush springs not to change the alignment of the brush contact edges. This is especially important in bridging brushes where such improper adjusting would shorten the contact surface. Care should also be taken in meeting this requirement, to hold the tension of each brush as close as possible to the minimum pressure specified in order that the friction of the worst brush load condition will not be heavy enough to prevent the selectors meeting the "Step Test" and "A" and "B" requirements. In making adjustments of brush spring tensions the tool should be given a turning motion and not used as a lever and given a side motion.

M-13 When tests and adjustments have been completed on one brush end of the rotor brush assembly, step the selector around electrically (step-by-step) to a position where the opposite brush end is in the proper position and resting upon the top row of terminals in the bank or detachable feeder brushes when installed, and repeat the same tests and necessary readjustments as described in M-11 and M-12 above.

Rotor Brush Prong Contact

M-14 Check for prong contact, in doubtful cases, by touching the prongs of the brushes with the end of the orange stick and noting whether or

not both prongs make contact with the bank feeder spring, or bank terminal when the feeder brushes are cut away. The "feel" of the tool will be an aid to the visual check for the requirement.

M-15 On selectors equipped with the two piece type feeder brushes which are not in alignment with their associated bank terminals within .010" at the point where the rotor brushes pass over them or which have a separation between the halves at this point of more than .005", it will be advisable to check or adjust for prong contact of the rotor brushes on the first row of bank terminals instead of on the feeder terminals.

M-16 To adjust the inner prongs to meet this requirement step the selector to the horizontal position, place the end of the No. 35 screw-driver in the slot between the prongs of the brush member and apply a turning or prying motion in the direction required. To adjust the outer prongs apply the No. 363 spring adjuster to the tip of the prong and give the tool a slight twisting motion. In adjusting prongs which do not meet the requirements, an attempt should be made to bring the clearance as near to zero as possible.

3.12 Toeing of Bridging Brushes (Rq.2.12)

M-1 To check the toeing of bridging brushes, rotate the brush assembly to a convenient position and observe whether the tips of each pair "toe out". Toeing bridging brushes out has a tendency to increase the reliability of their bridging. When necessary to adjust the "toeing" of bridging brushes proceed as follows:

M-2 Set the rotor assembly approximately in a horizontal position.

M-3 Hold the heel of the brush with one No. 363 spring adjuster and use a second spring adjuster on the contact portion of the brush to produce the required "toeing out". Take care not to distort the brush when applying this adjustment.

3.13 Heel Spacing (Rq.2.13)
 3.14 False Contact (Rq.2.14)

M-1 To check for heel spacing and false contacting step the selector electrically in turn to each of the specified positions and note whether or not the specified requirements are met.

M-2 The 38-B lamp socket and cord may be used to supply light when checking these requirements. The No.

3.13-3.14 (Continued)

376-A dental mirror may be used in inspecting for the "False Contacting" requirement.

M-3 These requirements should be met by adjusting the brushes close to the heels as required with a No. 363 spring adjuster. When detachable feeder brushes are installed, it will be necessary to advance the selector beyond these brushes to adjust the springs after which the rotor assembly should be returned to its previous position to check the adjustment. Care must be exercised in adjusting brushes for these requirements not to change the brush tension. The brush tension should be rechecked after these adjustments are made.

3.15 Clearance Between No. 1 Brush and Driving Arm (Rq.2.15)

M-1 To check this clearance rotate the selector electrically to the position in which the No. 1 rotor brush is nearest to the driving arm. Grasp the driving spring arm and apply a pressure to the right sufficient to take up the side play of the armature. Then observe that there is at least the specified minimum clearance between the No. 1 brush and the driving arm.

M-2 If the No. 1 brush meets its position requirement, failure to meet this requirement is probably due to a bent driving arm. Adjust the driving arm with the R-1760 adjuster applied to the driving arm directly beneath the point where the pawl spring is attached to the driving arm. After adjusting the driving arm, ascertain that the end of the pawl will strike the over-throw stop squarely.

3.16 Driving Spring Tension (Rq.2.16)

M-1 In measuring this tension the gauge should be applied to the "Standard Point of Measurement" and the outside interrupter spring should be pulled away sufficiently to prevent its making contact with the stud on the driving arm. Readjust for this requirement in the following manner:-

M-2 The outside interrupter spring should be forced away from possible contact with the driving arm stud, when the armature is fully drawn up. This may be done with a toothpick placed between the interrupter springs just below the contact point.

M-3 Attach the gauge to the "Standard Point of Measurement" and pull against the driving spring tension until

the driving pawl falls over the next tooth of the ratchet wheel at which instant the gram gauge should register at least the minimum specified tension. In making this measurement hold the gauge in a horizontal position. It is better to check the measurement two or three times on account of the liability of the gauge twisting at the point where it is attached to the driving arm.

