NEW YORK CENTRAL LINES

Signal and Train Control Committee

STANDARDS

October 1, 1959

NEW YORK CENTRAL SYSTEM STANDARD SIGNAL PLAN INDEX

OCT. 1, 1959

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*1055E	M-1952	" " : switch rod
*1360B	M-1941	Jaw: tang end with screw jaw
*1016C	M-1940	Jaws: screw & solid
*1018B	M-1941	Jaws: solid with tang ends
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*1679B	M-1943	Indicators, Locks, Buzzers and Bells			
*1680B	M-1943	Circuit Appurtenances			
*1681B	M-1943	Miscellaneous - Apparatus			
*271	1949	Electronic Definitions			

GENERAL

1. Each headquarters, where batteries are maintained, must be equipped with a hydrometer, a voltmeter and a thermometer with a temperature correction scale based on a normal of 77° F., designed for use with lead cells. Voltmeter must be checked frequently for calibration.

2. Tools, hydrometers, thermometers or utensils which have been used on other than lead acid cells must not be used.

3. Water for electrolyte must be stored or transported only in receptacles provided, which receptacles must be kept clean and covered and not used for other purposes.

4. An exposed flame must not be allowed near the battery, as the gases being given off may explode. Care must be exercised in the use of tools near the battery terminals to prevent striking an arc. To prevent drawing an arc when connecting or disconnecting cells, the load and charging circuits must be disconnected at a point away from the battery.

5. When battery is being charged, enough ventilation or space must be provided to avoid pocketing of the gases.

6. Battery, its connections and surrounding parts must be kept clean and dry. Vaseline or greases must not be removed from the sealing nuts. Vent plugs must be kept in place and tight.

7. If electrolyte is spilled or surrounding parts are damp with acid, a solution of baking soda in the proportions of 1 lb. of soda to 1 gal. of water must be applied, after which the parts must be rinsed with water and dried. The soda solution must not be allowed to get into the cells.

8. Soda solution or ammonia should be used promptly on clothing, cement, etc. to neutralize acid. If acid comes in contact with the skin, it should be washed away promptly with plenty of water.

RECEIPT OF SHIPMENT

9. Cells must be shipped to Storehouse or Installation Point in fully charged condition.

10. Cells must be unpacked carefully, keeping them in upright position. CELLS MUST NOT BE LIFTED BY POSTS OR COVERS.

11. After unpacking, electrolyte in cells must be examined to determine that it is level with upper mark on jar. If electrolyte is below this point add distilled or approved water unless there is evidence of spillage, in which case add electrolyte, the specific gravity of which must be the same as that of other cells of the same shipment. If electrolyte level is lower than 1/2" below the tops of the plates, the cells may be permanently damaged. Evidence of damage will be indicated by failure of cells to respond to the treatment outlined in Paragraph 21 or failure to meet requirements of test outlined in Paragraph 33. If water is added during freezing weather the cells must be given a charge to mix the water with the electrolyte to prevent freezing.

12. If a shipment of cells is not to be unpacked at once, remove the lid from the packing case and check for electrolyte level and proceed as in Paragraph 11.

13. Cells must not be allowed to stand idle for more than 30 days. They must be floated continuously at a rate which will maintain an approximate voltage of 2.15 or charged periodically. A freshening charge should be given just before sending cells out for installation. A freshening charge consists of a continuing charge at one half of the 8 hour discharge rate as long as the specific gravity of the lowest cell shows any increase and then for six hours after the last increase is shown. If the charge rate is much lower than the 8 hour rate, the three hour period should be lenghtened in proportion. The minimum rate for a freshening charge should be at least 1/8 of the 8 hour rate.

14. Before connecting cells, all surfaces which are to be bolted together must be scraped bright and then coated with pure vaseline or terminal grease supplied by the manufacturer. Vaseline or terminal grease must also be applied to the studs of the bolt connectors. Cells must be connected with standard intercell connectors and care must be used to avoid having any strain on either connectors or terminals as a strain may eventually cause breakage. If standard intercell connectors are not available, rubber covered wire may be used. Wire larger than No. 12 A.W.G. must be stranded or flexible. To hold strands together when stranded or flexible wire is used, the eye must be soldered. After connections are made, surplus vaseline or terminal grease must be wiped off.

15. A permanent number, preferably stenciled on rack, must be assigned to each cell starting from the positive end of the battery.

16. Cells must be arranged so that the positive terminal of one cell adjoins the negative of the next. Cells must be so placed that edge of plates will be to the front.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
LEAD TYPE STORAGE BATTERY
FLOATING CHARGE INSTRUCTIONS

S-35

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ISSUED 7-1-54

RECEIPT OF SHIPMENT – Continued

17. Cells must be separated from each other and from contact with sides of battery shelter. Cells must be held in place to prevent movement which may cause breakage of intercell connectors or battery terminals.

18. After all intercell connections are completed the voltage of each cell must be taken to determine that the positive terminal of each cell is connected to negative terminal of adjoining cell.

19. Connections must be arranged so that the positive terminal of the rectifier or charging source will connect with the positive terminal of the battery. Direct current only must be used for charging.

20. The specific gravity of the electrolyte of each cell must be tested to determine that it is within the limits of 1.190 to 1.220 at 77°F. If the specific gravity (corrected for temperature) of any cell is found to be below 1.190 at 77° F., the cell must not be placed in service until given a complete charge. Specific gravity readings are corrected for temperature by adding or subtracting points as indicated on the temperature correction scale of the thermometer or by subtracting .001 for each 3° F. below 77° F. or adding .001 for each 3° F. above 77° F. For Exide Manchex cells, a complete charge is not required until the specific gravity is below 1.175 with the solution level at the upper line. On Manchex cells, a change in electrolyte level of 1/4" will result in a ± .008 gravity correction.

21. After installation, cells must be charged at the maximum rated output of the rectifier and this charging rate continued until cells are fully charged. The voltage and specific gravity (corrected for temperature) of each cell must be recorded on Battery Record Card, Form SC-27, each week during original charge. Cells are fully charged when three equal consecutive voltage readings are obtained in excess of 2.25 volts per cell together with three equal consecutive specific gravity readings of 1.210 or higher (corrected for temperature). At convenient intervals thereafter, the output of the rectifier must be reduced in small steps until the voltage directly at the cell terminals generally stays between 2.10 and 2.20 volts per cell or averages 2.15 volts. The voltage may vary above or below these limits according to traffic conditions, power interruptions or electrolyte temperature but, should not be continually above or below these limits except in cold weather when the voltage during the continuance of low temperature may be allowed to increase to the following values:

Electrolyte Temperature °F.	Volts per Cell
60	2.19
50	2.22
40	2.26
30	2.30
20	2.33
10	2.37
0	2.4

Cell voltage readings are taken with rectifier connected and charging at the normal float rate. The specific gravity (corrected for temperature) must be maintained at 1.210 or higher.

MAINTENANCE

22. After original charge, the voltage of each individual cell of a battery must be taken at least once a month. The specific gravity of each cell in a low voltage battery and of a pilot cell in a high voltage battery (55 cells or more) must be taken at least once a month. The specific gravity of each cell in a high voltage battery must be taken at least once each year. All readings are to be recorded on Battery Record Card, Form SC-27, and specific gravity readings entered on the form must be corrected for temperature. The temperature of the electrolyte in each cell need not be taken, but the temperature of a pilot cell may be considered as the temperature for all similar cells in the same housing.

23. If, upon regular inspection, the specific gravity reading is found to be more than 15 points below normal as indicated on the record card, (25 points for Manchex) proceed as outlined in Paragraph 21.

24. If the battery is floating at approximately the correct rate, a slow stream of gas bubbles will be noted rising from the top corners of the outside negative plates but large bubbles will not be gathering and breaking at the surface of the electrolyte. The positive plates will be dark in color. Formations of gray or white spots on the edges of the positive plates are indications that the cell may not be in good condition and requires attention.

25. Too frequent adjustments of rectifier outputs must not be made. It is unnecessary to take or record the output of the rectifier except in case of adjustment.

26. A lead plate storage battery requires a certain amount of current input to overcome loss of charge due to internal local action. This current input varies with the type and size of cell and with the temperature of the

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
LEAD TYPE STORAGE BATTERY
FLOATING CHARGE INSTRUCTIONS

S-35

MAINTENANCE – Continued

cell. As example a 120 ampere hour capacity battery (at the 8-hour rate) requires about: -

.050 Amp. at 50° F. – .112 Amp. at 80° F.
.066 Amp. at 60° F. – .160 Amp. at 90° F.
.088 Amp. at 70° F. – .220 Amp. at 100° F.

27. The capacity of lead storage batteries decreases with decrease of temperature of cell and batteries should be protected from extreme heat or cold, as a change from 77° F. to 20° F. will decrease capacity of battery about 30%. Due to this loss of capacity more frequent inspections to determine that battery is fully charged are necessary in cold weather.

28. Separators must always be covered with electrolyte. For replacing evaporation, distilled or approved water only must be used. It should be necessary, if battery is floating properly, to add water only twice a year, preferably in the early Fall and in the Spring to avoid the danger of water freezing during cold weather. If water must be added during freezing weather a syringe must be used to stir the entire solution so as to mix the water and electrolyte. When water is added the level of the electrolyte must be brought up to the upper level line on the side of the jar. After adding water, allow 24 hours for water to mix with electrolyte before taking gravity readings.

29. Never add acid or electrolyte unless some has been spilled. When necessary to add electrolyte use one of 1.210 specific gravity.

30. Terminal nuts must be checked at intervals after installation to insure tight connections.

31. Should it become necessary to refill sealing nut cups pure vaseline or grease supplied by manufacturer only must be used; ordinary animal or vegetable greases are harmful.

32. In case a battery becomes discharged to any appreciable extent, the output of the rectifier must be increased to the maximum rating and procedure as outlined in Paragraph 21 must be followed. If this condition occurs, the Supervisor must be notified since it may be advisable to replace the battery or employ rectifier of larger capacity.

33. When cells do not respond to treatment outlined in Paragraph 21 or it is suspected that cells may not be in good condition, a one minute rate test should be made using an instrument designed for making such a test. Detailed instructions for making a one minute rate test are furnished with the instrument.

34. If terminals or connectors show evidence of corrosion the corroded surface must be scraped clean and then washed with soda solution after which a thin coating of vaseline or manufacturer's terminal grease must be applied. No corrosion will occur unless electrolyte is spilled and allowed to remain.

35. If a jar is broken and the element is exposed to the air the element may be placed in a hard rubber, glass or earthenware container filled with electrolyte of any specific gravity between 1.100 and 1.210. If electrolyte is not available approved water may be used, but the element must not be stored in this manner for more than one week. If the cell is to remain out of service longer than one week and electrolyte is not available the element must be dismantled, the separators and negative groups kept in water and the positive groups thoroughly dried. For shipment the negative groups must be thoroughly dried after washing in clear water.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
LEAD TYPE STORAGE BATTERY
FLOATING CHARGE
INSTRUCTIONS

Approved - - [signature]
Chief Signal Engineer

S-35

1. Within 15 days following the end of a month, each Signal Engineer shall submit a monthly report on Forms S-201A and S-201B to the Chief Signal Engineer showing interruptions to train operation attributed to block signal systems, interlockings, automatic train stop and other similar appliances on his district.

2. Preparation of Form S-201B.

   A. Interruptions and/or failures for each operating division shall be grouped by type of system.

      1. Block signal system.
      2. Interlocking.
      3. Automatic Train Stop.
      4. Other appliances.

   B. Interruptions and/or failures for each type system shall be grouped by type:

      1. False Restrictive - FR

         A false restrictive interruption is defined as a failure of a system, device or appliance to indicate or function as intended which results in greater restriction than is required.

         This category includes interruptions caused be defective apparatus, elements and faulty or improperly adjusted signal apparatus and failure to maintain signal apparatus. Also includes interruptions caused by faulty, improperly adjusted or improperly maintained apparatus of other departments such as switch stands, rail braces, anti-rail creepers, train stop equipment, etc.

      2. Creditable Restrictive - CR

         A creditable restriction is defined as an interruption brought about by the detection of an unsafe condition. This category includes interruptions caused by broken rails, operation of slide detector devices, obstructions in switch points, cars left on fouling sections, failure to replace padlock on electrically locked switch, improper manipulation of control machine, etc.

      3. Potential False Proceed Condition - PFPC

         Potential false proceed conditions include conditions of apparatus existing when no train is present, under which a false proceed failure would have occurred had a locomotive or train approached or entered a section of track where safety of the track was impaired.

         Potential False Proceed Conditions shall be shown on Form S-201B in capital letters and complete information shall be furnished regarding signal number, designation of interlocking, geographical location, designation of operating division, type of apparatus involved and explicit information on the condition.

      4. False Proceed - FP

         A false procced failure is a failure of a system, device or appliance to indicate or function as intended which results in less restriction than is required. For a failure to be classed as a false proceed a train must be involved.

         False Proceed failures shall be shown on Form S-201B in capital letters and complete information shall be furnished regarding train designation, locomotive number, signal number, designation of interlocking, geographical location, designation of operating division, type of apparatus involved, and explicit information on details of failure.

   C. Column 1 --

      Failures and/or restrictions for each type of system shall be numbered consecutively.

   D. Column 2 --

      Date each failure or restriction occurred shall be shown. When condition produces failures or restrictions over a period of more than 24 hours, one failure or restriction should be reported for the first 24 hours and an additional failure or restriction for each succeeding 24 hour period until repairs are made.

   E. Column 3 --

      Train designations or engine numbers which actually received improper indications or restrictions shall be shown. Do not include those trains or engines which did not receive improper indications or restrictions but were delayed by train ahead.

      Engine numbers must be shown for Automatic Train Stop Failures.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SIGNAL INTERRUPTION REPORT
INSTRUCTION

S-201

Printed in U.S.A.

ISSUED 9-15-59

SHEET 1 Cont'd on Sh. 2

F. Column 4 --

The automatic signal number or interlocking designation and the number of the signal governing train movements over the affected route shall be shown.

G. Column 5 --

The type of failure or restriction shall be shown using following symbols:

FR - False Restrictive
CR - Creditably Restrictive
PFPC - Potential False Proceed Condition
FP - False Proceed

H. Column 6 --

The cause for each failure or restriction shall be shown as chargeable to one of the following designated departments or groups using the proper symbol:

1. Signal Department - S

Failures chargeable to the signal department include failures due to material, apparatus or parts maintained by the signal department becoming disarranged or out of adjustment; also failures for which employees of the signal department are responsible through acts or omissions.

2. Motive Power (M), Track (T), and other Departments (O).

Failures chargeable to motive power, track, and other departments include failures due to material, apparatus, or parts maintained by these departments becoming disarranged or out of adjustment; also failures for which employees of these departments are responsible through acts or omissions.

3. Interference - I

Failures chargeable to interference, outside or malicious, include failures due to foreign current and wires being broken by blasting, falling trees, or by acts of persons other than railroad employees; also failures due to malicious acts such as stealing line wire or inductors, cutting or stealing bond wires, and placing obstructions in switches or other apparatus.

4. Elements - L

Failures chargeable to elements, storms, lightning, etc., include failures due to floods, frost, ice, lightning, rain, drifting sand, sleet, snow, and wind.

5. Defects - D

Failures chargeable to defects include failures due to improper design of equipment and apparatus, or defects in equipment, material, or apparatus not discoverable by reasonable inspection.

The word "Defective" should not be used as a general term to describe cases of failures of apparatus except when due, beyond reasonable doubt, to manufacture.

6. Undetermined - U

Failures chargeable to undetermined include the failures for which a cause cannot be assigned after thorough investigation.

I. Column 7 --

Show cause of failure in explicit concise terms. The word defective should not be used as a descriptive term such as "Defective Inductor". The defect should be shown as low impedance inductor, open inductor or other reason for the defect.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SIGNAL INTERRUPTION REPORT
INSTRUCTION

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ISSUED 9-15-59

SHEET 2 Cont'd on Sh. ___

NYCS
S-201B
(19)

NEW YORK CENTRAL SYSTEM

Sheet No.____ Of____

MONTHLY REPORT OF INTERRUPTIONS TO TRAIN OPERATION
ATTRIBUTED TO SIGNAL SYSTEMS AND DEVICES

DISTRICT _____ FOR THE MONTH OF _____ 19____

Number (1)	Date (2)	Trains or Locomotives affected (3)	Roadway or Interlocking location and Signal Number (4)	Classification: Kind of failure (5)	Classification: Chargeable to— (6)	Cause of Signal Interruption (7)

S-201B
White Manifold Paper 8" x 10 1/2"

NYCS
S-201A
(19)

NEW YORK CENTRAL SYSTEM

SUMMARY OF
MONTHLY REPORT OF INTERRUPTIONS TO TRAIN OPERATION
ATTRIBUTED TO SIGNAL SYSTEMS AND DEVICES

_____ DISTRICT
_____ MONTH

TYPE OF FAILURE	BLOCK SIGNAL SYSTEM	INTERLOCKING	AUTO. TRAIN STOP	OTHER APPLIANCES	TOTAL
FALSE RESTRICTIVE					
CREDITABLE					
FALSE PROCEED					
POTENTIAL FALSE PROCEED					
TOTALS					

Office of District Signal Engineer,

S-201A
White Manifold Paper 8" x 10 1/2"

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
FORMS
SIGNAL INTERRUPTION REPORTS

Approved L. S. Bottinelli
Chief Signal Engineer

S-201

ISSUED 9-15-59

SHEET 3 Cont'd on Sh. ____

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DESCRIPTION

An overlay track circuit is one which can be superimposed on a regular track circuit (used for signal control) without adding insulated joints and without changes in the existing track circuit. The overlay may be installed over any section of the existing track circuit. The energy for the overlay track circuit is AC of a relatively high frequency (approximately 10 KC). At this frequency the rail impedance is very high thus the overlay is effective for only a very short distance. It can therefore, be used in place of the short detector track circuit for the release of electric locks on hand operated switches in ABS and CTC territory.

The 10 KC energy is generated from DC (9 to 12 volts) by a transistor oscillator while the overlay relay is operated from the rectified output of an inert receiver tuned to the same frequency as the transmitter. Both transmitter and receiver are included in one assembly, the unit being known as a Transceiver. Schematic arrangement is shown in Fig. 1.

