

AMERICAN TELEPHONE AND TELEGRAPH COMPANY  
Department of Development and Research  
Bell Telephone Laboratories, Inc.

200 AND 206 TYPE SELECTORS  
AND 10 AND 26 TYPE BANKS

1. GENERAL

- 1.01 This section covers 200 and 206 Type Selectors and 10 and 26 Type Banks and replaces R.A.P. X-71100-01, Issue 2-D.
- 1.02 Reference shall be made to section 400.001, 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 Tension and Feeder Brush position requirements covered in this section apply only to selectors which are equipped with the single piece type feeder brushes (one forked feeder brush spring being provided for each pair of rotor brush springs). No requirements are specified for the double piece type of feeder brushes.
- 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 22nd terminal is not objectionable if it

recurs regularly on every half revolution. 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 is a series circuit which ordinarily consists of the selector coil and the associated No. 44 type resistance, when provided. However, when there is a relay in parallel with the No. 44 type resistance or otherwise wired so as to be permanently connected in the battery feed to the selector, it shall be considered as a part of the selector circuit. For the Running Tests, "A" and "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 The Standard Point of Measurement is a point on the driving arm beneath the pawl spring to which the driving pawl is fastened.

1.10 Variable Requirements, for individual selectors are given on the charts, pages 10 to 15 incl., and are referred to in the following paragraphs 2.01 to 2.26, incl., as "the specified maximum, (or minimum) tension", "the specified voltage", etc.

1.11 Non-Variable and Special Requirements In addition to the variable requirements the following paragraphs 2.01 to 2.26, 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 8 to 9 and will be indicated by the reference "See Note " appearing on the charts, pages 10 to 15 incl., in the box opposite "Notes and Special Reqs." and in the "Test" and "Reaj." column, under the particular selector to which the requirement applies.

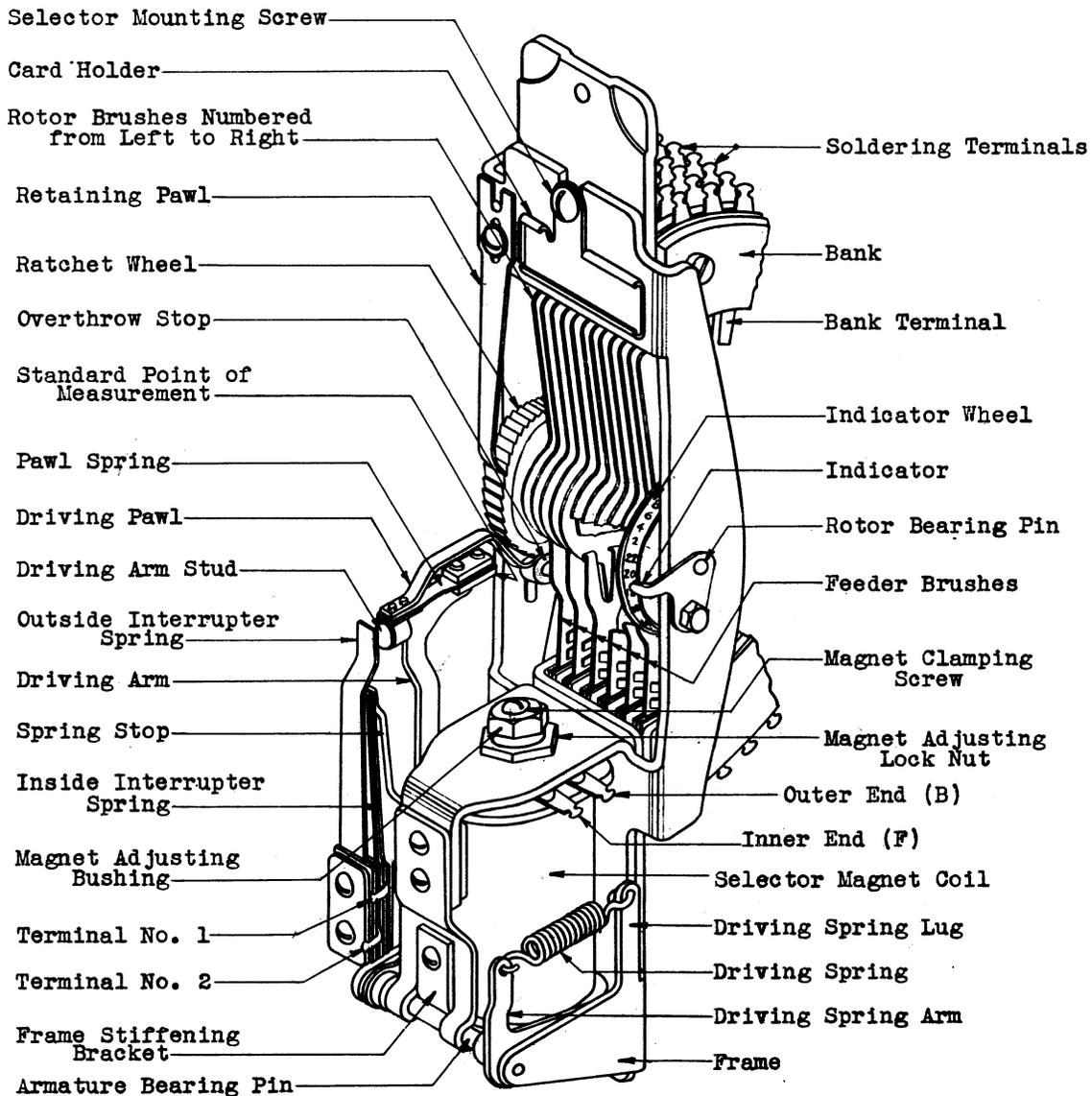


Fig. 1

1.12 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.

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

1.14 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 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) 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 R-1575 camel hair brush.
- (b) 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 R-1575 camel hair brush while

the selector is operating.

- (c) After turnover, it is recommended that, initially, the ratchet wheel teeth and the armature bearings be lubricated at intervals of one year and the rotor bearings at intervals of two years.
- (d) After turnover, periodic inspections shall be made to determine whether or not local conditions will permit an extension of the interval between lubrication periods.

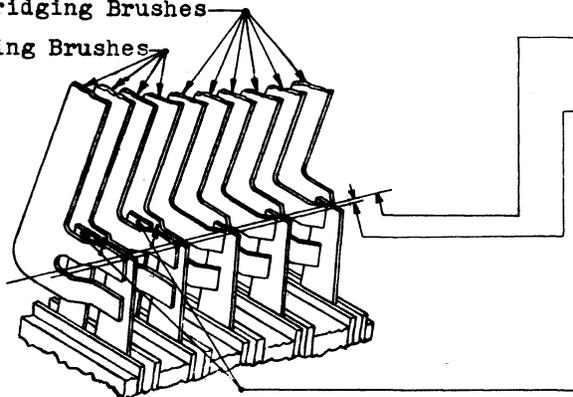
2.03 Record of Lubrication During the period of installation, a record shall be kept, by date, of the lubrication of the selector and this record shall be turned over to the Telephone Company with the equipment. If no lubrication has been done the record shall so state.

2.04 Notes and Special Requirements When specified a selector shall meet any special requirements given on pages 8 and 9.

### 2.05 Centering of Rotor Brushes on Terminals

Non-Bridging Brushes—

Bridging Brushes—



- (a) Trailing edges of all non-bridging brushes shall be in approximate alignment. Gauge by eye.
- (b) Trailing edges of the bridging brushes shall overlap those of the non-bridging brushes by approximately  $1/64$ ". Gauge by eye.
- (c) With the rotor in any normal position of rest, bridging brushes shall not contact with adjacent terminals. Gauge by eye.

Fig. 2

2.05 (Continued)

Point to Bend Rotor Brushes When Adjusting Rotor Brush Tension

Brush No. 6  
Brush No. 5  
Brush No. 4  
Brush No. 3  
Brush No. 2  
Brush No. 1

Feeder Brushes

Frame

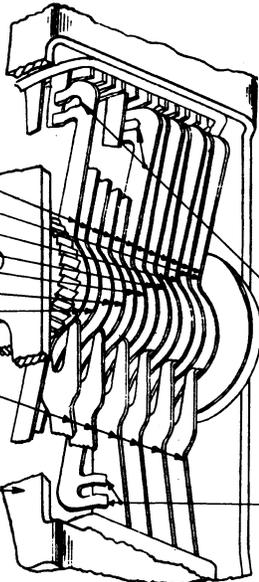
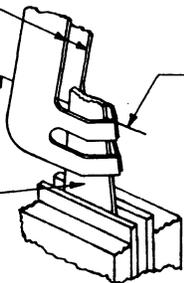


Fig. 3

Rotor Brush  
Center Line of Feeder

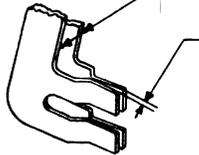
Feeder Brush

Fig. 4



Bridging Brush

Fig. 5



Bank

Bank Terminals

Fig. 6

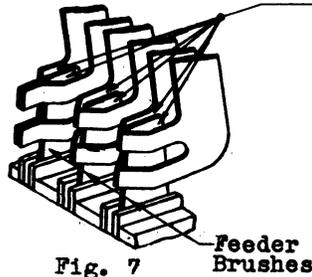
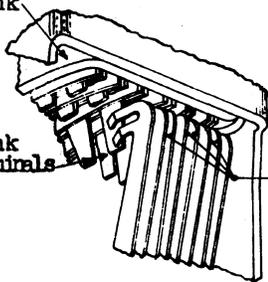


Fig. 7

2.06

(d) 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 back and forth 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.