M-4 When necessary increase or decrease the driving spring tension, by adjusting the driving spring lug on the selector frame with the No. 379-A adjuster (not by adjusting the driving spring arm on the armature). Exercise care in adjusting this lug as it is possible to spring the whole selector frame affecting thereby many of the other adjustments particularly on selectors not equipped with the frame stiffening bracket. Take care also in bending this lug, not to throw it out of alignment with the arm on the armature to which the other end of the driving spring is attached and thus cause unnecessary friction in the armature bearings.

3.17 Armature Back Stop (Rq.2.17)

M-1 To check for the minimum back stop requirement attach the test clip or socket to the interrupter spring terminal that is strapped to the magnet coil. Operate the selector one step at a time and at four positions of the ratchet wheel approximately 90° apart and test the freedom of the driving pawl. This freedom is tested by grasping the upper end of the driving arm between the thumb and forefinger and moving it gently from side to side. The inner end of the driving pawl must not bind on the over-throw stop. Binding will be indicated if the motion of the driving pawl is not equal at both ends.

M-2 To check for the maximum back stop requirement disengage the retaining pawl and, with the rotor in a convenient position, rotate the rotor assembly back and forth without imparting movement to the driving pawl and see that the rotary motion of the brushes is as little as possible, and at the most does not exceed 1/32". Repeat this check with the opposite ends of the brushes contacting with the bank terminals.

M-3 If the driving pawl is found to bind in one or more positions of the ratchet wheel or if its freedom is great enough to allow appreciable up and down movement at its point, the following readjustments for this requirement should be made.

M-4 To change, slightly, the position of the armature back stop, tap

3.17 (Continued)

the bottom of it with the R-1760 adjuster. If considerable movement is required, loosen the armature back stop screw slightly before lifting the armature back stop. The clearance between the driving pawl and the overthrow stop should be as small as possible with the rotor in the position in which this clearance is the smallest.

M-5 After shifting the armature back stop tighten the screw which holds it to the selector frame.

M-6 Repeat the test outlined under M-1 and M-2 above.

3.18 Retaining Pawl Tension and Position (Rq.2.18)

M-1 Retaining Pawl Tension With the rotor brush assembly in any position, check the spring tension of the retaining pawl by means of the No. 79-C gauge. The tension of the pawl should be measured at the bend in the pawl. The application of the gauge may be facilitated by using a small loop of twine looped over the pawl and the end of the gauge. A tension within the specified limits should be registered on the gauge at the instant that the contact between the pawl and the ratchet is broken.

M-2 If necessary, change the retaining pawl tension by means of the No. 303 spring adjuster, applied to the base of the pawl as near as possible to the point where it is fastened to the selector frame.

M-3 Retaining Pawl Position To check the retaining pawl position, operate the selector electrically, one quarter of a full turn and inspect for clearance between the pawl and the driving face of the ratchet wheel tooth. Repeat until an inspection of at least four equally spaced positions of the ratchet wheel has been made.

M-4 The retaining pawl may be adjusted for position by loosening the retaining pawl screw and then moving the retaining pawl up or down as required. When retightening the retaining pawl make sure that the ratchet end of the pawl falls wholly within the surface of the ratchet wheel.

M-5 If necessary to change the position of the pawl due to its binding on some one tooth, check the spring tension after such change is made.

3.19 Armature Air-Gap (Rq. 2.19)

M-1 In checking the armature air-gap

the overthrow or "whip" of the driving arm should be eliminated by pressing lightly against the outside interrupter spring above the offset with a finger. This "whip" if not damped would permit the driving pawl to take an effective stroke several thousandths of an inch longer than the actual distance between its position of rest and its operated position. The requirement specified on the sheet represents the maximum air-gap. It can be reduced to any point between zero and the given value when it is necessary to do so to meet "Magnet Pull" and "A" and "B" Tests. This test should be made in the following manner:-

M-2 With the voltage specified, apply the test clip or socket to the interrupter spring terminal that is strapped to the magnet coil.

M-3 Insert the proper blade of the No. 74-D gauge between the armature and the magnet core and energize the selector magnet. The driving pawl should not engage the next tooth on the ratchet wheel.

M-4 Deenergize the selector magnet and remove the gauge.

M-5 Energize the selector magnet. The driving pawl should drop into the next tooth on the ratchet wheel. Deenergize the selector magnet. The selector should release and step into the next position.

M-6 Repeat M-3, M-4 and M-5 outlined above for every position of the selector.