This overlay track circuit is referred to as the "SERIES" type because the presence of the axles and wheels of equipment on the track actually completes the circuit between transmitter and receiver to pick up the overlay relay. The track circuit is of the open circuit type and is suitable only for non-vital circuits such as release of electric switch locks, etc. When used for the release of switch locks, signals governing movements over the route must check the overlay relay in the de-energized position before displaying better than restricted speed aspects.

The circuit being of the series type requires but two wires (one for each rail) between the apparatus housing and track. Since these lead wires present considerable impedance to the 10 KC energy, a tuner is inserted in the leads to provide adjustment for variation in lead length. The 3MFD capacitor in the tuner produces resonance when the leads are approximately 150 feet long (300 ft. of wire) and with terminal posts 32 thru 36 shorted by connectors supplied with the unit. When the lead length is less than the specified maximum of 150 feet, it is necessary to cut-in additional reactance by removing shorting links on the tuner as required.

The overlay relay has a coil resistance of 6 ohms, operating on approximately 0.100 amperes and is designed to match the output of the transceiver. The relay is specially adjusted to provide a high percent release so that it will open as soon as possible after the train leaves the limits of the overlay.

INSTALLATION

Transceiver operates on 9 to 14 volts DC (5 or 6 lead cells.) It draws approximately 0.040 amperes when track is unoccupied and approximately 0.200 amperes when track is occupied. It will not operate satisfactorily with unfiltered rectified energy.

Series Overlay track circuit will operate satisfactorily with minimum natural distributed ballast resistance of 2 ohms per 1000 feet. Installation should be at least 200 feet from a highway crossing, if it is in the same track circuit. Overlay track circuit must not be used for release of electric lock on any switch not using a derail.

Length of each track lead must not exceed 150 feet. If 100 feet or less, wire size should be not smaller than No. 9 AWG. If over 100 feet, wire size should be not smaller than No. 6. AWG.

When used for release of electric switch locks, track leads for Series Overlay track circuit should be connected to the rails not less than 75 feet ahead of the point of switch. This arrangement will provide pick-up of relay with track occupancy approximately 15 to 40 feet each side of rail connections, depending on battery voltage, and release of relay approximately 60 to 100 feet each side of rail connections.

Two Series Overlay systems may be operated on the same track circuit provided they are separated by at least 250 feet.

Transceiver and Tuner should be protected by three shunt type track arresters connected as shown on Figure 1. A 1000 MF 30 volt electrolytic capacitor should be connected across the D.C. terminals of the transceiver to protect against surges in supply voltage to the transceiver. Connections should be as shown in Fig. 1.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
OVERLAY TRACK CIRCUIT
INSTRUCTION

S-270

ISSUED 3-28-58

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Transceiver and associated equipment must be located not over 400 feet from source of energy when fed over line from an adjacent facility.

The special relay for use with Transceiver has 4 FB contacts.

B1 relay reference is GRS Dwg. 56001-785 Gr. 91.

K4 relay reference is GRS Dwg. 53000-285 Gr. 69.

ADJUSTMENT

All connections to transceiver and tuner must be made in accordance with Fig. 1. Polarity of input energy must be as shown.

Connect low resistance shunt (Res. 0.01 ohms max.) across the track 10 feet either side of point where track leads connect to the rails.

Loosen lock nut and turn shaft on variable resistance "RES" to full clockwise position (max. relay current).

Adjust the tuner inductance in increments of 1 by removing shorting links to obtain maximum relay current (resonance). When maximum current is obtained the connectors should be locked in position. This completes calibration of tuner.

Measure battery voltage (terminals 15–16) and adjust resistance "RES" to provide relay current within the following limits:–

5 Cells Lead or Equal

.105 – .110 at 9.0 volts
.116 – .122 at 10.0 volts
.128 – .134 at 11.0 volts
.140 – .147 at 12.0 volts

6 Cells Lead or Equal

.105 – .110 at 11.0 volts
.116 – .122 at 12.0 volts
.128 – .134 at 13.0 volts
.140 – .147 at 14.0 volts

This completes the adjustment of the Overlay track circuit and shunt may be removed from track.

With the above adjustment, the relay should pick up when the track is shunted from 15 to 40 feet either side of rail connections and will drop away when shunt is moved from 50 to 90 feet either side of rail connections. Exact distances depend on battery voltage.

Rail joints should be painted Yellow to show the limits at which release of electric lock can be obtained.

MAINTENANCE

Every three months check adjustment of circuit by connecting low resistance shunt across track and observing operation of relay. Relay operation should be within limits specified in the next to last paragraph under ADJUSTMENT.

If relay does not operate as provided by initial adjustment, check battery voltage and relay current and if necessary, completely readjust circuit.

If necessary to replace the tuner or transceiver, circuit adjustment should be completely checked.

The transceiver is equipped with four special .125A fuses, G.R.S.Co. Dwg. 29805, connected in the emitter circuits of the amplifier transistors. The fuses are selected for their internal resistance and are designed to open when a surge occurs. Normally, a surge which will open a fuse will also damage the transistor, however, if trouble develops in the unit, the fuses should be checked before removing the unit from service. Transistors are not to be replaced in the field.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
OVERLAY TRACK CIRCUIT
INSTRUCTION

S-270

ISSUED 3-28-58

SHEET 2 Cont'd on Sh. 3

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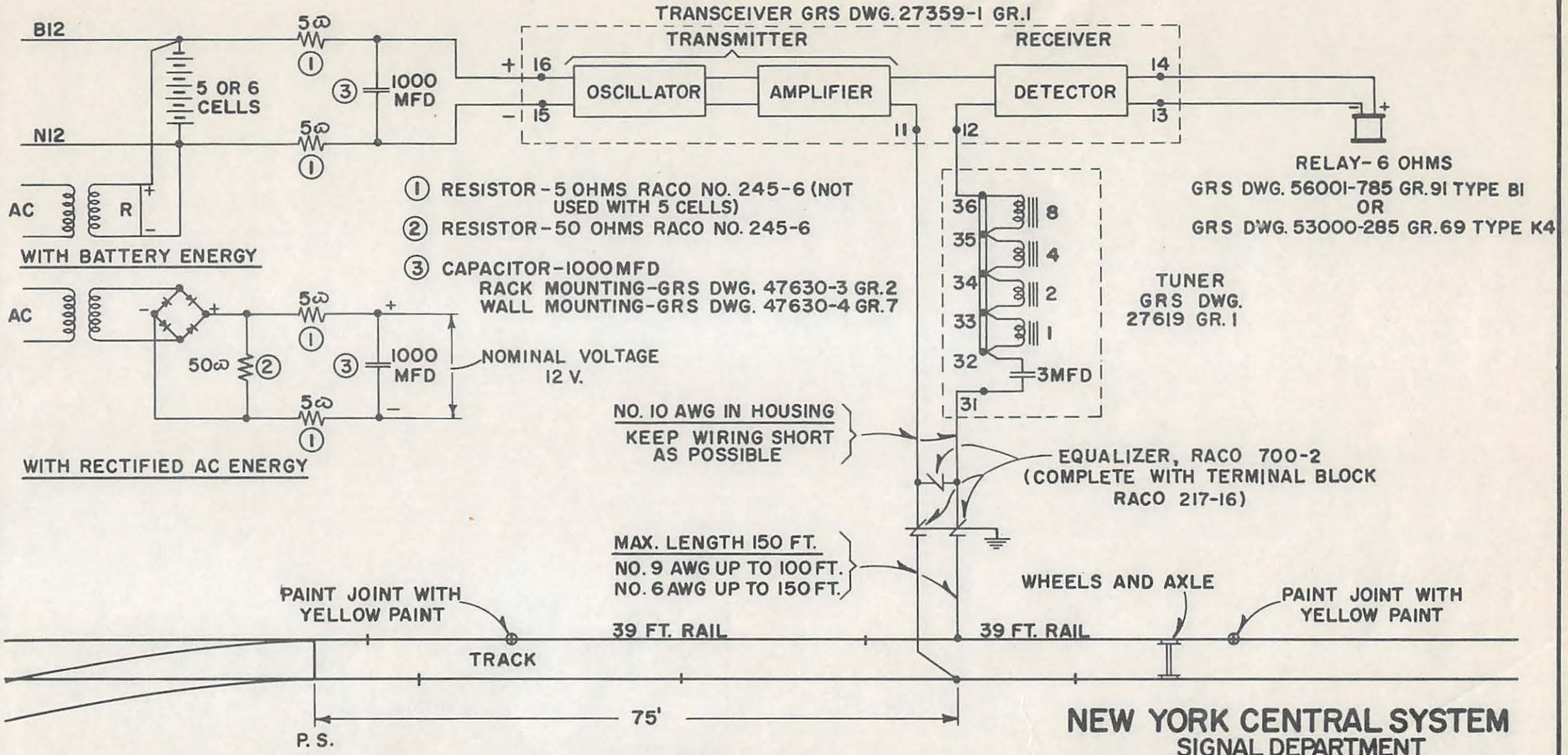

FIGURE 1

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
OVERLAY TRACK CIRCUIT
INSTRUCTION

Approved L. J. Bottinelli
Chief Signal Engineer

S-270

ISSUED 11-14-58

SHEET 3 Cont'd on Sh.

Printed in U.S.A.

GENERAL

1. These instructions must be followed unless instructed otherwise by Chief Signal Engineer. Signal Department forces shall be responsible for painting maintenance of all signal facilities unless specifically instructed otherwise. Painting must be done at sufficiently frequent intervals to provide adequate protection and maintain good appearance. All materials used under this schedule shall conform to the applicable specification as designated and failure of material to prove satisfactory shall be reported. Painting, except as specified herein, shall be in accord with requirements shown on plans of such apparatus and equipment.

2. Color numbers referred to in this specification are in accordance with Federal Specification TT-C-595.

APPLICATION

3. Paint may be applied by brushing, dipping or spraying and may be air dried or baked. Paint shall be uniformly applied, thoroughly worked into all joints or open spaces and each coat dry before application of the succeeding coat. Surfaces that will be inaccessible after assembly shall be properly coated before being assembled. In general, manufacturer's instructions for application practices shall be followed.

4. Cleaning
   a. Surfaces shall be thoroughly cleaned. All loose or detachable mill scale, paint, rust, grease, dirt or other foreign substances shall be removed and surfaces thoroughly dry before painting.

5. Mixing and Thinning:
   a. Mixing:
      1. Paint shall be thoroughly mixed before and during application, or an inferior paint coating will result. To provide thorough mixing the following procedure should be carried out:
         a. Pour off a portion of the liquid into another clean container.
         b. Stir the paint left in original container until it is a uniform smooth mixture, then add all the liquid previously poured off, stirring constantly as it is being added.
         c. Pour the contents from one container to the other until a smooth uniform mixture is obtained.
   b. Thinning:
      1. For the thinning of primers, paints and enamels, for application by brushing, spraying or dipping, manufacturer's direction shall be followed and the specified thinners used.

6. Paint shall not be applied under poor weather conditions nor when the temperature falls below 40° Fahrenheit.

PRESCRIBED PAINT COATINGS – FIELD

7. Sheet metal housings, including instrument and battery cases, terminal boxes, bungalows, and other sheet metal structures for outdoor installations shall be painted as follows:
   a. Exterior surfaces shall be given one coat of primer, Item 31, followed by two coats of Aluminum paint, Item 53.
   b. Interior surfaces, except composition linings, shall be given two coats of Baggage Car Gray, Item 33.

8. Sheet metal cabinets, tower cases, chaseways, interlocking and control machine cabinets, and cases for indoor installations shall be painted as follows:
   a. Exterior and interior surfaces shall be given one coat of primer, Item 31, followed by one coat of Quick-Drying enamel, Item 42, Color No. 1445.

9. Mechanical and power interlocking machine parts, (except levers and machine-finished surfaces) shall be given one coat of primer, Item 31, followed by one coat of Non-Reflecting Black enamel, Item 46.

10. Levers of mechanical and power interlocking machines (except machine-finished surfaces and latch handles) shall be given one coat of Quick-Drying enamel, Item 42, using colors as follows except that operative levers in mechanical machines not connected to a pipe line shall have the lower half painted with Aluminum paint, Item 53:
    a. Signal (Int.): Vermillion Red, Color No. 1105.
    b. Signal (Approach): Chrome Yellow, Color No. 1310.
    c. Switch: Black, Color No. 1775.
    d. Lock (F.P.L.): Robinegg Blue, Color No. 1520.
    e. Traffic: Green, Color No. 1445.
    f. Master Lock: Brown, Color No. 1005.
    g. Spare: White, Color No. 1755.
    h. Railroad Crossing Gates: Diagonal stripes of Black, Color No. 1775 and White, Color No. 1755. Stripes two inches wide on mechanical lever and one inch wide on power lever, painting downward at an angle of 45°, away from the Operator. Stripes adjacent to handle shall be black.

11. Searchlight and Doublet Type Color-light type signal parts, except finished parts, shall be given one coat of primer, Item 31, followed by one coat of Non-Reflecting Black enamel, Item 46, as follows:
    a. Inside and outside of metal surfaces of searchlight signal outer case.
    b. Inside and outside metal surfaces of doublet color-light signal case.
    c. Backgrounds and hoods.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
PAINTING
ORDERING REFERENCES AND INSTRUCTIONS

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PRESCRIBED PAINT COATINGS – FIELD – Continued

12. Exposed iron works, threaded parts, rivets and areas where galvanizing has been cut or removed on interlocking pipe shall be given one coat of Item 31, followed by two coats of Formula F paint, Item 32.

13. Steel pipe for signal poles and cable posts shall be be painted as follows:

    a. Interior surface of pipe shall be given one coat of primer, Item 31.

    b. Exterior surface of pipe shall be given one coat of primer, Item 31, followed by two coats of Formula F paint, Item 32.

14. Wood housings for outdoor installations shall be painted as follows:

    a. Exteriors shall be painted two coats of Formula F paint, Item 32.

    b. Interior, except composition linings, two coats of Baggage Car Gray Paint, Item 33.

15. Woodwork, installed in Signal Stations (except interlocking machine cabinets, relay and battery racks) shall be painted the same as inside of building.

16. Inside surfaces of switch machines, switch circuit controller parts and cable terminal and junction boxes shall be painted with Green enamel, Item 52, as follows:

    a. Inside surface of switch machine case.

    b. Interior parts of switch machines where paint is required.

    c. Inside surface of switch circuit controller case.

    d. Inside surface of cable terminal and junction boxes.

17. Braid-covered and made-up cables, shall be painted with cable paint, Item 37. Tape, braid and sleeving at wire ends shall be painted with cable paint, Item 38. In exceptionally bad locations special paint and painting may be required which must be approved by the Chief Signal Engineer.

18. Metal covers of trunking, tops of wood relay, cable and junction box housings and battery boxes shall be painted with Aluminum paint, Item 53.

19. Block type derails, signal masts, ladders, exposed iron and wood work, outside surfaces of switch machines and switch circuit controllers shall be given one coat of Formula F paint, Item 32.

20. Porcelain Relay tops shall be painted with Rubber Finished Japan, Item 39.

21. Inductor Coils and pole faces shall be painted with Adams Griptite Black Asbestos, Item 36.

    Inductor coils shall be impregnated with Varnish, Item 57.

22. Battery trays, inside of battery boxes, and battery racks exposed to battery acid shall be painted with Acid Resisting paint, Item 34.

23. Motor, hand and push cars shall be painted as follows:

    a. Engine and iron work, Black enamel, Item 40.

    b. Balance of car, Chrome Yellow enamel, Item 41.

24. Signal blades, switch and derail target banners shall be painted with Quick-Drying enamel, Item 42, of required color.

25. Frames of motors and generators shall be painted with Green enamel, Item 52, armature and coils shall be painted with Clear Glyptal, Item 51.

26. Concrete Relay Housings shall be painted as follows:

    a. Interiors shall be given, prior to placement and wiring of apparatus, 2 coats of Rust-oleum R-183 Signal Box Gray, Item 43.

    b. Exteriors shall not be painted unless required to prevent surface deterioration. Where painting is required, 2 coats of Rust-oleum R-183 Signal Box Gray, Item 43 shall be applied.

27. Concrete floors shall be given one finishing coat of Gray Concrete Floor Paint, Item 35.

REQUIRED PAINTING SCHEDULE – SHOP

28. Paints and painting required in connection with construction and repairs of apparatus and equipment in the shop shall be governed by requirements for the apparatus and equipment involved except as provided under Prescribed Paint Coatings – Field.

REQUIRED PAINTS SCHEDULE – MANUFACTURERS

29. Apparatus and equipment furnished by manufacturer shall be painted in accordance with his standard practice except as follows:

    a. Pinnacles, pipe line connections and switch rods shall be furnished with priming coat only.

REMOVABLE PROTECTIVE COVERING

30. Before shipment, storage, or exposure to dampness, machine-finished parts such as semaphore shafts, threads, etc., shall be covered with Grade A, No-Ox-Id, Item 62.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
PAINTING
ORDERING REFERENCES AND INSTRUCTIONS

S-350

ITEM	ORDERING REFERENCE
31	PRIMER: Rust-oleum R-769 1 Gal. Containers
32	PAINT: Black, Formula - F. N. Y. C. S., Spec. 3041-1 5 Gal. Containers
33	PAINT: Baggage Car Gray 5 Gal. Containers Pittsburgh Plate Glass Co., No. LS-8145.
34	PAINT: Acid Resisting N. Y. C. S., Spec. 1219. 1 Gal. Containers
35	PAINT: Burry's Floor, Porch and Deck Enamel, Light Gray 5 Gal. Containers Burry Corp., New York
36	PAINT: Adams Griptite Black Asbestos. 5 Gal. Containers
37	PAINT: Cable A. A. R. Signal Section, Spec. 187. 5 Gal. Containers
38	PAINT: Black Cable. A. A. R. Signal Section, Spec. 181. 1 Pint Containers
39	PAINT: Rubber Finished Japan. U. S. & S. Co., Spec. 509 - Class 50. 1 Pint Containers Union Switch & Signal Co. Swissvale, Penna.