**Rotor Brush Tension** 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 gram gauge.

2.07

**Prong Contact With Feeder Brush** At least one prong of each individual brush member shall make contact with the associated feeder brush. The other prong shall not be away from the feeder brush more than:

Test - Approximately .005"  
Readjust - .003"

Gauge by eye.

2.08

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

2.09

**Toeing of Bridging Brushes** The trailing edges or tips of 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.

2.10

**Heel Spacing**

(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 topmost row of terminals. Gauge by eye.

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

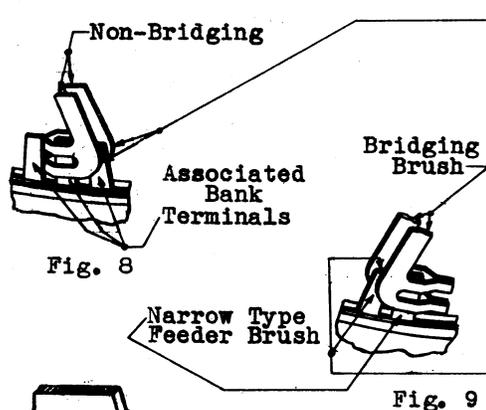


Fig. 8

Fig. 9

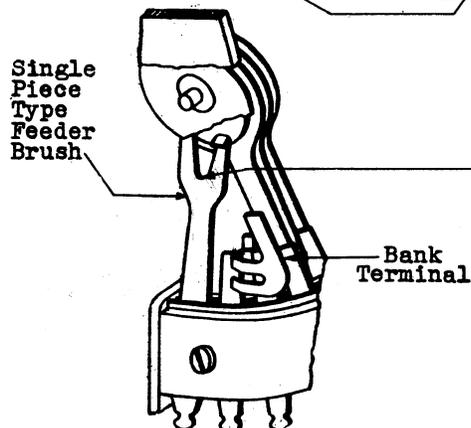


Fig. 10

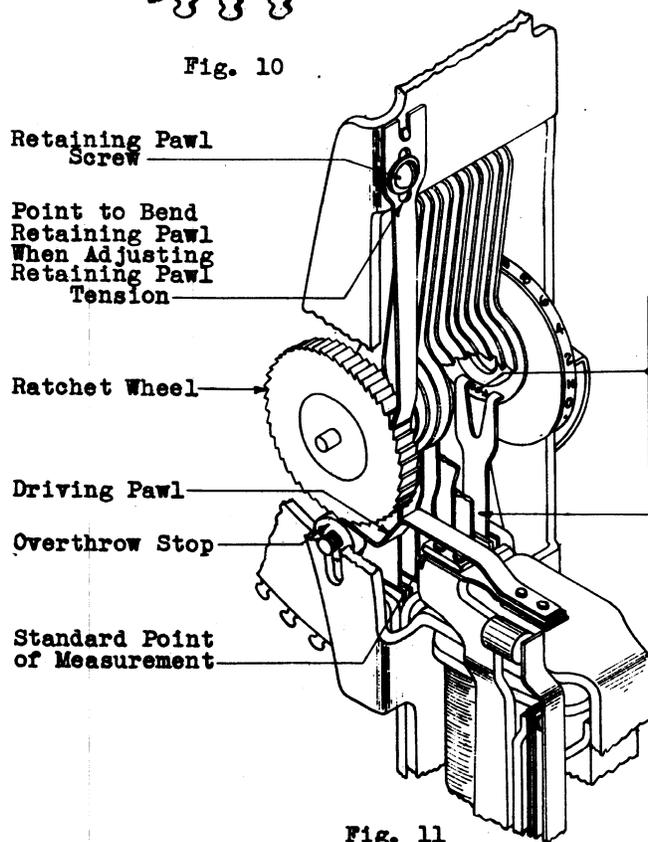


Fig. 11

2.11 False Contacting

- (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 11th and 12th terminals and the 2nd and 3rd terminals from the top of the bank. Gauge by eye.
- (b) Bridging Brushes On all selectors equipped with single piece narrow type 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.

2.12 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.

2.13 Feeder Brush Tension (Single Piece Type Only)

The tension of each feeder brush against the associated rotor hub measured at a point just below the crotch between the brush prongs 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 gram gauge.

2.14 Feeder Brush Position (Single Piece Type Only)

- (a) When the feeder brush is pushed away from the rotor with pressure applied on the center line of the feeder directly below the crotch, the two prongs shall leave the rotor at approximately the same time. Gauge by eye.
- (b) 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) Except where otherwise specified there shall be an appreciable clearance between all parts of the feeder and rotor brushes except contacting surfaces thereon. Gauge by eye.
- (d) That part of the feeder brush over which the rotor brushes pass shall be in alignment with the bank terminals within .010". Gauge by eye.

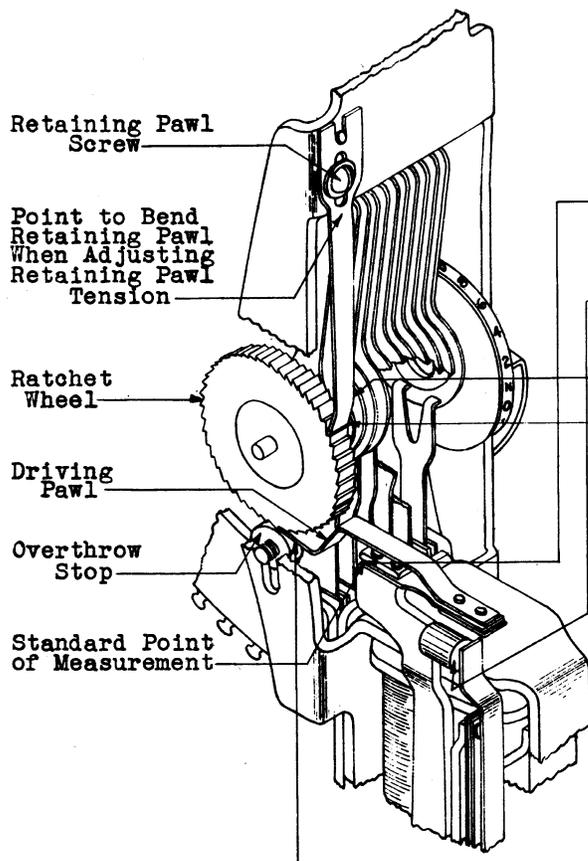


Fig. 12

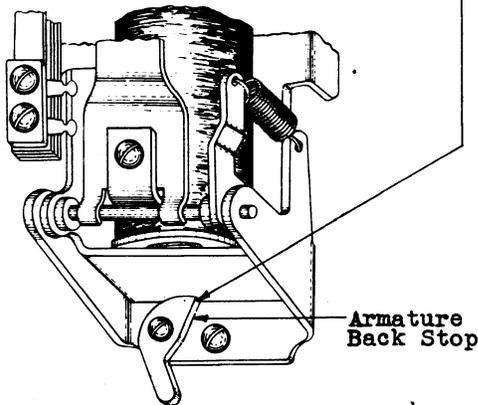


Fig. 13

### 2.15 Driving Spring Tension

- (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 gram gauge.
- (b) The driving spring shall not have less than the specified minimum tension measured as above. Use the No. 79-B gram gauge.
- (c) The interrupter spring shall not be in contact with the rubber stud when these requirements are met. Gauge by eye.

### 2.16 Armature Back Stop

- (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.
- (b) 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  $90^\circ$  apart, and to check the maximum requirement on both ends of the rotor brush assembly.

### 2.17 Retaining Pawl Tension and Position

- (a) The tension of the retaining pawl 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 gram gauge.
- (b) 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 requirement shall be checked with the ratchet wheel in at least 4 positions, approximately  $90^\circ$  apart. Gauge by eye.

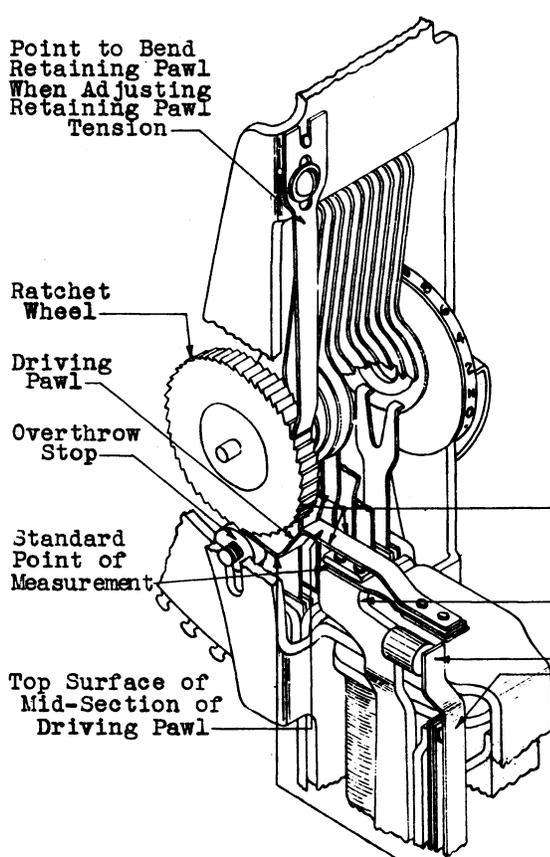


Fig. 14

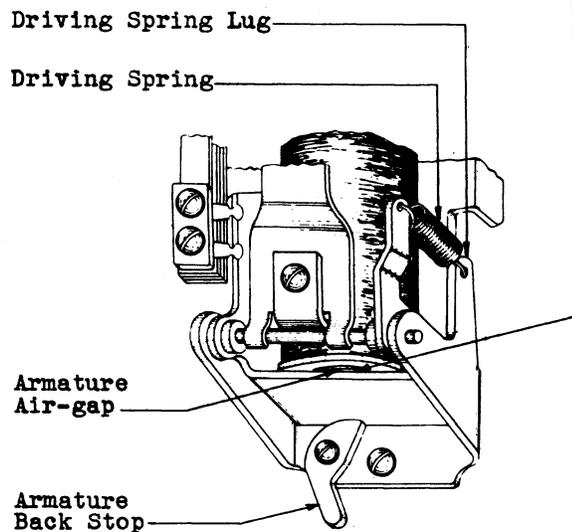


Fig. 15

### 2.18 Armature Air-Gap

- (a) The gap between the armature and 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 .004" blade of the No. 74-D thickness gauge.
- (c) In meeting the above requirements, 2.18 (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.