M-7 If necessary to increase or decrease the armature air-gap to meet the above requirements or to decrease the armature air-gap to meet "Magnet Pull" or "A" and "B" Requirements, such adjustment should be made in the following manner:

M-8 Loosen the magnet clamp screw with the No. 344 screw-driver and the magnet adjusting lock nut with the No. 243 wrench and then adjust the air-gap as required by screwing the magnet adjusting bushing up or down by means of the No. 305 socket wrench until the driving pawl will just drop into a tooth when the armature is operated with the specified voltage, and the "whip" is eliminated by pressing against the outside spring above the offset. Retighten the magnet clamp screw and the magnet adjusting lock nut before checking the adjustment. Repeat this operation until the required adjustment is obtained. (This adjustment is very important as it affects the "A" and "B", Speed and Magnet Pull Tests.)

3.20 Outside Interrupter Spring Tension (Rq.2.20)

M-1 Measure the interrupter spring pressure by means of a No. 79 type gauge applied in line with the outside interrupter spring contact and in a direction tending to pull the outside spring away from the inner spring. A small loop of twine may be used to attach the end of the gauge to the interrupter spring. The gauge should register within the specified limits at the instant the contact between the two springs is broken.

M-2 The tension of the outside interrupter spring should be adjusted by means of the No. 303 spring adjuster which should be applied close to the base of the spring.

3.21 Driving Pawl Tension and Position (Rq.2.21)

M-1 Driving Pawl Tension To check the tension of the driving pawl operate the armature electrically, place the No. 79-C gauge in the bend near the driving end of the pawl and observe the tension required to push the pawl away from the bottom of the ratchet wheel tooth.

NOTE: Before checking the driving pawl tension requirement, hold the No. 79-C gauge in the vertical position to determine the weight of its plunger. When measuring the tension as outlined in M-1 the true reading is equal to the indicated reading of the gauge plus the weight of the plunger of the gauge.

M-2 To adjust the driving pawl tension apply the No. 256 adjuster close to the point where the reed leaves the driving arm and adjust the tension as required. Adjusting the reed spring upward, toward the ratchet wheel, decreases the tension. Adjusting the reed spring downward, away from the ratchet wheel increases the tension.

M-3 Driving Pawl Position If the sides of the driving pawl are not parallel with the sides of the ratchet wheel apply the R-1760 adjuster to the driving arm beneath the point where the pawl spring is attached to the driving arm and adjust the driving arm so that this part of the requirement is met.

M-4 If the midsection of the driving pawl is not parallel to the surfaces of the ratchet wheel teeth hold the selector armature in the operated position, apply the KS-6015 duck-bill pliers to the midsection of the pawl and adjust the pawl as required.

3.22 Magnet Pull Test (Rq.2.22)

M-1 The magnet pull test gives a resultant force acting against the pull of the magnet which is greater than the specified driving spring tension at this point and represents a magnet pull margin of safety. This test should be made in the following manner.

M-2 With the specified potential across the "Selector Circuit" connect the test clip or socket to the interrupter spring terminal which is strapped to the magnet coil.

M-3 Apply the No. 79 type gauge to the driving arm in a horizontal line with the "Standard Point of Measurement" and push in a direction aiding the driving spring tension until the gauge registers the tension specified.

M-4 With the additional tension aiding the driving spring tension energize the selector magnet by closing the testing circuit. The armature should draw up sufficiently to allow the driving pawl to fall into the next tooth on the ratchet wheel.

M-5 If the pull of the magnet should fail to meet the above test it may be that either the armature air-gap is too large or the driving spring tension is not close enough to the specified minimum in which case the required adjustment should be made as outlined under "Armature Air-Gap" or "Driving Spring Tension".

3.23 Step Test (Rq.2.23)

M-1 The step test reduces the pressure exerted by the driving pawl on the ratchet wheel and represents the minimum force that is considered necessary to overcome the friction of the worst brush load condition. The worst brush load condition is met while the brushes are advancing to the position in which they make contact with the feeder terminals. This test should be made in the following manner:

M-2 Apply the test clip or socket to the interrupter spring terminal that is strapped to the selector magnet and step the selector electrically (step-by-step) to a position of rest on the 21st terminal in the bank (counting from the bottom bank terminal). If the bank feeder brushes are cut away step the selector to the 3rd terminal in the bank.

M-3 Energize the selector magnet.

M-4 Attach the No. 79 type gauge to the driving arm as the "Standard Point of Measurement" and pull in a horizontal direction opposing the driving

3.23 (Continued)

spring tension until the gauge registers the specified tension.

M-5 With the above mentioned tension opposing the driving spring tension, deenergize the selector magnet by opening the testing circuit. This should allow the selector to release and take a full step to the 4th or 22nd terminal. See that the retaining pawl is properly engaged with the ratchet wheel tooth.