ITEM	ORDERING REFERENCE
40	ENAMEL: Black DuPont Dulux No. 83-005. 1 Gal. Containers
41	ENAMEL: Yellow, Chrome - Medium. N. Y. C. S., Spec. 1216. 1 Gal. Containers
42	ENAMEL: High Grade, Quick-drying, Hard Finish. 1 Pint and 1 Quart Containers Specify color number (See paragraph 10) Approved list of Manufacturers: Dolphin - DuPont - Rapolin Valentine - C. A. Wiley's Chas. R. Long, Jr., Co. O'Brien Varnish Co. Patterson-Sargent's E. E.
43	PAINT: Rust-oleum Signal Box Gray, R-183 1 Gal. and 5 Gal. Containers
44	THINNER: Rust-oleum Thinning Oil, R-633 1 Gal. Containers (Thinner for Rust-oleum Products)

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
PAINTING
ORDERING REFERENCES AND INSTRUCTIONS

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ITEM	ORDERING REFERENCE	
45		
46	ENAMEL:	Non-Reflecting Black No. 6651 1 Gal. Containers McDougall-Butler Co.
47	REDUCER:	No. 292. 1 Qt. Containers. McDougall-Butler Co. (Thinner, McDougall-Butler No. 6600 and No. 6651)
48	ENAMEL:	White Rolled Coat No. N-7182. 1 Qt. Containers Pittsburgh Plate Glass Co.
49		
50		
51	LACQUER:	Clear, Glyptal No. 1202. 1 Qt. Containers General Electric Co.
52	LACQUER:	Green, Glyptal No. 1211. 1 Qt. Containers General Electric Co.
53	PAINT:	Aluminum No. 6600 1 Gal. Containers McDougall-Butler Co.
54	THINNER:	Glyptal No. 1500. 1 Gal. Containers General Electric Co. (Thinner for G. E. Co., Glyptal)

ITEM	ORDERING REFERENCE	
55		
56		
57	VARNISH:	Baking, Westinghouse No. 1133. 1 Gal. Containers
58		
59		
60		
61		
62	GREASE:	Grade-A, Special No-Ox-Id. 5 Gal. Containers Dearborn Chemical Co.
63		

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
PAINTING
ORDERING REFERENCES AND INSTRUCTIONS

Approved - - - - - - - - - - - - - - - - - -
Chief Signal Engineer

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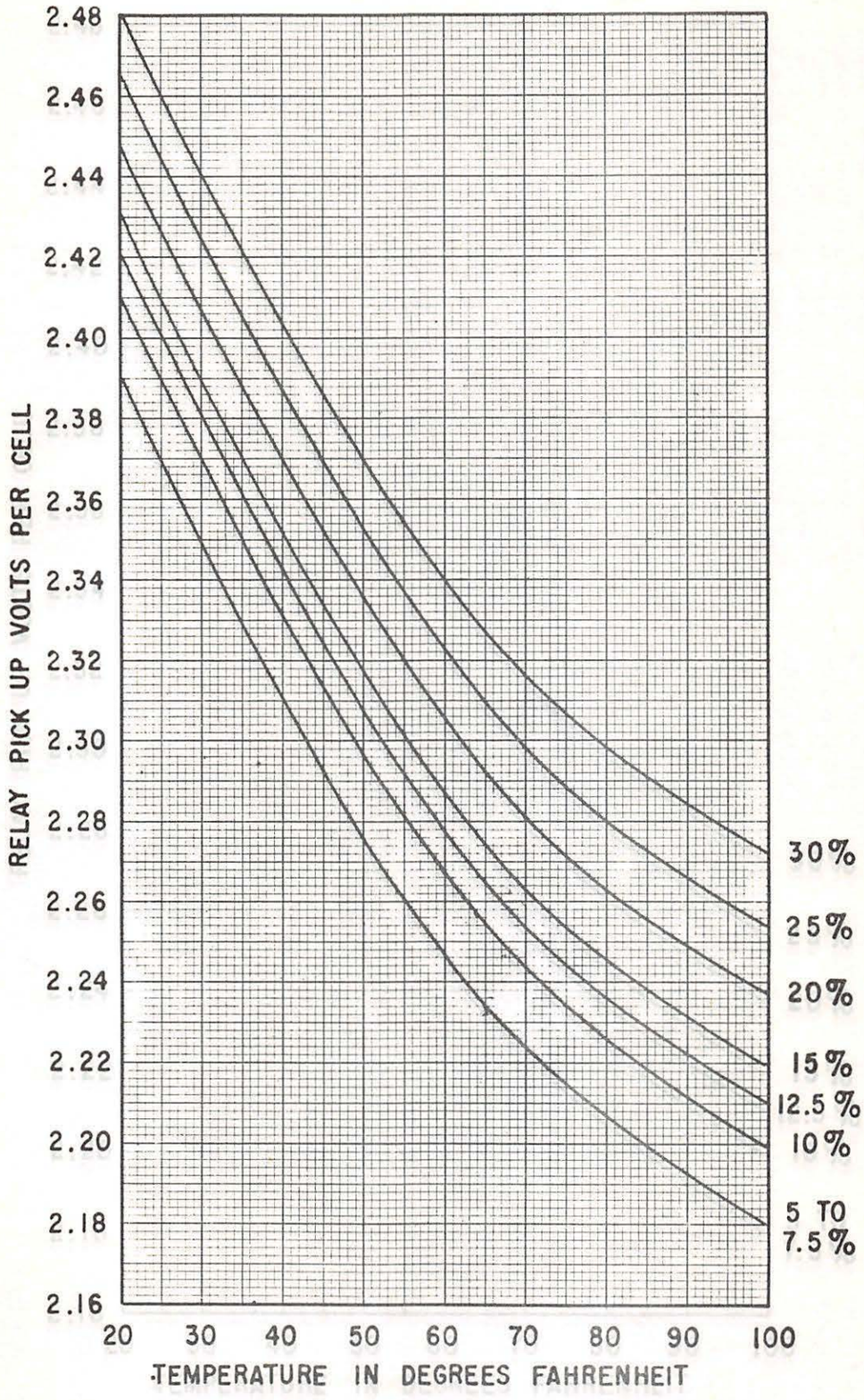
ISSUED 7-1-54



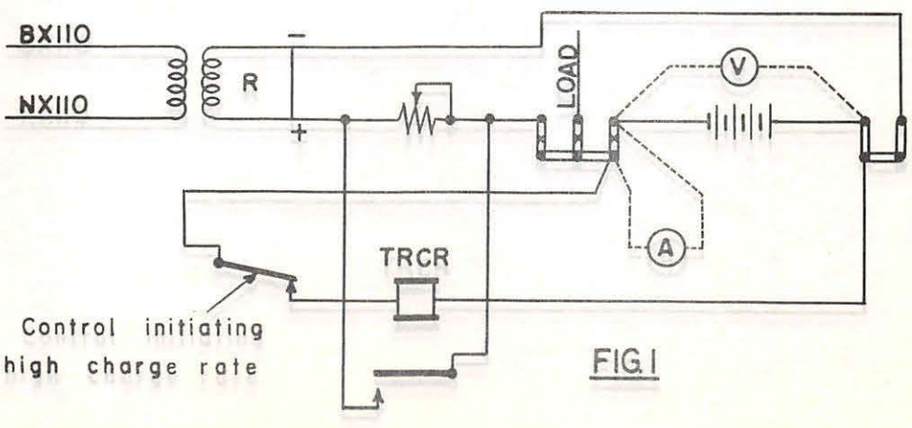


FIG. 1

Approved H. H. Scott
Chief Signal Engineer

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ISSUED 3-28-58

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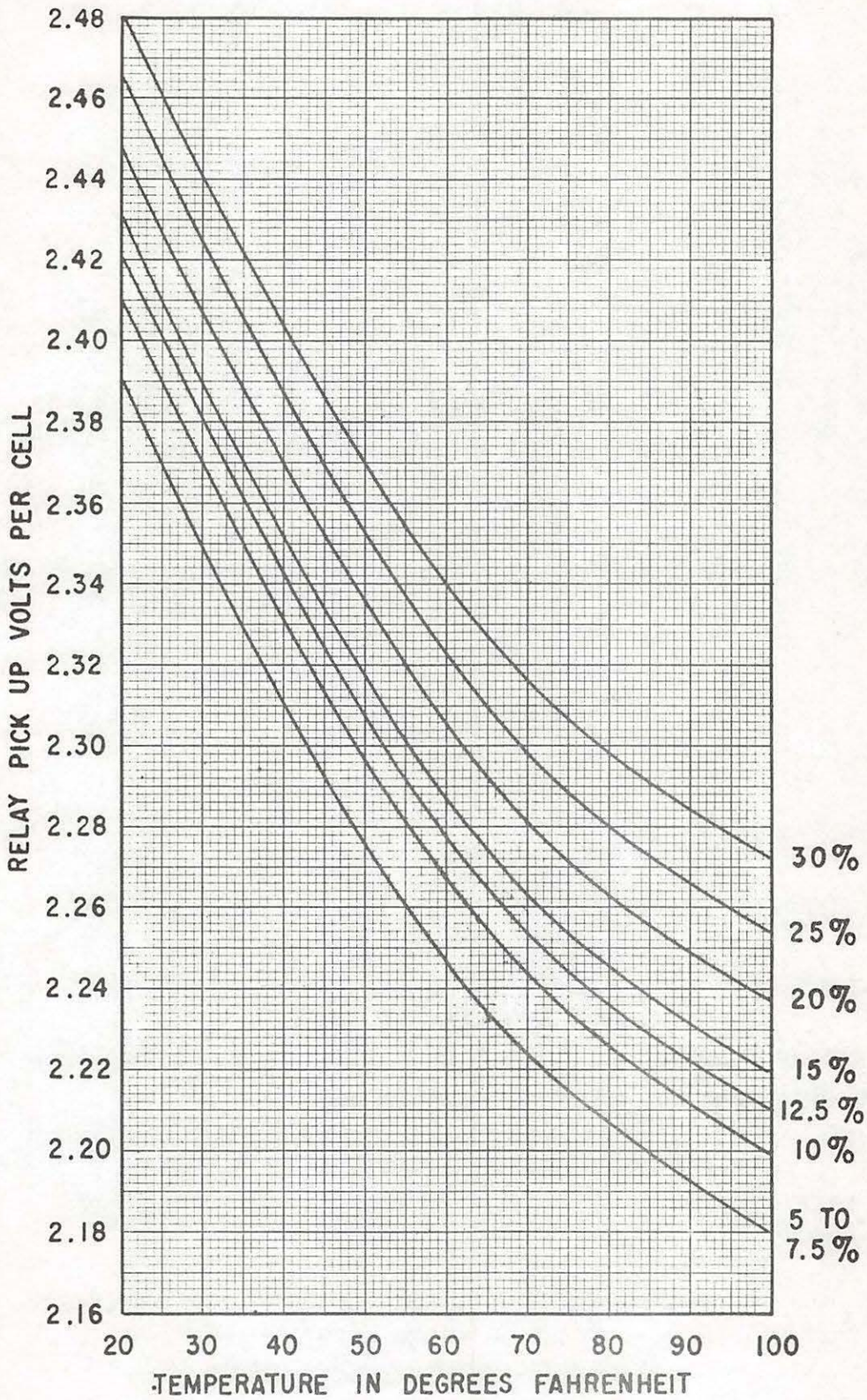

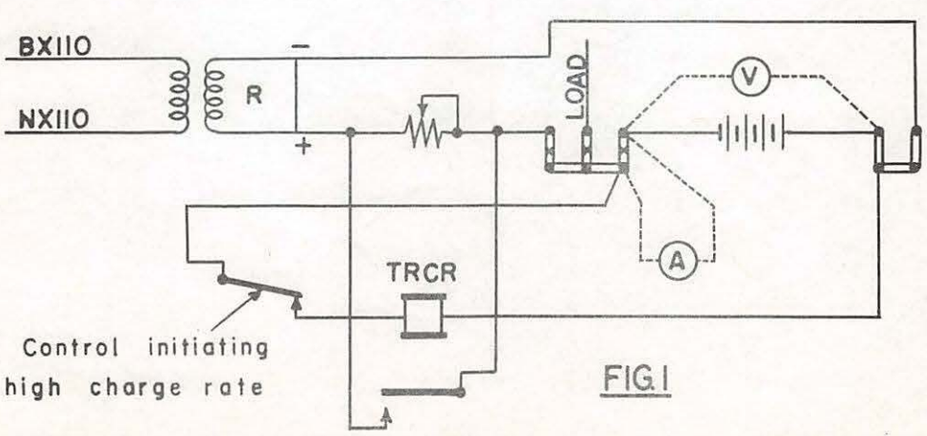

FIG. 1

Approved
Chief Signal Engineer

S-380

ISSUED 3-28-58

SHEET 2 Cont'd on Sh...

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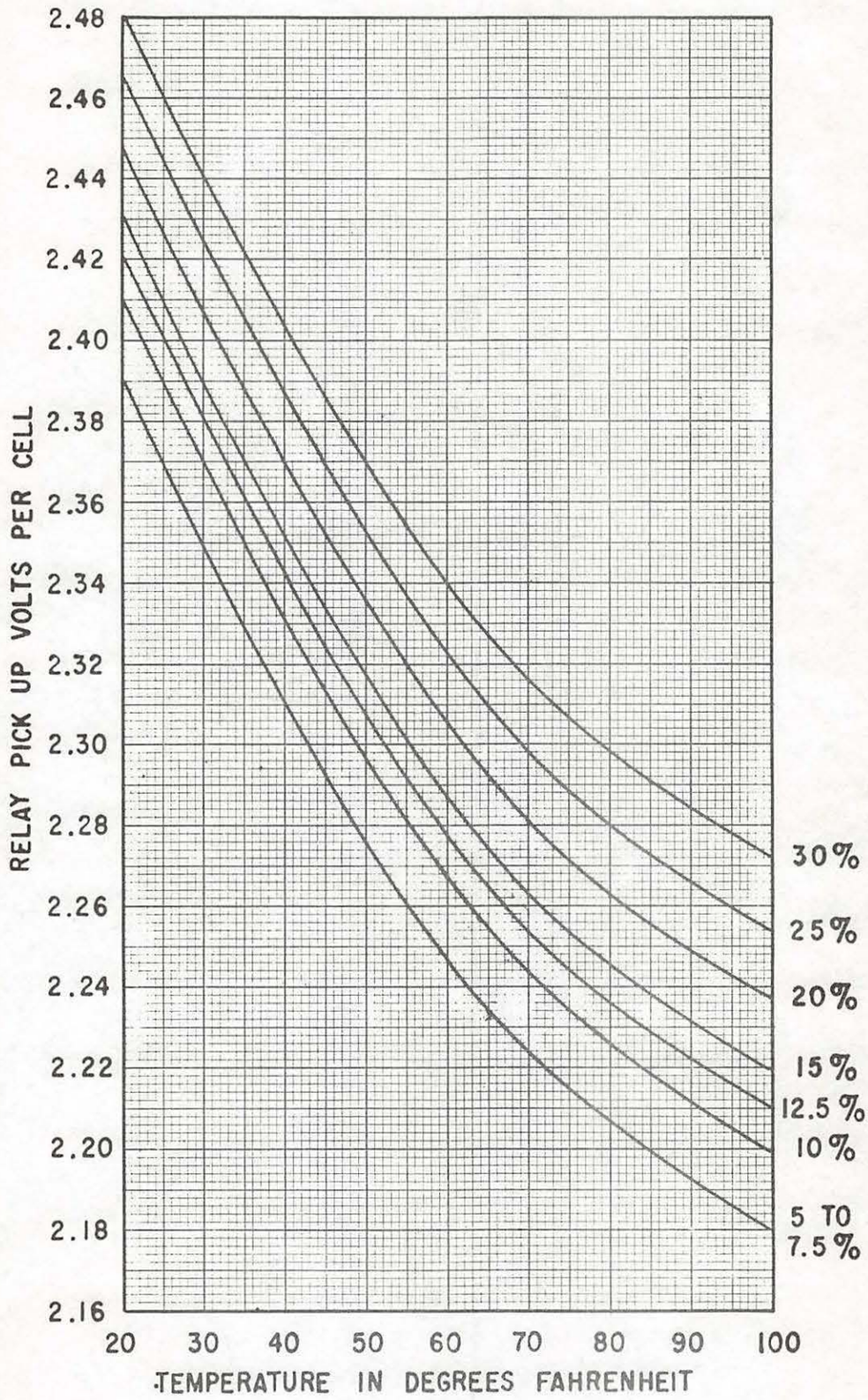

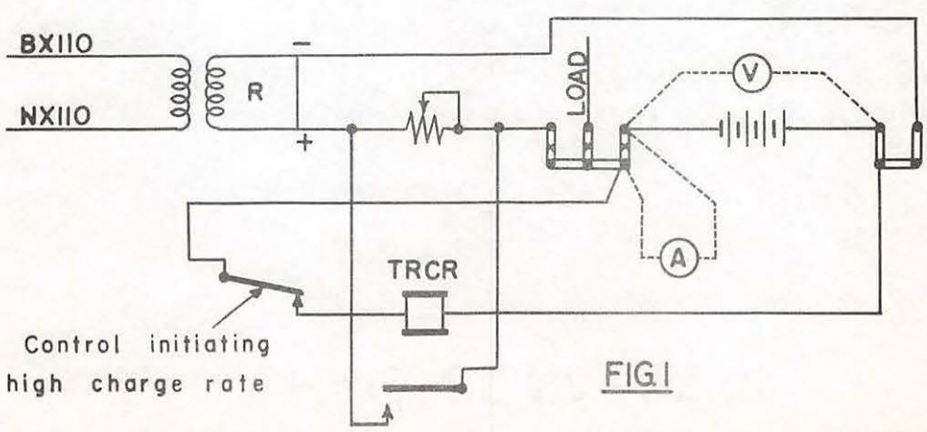

FIG 1

Approved V. H. Scott
Chief Signal Engineer

S-380

ISSUED 3-28-58

SHEET ...2... Cont'd on Sh...