- 2.19 Interrupter Spring Tension The tension of the outside interrupter spring shall meet the specified minimum and maximum limits. Use the No. 79 type gram gauge.

### 2.20 Driving Pawl Tension and Position

- (a) 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 gram gauge.

- (b) 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.

- 2.21 Magnet Pull Test 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 gram gauge.

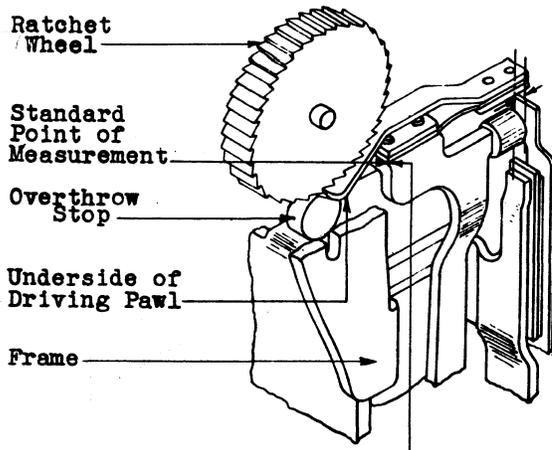


Fig. 16

- 2.22 Step Test 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

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 R-2228 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. When so used the "Selector Circuit" includes the winding of the associated (RA) relay.

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 thickness gauge.

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

(c) It is not required that the selector be rotated under self-interruptions. It shall, however, be rotated step-by-step two complete revolutions on the voltage specified.

brushes. Use the No. 79 type gram gauge.

- 2.23 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".

- 2.24 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".

- 2.25 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".

- 2.26 Interrupter Contact Test 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 thickness gauge.

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 When this selector is used in a 51-A Dial Tester Circuit the "Selector Circuit" includes the winding of the associated (SA) relay.

NOTE 10 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 2.23, 2.25 and 2.26. The selector shall be rotated partly step-by-step and partly under self-interruptions for two complete revolutions on the specified low voltage.

NOTE 11 Requirements cover uses other than as party test switch in 2-party message rate district circuits.

NOTE 12 When these selectors are so wired in circuit that they cannot be rotated under self-interruptions, the following requirement shall be substituted for requirement 2.23. The selector shall be rotated step-by-step two

complete revolutions on the specified low voltage and shall be rotated at least 10 revolutions at the time of test under control of the associated relay on the office voltage.

**NOTE 13** When these selectors are used in a 51-A dial tester circuit the "Selector Circuit" includes the winding of the associated (RA) relay.

**NOTE 14** Requirements cover use in offices where the rated voltage is 40 to 56 volts.

**NOTE 15** Requirements cover use as a numerical register switch in offices where the rated voltage is 40 to 56 volts. When so used, the "Selector Circuit" includes the winding of the associated (ADV) relay.

**NOTE 16** Requirements cover use as a numerical register switch in offices where the rated voltage is 36 to 44 volts. When so used, the "Selector Circuit" includes the winding of the associated (ADV) relay.

**NOTE 17** Requirements cover use in offices where the rated voltage is 20 to 25 volts.

**NOTE 18**

(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 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 79-C gauge.

**NOTE 19** 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 mica insulator and the contact adjusting lug directly behind the contact on the inside interrupter spring. Use the No. 74-D thickness gauge.

**NOTE 20** All interrupter operation requirements shall be met with the same interrupter adjustment.

**NOTE 21**

(a) The selector shall operate steadily and uniformly on self-interruption 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" thick gauge placed between the outside interrupter spring 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 22** 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" thick gauge inserted between the outer spring and its spring stop. Use the No. 74-D thickness gauge.

**NOTE 23**

(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 2.19. Use the No. 79-C gram gauge and the No. 74-D thickness gauge.

**NOTE 24** 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 mica insulator and the contact adjusting lug directly behind the contact on the inside interrupter spring. Use the No. 74-D thickness gauge.

**NOTE 25** There shall be a clearance of 1/32" (approximately twice 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 26**

(a) The contact pressure of the operating spring measured at the contact shall be min. 45 grams, max. 65 grams. Use a 79 type 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.

REASON FOR ISSUE COVERING CHANGES IN REQUIREMENTS

1. To add requirements for the 206-BE, BF, BG, BH and BJ selectors as shown in table.
2. To omit requirements for the D-87338 selector.
3. To add Notes 1 and 13 and low voltage operate values to the requirements of the D-87337 selector.
4. To add low voltage operate values to the requirements of the D-80882 selector.

THE FOLLOWING VARIABLE TEST AND REAJ. REQ. FOR 200 TYPE AND 206 TYPE SEL. SHALL BE APPLIED IN ADDITION TO COMMON REQ. 2.01, 2.02, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.16, 2.17, 2.20

NO. REQUIREMENTS UNIT		45 TO 50 VOLT SELECTORS																									
		206-A SEL. 200-B SEL.				206-A SEL. 200-B SEL.				206-B SEL. 200-A SEL.				206-C SEL. 200-D SEL.				206-D SEL. 200-E SEL.				206-E SEL. 200-F SEL.					
		26-A or D BANK 10-B or E BANK				26-A BANK 10-B BANK				26-A or B BANK 10-A or B BANK				26-D BANK 10-E BANK				26-C BANK 10-D BANK				26-A BANK 10-B BANK					
		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.			
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX				
2.04 SPL. REQS. SEE NOTE		NO. 2																									
2.06 ROTOR BR. TENSION		BR. NO.1	GRAM	20	40	25	40	30	50	35	50	15	35	20	35	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	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
2.15 DRIVING SPRING TENSION		GRAM		800		800		800		800		800		800		500	600	500	600	550	650	550	650	700		700	
2.18 ARMATURE AIR-GAP		VOLT		45		44		45		44		45		44		45		44		45		44		45		44	
2.19 INTERRUPTER SPRING TENSION		GRAM		100		400		100		400		100		400		100		400		45		65		45		65	
2.21 MAGNET PULL TEST		VOLT		45		44		45		44		45		44		45		44		45		44		45		44	
		GRAM		50		50		45		50		50		50		225		250		300		300		150		150	
2.22 STEP TEST		GRAM		150		300		150		300		150		300		75		150		150		300		100		200	
2.23 LOW VOLTAGE OPR. TEST "A"		VOLT		45		44		45		44		45		44		45		44		45		44		45		44	
2.24 SPEED		TPS		20		20		20		20		40		40										30		30	
2.25 HIGH VOLTAGE OPR. TEST "B"		VOLT		50		51		50		51		50		51		50		51						50		51	
2.26 INTERRUPTER CONTACT TEST		VOLT		45		44		45		44		45		44		45		44						45		44	
(a) GAUGE FOR 206 TYPE		INCH		.003"		.003"		.003"		.002"		.002"		.002"		.002"		.002"		-		-		.002"		.002"	
(b) GAUGE FOR 200 TYPE		INCH		.002"		.002"		.002"		.002"		.002"		.002"		.002"		.002"		-		-		.002"		.002"	

THE FOLLOWING VARIABLE TEST AND REAJ. REQ. FOR 200 TYPE AND 206 TYPE SEL. SHALL BE APPLIED IN ADDITION TO COMMON REQ. 2.01, 2.02, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.16, 2.17, 2.20

NO. REQUIREMENTS UNIT		45 TO 50 VOLT SELECTORS																									
		206-G SEL. 200-H SEL.				206-J SEL. 200-K SEL.				206-J SEL. 200-K SEL.				206-K SEL. 200-L SEL.				206-L SEL. 200-M SEL.				206-M SEL. 200-P SEL.					
		26-D BANK 10-E BANK				26-D BANK 10-E BANK				26-D BANK 10-E BANK				26-A or D BANK 10-B or E BANK				26-A or D BANK 10-B or E BANK				26-A BANK 10-B BANK					
		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.			
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		
2.04 SPL. REQS. SEE NOTE		NO. 6																									
2.06 ROTOR BR. TENSION		BR. NO.1	GRAM	30	50	35	50	15	35	20	35	25	50	35	50	20	40	25	40	20	40	25	40	20	40	25	40
		BR. NO.2	GRAM	20	40	25	40	15	35	20	35	15	35	20	35	20	40	25	40	20	40	25	40	20	40	25	40
		BR. NO.3	GRAM	20	40	25	40	15	35	20	35	15	35	20	35	20	40	25	40	20	40	25	40	20	40	25	40
		BR. NO.4	GRAM	20	40	25	40	15	35	20	35	15	35	20	35	20	40	25	40	20	40	25	40	20	40	25	40
		BR. NO.5	GRAM	20	40	25	40	15	35	20	35	15	35	20	35	20	40	25	40	20	40	25	40	20	40	25	40
		BR. NO.6	GRAM	20	40	25	40	15	35	20	35	15	35	20	35	20	40	25	40	20	40	25	40	20	40	25	40
2.15 DRIVING SPRING TENSION		GRAM		750		750		500		600		500		700		800		800		800		800		800		800	
2.18 ARMATURE AIR-GAP		VOLT		45		44		45		44		45		44		45		44		45		44		45		44	
2.19 INTERRUPTER SPRING TENSION		GRAM		100		400		100		400		100		400		100		400		100		400		100		400	
2.21 MAGNET PULL TEST		VOLT		45		44		45		44		45		44		45		44		45		44		45		44	
		GRAM		45		50		225		250		135		150		50		50		50		50		50		50	
2.22 STEP TEST		GRAM		150		300		75		150		75		150		150		300		150		300		150		300	
2.23 LOW VOLTAGE OPR. TEST "A"		VOLT		45		44		45		44		45		44		45		44		45		44		45		44	
2.24 SPEED		TPS		20		20																					
2.25 HIGH VOLTAGE OPR. TEST "B"		VOLT		50		51		50		51		50		51		50		51		50		51		50		51	
2.26 INTERRUPTER 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"		.002"		.002"		.002"		.003"		.003"		.003"		.003"	
(b) GAUGE FOR 200 TYPE		INCH		.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