M-6 Repeat the above test with the brushes of the other end of the rotor brush assembly resting on the above mentioned terminals.

M-7 Failure to meet this test is an indication that the driving spring tension is too close to the specified minimum or that the brush load is excessive.

M-8 When necessary check and adjust for requirements 2.10 and 2.16.

3.24 Low Voltage Operate Test "A" (Rq.2.24)3.25 Speed (Rq.2.25)3.26 High Voltage Operate Test "B" (Rq.2.26)

M-1 When making these tests, connect the test set to the selector as specified in paragraph 3.005 and proceed according to the methods given in paragraph 3.006.

M-2 The speed of the selector should be determined at the same time the Low Voltage Operate Test "A" is being met by timing ten complete revolutions (440 steps) of the rotor brush assembly with a watch.

M-3 In case the selector does not meet the requirements specified under either Test "A" or Test "B" the lip of the outside interrupter spring may be adjusted slightly to meet the requirements. The change of speed or in the smoothness of operation noted when pressing or pulling on the interrupter spring stop, which supports the interrupter spring assembly at a point directly in line with the contacts, will indicate in what direction the

lip of the outside interrupter spring should be adjusted. When an adjustment is necessary the lip of the spring should be adjusted by means of the No. 303 adjuster. After making this adjustment check the spring clearance when definite limits are specified.

3.27 Interrupter Contact Test (Rq. 2.27)

M-1 This test decreases the interrupter spring clearance and provides a margin of safety in the interrupter spring contacts as regards the time of their break.

M-2 When making the Interrupter Contact Test allow the selector to run under self-interruptions in the same manner as when making the Low Voltage Operate Test "A" except that the proper thickness blade of the No. 74-D gauge should be held between the lip of the outside interrupter spring and the driving arm stud. Care should be taken to hold the gauge parallel to the lip of the interrupter spring and not to apply any pressure which would tend either to lift the spring away from the stud or impede its action.

M-3 To adjust for Interrupter Contact, adjust the outside interrupter spring with the No. 303 spring adjuster as specified in procedure 3.26, M-3.

REASON FOR REISSUE - CHANGES IN ADJUSTING PROCEDURES

1. To revise the list of tools, gauges and materials.
2. To cover use of new 425-A selector holding tool (3.004)
3. To make the necessary changes to cover the new soldering and testing lugs (3.0051, 3.0054, 3.0061, 3.17, 3.19, 3.22 and 3.23).
4. To cover lubrication of rotor bearings through hole in side of frame.(3.02).
5. To add note covering compensation for 79-C gauge plunger weight when checking driving pawl tension. (3.21)

APPROVED:

Bell Telephone Laboratories, Inc. 10-15-30
Department of Development and Research 10-15-30

SELECTORS 200 AND 206 TYPES

AND

BANKS 10 AND 26 TYPES

1. GENERAL

1.01 This addendum covers requirements for the Nos. 206-BS, 206-BT, 206-BU, 206-BW, 206-BY, 206-CA and 206-CB selectors, and requirements for single piece type feeder brushes having the prongs bent in opposite directions. It supplements Section A468.002, Issue 2-D, and replaces Provisional Addendum A468.002, Issue 1-D. This addendum is re-issued to add requirements for the No. 206-CB selector and single piece type feeder brushes having the prongs bent in opposite directions (balanced type) and to revise the requirements covering feeder brush position, toeing of bridging brushes and low voltage operate test "A". Detailed reasons for re-issue will be found at the end of the parts affected.

1.12 Variable Requirements for individual selectors as given on the chart on page 4 of this addendum shall be added to the charts on pages 11 to 17 incl. of Section A468.002, Issue 2-D.

1.13 Non-Variable and Special Requirements
In addition to the variable requirements, the Nos. 206-BS, 206-BT, 206-BU, 206-BW, 206-BY, 206-CA and 206-CB selectors shall meet the common requirements (2.01 to 2.27 incl. except as modified herein) covered in Section A468.002, Issue 2-D.

1.17 "Running" and "Stepping" In the circuit requirement table, test clip data is given to indicate the method of connecting the test set to the selector in checking and readjusting to meet the requirements specified herein. "For Running" ("Requirements For Running" on older circuits) and "For Stepping" ("Requirements For Stepping" on older circuits) appears in the "Remarks" column and is associated with the test clip data. The data "For Running" is for use in cleaning and lubricating the selector and for checking requirements 2.24 (Low Voltage Operate Test "A"), 2.25 (Speed), 2.26 (High Voltage Operate Test "B") and 2.27 (Interrupter Contact Test), where it is necessary to rotate the selector under self-interruptions or under control of the relay wired to its interrupter contacts. The data "For Stepping" is for use in cleaning and lubricating in case the selector is not wired for operation on self-interruptions and in checking such requirements as 2.22 (Magnet Pull Test) and 2.23 (Step Test), where it is necessary to operate the selector step-by-step.