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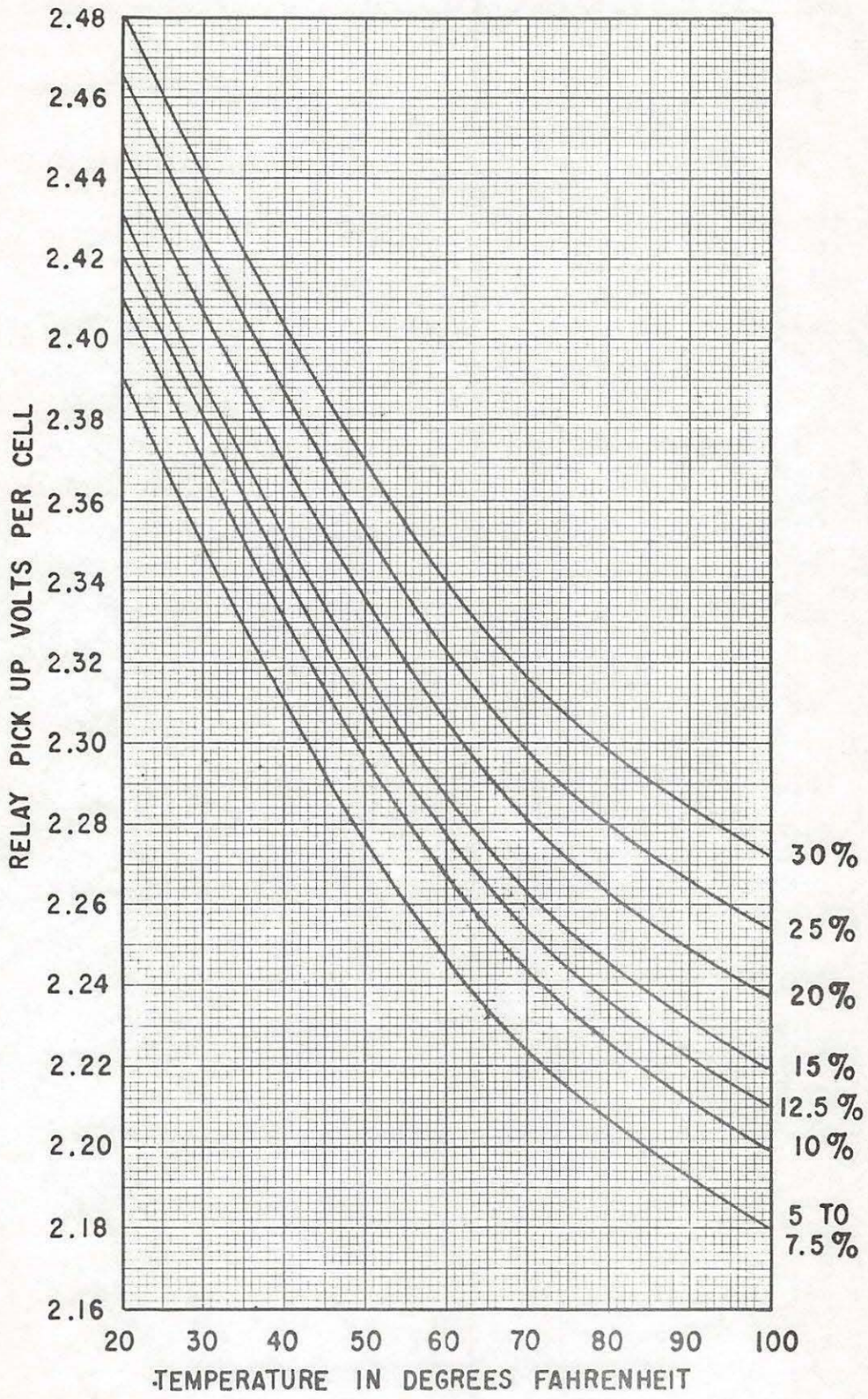

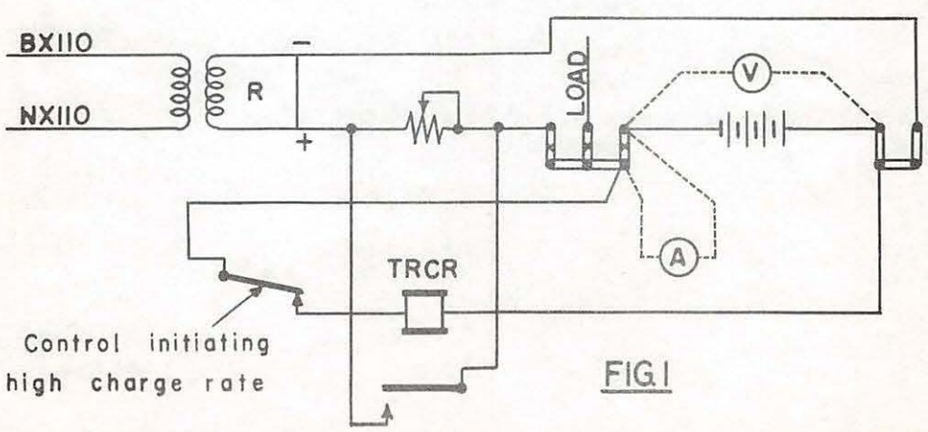

FIG 1

Approved
Chief Signal Engineer

S-380

ISSUED 3-28-58

SHEET 2 Cont'd on Sh...

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DESCRIPTION

At many signal locations, the discharge from the signal battery is irregular and varies over wide limits. An example would be a switch operating battery where the discharge varies considerably depending upon traffic and the number of times the switches are operated. Such variable loads make it difficult to adjust the charging rate to an average value that will maintain the battery in a fully charged condition and yet not overcharge it excessively.

To overcome these difficulties, a two rate charge control relay may be used to periodically initiate a high-rate charge when the relay is de-energized and to transfer to a low-rate charge when the relay picks up as the battery approaches its fully charged condition. This will insure rapid automatic replacement of discharge from the battery under varying load conditions. In addition, the pick up characteristic of the relay is compensated for temperature and is similar to the "Voltage versus temperature" characteristic of a lead battery on charge and approaching a fully charged condition. The voltage of a lead cell decreases as the cell temperature increases and the two rate charge control relay is designed with inverse temperature characteristics which decrease the overall relay resistance and thus lower the pick-up voltage with a temperature increase.

The two rate relay may be either Type "B", Size 1, or Type "K", Size 2, equipped with one independent back contact and should be selected according to the number of cells in the battery.

INSTALLATION

For proper operation, the relay should be located so that it will be subject to the same ambient temperatures as the battery. The relay is connected across the battery through a suitable means for opening the circuit when an increase in charge is called for. The rectifier used should have sufficient output capacity to supply the normal load plus a high charge rate of not less than 10% of the battery 8 hour rate.

Figure 1 shows a typical circuit for the two rate charge control relay. The back contact of the relay shunts a resistor in the charging circuit, thereby establishing the high rate. The high rate will be applied until the battery becomes sufficiently charged to cause the relay to pick up and remove the shunt, thereby establishing the low rate. The resistor used must be of sufficient capacity to carry the low rate charging current.

ADJUSTMENT

When making adjustments, the ammeter should be connected as shown in Figure 1 so as to read only that part of the current going into the battery and the voltmeter connected directly across the terminals of the battery. When adjusting the low rate, the voltmeter should be disconnected.

(1) Calculate the 8 hour charge rate of the battery. (The 8 hour ampere hour capacity divided by 8).

(2) With the coil circuit of the two rate relay open, charge the battery at the rated output of the rectifier to a voltage of 2.15 volts per cell. Continue the charge until the cells gas freely and the specific gravity stops rising. The voltage will rise above 2.15 volts per cell and the charging current will decrease.

(3) Adjust the final high-rate charge to approximately 10 to 30 percent of the 8 hour rate and record this final charging current for use in calculating the pick up value of the relay in (5). The higher rate is preferred for rapid recovery.

(4) With the two rate charge relay in the energized position and with bus load at normal steady value, adjust the low rate charge by means of the adjustable resistor until a value is obtained which will supply the battery losses. (These losses may be assumed to be approximately 1/2 of 1 percent of the 8 hour rate at 68° F.)

(5) Calculate the percentage relation of the input current to the 8 hour rate.

$$\frac{\text{Battery input amperes (3)}}{\text{8 hour rate amperes (1)}} \times 100$$

(6) Refer to the percentage curve on Page 2 nearest to but not in excess of the percentage obtained in (5) above. Knowing the electrolyte temperature, a point on the curve may be obtained at which the the relay pickup voltage per cell can be established. This voltage multiplied by the number of cells will give the voltage value at which to set the pick up of the charge control relay.

(7) Adjust the pick up of the charge control relay by turning the adjustment so as to increase the relay pick up to a value greater than the voltage present across the battery. Next turn the adjustment slowly in the opposite direction, decreasing the pick up value until the relay will just pick up at value determined from (6) above.

(8) Connect all wires to relay and test operation by slightly discharging the battery, then tripping the two rate relay. With the high-rate charge applied, the relay should pick up as the battery voltage reaches the value determined in (6) with the current as determined in (3).

(9) Battery should be tested for specific gravity periodically after installation to insure that it is being kept fully charged and that the relay is operating properly. (See instruction S–35.)

(10) Example: –

40 A.H. battery ÷ 8 hours = 5 amps (8 hour rate)

Set high rate at 20% of 8 hour rate = 5 x .2 = 1.0A

Set low rate at 1/2% of 8 hour rate = 5 x .005 = .025A

With electrolyte temperature of 65° F. a cell voltage of 2.29 is read from the 20% curve.

Relay pickup = 2.29 x 60 = 137.4 volts.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
LEAD TYPE STORAGE BATTERY
TWO RATE CHARGING INSTRUCTIONS

S-380

Printed in U.S.A.

ISSUED 3-28-58

SHEET 1 Cont'd on Sh. 2

DESCRIPTION

At many signal locations, the discharge from the signal battery is irregular and varies over wide limits. An example would be a switch operating battery where the discharge varies considerably depending upon traffic and the number of times the switches are operated. Such variable loads make it difficult to adjust the charging rate to an average value that will maintain the battery in a fully charged condition and yet not overcharge it excessively.

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For proper operation, the relay should be located so that it will be subject to the same ambient temperatures as the battery. The relay is connected across the battery through a suitable means for opening the circuit when an increase in charge is called for. The rectifier used should have sufficient output capacity to supply the normal load plus a high charge rate of not less than 10% of the battery 8 hour rate.

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LEAD TYPE STORAGE BATTERY
TWO RATE CHARGING INSTRUCTIONS

S-380

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SHEET 1 Cont'd on Sh. 2

RESISTANCE OHMS	DRAWING NO.
NEUTRAL	
1.8	56001-95 GR. 2
	-111 GR. 2
	-734 GR. 2
4	-110 GR. 1
	-116 GR. 1
	-132 GR. 1
	-133 GR. 1
	-714 GR. 1
	-730 GR. 1
	-734 GR. 1
	-785 GR. 36
	-838 GR. 2
	-896 GR. 8
	56002-702 GR. 1
5.7	56001-85 GR. 20
6	-785 GR. 91
9	-733 GR. 1
	-785 GR. 12
16	-85 GR. 16
	-714 GR. 2
	56002-85 GR. 6
	-85 GR. 9
	-702 GR. 2
28.5	56001-838 GR. 1
	-857 GR. 1
41	-732 GR. 1
50	-872 GR. 1
66	-785 GR. 13
84	-85 GR. 19
	-85 GR. 34
	-732 GR. 3
	-785 GR. 31

RESISTANCE OHMS	DRAWING NO.
100	56001-119 GR. 1
	-701 GR. 5
	-762 GR. 5
	-785 GR. 2
	-789 GR. 3
180/180/180	56002-85 GR. 4
	-785 GR. 2
200	56001-701 GR. 6
	-762 GR. 6
330	56002-710 GR. 1
	-713 GR. 3
350	56001-762 GR. 7
500	-82 GR. 2
	-85 GR. 11C
	-85 GR. 39C
	-86 GR. 2
	-87 GR. 2
	-105 GR. 2
	-126 GR 2
	-135 GR. 2
	-701 GR. 2
	-741 GR. 2
	-753 GR. 2
	-762 GR. 2
	-785 GR. 6
	56002-56 GR. 1
	-61 GR. 1
	-85 GR. 5
	-85 GR. 10
	-703 GR. 1
	-708 GR. 1
900	56001-87 GR. 1
	-105 GR. 1
	-134 GR. 1
	-701 GR. 1
	-716 GR. 2
	-717 GR. 1

RESISTANCE OHMS	DRAWING NO.
900	56001-737 GR. 1
	-753 GR. 1
	-762 GR. 1
	-763 GR. 1
	-783 GR. 1
	-822 GR. 1
	-859 GR. 1
	-896 GR. 1
1400	-911 GR. 1
2240	-131 GR. 3
	-737 GR. 3
	-813 GR. 3
NEUTRAL QUICK PICK-UP	
65/135	56001-909 GR. 1
270	-717 GR. 6
	-885 GR. 1
NEUTRAL SLOW PICK-UP, QUICK DROP-AWAY	
42	56001-85 GR. 29
	-85 GR. 33
	-726 GR. 1
	-785 GR. 15
NEUTRAL OVERLOAD	
.068/135	56001-785 GR. 30
.068/230	-785 GR. 14
.068/1225	-785 GR. 1
NEUTRAL BIASED	
48	56001-801 GR. 9
63	-724 GR. 5
	-801 GR. 5
	-922 GR. 5
200	-801 GR. 8
250	-801 GR. 1
350	56002-720 GR. 1
1000	56001-801 GR. 4

RESISTANCE OHMS	DRAWING NO.
NEUTRAL SLOW RELEASE	
5.2	56001-758 GR. 1
24	-731 GR. 1
48	-890 GR. 1
56	-886 GR. 4
80	-137 GR. 2
	-727 GR. 2
	-759 GR. 1
105/105	-85 GR. 10
	-713 GR. 2
140	-115 GR. 1
	-137 GR. 1
	-727 GR. 1
	-886 GR. 3
165/165	-754 GR. 1
194	-718 GR. 1
	-779 GR. 1
250	-83 GR. 27
	-739 GR. 27
300	-744 GR. 1
340	-87 GR. 26
	-105 GR. 26
	-728 GR. 26
	-771 GR. 1
	-780 GR. 1
460	-735 GR. 26
	-830 GR. 1
460/460	-785 GR. 85
470	-785 GR. 93
900	-841 GR. 1

RESISTANCE OHMS	DRAWING NO.
NEUTRAL SLOW PICK-UP	
230	56001-120 GR. 1
	-736 GR. 1
	-757 GR. 1
300	-729 GR. 1
3100	-901 GR. 1
POWER TRANSFER	
50/50	56001-89 GR. 1
	-721 GR. 1
100/100	-92 GR. 1
	-140 GR. 1
	-745 GR. 1
LIGHT OUT	
.12	56001-839 GR. 1
.12/450	-873 GR. 1
.138	-858 GR. 2
.45/450	-785 GR. 59
LAMP CONTROL	
100	56001-855 GR. 1
210	-880 GR. 1
FLASHER	
136/136	56008-50 GR. 1
	-50 GR. 2
	-53 GR. 1
	-53 GR. 2
300	56001-903 GR. 1
490	-915 GR. 1
MAGNETIC STICK	
46	56001-791 GR. 2

RESISTANCE OHMS	DRAWING NO.
NEUTRAL SWITCH CONTROL	
.04/700	56001-785 GR. 43
.045/450	-785 GR. 96
	-785 GR. 99
POLAR SWITCH CONTROL	
.14/125	56003-785 GR. 8
.14/300	-85 GR. 16
	-85 GR. 18
	-85 GR. 26
	-785 GR. 1
POLAR	
34	56003-701 GR. 7
165/165	-85 GR. 14
200	-56 GR. 1
	-57 GR. 3
	-58 GR. 3
	-62 GR. 3
	-64 GR. 3
	-70 GR. 1
	-701 GR. 3
	-707 GR. 3
	-710 GR. 1
200/200	-85 GR. 1
	-85 GR. 12C
	-785 GR. 6
500	-57 GR. 2
	-64 GR. 2
	-701 GR. 2
POLAR SLOW RELEASE	
120	56003-709 GR. 2
276	-708 GR. 26
476	-709 GR. 3
POLAR RETAINED NEUTRAL	
220	56004-54 GR. 1
	-56 GR. 1
	-702 GR. 1

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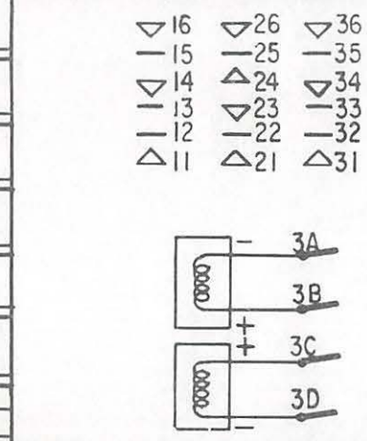
CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.028		.028	
Min. Drop-away A.	.0052		.0036	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0103		.0113	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete
Following Relays may be substituted
56001-135 GR.2
56001-741 GR.2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-82	2

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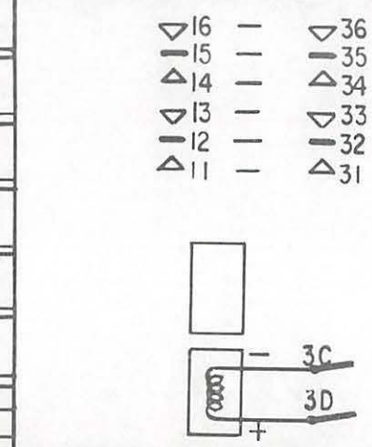
CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.074		.074	
Min. Drop-away A.	.0057		.0040	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0178		.0196	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time .9 Sec. At 10 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .005"
Catalogue Reference
S-500 Reference
Class N
SR



REMARKS: Obsolete
Following Relay may be substituted
56001-739 GR.27

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	250	56001-83	27

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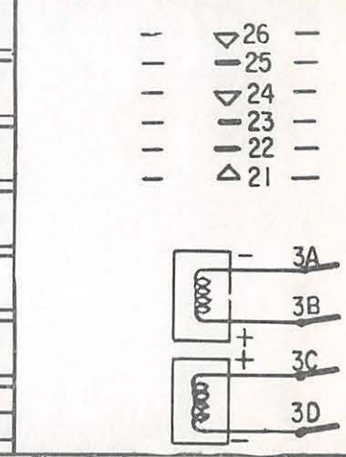
CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.070		.070	
Min. Drop-away A.	.007		.0049	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.022		.0242	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time .18-.25 Sec. At 5 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N
SR