THE FOLLOWING VARIABLE TEST AND REAJ. REQ. FOR 200 TYPE AND 206 TYPE SEL. SHALL BE APPLIED IN ADDITION TO COMMON REQ. 2.01, 2.02, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.16, 2.17, 2.20			45 TO 50 VOLT SELECTORS																											
			206-N SEL. 200-R SEL.				206-P SEL. 200-S SEL.				206-P SEL. 200-S SEL.				200-T SEL.				206-R SEL. 200-U SEL.				206-S SEL. 200-AA SEL.							
			26-E BANK 10-F BANK				26-A or D BANK 10-B or E BANK				26-D BANK 10-E BANK				26-A or D BANK 10-B or E BANK				26-A or D BANK 10-B or E BANK				26-A BANK 10-B BANK							
			TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.	
NO.	REQUIREMENTS	UNIT	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
2.04 SPL. REQS. SEE NOTE			NO. 9				NO. 10				NO. 11				-				-				NOS. 1 AND 12							
2.06 ROTOR BR. TENSION	BR. NO.1	GRAM	20	40	25	40	25	45	30	45	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40
	BR. NO.2	GRAM	20	40	25	40	25	45	30	45	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40
	BR. NO.3	GRAM	20	40	25	40	25	45	30	45	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40
	BR. NO.4	GRAM	20	40	25	40	25	45	30	45	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40
	BR. NO.5	GRAM					25	45	30	45	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40
	BR. NO.6	GRAM					20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40
2.15 DRIVING SPRING TENSION		GRAM	800		800		800		800		800		800		500	700	500	700	800		800		800		800		800		800	
2.18 ARMATURE AIR-GAP		VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44
2.19 INTERRUPTER SPRING 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	100	400	100	400
2.21 MAGNET PULL TEST		VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44
		GRAM	50		50		50		50		50		50		150		150		50		50		50		50		50		50	
2.22 STEP TEST		GRAM	150		300		125		250		125		250		75		150		150		300		150		300		150		300	
2.23 LOW VOLTAGE OPR. TEST "A"		VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44
2.24 SPEED		TPS																												
2.25 HIGH VOLTAGE OPR. TEST "B"		VOLT	50		51		50		51		50		51		50		51		50		51		50		51		50		51	
2.26 INTERRUPTER CONTACT TEST		VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44
	(a) GAUGE FOR 206 TYPE	INCH		.003"				.003"				.003"				-				.003"				-				-		
	(b) GAUGE FOR 200 TYPE	INCH		.002"				.002"				.002"				.002"				.002"				.002"				-		

THE FOLLOWING VARIABLE TEST AND REAJ. REQ. FOR 200 TYPE AND 206 TYPE SEL. SHALL BE APPLIED IN ADDITION TO COMMON REQ. 2.01, 2.02, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.16, 2.17, 2.20			45 to 50 VOLT SELECTORS																											
			206-W SEL. 200-AE SEL.				206-Y SEL. 200-AF SEL.				206-AA SEL. 200-AG SEL.				206-AB SEL. 200-AH SEL.				206-AD SEL. 200-AK SEL.				206-AE SEL. 200-AM SEL.							
			26-D BANK 10-E BANK				26-D BANK 10-E BANK				26-D BANK 10-E BANK				26-A or D BANK 10-B or E BANK				26-E BANK 10-F BANK				26-E BANK 10-J BANK							
			TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.	
NO.	REQUIREMENTS	UNIT	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	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. 1, 12 AND 13							
2.06 ROTOR BR. 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	40	25	40	20	40	25	40
	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	40	25	40	20	40	25	40
	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	40	25	40	20	40	25	40
	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	40	25	40	20	40	25	40
	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												
2.15 DRIVING SPRING TENSION		GRAM	500	600	500	600	800		800		500	600	500	600	800		800		800		800		550	650	550	650				
2.18 ARMATURE AIR-GAP		VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44
2.19 INTERRUPTER SPRING 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	100	400	100	400
2.21 MAGNET FULL TEST		VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44
		GRAM	180		200		50		50		180		200		50		50		50		50		50		50		50		50	
2.22 STEP TEST		GRAM	75		150		150		300		75		150		150		300		150		300		75		150		75		150	
2.23 LOW VOLTAGE OPR. TEST "A"		VOLT		44		43		45		44		44		43		45		44		45		44		45		44		45		44
2.24 SPEED		TPS																												
2.25 HIGH VOLTAGE OPR. TEST "B"		VOLT	50		51		50		51		50		51		50		51		50		51		50		51		50		51	
2.26 INTERRUPTER CONTACT TEST		VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44
	(a) GAUGE FOR 206 TYPE	INCH		.002"				.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

THE FOLLOWING VARIABLE TEST AND REAJ. REQ. FOR 200 TYPE AND 206 TYPE SEL. SHALL BE APPLIED IN ADDITION TO COMMON REQ. 2.01, 2.02, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.16, 2.17, 2.20			45 TO 50 VOLT SELECTORS																																	
			206-AF SEL.				206-AJ SEL.				206-AL SEL.				206-AM SEL.				206-AP SEL.				206-AU SEL.													
			200-AN SEL.				200-AS SEL.				200-AW SEL.				200-AY SEL.				200-BB SEL.																	
			26-A or D BANK				26-E BANK				26-F BANK				26-D BANK				26-C BANK				26-H BANK													
NO. REQUIREMENTS			UNIT		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.													
					MIN	MAX	MIN	MAX	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. 1 AND 12																																	
2.06 ROTOR BR. TENSION			BR. NO.1	GRAM	30	50	35	50	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
			BR. NO.2	GRAM	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
			BR. NO.3	GRAM	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40									20	40	25	40	20	40	25	40
			BR. NO.4	GRAM	20	40	25	40	20	40	25	40	20	40	25	40	20	40	25	40									25	45	30	45	25	45	30	45
			BR. NO.5	GRAM	20	40	25	40					20	40	25	40	20	40	25	40									25	45	30	45	25	45	30	45
			BR. NO.6	GRAM	20	40	25	40									20	40	25	40									30	50	35	50	30	50	35	50
2.15 DRIVING SPRING TENSION			GRAM	800		800			550	650	550	650	800		800			700	800	700	800	800		800			800		800							
2.18 ARMATURE AIR-GAP			VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44					
2.19 INTERRUPTER SPRING TENSION			GRAM	100	400	100	400	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300					
2.21 MAGNET FULL TEST			VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44					
			GRAM	50		50		50		50		50		50		200		200		50		50		50		50		50		50						
2.22 STEP TEST			GRAM	150		300		75		150		150		300		100		200		150		300						150		300						
2.23 LOW VOLTAGE OPR. TEST "A"			VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44					
2.24 SPEED			TPS									20		20																						
2.25 HIGH VOLTAGE OPR. TEST "B"			VOLT									50		51		50		51		50		51														
2.26 INTERRUPTER CONTACT TEST			VOLT									45		44		45		44		45		44														
(a) GAUGE FOR 206 TYPE			INCH		-		-		-		-		.003"		-		.003"		-		.003"		-		-		-		-		-					
(b) GAUGE FOR 200 TYPE			INCH		-		-		-		-		.003"		-		.003"		-		.003"		-		-		-		-		-					