REASON FOR REISSUE - CHANGE IN GENERAL

1. To add a paragraph covering "running" and "stepping" (1.17).

2. REQUIREMENTS

2.01 The following non-variable and special requirements replace requirements 2.08, 2.09, 2.12 and 2.24 and notes 1 and 5 of Section A468.002, Issue 2-D.

2.08 Feeder Brush Position Each feeder brush shall meet the requirements listed in the following table for the particular type of feeder brushes involved:

Bank Feeder Brushes			Detachable Feeder Brushes		
Single Piece Type	Single Piece Type	Two Piece Type	Single Piece Type	Single Piece Type	Two Piece Type
Per Fig. 1	Per Fig. 2	Per Fig. 3	Per Fig. 1	Per Fig. 2	Per Fig. 3
(a)			(a)		
(b)	(b)	(b)	(b)	(b)	(b)
			(c)	(c)	(c)
(d)	(d)	(d)	(d)	(d)	(d)
(e)	(e)	(e)			
(f)	(f)	(f)	(f)	(f)	(f)
			(g)	(g)	(g)
			(h)	(h)	(h)

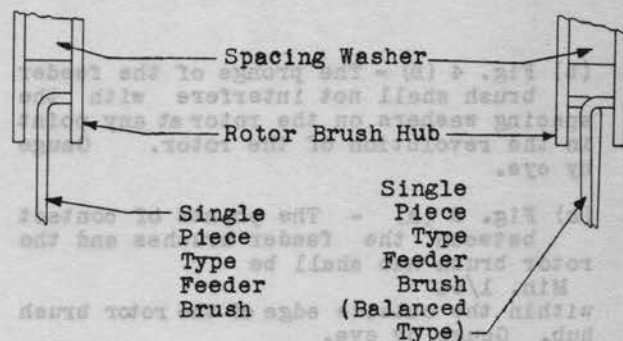


Fig. 1 Fig. 2

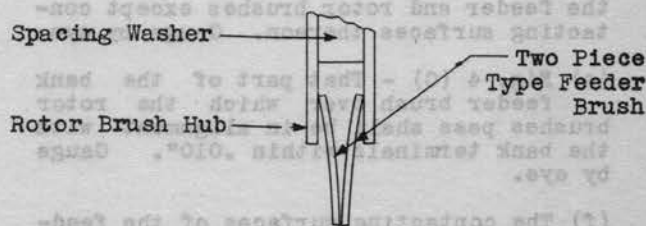


Fig. 3

2.08 (Continued)

(a) Fig. 4 (A) - When the feeder brush is pushed away from the rotor with pressure applied on the center line of the feeder brush and close to the crotch, the two prongs shall leave the rotor at the same time. Gauge by eye.

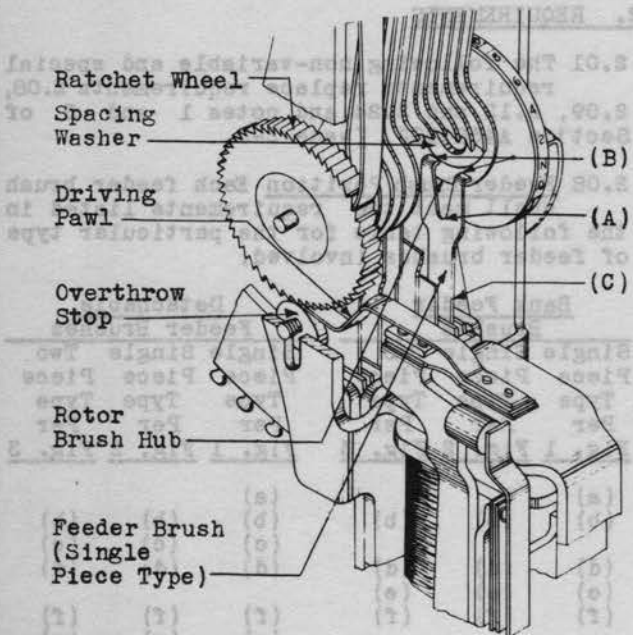


Fig. 4

(b) Fig. 4 (B) - The prongs of the feeder brush shall not interfere with the spacing washers on the rotor at any point in the revolution of the rotor. Gauge by eye.

(c) Fig. 5 (A) - The points of contact between the feeder brushes and the rotor brush hub shall be Min. $1/64$ " within the outside edge of the rotor brush hub. Gauge by eye.