REMARKS: Obsolete
Test Values shown are
for one Coil
Following Relay may be substituted
56001-713 GR.2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	105-105	56001-85	10

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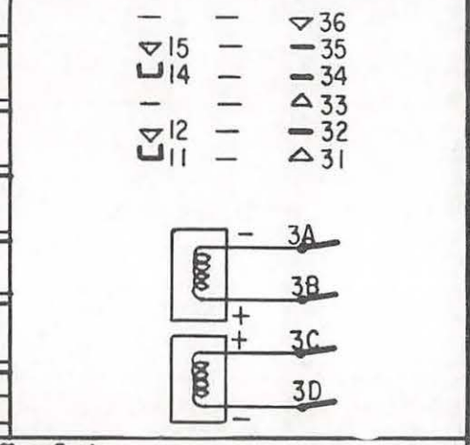
CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.028		.028	
Min. Drop-away A.	.0040		.0028	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0150		.0165	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .125"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-85 GR.39C
56001-785 GR.6

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-85	11C

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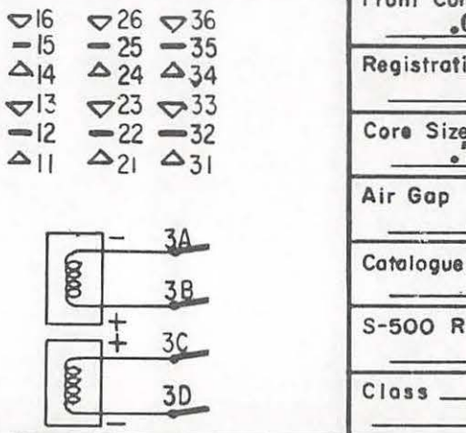
CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.160		.160	
Min. Drop-away A.	.0225		.0184	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.041		.045	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .016
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relay may be substituted
56001-714 GR.2

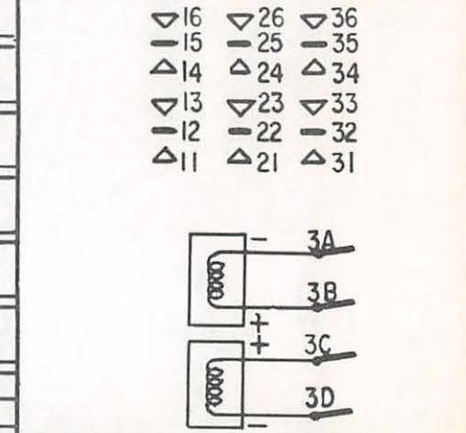
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	16	56001-85	16

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.120		.120	
Min. Drop-away A.	.0088		.0062	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.022		.0242	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size .736"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-85 GR.34
56001-732 GR.3
56001-785 GR.31

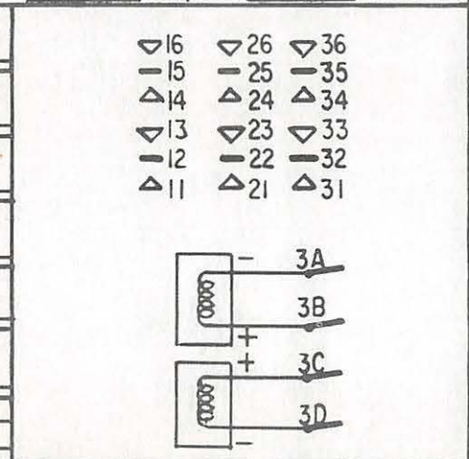
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	84	56001-85	19

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.300		.300	
Min. Drop-away A.	.036		.0295	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.065		.072	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size .736"
Air Gap .016"
Catalogue Reference
S-500 Reference
Class M



REMARKS: Obsolete

Following Relay may be substituted
56001-733 GR.1
56001-785 GR.12

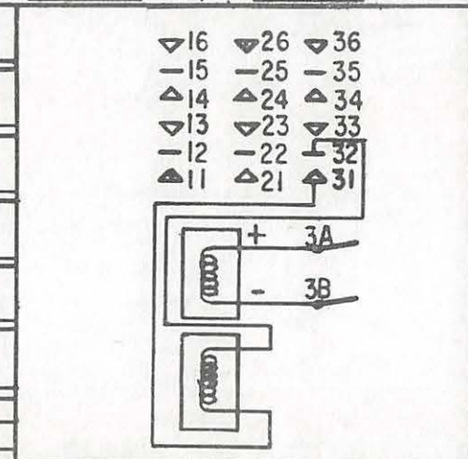
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	5.7	56001-85	20

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.300		.300	
Min. Drop-away A.	.019		.0133	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.041		.045	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time .45 Sec. At 4.0 Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size .736"
Air Gap .009"
Catalogue Reference
S-500 Reference
Class M
SPU-QDA



REMARKS: Obsolete

Following Relays may be substituted
56001-85 GR.33
56001-726 GR.1

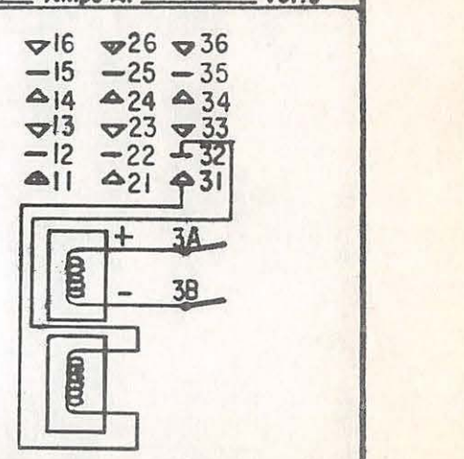
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	42	56001-85	29

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.300		.300	
Min. Drop-away A.	.019		.0133	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.041		.045	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time .45 Sec. At 4.0 Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size .736"
Air Gap .009"
Catalogue Reference
S-500 Reference
Class M
SPU-QDA



REMARKS: Obsolete

Following Relays may be substituted
56001-85 GR.29
56001-726 GR.1

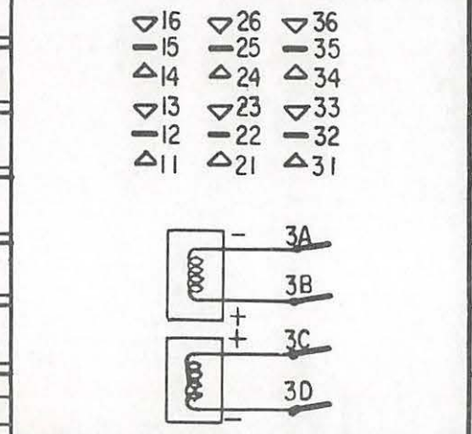
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	42	56001-85	33

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.120		.120	
Min. Drop-away A.	.0088		.0062	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.022		.0242	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size .736"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-85 GR. 19
56001-732 GR. 3
56001-785 GR. 31

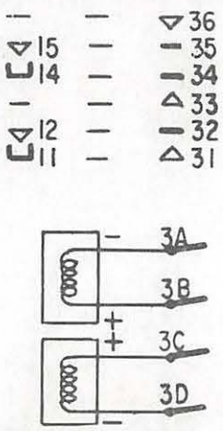
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	84	56001-85	34

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.028		.028	
Min. Drop-away A.	.004		.0028	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	015		.0165	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .125"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-85 GR. 11C
56001-785 GR. 6

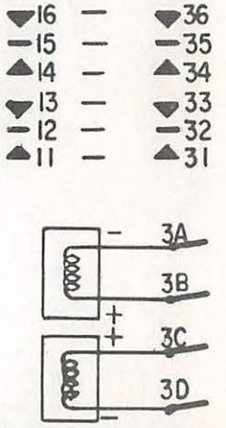
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-85	39C

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.026		.026	
Min. Drop-away A.	.0042		.0029	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.012		.0132	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 10 Amps At 175 Volts

Front Contact Open .090"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-126 GR.2
56001-753 GR. 2

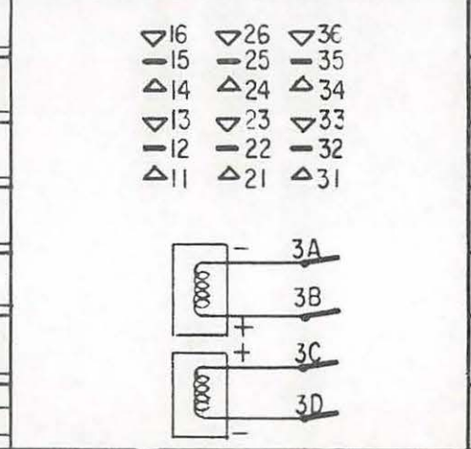
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-86	2

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.0194		.0194	
Min. Drop-away A.	.004		.0028	
Min Pick-up A				
Max. Pick-up A.				
Max. Working A.	.008		.0088	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-105 GR.1 56001-87 GR.2
56001-701 GR.1 56001-105 GR.2
56001-762 GR.1 56001-701 GR.2
56001-762 GR.2

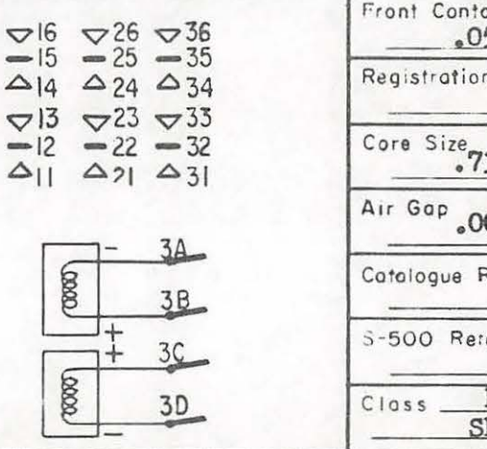
TYPE	SIZE	RESISTANCE	DRAWING	GR
B	1	900	56001-87	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.028		.028	
Min Drop-away A.	.0057		.004	
Min Pick-up A.				
Max. Pick-up A.				
Max. Working A	.0115		.0127	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-105 GR.2 56001-87 GR.1
56001-701 GR.2 56001-105 GR.1
56001-762 GR.2 56001-701 GR.1
56001-762 GR.1

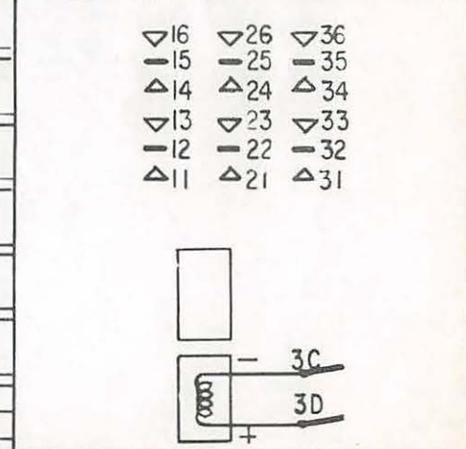
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-87	2

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.040		.040	
Min. Drop-away A.	.0055		.0039	
Min Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.019		.0209	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min _____ At _____ Volts
Release Time 1.0 Sec. At 10 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size .736"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N
SR



REMARKS: Obsolete

Following Relays may be substituted
56001-105 GR.26
56001-728 GR.26
56001-780 GR.1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	340	56001-87	26

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	V. AC	10		10	
Min. Drop-away	V. AC	6.3		5.4	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	V. AC	8.3		8.7	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts

Release Time _____ Sec. At _____ Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time _____ Sec. At _____ Volts

Contact Capacity 7.5 Amps At 30 Volts

Front Contact Open .050"

Registration

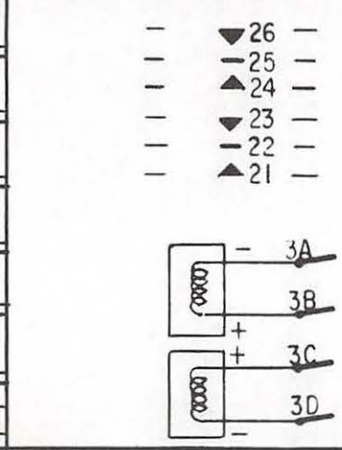
Core Size 9/16"

Air Gap .063"

Catalogue Reference

S-500 Reference

Class N
Power Transfer



REMARKS: Obsolete

Following Relay may be substituted
56001-721 GR.1
Relay to be tested with Rectifier

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	50-50	56001-89	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	V. AC	10		10	
Min. Drop-away	V. AC	6.3		5.5	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	V. AC	8.3		9.0	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts

Release Time _____ Sec. At _____ Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time _____ Sec. At _____ Volts

Contact Capacity 7.5 Amps At 10 Volts

Front Contact Open .050"

Registration

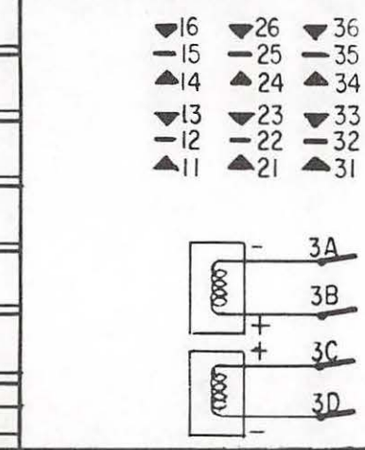
Core Size 9/16"

Air Gap .030"

Catalogue Reference

S-500 Reference

Class N
Power Transfer



REMARKS: Obsolete

Following Relays may be substituted
56001-140 GR.1
56001-745 GR.1
Relay to be tested with Rectifier

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	100-100	56001-92	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.435		.435	
Min. Drop-away	A.	.061		.050	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.101		.0111	
Max. Pol. P.U. & Work	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts

Release Time _____ Sec. At _____ Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time _____ Sec. At _____ Volts

Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"

Registration

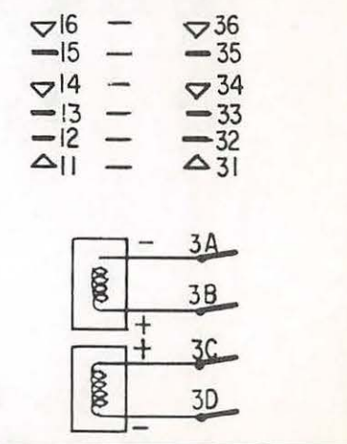
Core Size 9/16"

Air Gap .010"

Catalogue Reference

S-500 Reference

Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-111 GR.2
56001-734 GR.2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	1.8	56001-95	2

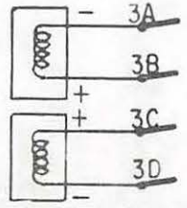
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.0194		.0194	
Min. Drop-away A.	.004		.0028	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.008		.0088	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36
—15 —25 —35
△14 △24 △34
▽13 ▽23 ▽33
—12 —22 —32
△11 △21 △31



REMARKS: Obsolete

Following Relays may be substituted
56001-87 GR.1 56001-87 GR.2
56001-701 GR.1 56001-105 GR.2
56001-762 GR.1 56001-701 GR.2
56001-762 GR.2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-105	1

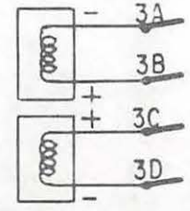
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.028		.028	
Min Drop-away A.	.0057		.004	
Min Pick-up A.				
Max. Pick-up A.				
Max. Working A	.0115		.0127	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. A· ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36
—15 —25 —35
△14 △24 △34
▽13 ▽23 ▽33
—12 —22 —32
△11 △21 △31



REMARKS: Obsolete

Following Relays may be substituted
56001-105 GR.2 56001-87 GR.1
56001-701 GR.2 56001-105 GR.1
56001-762 GR.2 56001-701 GR.1
56001-762 GR.1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-105	2

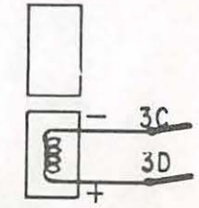
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.040		.040	
Min. Drop-away A.	.0055		.0039	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.019		.0209	
Max. Pol. P.U & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time 1.0 Sec. At 10 Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size .736"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N SR

▽16 ▽26 ▽36
—15 —25 —35
△14 △24 △34
▽13 ▽23 ▽33
—12 —22 —32
△11 △21 △31



REMARKS: Obsolete

Following Relays may be substituted
56001-87 GR.26
56001-728 GR.26
56001-780 GR.1

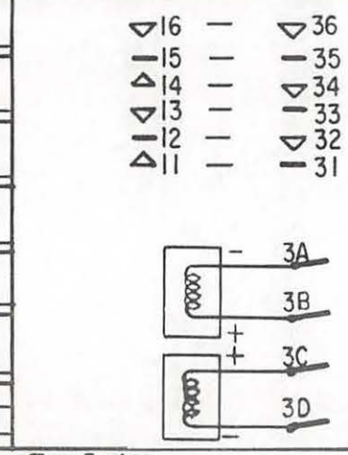
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	340	56001-105	26

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.300		.300	
Min. Drop-away A.	.041		.034	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.065		.072	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .016"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-133 GR.1
56001-730 GR.1

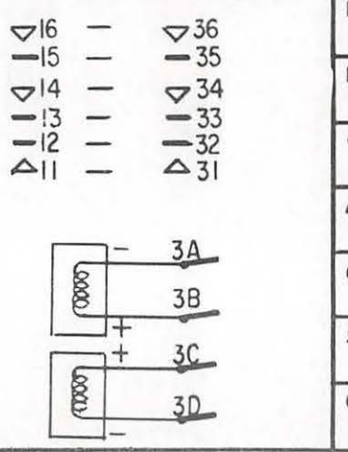
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	4	56001-110	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.435		.435	
Min. Drop-away A.	.061		.050	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.101		.111	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-95 GR.2
56001-734 GR.2

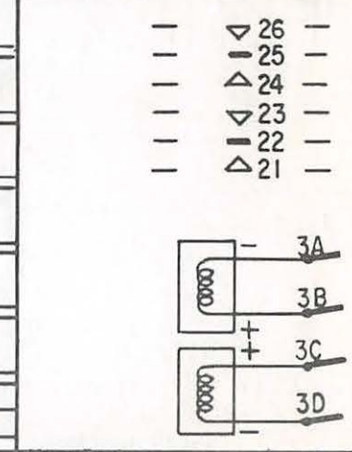
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	1.8	56001-111	2