THE FOLLOWING VARIABLE TEST AND REAJ. REQ. FOR 200 TYPE AND 206 TYPE SEL. SHALL BE APPLIED IN ADDITION TO COMMON REQ. 2.01, 2.02, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.16, 2.17, 2.20			45 TO 50 VOLT SELECTORS																													
			206-AW SEL.				206-BC SEL.				206-BD SEL.																					
			26-G BANK				26-F BANK				26-F BANK																					
NO. REQUIREMENTS			UNIT		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.									
					MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX						
2.04 SPL. REQS. SEE NOTE			-																													
2.06 ROTOR BR. TENSION			BR. NO.1	GRAM	30	50	35	50	30	50	35	50	30	50	35	50																
			BR. NO.2	GRAM	25	45	30	45	30	50	35	50	25	45	30	45																
			BR. NO.3	GRAM	25	45	30	45	30	50	35	50	25	45	30	45																
			BR. NO.4	GRAM					30	50	35	50																				
			BR. NO.5	GRAM					20	40	25	40																				
			BR. NO.6	GRAM					20	40	25	40																				
2.15 DRIVING SPRING TENSION			GRAM	800		800			1000		1000			1000		1000																
2.18 ARMATURE AIR-GAP			VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44	
2.19 INTERRUPTER SPRING TENSION			GRAM	100	300	100	300	100	300	100	300	100	300	100	300																	
2.21 MAGNET FULL TEST			VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44	
			GRAM	50		50		50		50		50		50																		
2.22 STEP TEST			GRAM	150		300		100		200		150		300																		
2.23 LOW VOLTAGE OPR. TEST "A"			VOLT		45		44		45		44		45		44		45		44		45		44		45		44		45		44	
2.24 SPEED			TPS									30		30		30		30														
2.25 HIGH VOLTAGE OPR. TEST "B"			VOLT									50		51		50		51														
2.26 INTERRUPTER CONTACT TEST			VOLT									45		44		45		44														
(a) GAUGE FOR 206 TYPE			INCH		-		-		.002"		-		.002"		-		-		-		-		-		-		-		-		-	
(b) GAUGE FOR 200 TYPE			INCH		-		-		-		-		-		-		-		-		-		-		-		-		-		-	

REQUIREMENTS FOR 200 AND 206 TYPE SELECTORS AND 10 AND 26 TYPE BANKS

THE FOLLOWING VARIABLE TEST AND REAJ. REQ. FOR 200 TYPE AND 206 TYPE SEL. SHALL BE APPLIED IN ADDITION TO COMMON REQ. 2.01, 2.02, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.16, 2.17, 2.20			45 TO 50 VOLT SELECTORS												45 TO 52 VOLT SELECTORS							
			D-78143 SEL.				D-78677 SEL.												D-80449 SEL.			
			D-78142 BANK				26-D BANK												26-A BANK			
			10-E BANK				10-E BANK												10-B BANK			
NO.	REQUIREMENTS	UNIT	TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.	
			MIN	MAX	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. 1, 12 AND 13												NOS. 20 AND 24							
2.06 ROTOR BR. TENSION	BR. NO.1	GRAM	20	40	25	40	15	35	20	35									25	45	30	45
	BR. NO.2	GRAM	20	40	25	40	15	35	20	35									25	45	30	45
	BR. NO.3	GRAM	20	40	25	40	15	35	20	35									20	40	25	40
	BR. NO.4	GRAM	20	40	25	40	15	35	20	35									20	40	25	40
	BR. NO.5	GRAM					15	35	20	35									20	40	25	40
	BR. NO.6	GRAM					15	35	20	35									20	40	25	40
2.15 DRIVING SPRING TENSION		GRAM	550	650	550	650	500	600	500	600									950		950	
2.18 ARMATURE AIR-GAP		VOLT		45		44		45		44									45		44	
2.19 INTERRUPTER SPRING TENSION		GRAM	100	400	100	400	100	400	100	400									100	300	100	300
2.21 MAGNET PULL TEST		VOLT		45		44		45		44									45		44	
		GRAM	50		50		180		200										50		50	
2.22 STEP TEST		GRAM	75		150		75		150										75		150	
2.23 LOW VOLTAGE OPR. TEST "A"		VOLT		45		44		45		44									45		44	
2.24 SPEED		TPS																	30		30	
2.25 HIGH VOLTAGE OPR. TEST "B"		VOLT				50		51											52		53	
2.26 INTERRUPTER CONTACT TEST		VOLT					45		44										45		44	
	(a) GAUGE FOR 206 TYPE	INCH		-		-		-		-									-		-	
	(b) GAUGE FOR 200 TYPE	INCH		-		.002"		-		-									.002"		-	

THE FOLLOWING VARIABLE TEST AND REAJ. REQ. FOR 200 TYPE AND 206 TYPE SEL. SHALL BE APPLIED IN ADDITION TO COMMON REQ. 2.01, 2.02, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.16, 2.17, 2.20			40 TO 56 VOLT SELECTORS												36 TO 44 VOLT SELECTORS											
			206-G SEL.				206-H SEL.				206-J SEL.				206-AY SEL.				206-T SEL.				206-U SEL.			
			200-H SEL.				200-J SEL.				200-K SEL.				26-D BANK				26-T BANK				26-U BANK			
			26-D BANK				26-D BANK				26-D BANK				26-D BANK				26-D BANK				26-D BANK			
10-E BANK				10-E BANK				10-E BANK				10-E BANK				10-E BANK				10-E BANK						
NO.	REQUIREMENTS	UNIT	TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.					
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX				
2.04 SPL. REQS. SEE NOTE			NO. 14												NO. 15											
2.06 ROTOR BR. TENSION	BR. NO.1	GRAM	20	40	25	40	20	40	25	40	15	35	20	35	15	35	20	35	20	40	25	40				
	BR. NO.2	GRAM	20	40	25	40	20	40	25	40	15	35	20	35	15	35	20	35	20	40	25	40				
	BR. NO.3	GRAM	20	40	25	40	20	40	25	40	15	35	20	35	15	35	20	35	20	40	25	40				
	BR. NO.4	GRAM	20	40	25	40	20	40	25	40	15	35	20	35	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				
2.15 DRIVING SPRING TENSION		GRAM	750		750		750		750	500	600	500	600	550		550		800		800	600	700				
2.18 ARMATURE AIR-GAP		VOLT		40		40		40		40		40		40		40		36		35						
2.19 INTERRUPTER SPRING TENSION		GRAM	100	400	100	400	100	400	100	400	100	400	100	400	100	300	100	300	100	400	100	400				
2.21 MAGNET FULL TEST		VOLT		40		40		40		40		40		40		40		36		35						
		GRAM	50		50		50		50	45		50		75		75		50		50						
2.22 STEP TEST		GRAM	150		300		150		300	75		150		100		200		150		300						
2.23 LOW VOLTAGE OPR. TEST "A"		VOLT		40		40		40		40		40		40		40		36		35						
2.24 SPEED		TPS	20		20		20		20									20		20						
2.25 HIGH VOLTAGE OPR. TEST "B"		VOLT	56		56		56		56	56		56		56		56		44		45						
2.26 INTERRUPTER CONTACT TEST		VOLT		40		40		40		40		40		40		40		36		35						
	(a) GAUGE FOR 206 TYPE	INCH		.003"		.003"		.003"		.002"		.002"		.002"		.002"		.002"		.002"						
	(b) GAUGE FOR 200 TYPE	INCH		.002"		.002"		.002"		.002"		.002"		-		-		.002"		.002"						

REQUIREMENTS FOR 200 AND 206 TYPE SELECTORS AND 10 AND 26 TYPE BANKS

THE FOLLOWING VARIABLE TEST AND REAJ. REQ. FOR 200 TYPE AND 206 TYPE SEL. SHALL BE APPLIED IN ADDITION TO COMMON REQ. 2.01, 2.02, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.16, 2.17, 2.20			20 TO 25 AND 20 TO 28 VOLT SELECTORS																							
			206-E SEL.				206-F SEL.				206-AC SEL.				206-AG SEL.				206-AH SEL.				206-AK SEL.			
			TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.	
NO.	REQUIREMENTS	UNIT	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		
2.04	SPL. REQS. SEE NOTE		NO. 17				NO. 18				-				NOS. 19 AND 20				NOS. 19 AND 20				NOS. 19, 20 & 21			
2.06	ROTOR BR. TENSION	GRAM	30	50	35	50	30	50	35	50	30	50	35	50	30	50	35	50	30	50	35	50	15	30	20	30
	BR. NO.1	GRAM	20	40	25	40	20	40	25	40	20	40	25	40	25	45	30	45	30	50	35	50	15	30	20	30
	BR. NO.2	GRAM	20	40	25	40	20	40	25	40	20	40	25	40	25	45	30	45					15	30	20	30
	BR. NO.3	GRAM	20	40	25	40	20	40	25	40	20	40	25	40	25	45	30	45					15	30	20	30
	BR. NO.4	GRAM	20	40	25	40	20	40	25	40	20	40	25	40	25	45	30	45					15	30	20	30
	BR. NO.5	GRAM	20	40	25	40	20	40	25	40	20	40	25	40									15	30	20	30
	BR. NO.6	GRAM	20	40	25	40	20	40	25	40	20	40	25	40									15	30	20	30
2.15	DRIVING SPRING TENSION	GRAM	700		700		700		700	700		700		800		800		600	700	600	700	650	700	650	700	
2.18	ARMATURE AIR-GAP	VOLT		20		20		20		20		20		20		19		20		19		20		19		
2.19	INTERRUPTER SPRING TENSION	GRAM	100	400	100	400	150	300	150	300	100	400	100	400	100	300	100	300	100	300	100	300	200	300	200	300
2.21	MAGNET PULL TEST	VOLT		20		20		20		20		20		20		19		20		19		20		19		
		GRAM	135		150		135		150	135		150		50		50		150		150		200		200		
2.22	STEP TEST	GRAM	100		200		100		200	100		200		100		200		75		150		75		150		
2.23	LOW VOLTAGE OPR. TEST "A"	VOLT		20		20		20		20		20		20		19		20		19		20		19		
2.24	SPEED	TPS	30		30		30		30	30		30		20		20		28		29		28		29		
2.25	HIGH VOLTAGE OPR. TEST "B"	VOLT	25 $\frac{1}{2}$		25 $\frac{1}{2}$		25		25	25 $\frac{1}{2}$		25 $\frac{1}{2}$		28		29		28		29		28		29		
2.26	INTERRUPTER CONTACT TEST	VOLT		20		20		20		20		20		20		19		20		19						
	(a) GAUGE FOR 206 TYPE	INCH																								
	(b) GAUGE FOR 200 TYPE	INCH																								