(d) Except where otherwise specified, there shall be an appreciable clearance (Min. $.005$ ") between all parts of the feeder and rotor brushes except contacting surfaces thereon. Gauge by eye.

(e) Fig. 4 (C) - That part of the bank feeder brush over which the rotor brushes pass shall be in alignment with the bank terminals within $.010$ ". Gauge by eye.

(f) The contacting surfaces of the feeder brushes shall make contact with and be parallel to the face of the rotor brush hub throughout the revolution of the rotor brush hub. Gauge by eye.

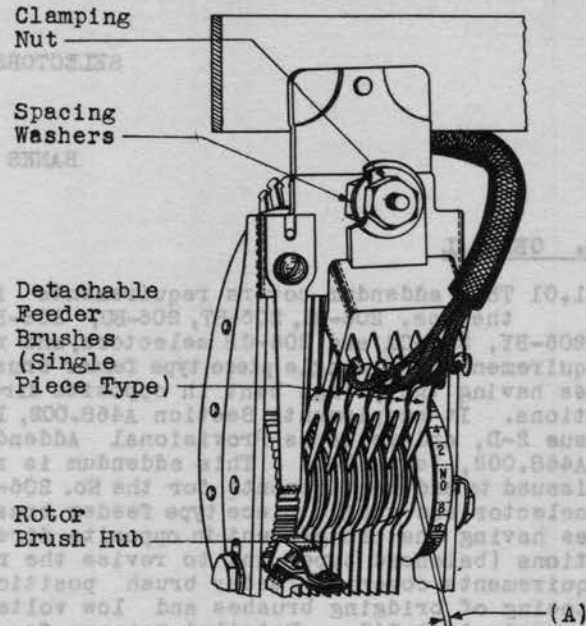


Fig. 5

(g) When one end of the non-bridging rotor brushes is contacting the feeder brushes sufficiently to cause the rotor brushes to begin to separate, the brushes on the opposite end of the rotor shall not be in contact with the bank terminals. Gauge by eye.

(h) With one end of the rotor brushes resting on the 5th row of bank terminals, the center line of that part of the feeder brush over which the rotor brush passes shall line up with the junction of the associated pair of rotor brush springs within $.010$ ". The single piece type feeder brushes are $.014$ " thick. Each spring of the chromium plated two piece type feeder brush is approximately $.009$ " thick and each spring of the non-chromium plated two piece type feeder brush is $.007$ " thick. Gauge by eye.

2.09 Feeder Brush Tension

(a) Fig. 4 (A) - Single Piece Type per Fig. 1 The tension of each feeder brush against the associated rotor brush hub measured at a point on the centerline of the feeder brush and close to the crotch shall be:

Test - Min. 65 grams, Max. 90 grams
Readjust - Min. 70 grams, Max. 90 grams
This requirement shall be checked with the rotor in its normal position with respect to side play. Use the No. 70-E gauge.

2.09 (Continued)

(b) Single Piece Type Per Fig. 2

(1) Fig. 6 (A) - When the rotor brush assembly is approximately centered in the frame, the tension of the front prong of the feeder brush against the associated rotor brush hub, measured just below the hub of the rotor shall be:
Min. 25 grams, Max. 40 grams
Use the No. 70-D gauge.

(2) Fig. 6 (B) - The rear prong shall make contact with the rotor brush hub. Gauge by eye and by feel.

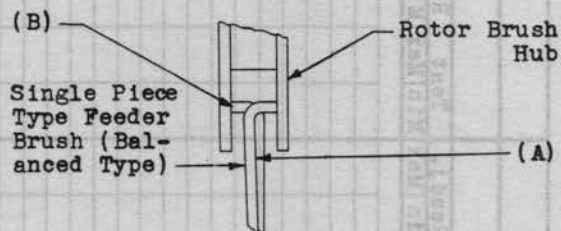


Fig. 6

(c) Two Piece Type Detachable Feeder Brushes per Fig. 3 With the adjacent brushes held away, the spread of the contact ends of the two piece type brushes shall be approximately $(\pm 1/16")$ $3/8"$. Gauge by eye. This requirement may be checked for by the Telephone Company if they require it before the Installation Department has mounted the feeder brush unit on the selector.

2.12 Toeing of Bridging Brushes - Fig. 7 (A)

When the bridging rotor brush is not contacting with the feeder brush or bank terminals, both pairs of trailing edges or tips of the brush shall "toe out" but the maximum separation between each pair of tips shall not exceed .010". Gauge by eye.

Note: At least one, but not necessarily both pairs of contacting surfaces of the brush shall make contact with each other. Gauge by eye.