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.044		.044	
Min. Drop-away A.	.0044		.0031	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0141		.0155	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time .13 Sec. At 4.2 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N SR



REMARKS: Obsolete

Following Relays may be substituted
56001-137 GR.1
56001-727 GR.1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	140	56001-115	1

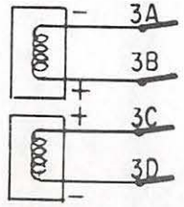
S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.300		.300	
Min. Drop-away A.	.052		.043	
Min. Pick-up A.	·			
Max. Pick-up A.				
Max. Working A.	.085		.094	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .016"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36
—15 —25 —35
△14 △24 △34
▽13 ▽23 ▽33
—12 —22 —32
△11 △21 △31



REMARKS: Obsolete

Following Relays may be substituted
56001-132 GR.1
56001-714 GR.1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	4	56001-116	1

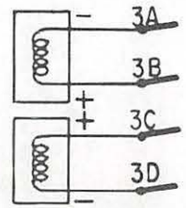
S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.115		.115	
Min. Drop-away A.	.010		.007	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.023		.0253	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N

— ▽26 —
— —25 —
— △24 —
— ▽23 —
— —22 —
— △21 —



REMARKS: Obsolete

Test Values shown are for Coils in multiple
Following Relay may be substituted
56001-785 GR.2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	100	56001-119	1

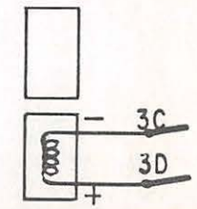
S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.115		.115	
Min. Drop-away A.	.017		.0119	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.039		.043	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time .6 Sec. At 11.0 Volts
Pick-Up Time 1.5 Sec. At 11.0 Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N
SPU

▽16 ▽26 ▽36
—15 —25 —35
△14 △24 △34
▽13 ▽23 ▽33
—12 —22 —32
△11 △21 △31



REMARKS: Obsolete

Following Relay may be substituted
56001-736 GR.1

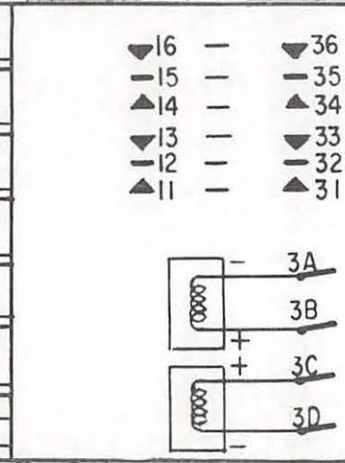
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	230	56001-120	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.026		.026	
Min. Drop-away A.	.0042		.0029	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.012		.0132	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 10 Amps At 175 Volts

Front Contact Open .090"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-86 GR.2
56001-753 GR.2

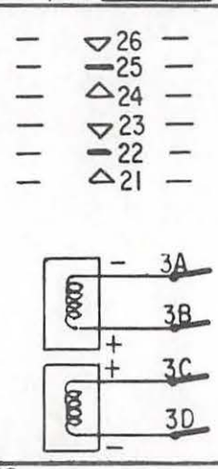
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-126	2

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.0125		.0125	
Min. Drop-away A.	.0015		.0011	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0037		.0041	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-737 GR.3
56001-813 GR.3

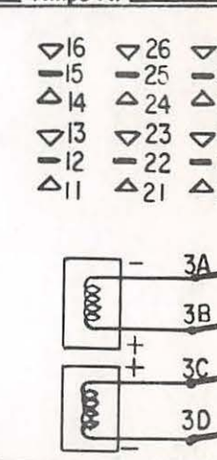
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	2240	56001-131	3

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.300		.300	
Min. Drop-away A.	.052		.043	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.085		.094	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .016"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-116 GR.1
56001-714 GR.1

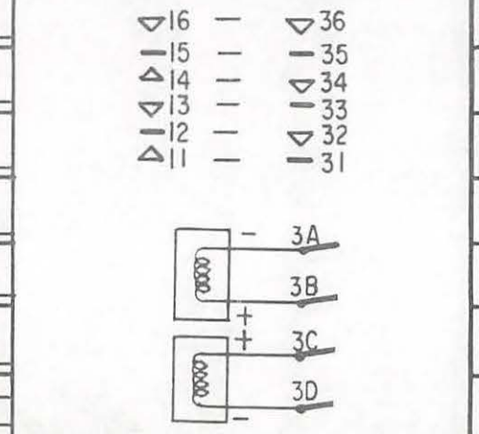
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	4	56001-132	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.300		.300	
Min. Drop-away	A.	.041		.034	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.065		.072	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .016"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-110 GR.1
56001-730 GR.1

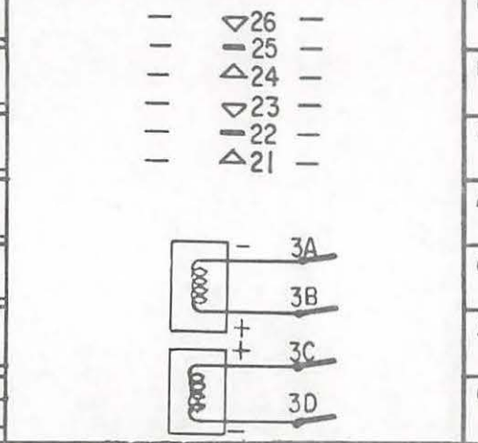
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	4	56001-133	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.0194		.0194	
Min. Drop-away	A.	.0023		.0016	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.0057		.0063	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relay may be substituted
56001-737 GR.1

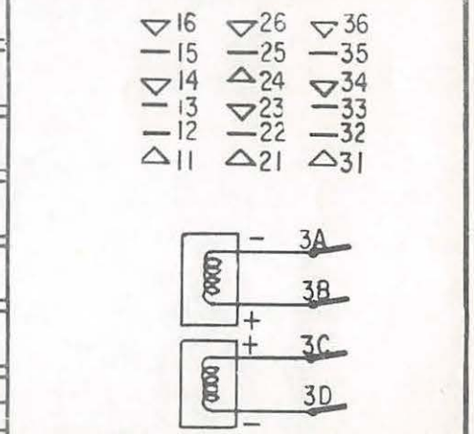
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-134	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.028		.028	
Min. Drop-away	A.	.0052		.0036	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.0103		.0113	
Max. Pol. P.U. & Work	A.				
Max. Start	V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-82 GR.2
56001-741 GR.2

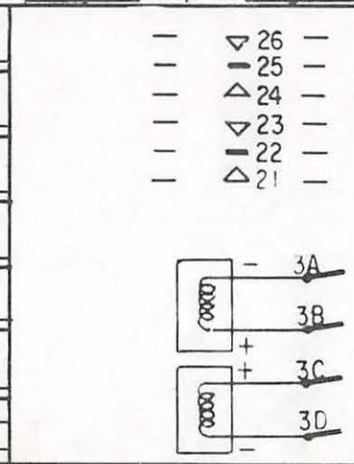
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-135	2

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.044		.044	
Min. Drop-away A.	.0044		.0037	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0141		.0155	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time .13 Sec. At 4.2 Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N SR



REMARKS: Obsolete

Following Relays may be substituted
56001-115 GR.1
56001-727 GR.1

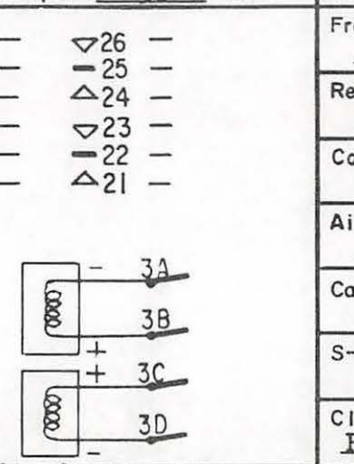
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	140	56001-137	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.056		.056	
Min. Drop-away A.	.0056		.0039	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0182		.020	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time .13 Sec. At 4.2 Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N SR



REMARKS: Obsolete

Following Relay may be substituted
56001-727 GR.2

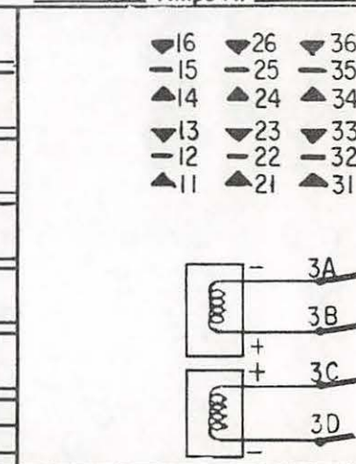
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	80	56001-137	2

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge V. AC	10		10	
Min. Drop-away V. AC	6.3		5.5	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working V. AC	8.3		9.0	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 7.5 Amps At 10 Volts

Front Contact Open .050"
Registration
Core Size 9/16"
Air Gap .030"
Catalogue Reference
S-500 Reference
Class N Power Transfer



REMARKS: Obsolete

Following Relays may be substituted
56001-92 GR.1
56001-745 GR.1
Relay to be tested with Rectifier

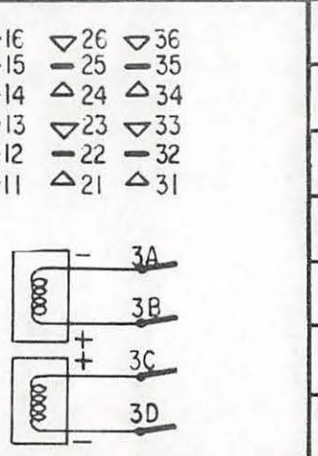
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	100-100	56001-140	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.032		.032	
Min. Drop-away	A.	.004		.0028	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.008		.0088	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-4
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted

56001-87 GR.1	56001-87 GR.2
56001-105 GR.1	56001-105 GR.2
56001-762 GR.1	56001-762 GR.2
	56001-701 GR.2

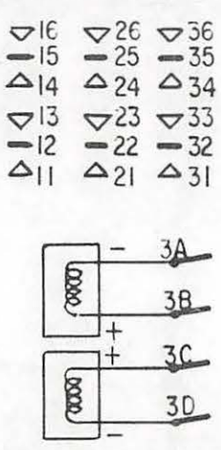
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-701	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.046		.046	
Min. Drop-away	A.	.0057		.004	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.0115		.0127	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-4
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted

56001-87 GR.2	56001-87 GR.1
56001-105 GR.2	56001-105 GR.1
56001-762 GR.2	56001-762 GR.1
	56001-701 GR.1

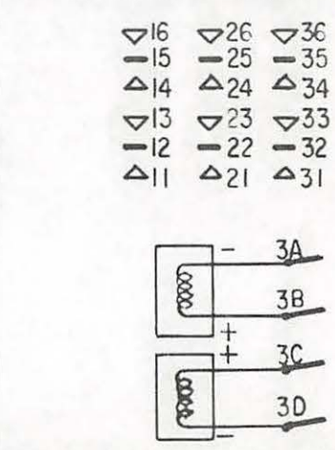
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-701	2

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.096		.096	
Min. Drop-away	A.	.012		.084	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.024		.026	
Max. Pol. P.U. & Work	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-4
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relay may be substituted

56001-762 GR.5

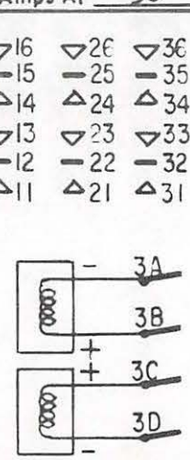
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	100	56001-701	5

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.072		.072	
Min. Drop-away A.	.009		.0063	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.018		.0198	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-4
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relay may be substituted
56001-762 GR.6

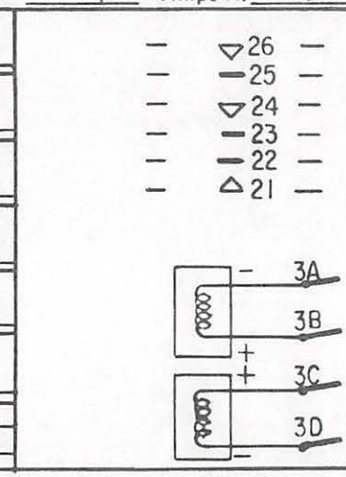
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	200	56001-701	6

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.070		.070	
Min. Drop-away A.	.007		.0049	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.022		.0242	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time .18-.25 Sec. At 5.0 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-25
Core Size 9/16"
Air Gap .006"
Catalogue Reference
S-500 Reference 302
Class N SR



REMARKS:

Test Values shown are for one coil

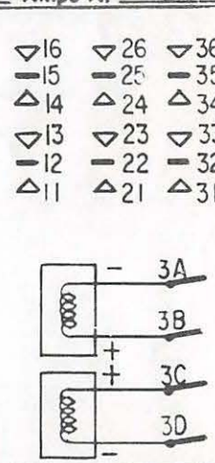
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	105-105	56001-713	2

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.300		.300	
Min. Drop-away A.	.052		.043	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.085		.094	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-26
Core Size 9/16"
Air Gap .016"
Catalogue Reference A62-261
S-500 Reference 271
Class N



REMARKS:

Following Relays may be substituted
56001-116 GR.1
56001-132 GR.1

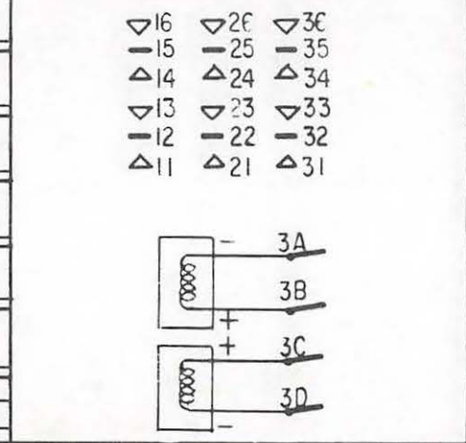
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	4	56001-714	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.150		.150	
Min. Drop-away A.	.0225		.018	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.041		.045	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-26
Core Size 9/16"
Air Gap .016"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relay may be substituted
56001-85 GR. 16

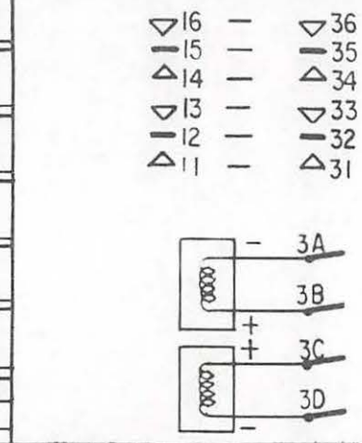
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	16	56001-714	2

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.0194		.0194	
Min. Drop-away A.	.0032		.0022	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.007		.0077	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-28
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

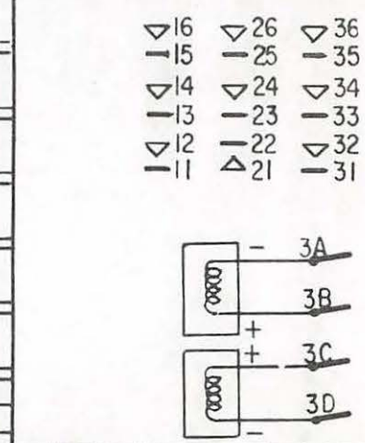
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-716	2

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.029		.029	
Min. Drop-away A.	.004		.0028	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0073		.0080	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-29
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

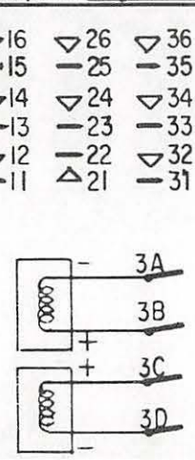
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-717	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.180		.180	
Min. Drop-away A.	.026		.0182	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.048		.053	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-29
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference 322
Class N QPU



REMARKS:

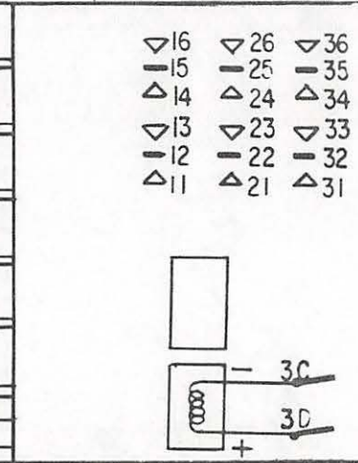
TYPE B | SIZE 1 | RESISTANCE 270 | DRAWING 56001-717 | GR. 6

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.136		.136	
Min. Drop-away A.	.007		.0049	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.034		.037	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time 1.6 Sec. At 10.0 Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-30
Core Size .736"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N SR



REMARKS: Obsolete

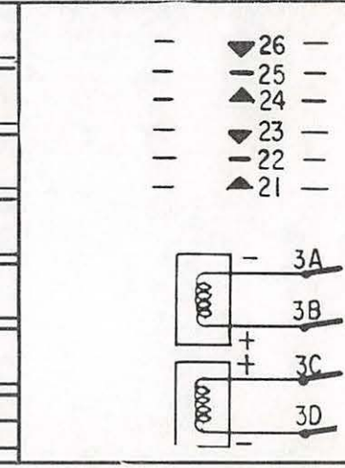
TYPE B | SIZE 1 | RESISTANCE 194 | DRAWING 56001-718 | GR. 1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge V. AC	10.0		10.0	
Min. Drop-away V. AC	6.3		5.35	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working V. AC	8.3		8.7	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 7.5 Amps At 10 Volts

Front Contact Open .050"
Registration 1-2-3-33
Core Size 9/16"
Air Gap .063"
Catalogue Reference A62-401
S-500 Reference 284
Class N Power Transfer



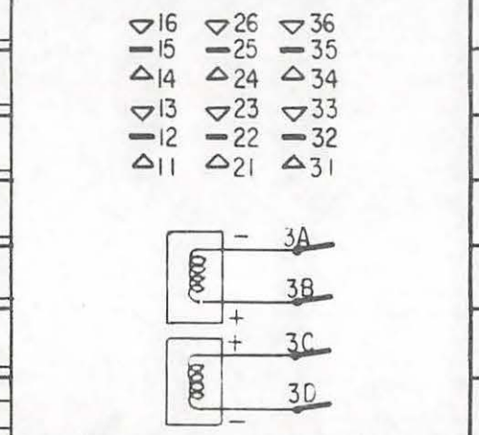
REMARKS:
Following Relay may be substituted
56001-89 GR.1
Relay to be tested with Rectifier