THE FOLLOWING VARIABLE TEST AND REAJ. REQ. FOR 200 TYPE AND 206 TYPE SEL. SHALL BE APPLIED IN ADDITION TO COMMON REQ. 2.01, 2.02, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.16, 2.17, 2.20			20 TO 25 AND 20 TO 28 VOLT SELECTORS																							
			206-AN SEL.				206-AR SEL.				206-AS SEL.				206-AT SEL.				206-BA SEL.				206-BB SEL.			
			TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.	
NO.	REQUIREMENTS	UNIT	MIN	MAX	MIN	MAX	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. 19 AND 20				NOS. 19 AND 20				NOS. 19 AND 20				NOS. 1 AND 12				NOS. 19 AND 20			
2.06	ROTOR BR. TENSION	GRAM	30	50	35	50	20	40	25	40	30	50	35	50	30	50	35	50	25	45	30	45	20	40	25	40
	BR. NO.1	GRAM	25	45	30	45	20	40	25	40	30	50	35	50	20	40	25	40	25	45	30	45	20	40	25	40
	BR. NO.2	GRAM	25	45	30	45	20	40	25	40	20	40	25	40	20	40	25	40	25	45	30	45	20	40	25	40
	BR. NO.3	GRAM					30	50	35	50	20	40	25	40	20	40	25	40	25	45	30	45	20	40	25	40
	BR. NO.4	GRAM												20	40	25	40	20	40	25	40	30	50	35	50	
	BR. NO.5	GRAM												20	40	25	40	20	40	25	40	30	50	35	50	
	BR. NO.6	GRAM												20	40	25	40	20	40	25	40	30	50	35	50	
2.15	DRIVING SPRING TENSION	GRAM	800		800		800		800	800		800		800		800		800		800		900		900		
2.18	ARMATURE AIR-GAP	VOLT		20		19		20		19		20		19		20		19		20		19		20		
2.19	INTERRUPTER SPRING TENSION	GRAM	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	300		
2.21	MAGNET FULL TEST	VOLT		20		19		20		19		20		19		20		19		20		19		20		
		GRAM	50		50		50		50	50		50		50		50		50		50		50		50		
2.22	STEP TEST	GRAM	150		300		150		300	150		300		150		300		150		300		150		300		
2.23	LOW VOLTAGE OPR. TEST "A"	VOLT		20		19		20		19		20		19		20		19		20		19		20		
2.24	SPEED	TPS																								
2.25	HIGH VOLTAGE OPR. TEST "B"	VOLT	28		29		28		29	28		29		28		29		28		29		28		29		
2.26	INTERRUPTER CONTACT TEST	VOLT					20		19					20		19								20		
	(a) GAUGE FOR 206 TYPE	INCH																								
	(b) GAUGE FOR 200 TYPE	INCH																								

REQUIREMENTS FOR 200 AND 206 TYPE SELECTORS  
AND 10 AND 26 TYPE BANKS

THE FOLLOWING VARIABLE TEST AND REAJ. REQ. FOR 200 TYPE AND 206 TYPE SEL. SHALL BE APPLIED IN ADDITION TO COMMON REQ. 2.01, 2.02, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.16, 2.17, 2.20			15 TO 21, 20 TO 25 AND 20 TO 28 VOLT SELECTORS																								
			206-BE SEL.				206-BF SEL.				206-BG SEL. 206-BH SEL.				206-BJ SEL.				D-78683 SEL.				D-80701 SEL.				
			26-A BANK				26-A BANK				26-D BANK				26-C BANK				26-G BANK D-78684 BANK				26-G BANK D-78684 BANK				
			TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		
NO.	REQUIREMENTS	UNIT	MIN	MAX	MIN	MAX	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. 1 AND 12				NOS. 1 AND 12				NOS. 19 AND 20				NOS. 19 AND 20				-				NOS. 19, 20, 22 & 23				
2.06	ROTOR BR. TENSION	GRAM	20	40	25	40	30	50	35	50	30	50	35	50	20	40	25	40	30	50	35	50	20	40	25	40	
	BR. NO.1	GRAM	20	40	25	40	30	50	35	50	30	50	35	50	20	40	25	40	30	50	35	50	20	40	25	40	
	BR. NO.2	GRAM	20	40	25	40	30	50	35	50	20	40	25	40					25	40	30	40	20	40	25	40	
	BR. NO.3	GRAM	20	40	25	40	30	50	35	50	20	40	25	40					25	40	30	40	20	40	25	40	
	BR. NO.4	GRAM	20	40	25	40	30	50	35	50	20	40	25	40													
	BR. NO.5	GRAM	25	45	30	45	30	50	35	50	20	40	25	40													
BR. NO.6	GRAM	25	45	30	45	30	50	35	50	20	40	25	40														
2.15	DRIVING SPRING TENSION	GRAM	900		900		800		800	900		900		650	750	650	750	550	650	550	650	700		700			
2.18	ARMATURE AIR-GAP	VOLT		20		19		20		19		20		15		14		20		19		20		19			
2.19	INTERRUPTER SPRING TENSION	GRAM	100	300	100	300	100	300	100	300	100	300	100	300	100	300	100	400	100	400	100	200	100	200	100	200	
2.21	MAGNET FULL TEST	VOLT		20		19		20		19		20		15		14		20		19		20		19			
		GRAM	50		50		50	150	50	150	50		50		100		100		50		50		100		100		
2.22	STEP TEST	GRAM	150		300		150		300	150		300		125		250		75		150		150		300			
2.23	LOW VOLTAGE OPR. TEST "A"	VOLT		20		19		20		19		20		15		14		20		19		20		19			
2.24	SPEED	TPS																									
2.25	HIGH VOLTAGE OPR. TEST "B"	VOLT								28		29		21		22		25		26		28		29			
2.26	INTERRUPTER CONTACT TEST (a) GAUGE FOR 206 TYPE (b) GAUGE FOR 200 TYPE	VOLT								20		19		15		14		20		19		20		19			
		INCH		-		-		-		.003"		.003"		.003"		.002"		.003"		.003"		.003"		.003"		-	
		INCH		-		-		-		-		-		-		-		.002"		-		-		-		-	

THE FOLLOWING VARIABLE TEST AND REAJ. REQ. FOR 200 TYPE AND 206 TYPE SEL. SHALL BE APPLIED IN ADDITION TO COMMON REQ. 2.01, 2.02, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.16, 2.17, 2.20			20 TO 25 AND 20 TO 28 VOLT SELECTORS																								
			D-80882 SEL.				D-81007 SEL.				D-87337 SEL.				D-87398 SEL.				D-87399 SEL.				D-88325 SEL.				
			26-A BANK D-81893 BANK				26-A BANK 10-B BANK				26-A BANK				26-G BANK				26-E BANK				26-A BANK				
			TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		TEST		REAJ.		
NO.	REQUIREMENTS	UNIT	MIN	MAX	MIN	MAX	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. 1 AND 12				NOS. 19 AND 20				NOS. 1 AND 12				-				NOS. 19 AND 20				NOS. 19, 20 & 26				
2.06	ROTOR BR. TENSION	GRAM	20	40	25	40	20	40	25	40	30	50	35	50	30	45	35	45	25	45	30	45	30	50	35	50	
	BR. NO.1	GRAM	20	40	25	40	20	40	25	40	30	50	35	50	25	40	30	40	20	40	25	40	30	50	35	50	
	BR. NO.2	GRAM	20	40	25	40	20	40	25	40	30	50	35	50	25	40	30	40	20	40	25	40	20	40	25	40	
	BR. NO.3	GRAM	20	40	25	40	20	40	25	40	30	50	35	50					25	45	30	45	20	40	25	40	
	BR. NO.4	GRAM	20	40	25	40	20	40	25	40	30	50	35	50									20	40	25	40	
	BR. NO.5	GRAM	25	45	30	45	20	40	25	40	30	50	35	50									20	40	25	40	
BR. NO.6	GRAM	25	45	30	45	20	40	25	40	30	50	35	50									20	40	25	40		
2.15	DRIVING SPRING TENSION	GRAM	900		900		900		900	800		800		550	650	550	650	800		800		800		800			
2.18	ARMATURE AIR-GAP	VOLT		20		19		20		19		20		19		20		19		20		19		20			
2.19	INTERRUPTER SPRING TENSION	GRAM	100	300	100	300	100	300	100	300	100	300	100	300	100	400	100	400	100	300	100	300	100	200	100	200	
2.21	MAGNET FULL TEST	VOLT		20		19		20		19		20		19		20		19		20		19		20			
		GRAM	50		50		50		50		50	150	50	150	50		50		50		50		50		50		
2.22	STEP TEST	GRAM	150		300		100		200	150		300		75		150		100		200		150		300			
2.23	LOW VOLTAGE OPR. TEST "A"	VOLT		20		19		20		19		20		19		20		19		20		19		20			
2.24	SPEED	TPS																20		20							
2.25	HIGH VOLTAGE OPR. TEST "B"	VOLT						28		29				25		26		28		29		28		29			
2.26	INTERRUPTER CONTACT TEST (a) GAUGE FOR 206 TYPE (b) GAUGE FOR 200 TYPE	VOLT						20		19				20		19		20		19		20		19			
		INCH		-		-		.003"		-		-		.002"		.003"		.003"		.003"		.003"		.003"		-	
		INCH		-		-		-		-		-		-		-		-		-		-		-		-	