2.24 Low Voltage Operate Test "A" - When specified, the selector shall start from its normal position and continue to operate steadily and uniformly under self-interruptions when not more than the specified low voltage is applied across the "Selector Circuit". Where the low voltage operate test "A" is specified and the selector is wired so that it cannot be rotated under self-interruptions, it shall be rotated under control of the relay wired to its interrupter contacts for at least 10 revolutions on the office voltage.

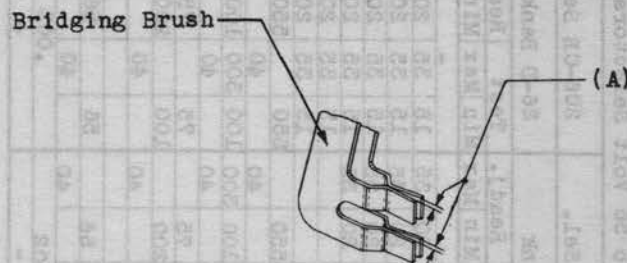


Fig. 7

Notes and Special Requirements for 200 and 206 Type Selectors

Note 1 (a) The clearance between the driving arm stud and the outside interrupter spring shall be:
Min. .040", Max. .050"
Use the No. 112-A gauge.

(b) The selector shall be rotated step-by-step for 2 complete revolutions on the voltage specified for the magnet pull test.

Note 5 (a) The clearance between the driving arm stud and the outside interrupter spring shall be:
Test - Max. .012"
Readjust - Min. .004", Max. .012"
When the outside interrupter spring contact is not connected in a circuit, this requirement may be omitted. Use the No. 74-D gauge.

(b) The selector shall be rotated step-by-step for 2 complete revolutions on the voltage specified for the magnet pull test.

REASON FOR REISSUE - CHANGES IN REQUIREMENTS

1. To add requirements for the No. 206-CB selector.
2. To revise and amplify the requirement covering feeder brush position (2.08).
3. To add requirements for feeder brushes having the prongs bent in opposite directions (balanced type) (2.08 and 2.09). (Information for W. E. Co. covered by CO-127525 and CO-127526).
4. To revise the requirement covering toeing of bridging brushes (2.12).
5. To revise the low voltage operate test "A" (2.24).
6. To amplify notes 1 and 5.

The Following Variable Req. for 200 and 206 Type Sel. shall be Applied in Addition to Common Req. 2.01, 2.02, 2.03, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13, 2.14, 2.15, 2.17, 2.18, 2.21																							
No.	Requirements	Unit	44 to 52 Volt Selectors										40 to 56 Volt Selectors										
			206-BW Sel.		206-E Bank		206-BY Sel.		206-F Bank		206-CA Sel.		206-BS Sel.		206-EB Sel.		206-DB Bank						
Test	Readj.	Min	Max	Min	Max	Test	Readj.	Min	Max	Test	Readj.	Min	Max	Test	Readj.	Min	Max	Test	Readj.	Min	Max		
																						No. 14	
20	50	35	50	30	50	35	50	20	40	25	40					15	35	20	35	15	35	20	35
20	40	25	40	20	40	25	40	20	40	25	40					15	35	20	35	15	35	20	35
20	40	25	40	20	40	25	40	20	40	25	40					15	35	20	35	15	35	20	35
20	40	25	40	20	40	25	40	20	40	25	40					15	35	20	35	15	35	20	35
Br. No. 4	Gram			20	40	25	40	20	40	25	40					15	35	20	35	15	35	20	35
Br. No. 5	Gram							20	40	25	40					15	35	20	35	15	35	20	35
Br. No. 6	Gram															15	35	20	35	15	35	20	35
2.2.16 Driving Spg.	Tension	Gram	800				800				800					550			550				
2.19 Armature Air-Gap	Volt		44				44				44					40			40				
2.2.20 Out.Int.Spg. Tension	Gram	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300
2.22 Magnet Pul Test	Volt		44				44				44					40			40				
	Gram	50		50			50				50					75			75				
2.23 Step Test	Gram	150	300				150	300			150	300				100			100				
2.24 Low Volt.Opr. Test "A"	Volt		44				44				44					40			40				
2.25 Speed	T.P.S.																						
2.26 High Volt.Opr. Test "B"	Volt	52					52				53												
2.27 Int. Contact Test	Volt		44				44				44					56			56				
{ a) Gauge for 206 Type	Inch															40			40				
{ b) Gauge for 200 Type	Inch																						
			.003		.003		.003		.003		.003		.002		.002		.002		.002		.002		