TYPE B | SIZE 1 | RESISTANCE 50-50 | DRAWING 56001-721 | GR. 1

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.092		.092	
Min. Drop-away A.	.011		.0077	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.025		.0275	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-13
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N Biased



REMARKS: Obsolete

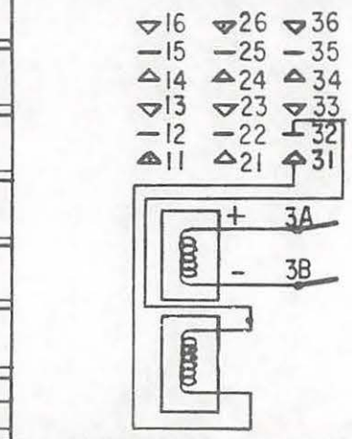
Following Relays may be substituted
56001-801 GR.5
56001-922 GR.5

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	63	56001-724	5

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.300		.300	
Min. Drop-away A.	.019		.0133	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.041		.045	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time .45 Sec. At 4.0 Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-21
Core Size .736"
Air Gap .009"
Catalogue Reference
S-500 Reference
Class N SPU-QDA



REMARKS: Obsolete

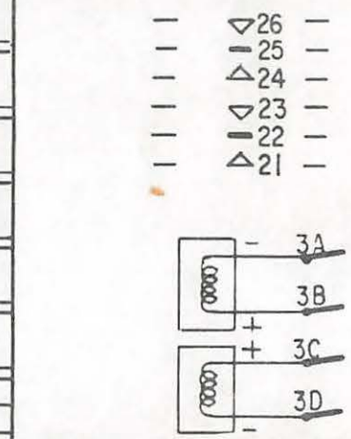
Following Relays may be substituted
56001-85 GR. 29
56001-85 GR. 33

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	42	56001-726	1

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.044		.044	
Min. Drop-away A.	.0044		.0031	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0141		.0155	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time .13 Sec. At 4.2 Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-22
Core Size 9/16"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N SR



REMARKS: Obsolete

Following Relays may be substituted
56001-115 GR.1
56001-137 GR.1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	140	56001-727	1

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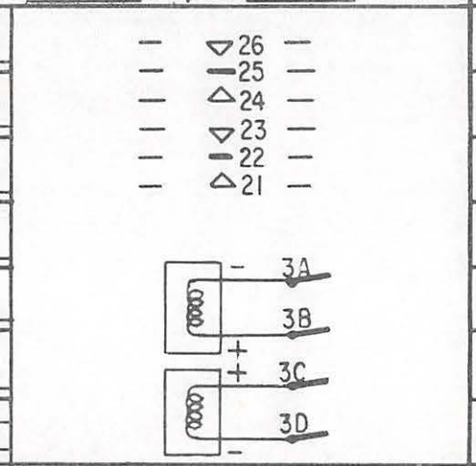
CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.056		.056	
Min. Drop-away A.	.0056		.0039	
Min. Pick-up A.				
Max Pick-up A.				
Max. Working A.	.0182		.020	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time .13 Sec. At 4.2 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-22
Core Size 9/16"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N / SR



REMARKS: Obsolete

Following Relay may be substituted
56001-137 GR.2

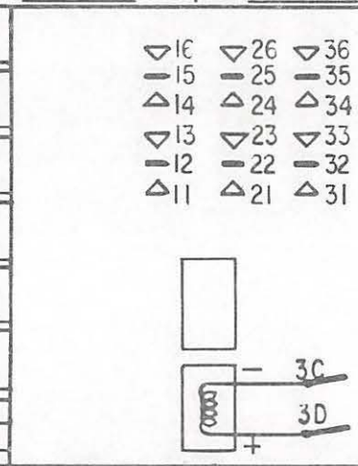
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	80	56001-727	2

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.040		.040	
Min. Drop-away A.	.0055		.0039	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.019		.0209	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time 1.0 Sec. At 10 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-23
Core Size .736"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N / SR



REMARKS: Obsolete

Following Relays may be substituted
56001-87 GR.26
56001-105 GR. 26
56001-780 GR.1

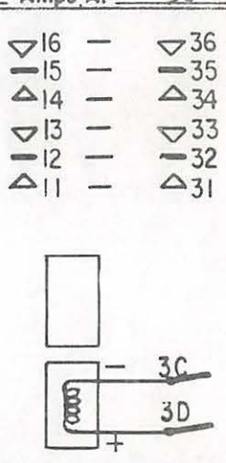
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	340	56001-728	26

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.080		.080	
Min. Drop-away A.	.009		.0063	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.028		.031	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time 2.2 Sec. At 10 Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-24
Core Size .736"
Air Gap .013"
Catalogue Reference
S-500 Reference 318
Class N / SPU



REMARKS:

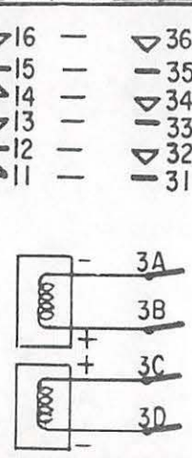
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	300	56001-729	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.300		.300	
Min. Drop-away A.	.041		.034	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.065		.072	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-20
Core Size 9/16"
Air Gap .016"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-110 GR.1
56001-133 GR.1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	4	56001-730	1

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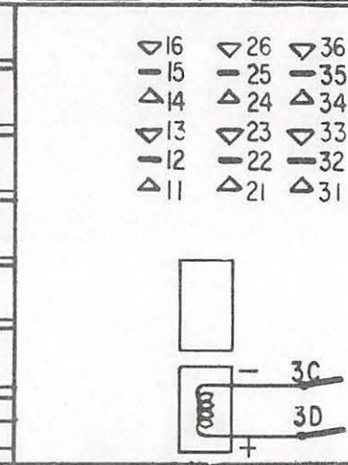
CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.300		.300	
Min. Drop-away A.	.021		.0147	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.060		.066	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time 1.8 Sec. At 8.0 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-5-18
Core Size .736"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N SR



REMARKS: Obsolete

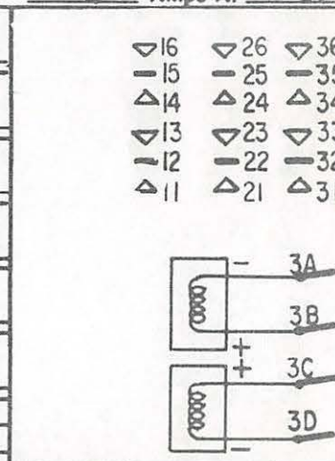
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	24	56001-731	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.161		.161	
Min. Drop-away A.	.010		.007	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0305		.034	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-5-19
Core Size .736"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

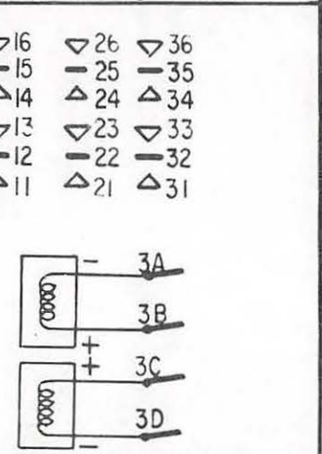
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	41	56001-732	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.126		.126	
Min. Drop-away A.	.0079		.0055	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0223		.0245	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-5-19
Core Size .736"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-85 GR.19
56001-85 GR.34
56001-785 GR.31

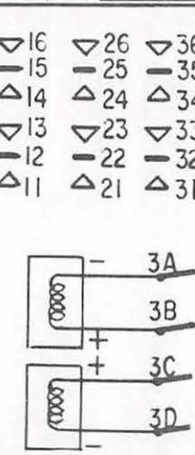
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	84	56001-732	3

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.230		.230	
Min Drop-away A.	.028		.023	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.052		.057	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-5-20
Core Size .736"
Air Gap .016"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relay may be substituted
56001-785 GR.12

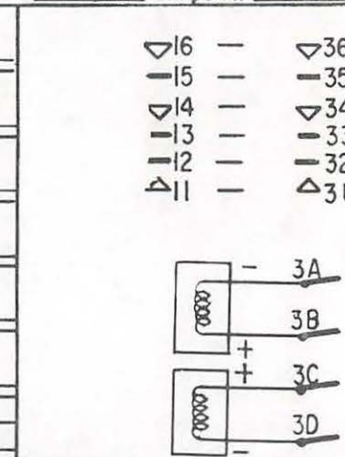
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	9	56001-733	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.300		.300	
Min. Drop-away A.	.042		.034	
Min. Pick-up A.	.			
Max. Pick-up A.				
Max. Working A.	.070		.077	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-5-21
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	4	56001-734	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.435		.435	
Min. Drop-away A.	.061		.050	
Min. Pick-up A				
Max. Pick-up A.				
Max. Working A.	.101		.111	
Max. Pol. P.U. & Work. A.				
Max. Start V.				
Flashes Per Min	____ At ____ Volts			
Release Time	____ Sec. At ____ Volts			
Pick-Up Time	____ Sec At ____ Volts			
Max. Reversal Time	____ Sec. At ____ Volts			
Contact Capacity	4 Amps At 30 Volts			

Front Contact Open .050"

Registration 1-2-5-21

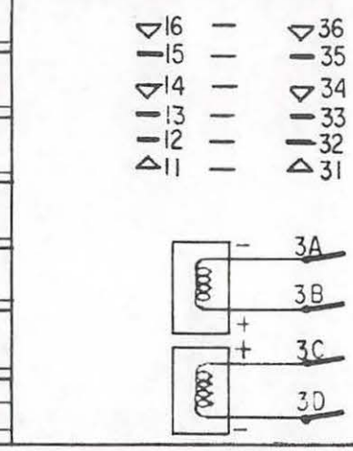
Core Size 9/16"

Air Gap .010"

Catalogue Reference A62-270

S-500 Reference 270

Class N



REMARKS:

Following relays may be substituted
56001-95 GR.2
56001-111 GR.2

TYPE	SIZE	RESISTANCE	DRAWING	GR
B	1	1.8	56001-734	2

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.050		.050	
Min Drop-away A.	.0026		.0018	
Min Pick-up A.				
Max. Pick-up A.				
Max. Working A	.013		.0143	
Max. Pol. P.U. & Work. A.				
Max. Start V				
Flashes Per Min	____ At ____ Volts			
Release Time	3.0 Sec. At 9.0 Volts			
Pick-Up Time	____ Sec. At ____ Volts			
Max Reversal Time	____ Sec. At ____ Volts			
Contact Capacity	4 Amps At 30 Volts			

Front Contact Open .050"

Registration 1-2-5-22

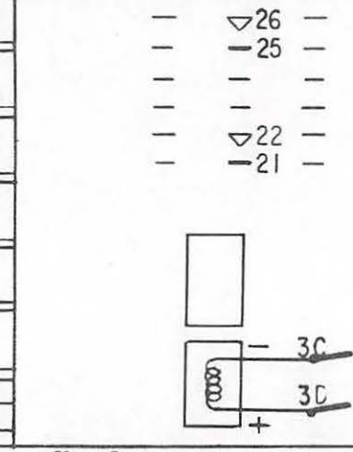
Core Size .736"

Air Gap .006"

Catalogue Reference

S-500 Reference

Class N
SR



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	460	56001-735	26

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.156		.156	
Min. Drop-away A.	.0175		.0123	
Min Pick-up A.				
Max. Pick-up A.				
Max Working A.	.039		.043	
Max Pol P.U & Work A.				
Max Start V.				
Flashes Per Min	____ At ____ Volts			
Release Time	.6 Sec. At 11.5 Volts			
Pick-Up Time	1.35 Sec. At 11.5 Volts			
Max. Reversal Time	____ Sec. At ____ Volts			
Contact Capacity	4 Amps At 30 Volts			

Front Contact Open .050"

Registration 1-2-5-24

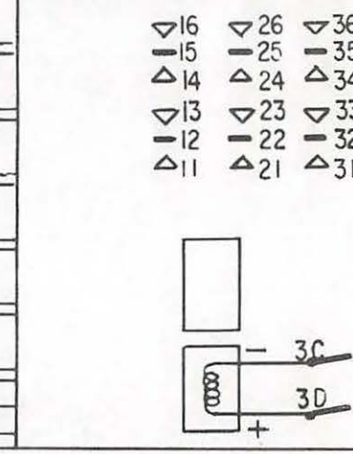
Core Size 9/16"

Air Gap .010"

Catalogue Reference A62-345

S-500 Reference 317

Class N
SPU



REMARKS:

Following relay may be substituted
56001-120 GR.1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	230	56001-736	1

Printed in U S A

D. C. RELAYS, PLUG-IN TYPE

SH. 26 CONT'D ON SH. 27

ISSUED 3-1-62

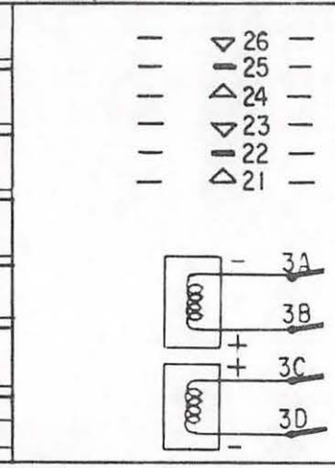
S-393

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.0194		.0194	
Min. Drop-away A.	.0023		.0016	
Min. Pick-up A				
Max. Pick-up A.				
Max. Working A.	.0057		.0063	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-5-26
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relay may be substituted
56001-134 GR.1

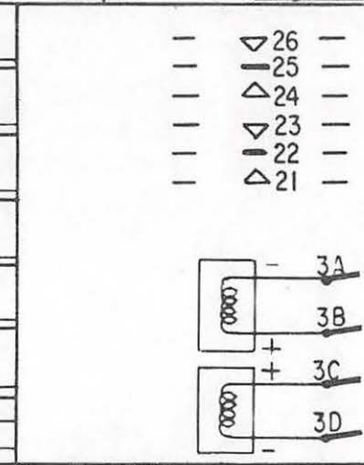
TYPE	SIZE	RESISTANCE	DRAWING	GR
B	1	900	56001-737	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.0125		.0125	
Min Drop-away A	.0015		.0011	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A	.0037		.0041	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-5-26
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-131 GR.3
56001-813 GR.3

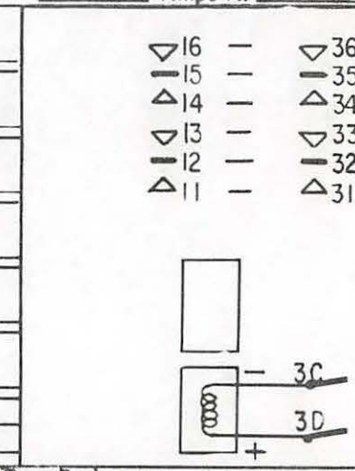
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	2240	56001-737	3

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.074		.074	
Min. Drop-away A.	.0057		.004	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0178		.0196	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min _____ At _____ Volts
Release Time 0.9 Sec. At 10.0 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-6-9
Core Size 9/16"
Air Gap .005"
Catalogue Reference
S-500 Reference
Class N
SR



REMARKS: Obsolete

Following Relay may be substituted
56001-83 GR. 27

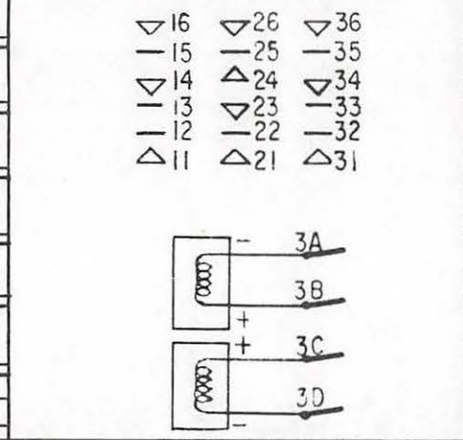
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	250	56001-739	27

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.028		.028	
Min. Drop-away A.	.0052		.0036	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0103		.0113	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-6-11
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-82 GR.2
56001-135 GR.2

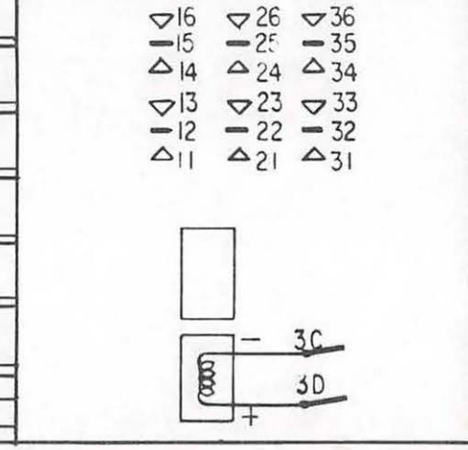
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-741	2

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.080		.080	
Min. Drop-away A.	.007		.0049	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.027		.0297	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time 1.7 Sec. At 8.4 Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-6-14
Core Size .736
Air Gap .005"
Catalogue Reference
S-500 Reference 297
Class N SR



REMARKS:

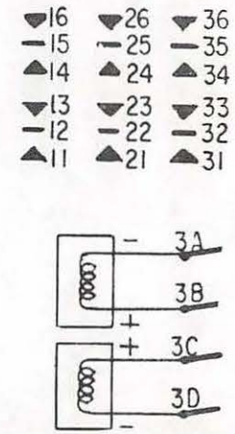
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	300	56001-744	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge V. AC	10		10	
Min. Drop-away V. AC	6.3		5.5	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working V. AC	8.3		9.0	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 7.5 Amps At 10 Volts

Front Contact Open .050"
Registration 1-2-6-15
Core Size 9/16"
Air Gap .030"
Catalogue Reference A62-406
S-500 Reference 285
Class N Power Transfer



REMARKS:

Following Relays may be substituted
56001-92 GR.1
56001-140 GR.1
Relay to be tested with Rectifier