REQUIREMENTS FOR 200 AND 206 TYPE SELECTORS  
AND 10 AND 26 TYPE BANKS

3. ADJUSTING PROCEDURESTOOLS

<u>Code No.</u>	<u>Description</u>
38-B	Lamp Socket with No. 802 Cord
179	Spring Adjuster
243	Wrench 3/16" and 5/8" Hex. Closed - Double-end Flat
256	Spring Adjuster
262	Test Pick for 200-A Selectors Only
265-B (or the re-placed 265)	Contact Burnisher
303	Spring Adjuster
305	Wrench 7/16" Hex. Socket Offset
306	Wrench 1/4" and 3/8" Hex. Double-end Flat
344 (or the re-placed 304)	Screw-driver Offset
359	Magnet Core and Armature Cleaning Tool
363	Spring Adjuster
376-A (or the re-placed R-1623)	Dental Mirror
379-A (or the re-placed R-63773)	Driving Spring Lug and Interrupter Back Stop Adjuster
R-1575	Camel Hair Brush
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

GAUGES

70-D (or the re-placed 70)	50-0-50 Gram Gauge
70-E (or the re-placed 70-B)	150-0-150 Gram Gauge

GAUGES (Continued)

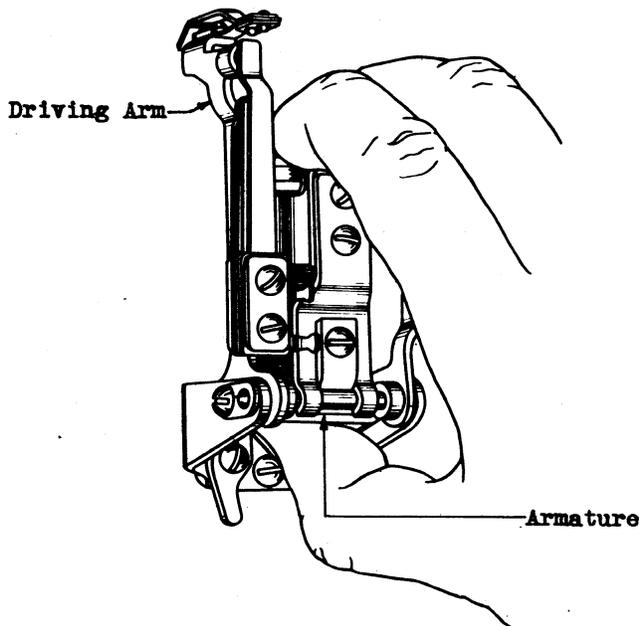
<u>Code No.</u>	<u>Description</u>
74-D (or the re-placed 74-C)	Thickness Gauge Nest
79-C (or the re-placed 79-A)	0-200 Gram Push-Pull Tension Gauge
79-B	0-1000 Gram Push-Pull Tension Gauge
R-2228	.040" - .050" Double-end Thickness Gauge

MATERIALS

-	Western Electric Lubricating Compound No. 3
-	Carbon Tetrachloride (C.F.)
-	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. 17, 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. 17

3.004 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 "G/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.

3.0041 "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 3.0042, "Low Voltage Test" and attach the clip of the red conductor to the point on the battery described in paragraph 3.0043, "High Voltage Test". Insert the plug of patching cord (B) into jack (TEST) of the test set and attach the clip 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 the winding terminal of the selector. For making running tests attach the clip 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.

3.0042 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 3.0041. 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

## 3.0042 (Continued)

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.

3.0043 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.

3.0044 "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 "G" and attach the clip end of the cord to the selector as previously described under paragraph 2.0041 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 3.0043 and 3.0044. 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.

3.0045 "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 3.0041. 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.

3.0046 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.

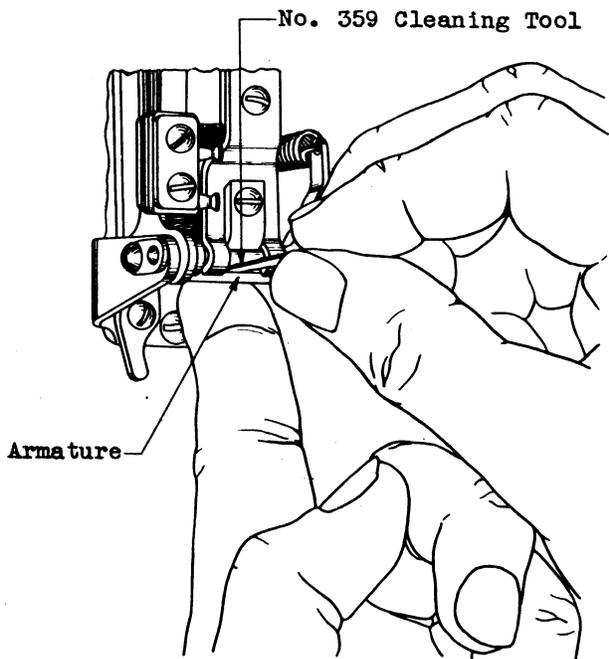
3.005 Method for Measuring the "Step Test", "Magnet Pull Test" and for the "A", "B" and Special Operate Requirements

3.0051 With the clip 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 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.

3.0052 Before making the "Step Test" as specified in the following requirements, the rotor brush assembly should be stepped electrically (step-by-step and not under self-interruptions) to the 21st bank terminal counting from the bottom (not counting the feeder brush). This position is not position No. 21 on all types of selectors, but it is the position just preceding the one wherein the contacting edges of the rotor brushes will engage the feeder brushes. In stepping from the 21st to the 22nd terminals the friction of the brushes is perceptibly increased, as the brushes, in addition to engaging the 22nd terminal, have to engage the feeder brushes which feed the rotor brush assembly. This is, therefore, the worst brush load condition under which the selector is required to operate. (See requirement 2.22 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.



Method of Cleaning the Magnet Core Gap

Fig. 18

**M-2 Bank and Bank Terminals** The selector should be rotated a number of times and any loose dirt should 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 magnet core and armature 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. 18. 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.

3.02 LUBRICATION (Rq.2.02)

**M-1 Rotor Bearings** To lubricate the rotor bearings dip the R-1575 Camel Hair Brush into the Lubricant. Take up the end play of the rotor toward one side of the selector and apply the lubricant to the bearing as shown in Fig. 19, giving the brush a slight twist to release the lubricant. Two applications of the lubricant should be made to this bearing.

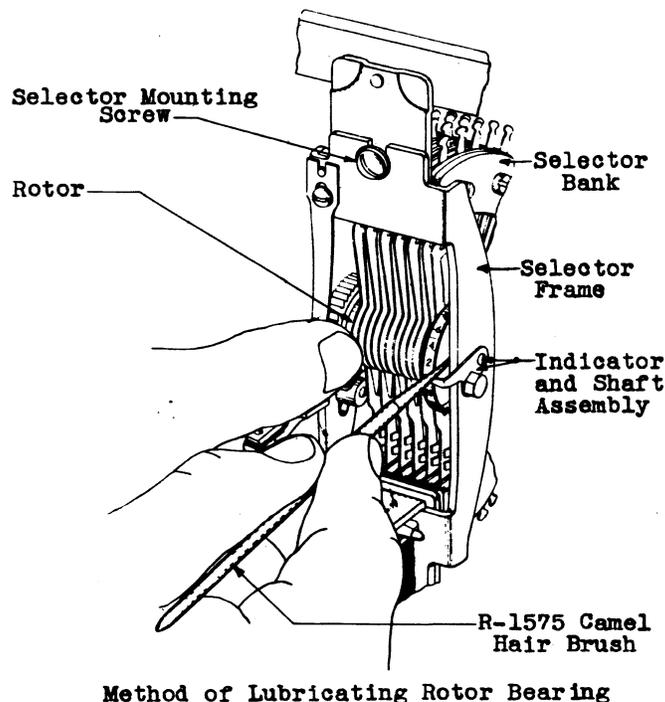


Fig. 19

## 3.02 (Continued)

M-2 Take up the end play of the rotor in the opposite direction and make two applications of the lubricant to the other bearing as covered in M-1.

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 in a manner similar to that covered in M-1.

M-4 After the lubricant has been applied, operate the selector 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 paragraph 3.01, M-1.

M-6 To lubricate the surfaces of the ratchet wheel teeth with Western Electric Lubricating Compound No. 3 dip the R-1575 Camel Hair 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 on to the brushes or bank terminals.

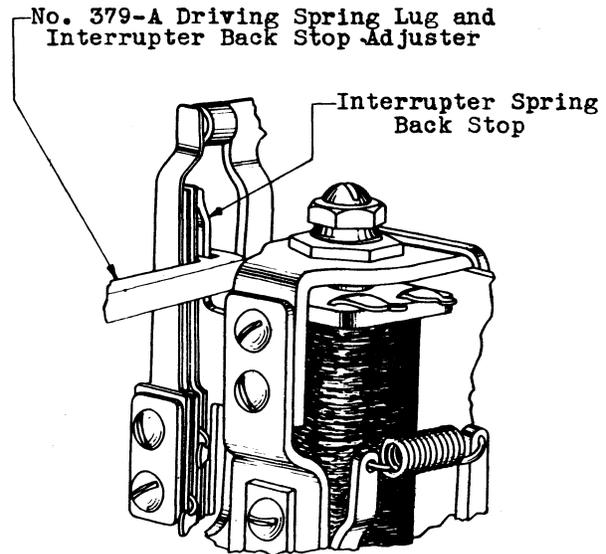
3.03 RECORD OF LUBRICATION (Rq.2.03)  
(No Procedure)

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 bending is required, to bring the clearance within the limits bend the spring stop with the No. 379-A driving spring lug and interrupter back stop adjuster, but when a slight adjustment is required, bend the 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. 20 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.