20 to 28 Volt Selectors														
No.	Requirements	Unit	206-BT Sel.			206-EU Sel.			26-G Bank			26-A Bank		
			Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.	Test	Readj.		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2.04	Spl. Reqs. See Note													
2.10	Rotor Brush Tension	Gram												
		Br. No.1												
		Br. No.2												
		Br. No.3												
		Br. No.4												
		Br. No.5												
2.16	Driving Spg. Tension	Gram												
2.19	Armature Air-Gap	Volt												
2.20	Out.Int.Spg. Tension	Gram												
		Volt												
2.22	Magnet Pull Test	Gram												
		Gram												
2.23	Step Test	Gram												
2.24	Low Volt.Opr.Test "A"	Volt												
2.25	Speed	T.P.S.												
2.26	High Volt.Opr.Test "B"	Volt												
2.27	Int. Contact Test	Volt												
		Inch												
	(a) Gauge for 206 Type													
		(b) Gauge for 200 Type												

Requirements for 200 and 206 Type Selectors
and 10 and 26 Type Banks

3. ADJUSTING PROCEDURES

3.001 Additional Tools

<u>Code No.</u>	<u>Description</u>
<u>Tools</u>	
325-B	Adjuster
456-A	Adjuster
-	Bell System P-Long Nose Pliers - 6-1/2" per Specification No. 6267

3.01 The following procedures replace procedure 3.07-3.11 (M-8 and M-9) and procedure 3.21 of Section A468.002, Issue 2-D.

3.09 Feeder Brush Tension (Rq.2.09)

(8) Single Piece Type Feeder Brushes per Fig. 1 Step the selector electrically to a position where the feeder brushes are readily accessible and also where the rotor brushes are not in contact with the feeder brushes. Make sure that the rotor brush assembly is in the center of the frame. Use the KS-6320 orange stick for checking the tension of the No. 1 brush, as the No. 70-E gauge is not suitable. If necessary to adjust the brush, place the No. 363 adjuster close to the base of the brush and apply a turning motion. Take care not to distort the brush, and make sure that that part of the bank feeder brush over which the rotor brush passes is not out of alignment with the first row of bank terminals by more than the specified amount. If necessary, readjust with the KS-6015 duck-bill pliers. When using the duck-bill pliers grasp the brush above the point at which the rotor brushes make contact and move the pliers toward the top, at the same time giving them a twisting motion in the direction of the desired tension.

(9) Single Piece Type Feeder Brushes per Fig. 2 Step the selector electrically to a position where the feeder brushes are readily accessible and also where the rotor brushes are not in contact with the feeder brushes. Make sure that the rotor brush assembly is in the center of the frame. To check the tension of the front prong apply the No. 70-D gauge directly beneath the offset portion of the prong and in a direction tending to lift the prong away from the rotor brush hub. Check that the rear prong is making contact with the rotor brush hub with the KS-6320 orange stick. Use the No. 38-B lamp socket equipped with a suitable lamp in making this check. If necessary to adjust the brush, apply the No. 363 ad-

juster to the front prong just above the crotch and adjust as required. In case the rear prong does not make contact with the rotor brush hub, turn the No. 456-A adjuster sideways so that the embossing on the adjuster will not interfere, and insert this adjuster between the feeder brushes. Adjust the rear prong with the No. 456-A adjuster so that it contacts with the rotor brush hub and then recheck the tension of the front prong. Make an effort to have approximately equal pressures on each prong. This may be accomplished if the feeder brush is kept free of bows or kinks.

3.21 Driving Pawl Tension and Position (Rq.2.21)

(1) Driving Pawl Tension To check the tension of the driving pawl, operate the armature electrically, place the No. 79-C gauge in the bend near the driving end of the pawl and observe the tension required to push the pawl away from the bottom of the ratchet wheel tooth.

(2) To adjust the driving pawl tension, hold that portion of the driving pawl which is riveted to the pawl spring with the long nose pliers. Apply the No. 325-B adjuster to hold the sloping portion of the driving pawl adjacent to the reed spring, and adjust the driving pawl until the required tension is obtained. Adjusting the riveted portion of the pawl upward increases the tension, and downward decreases the tension.

(3) Driving Pawl Position If the sides of the driving pawl are not parallel with the sides of the ratchet wheel, apply the R-1760 adjuster to the driving arm beneath the point where the pawl spring is attached to the driving arm and adjust the driving arm so that this part of the requirement is met.

(4) If the midsection of the driving pawl is not parallel to the surfaces of the ratchet wheel teeth, hold the selector armature in the operated position, apply the KS-6015 duck-bill pliers to the midsection of the pawl and adjust the pawl as required.

REASON FOR REISSUE - CHANGES IN ADJUSTING PROCEDURES

1. To list additional tools (3.001).
2. To add a procedure covering feeder brushes having the prongs bent in opposite directions (balanced type) (3.07-3.11).
3. To revise the procedure covering driving pawl tension and position (3.21).

APPROVED:

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