Method of Adjusting Interrupter Spring Back Stop

Fig. 20

M-3 When bending the spring stop an attempt should be made to obtain the correct adjustment with the least number of bending operations because the spring stop has a tendency to lose its adjustment if it is subjected to too many bending 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.

M-4 Special Requirements for Selector D-80701 These requirements shall be met at the same time as the interrupter contact requirements and with the same adjustment of the interrupter. To check the contact pressure of the interrupter spring against the spring stop apply the No. 79-C push-pull tension 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 bend as required. To check the air-gap between the contacts of the interrupter and outer spring insert the .005" blade of the 74-D thickness gauge between the contacts when the selector is in the normal position. After checking

## 3.04 (Continued)

for the minimum specified gap check the maximum allowable gap with the .010" blade of the No. 74-D thickness gauge. To adjust the air-gap apply the spring adjuster close to the base of the spring stop of the back contact spring and bend 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 thickness 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 bend as required.

3.05 CENTERING OF ROTOR BRUSHES (Rq.2.05)  
ON TERMINALS

M-1 A preliminary inspection of each end of the rotor brush assembly should show the trailing contact edges of all non-bridging brushes in approximate alignment and the trailing contact edges of the bridging brushes overlapping those of the non-bridging brushes by about 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 changed.

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. 306 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.

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 to this requirement.

3.06 ROTOR BRUSH TENSION (Rq.2.06)

M-1 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 made at the same time as the adjustment for rotor brush alignment and should be done as follows:

M-2 Step the selector electrically to the top row of terminals in the bank and then apply the end of the No. 70-D gram 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 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 noted that a lamp for use with the available voltage is being used in the lamp socket.

M-3 If necessary, readjust the tension of the brush spring, by means of the No. 363 spring adjuster applied to the base of the brush spring close to

## 3.06 (Continued)

the shaft of the rotor brush assembly. 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 bending 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 specified on page 8. 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-4 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, and repeat the same tests and necessary readjustments as described in M-3 and M-4 above.

3.07 PRONG CONTACT WITH FEEDER BRUSH (Rq.2.07)

M-1 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 feeder spring. The "feel" of the tool will be an aid to the visual check for the requirement.

M-2 On selectors equipped with the double 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-3 Adjust for this requirement by placing the end of a very small screw-driver or an equivalent tool in the slot between the prongs of the brush and applying a turning or prying motion in the direction required. In adjusting prongs which do not meet the requirements, an attempt should be made to bring the clearance as near to zero as possible.

3.08 BRUSH ALIGNMENT (Rq.2.08)

M-1 To check the brush alignment, step the selector to a position

where one end of the rotor brush assembly is about to pass on to the feeder brushes and note visually that the junction between each pair of brush prongs is in line with the center line of the associated feeder brush within the specified limit.

M-2 When the majority of the rotor brushes are found to be out of line with the feeder brushes 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. To adjust the individual rotor brushes, bend them 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-3 Advance the rotor assembly a half revolution or until the opposite ends of the rotor brushes are about to pass on to the feeder brushes and repeat the above adjustment.

3.09 TOEING OF BRIDGING BRUSHES (Rq.2.09)

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 offset angle 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". Care should be taken not to distort the brush when applying this adjustment.

M-4 Advance the rotor assembly one half revolution and repeat the adjustment on the opposite ends of the bridging brushes.

3.10 HEEL SPACING (Rq.2.10)3.11 FALSE CONTACTING (Rq.2.11)

M-1 To check for false contacting of non-bridging brushes, step the selector in turn to each of the specified positions and note that with the contact edges of the brush members in contact with each other between terminals there is at least the specified clearance between the heel of each non-bridging brush and the associated bank terminals. Check that, with the brushes resting on the topmost row of terminals, there is at least the specified clearance between the brush members of adjacent pairs

## 3.10-3.11 (Continued)

and also that there is at least the specified clearance between the heels of the rotor brushes and the sides of the feeder brushes just before they engage the feeder brushes.

M-2 To check for false contacting of bridging brushes step the selector to the point where the brushes are about to pass on to the Feeder Brushes and observe the clearance between the heels of the rotor brush members and the associated bank terminal No. 1.

M-3 The 38-B lamp socket and cord may be used to supply light when checking the "Heel Spacing" and "False Contacting" requirements. The No. 376-A dental mirror may be used in inspecting for the "False Contacting Requirement".

M-4 These requirements should be met by bending the brushes close to the heels as required with a No. 363 spring adjuster. Care must be exercised in adjusting brushes for the "Heel Spacing" the "False Contacting" and the "Brush Alignment" requirements not to change the brush tension and the brush tension should be rechecked after these adjustments are made.

3.12 CLEARANCE BETWEEN NO. 1 BRUSH (Rq.2.12) AND THE DRIVING ARM

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 frame and armature adjuster applied to the driving arm directly beneath the point where the pawl spring is attached to the driving arm. Care should be taken in bending the driving arm to have it in such adjustment that the end of the pawl will strike the overthrow stop squarely.

3.13 FEEDER BRUSH TENSION (Rq.2.13)

M-1 To check the feeder brush tension, apply the No. 70-E gram gauge to each feeder brush except the No. 1 brush at a point directly below the crotch and

midway between the brush prongs. 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-B gram gauge is not suitable.

M-2 In adjusting 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 bending 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 towards the top, at the same time giving them a twisting motion in the direction of the desired tension.

3.14 FEEDER BRUSH POSITION (Rq.2.14)

M-1 At the time the feeder brush tension requirement is checked a check should also be made to determine that when the feeder brush is pushed away from the rotor with pressure applied on the center line of the feeder directly below the crotch, the two prongs leave the rotor at approximately the same time. A check should also be made at this time to make sure that there is at least the specified clearance between all parts of the feeder and rotor brushes except contacting surfaces thereon at any point in the revolution of the rotor and also to make sure that both prongs of each feeder make contact with the rotor over the entire contacting surfaces and that they do not interfere with the spacing washers on the rotor.

M-2 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. Care must be taken not to disturb the previous adjustments for feeder brush tension.

3.15 DRIVING SPRING TENSION (Rq.2.15)

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. Readjustments for this requirement should be made 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 gram 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 gram 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 bending the driving spring lug on the selector frame with the No. 379-A driving spring lug and interrupter back stop adjuster (not by bending the driving spring arm on the armature). Care should be exercised in bending 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.

3.16 ARMATURE BACK STOP (Rq.2.16)

M-1 To check for the minimum back stop requirement attach the test clip 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, 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". This check should be repeated 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 the bottom of it with the R-1760 frame and armature 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 over-throw 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.

3.17 RETAINING PAWL TENSION (Rq.2.17)  
AND POSITION

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 push pull tension 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 gram 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.

3.17 (Continued)

**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.

3.18 ARMATURE AIR-GAP (Rq.2.18)

**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 to the interrupter spring terminal that is strapped to the magnet coil.

**M-3** Insert the proper blade of the No. 74-D thickness 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 a No. 344 offset screw-driver and the magnet adjusting lock nut with a No. 243 closed double-end flat wrench and then adjust the air-gap as required by screwing the magnet adjusting bushing up or down by means of the No. 305 offset 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.)

3.19 INTERRUPTER SPRING TENSION (Rq.2.19)

**M-1** Measure the interrupter spring pressure by means of a No. 79 type gram 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 gram 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.

3.20 DRIVING PAWL TENSION (Rq.2.20) AND POSITION

**M-1** Driving Pawl Tension To check the tension of the driving pawl operate the armature electrically, place the No. 79-C push pull gram tension gauge in the bend near the driving end

## 3.20 (Continued)

of the pawl and observe the tension required to force the pawl away from the bottom of the ratchet wheel tooth.

M-2 To adjust the driving pawl tension apply the No. 256 spring 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 Frame and Armature 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.

3.21 MAGNET PULL TEST (Rq.2.21)

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 to the interrupter spring terminal which is strapped to the magnet coil.

M-3 Apply the No. 79 type push pull tension 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 gram 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".

3.22 STEP TEST (Rq.2.22)

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 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.)

M-3 Energize the selector magnet.

M-4 Attach the No. 79 type push pull tension gauge to the driving arm at the "Standard Point of Measurement" and pull in a horizontal direction opposing the driving spring tension until the gram 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 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.

- 3.23 LOW VOLTAGE OPERATE TEST "A" (Rq.2.23)  
 3.24 SPEED (Rq.2.24)  
 3.25 HIGH VOLTAGE OPERATE TEST "B" (Rq.2.24)

M-1 When making these tests, connect the test set to the selector as specified in paragraph 3.004 and proceed according to the methods given in paragraph 3.005.

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 bent 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 bent to acquire the desired adjustment. When an adjustment is

necessary the lip of the spring should be bent by means of the No. 303 tool spring adjuster. After making this adjustment check the spring clearance when definite limits are specified.

3.26 INTERRUPTER CONTACT TEST (Rq.2.26)

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 thickness 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 bend the outside interrupter spring with the No. 303 spring adjuster as specified in paragraph 2.25, M-3.

REASON FOR ISSUE COVERING CHANGES IN ADJUSTING PROCEDURES

1. To change the following procedure:  
 3.07 M-2 Prong Contact with Feeder  
 Brush - Different checking and

adjusting for Prong Contact of  
 Double Piece Type Feeder  
 Brushes.

APPROVED

FAC 2/2/29  
 GWK 2/1/29