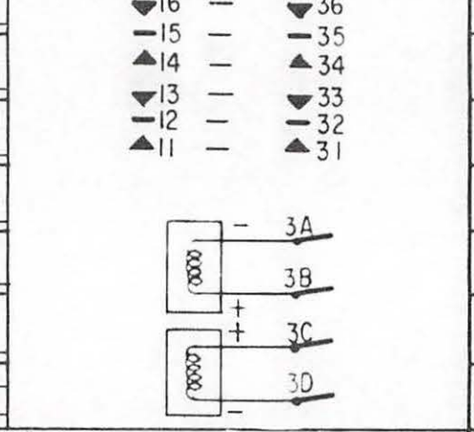
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	100-100	56001-745	1

S-393

CHARACTERISTICS		SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge	A.	.0194		.0194	
Min. Drop-away	A.	.0032		.0022	
Min. Pick-up	A				
Max. Pick-up	A.				
Max. Working	A.	.009		.0099	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 10 Amps At 175 Volts

Front Contact Open .090"
Registration 1-2-7-27
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

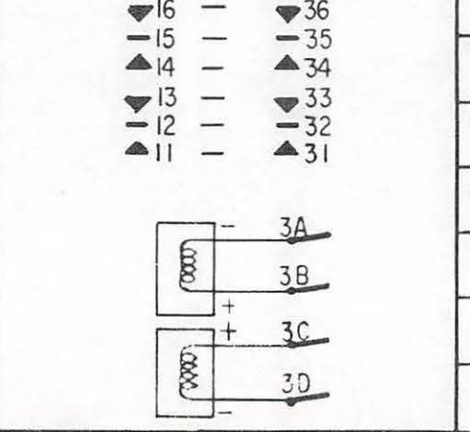
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-753	1

S-393

CHARACTERISTICS		SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge	A.	.026		.026	
Min Drop-away	A.	.0042		.0029	
Min Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A	.012		.0132	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 10 Amps At 175 Volts

Front Contact Open .090"
Registration 1-2-7-27
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-86 GR.2
56001-126 GR.2

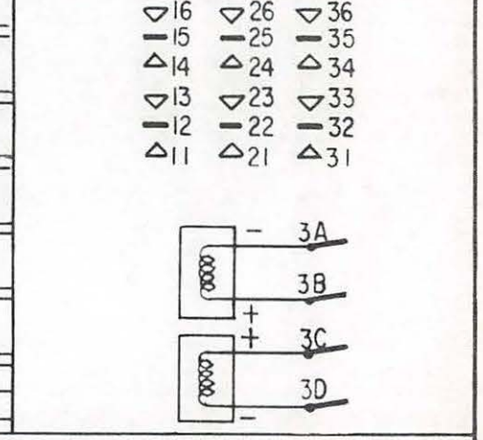
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-753	2

S-393

CHARACTERISTICS		SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge	A.	.069		.069	
Min. Drop-away	A.	.0141		.0099	
Min. Pick-up	A				
Max. Pick-up	A.				
Max. Working	A.	.0283		.031	
Max. Pol. P.U. & Work	A.				
Max. Start	V.				

Flashes Per Min _____ At _____ Volts
Release Time .08 Sec. At 10.0 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-7-32
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference 303
Class N SR



REMARKS:

Test Values shown are for one Coil

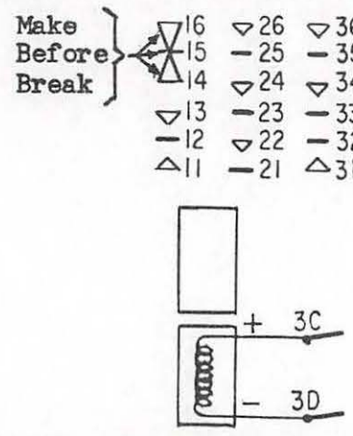
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	165-165	56001-754	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.156		.156	
Min. Drop-away A.	.0175		.0122	
Min. Pick-up A				
Max. Pick-up A.				
Max. Working A.	.039		.043	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time 1.35 Sec At 11.0 Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-8-25
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N SPU



REMARKS: Obsolete

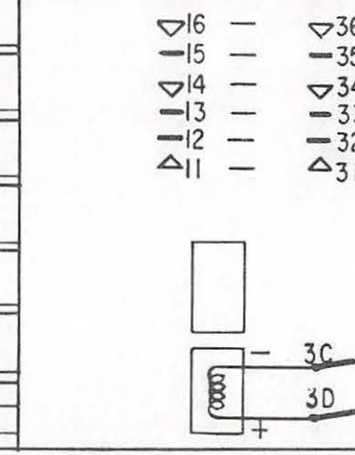
TYPE	SIZE	RESISTANCE	DRAWING	GR
B	1	230	56001-757	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.500		.500	
Min Drop-away A.	.070		.049	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A	.125		.138	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time 0.3 Sec. At 1.0 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-8-27
Core Size 9/16"
Air Gap .020"
Catalogue Reference
S-500 Reference
Class N SR



REMARKS: Obsolete

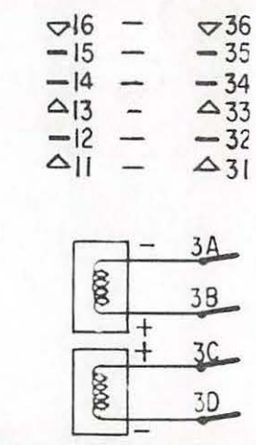
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	5.2	56001-758	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.092		.092	
Min. Drop-away A.	.0065		.0046	
Min Pick-up A.				
Max Pick-up A.				
Max Working A.	.023		.0253	
Max. Pol. P.U. & Work A.				
Max Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time 0.1 Sec. At 2.0 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-9-10
Core Size 9/16"
Air Gap .006"
Catalogue Reference A62-380
S-500 Reference 295
Class N SR



REMARKS:

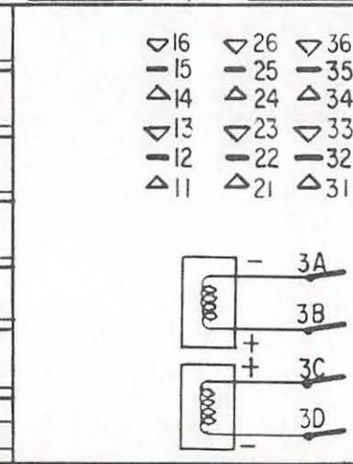
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	80	56001-759	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.032		.032	
Min. Drop-away A.	.004		.0028	
Min. Pick-up A				
Max. Pick-up A.				
Max. Working A.	.008		.0088	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-9-14
Core Size 9/16"
Air Gap .010"
Catalogue Reference —
S-500 Reference —
Class N



REMARKS: Obsolete

Following Relays may be substituted

56001-87 GR.1	56001-87 GR.2
56001-105 GR.1	56001-105 GR.2
56001-701.GR.1	56001-701 GR.2
	56001-762 GR.2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-762	1

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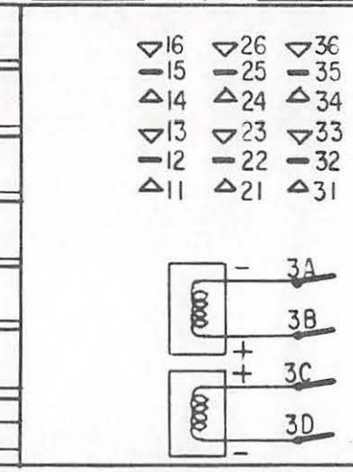
CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.046		.046	
Min. Drop-away A.	.0057		.004	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0115		.0127	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-9-14
Core Size 9/16"
Air Gap .010"
Catalogue Reference A62-262
S-500 Reference 281
Class N



REMARKS:

Following relays may be substituted

56001-87 GR.2	56001-87 GR.1
56001-105 GR.2	56001-105 GR.1
56001-701 GR.2	56001-701 GR.1
	56001-762 GR.1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-762	2

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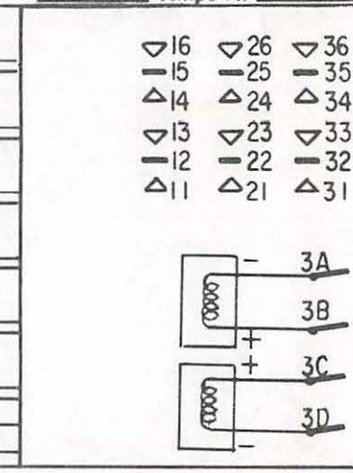
CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.096		.096	
Min. Drop-away A.	.012		.0084	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.024		.0264	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-9-14
Core Size 9/16"
Air Gap .010"
Catalogue Reference —
S-500 Reference 274
Class N



REMARKS:

Following Relay may be substituted

56001-701 GR.5

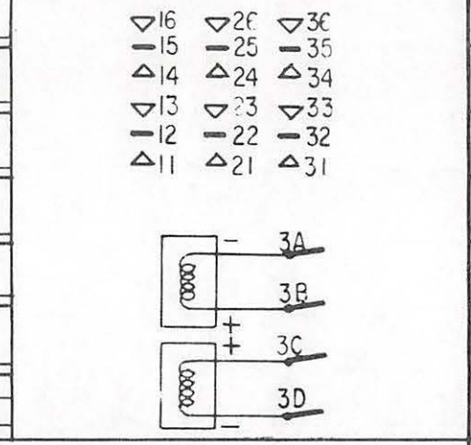
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	100	56001-762	5

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.072		.072	
Min. Drop-away A.	.009		.0063	
Min. Pick-up A				
Max. Pick-up A.				
Max. Working A.	.018		.0198	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-9-14
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference 276
Class N



REMARKS.

Following Relay may be substituted
56001-701 GR. 6

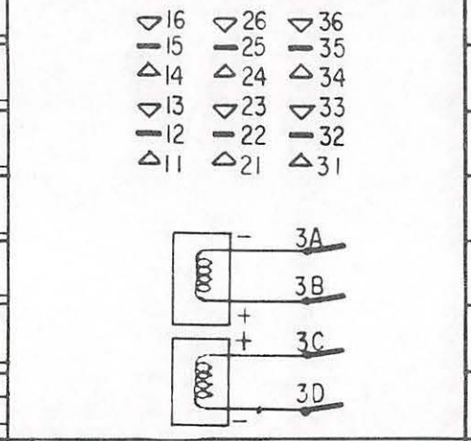
TYPE	SIZE	RESISTANCE	DRAWING	GR
B	1	200	56001-762	6

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.042		.042	
Min Drop-away A	.0065		.0046	
Min Pick-up A				
Max. Pick-up A.				
Max. Working A	.013		.0143	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-9-14
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS. Obsolete

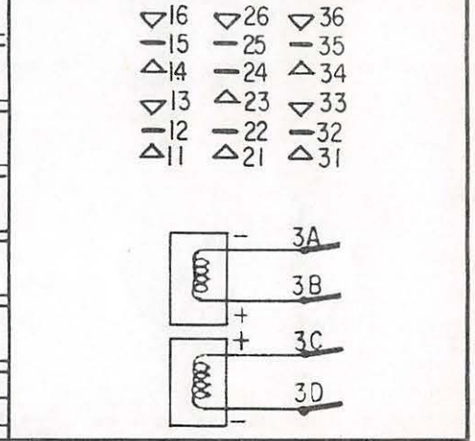
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	350	56001-762	7

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.020		.020	
Min. Drop-away A.	.0041		.0029	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0111		.0122	
Max. Pol. P.U. & Work A.				
Max Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .090"
Registration 1-2-9-16
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

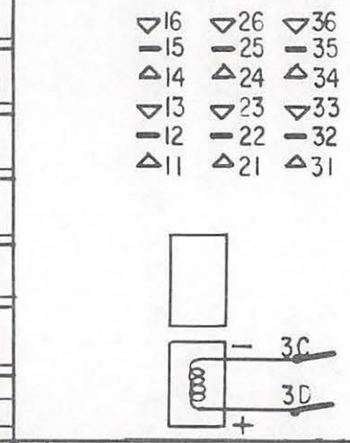
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-763	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.060		.060	
Min. Drop-away A.	.0055		.0039	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.024		.0264	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min ____ At ____ Volts
Release Time 1.0 Sec. At 10.0 Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-23
Core Size .736"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N SR



REMARKS: Obsolete

Test values shown are with magnetic hold down

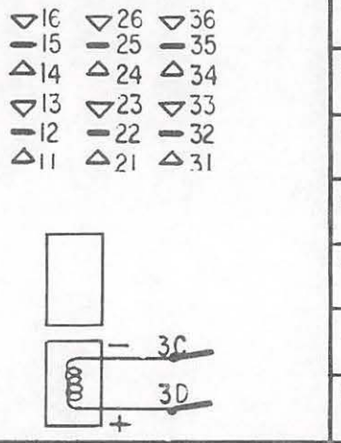
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	340	56001-771	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.128		.128	
Min. Drop-away A.	.0055		.0039	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.032		.035	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time 3.0 Sec. At 12.0 Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-10-17
Core Size .736"
Air Gap .003"
Catalogue Reference
S-500 Reference
Class N SR



REMARKS: Obsolete

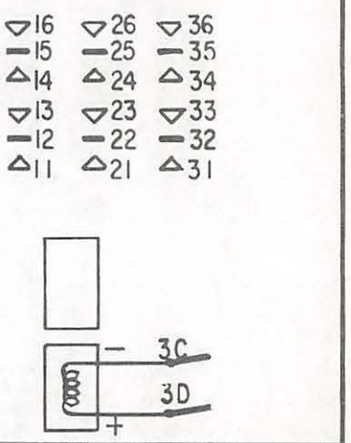
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	194	56001-779	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.040		.040	
Min. Drop-away A.	.0055		.0039	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.019		.0209	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time 1.0 Sec. At 10.0 Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-23
Core Size .736"
Air Gap .006"
Catalogue Reference A62-359
S-500 Reference 298
Class N SR



REMARKS:

Following Relays may be substituted
56001-87 GR.26
56001-105 GR.26
56001-728 GR.26

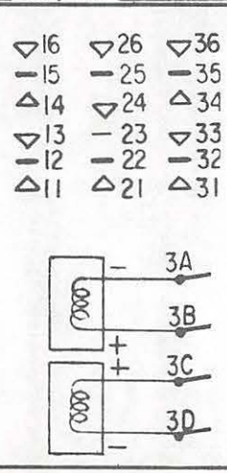
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	340	56001-780	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.0194		.0194	
Min. Drop-away	A.	.004		.0028	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.008		.0088	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-11
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relay may be substituted
56001-822 GR.1

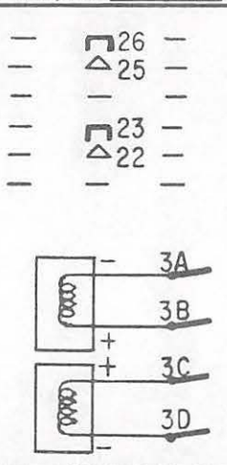
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-783	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	V.-DC.	50		50	
Min. Drop-away	A.	.005		.0035	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.040		.044	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 10 Amps At 175 Volts

Front Contact Open .125"
Registration 1-2-5-23
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N
Overload



REMARKS: Obsolete

Test values shown are for
1225 Ohm Coil
For Overload Test see S-419

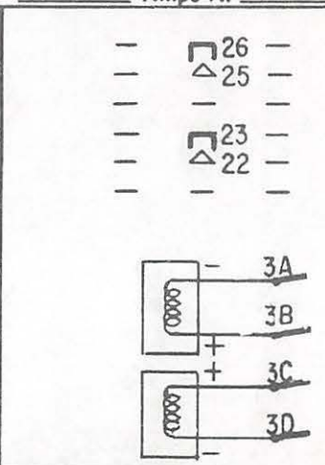
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	.068-1225	56001-785	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.057		.057	
Min. Drop-away	A.	.005		.0035	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.0115		.0126	
Max. Pol. P.U. & Work	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-5-25
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relay may be substituted
56001-119 GR. 1

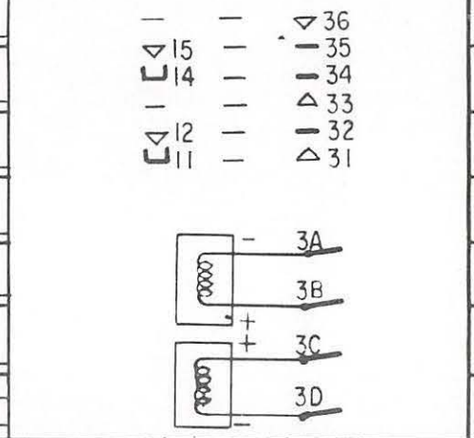
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	100	56001-785	2

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.028		.028	
Min. Drop-away A.	.004		.0028	
Min. Pick-up A				
Max Pick-up A.				
Max. Working A.	.015		.0165	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .125"
Registration 1-2-7-26
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-85 GR.11C
56001-85 GR.39C

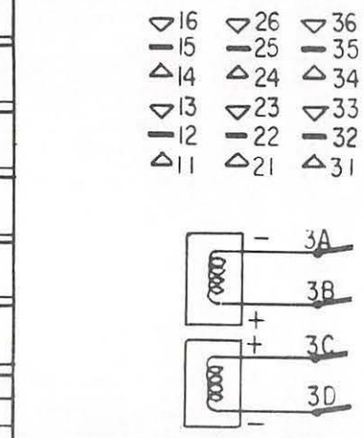
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	500	56001-785	6

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.230		.230	
Min Drop-away A.	.028		.023	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A	.052		.057	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-5-20
Core Size .736"
Air Gap .016"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relay may be substituted
56001-733 GR.1

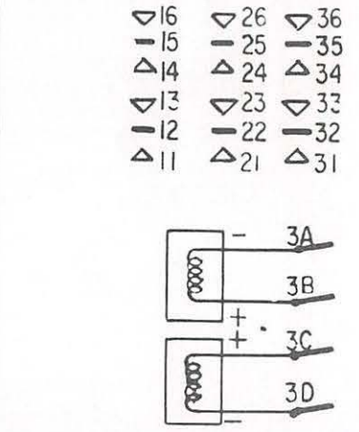
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	9	56001-785	12

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.140		.140	
Min. Drop-away A.	.0115		.008	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.038		.042	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time 0.47 Sec. At 9.2 Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-21
Core Size .736"
Air Gap .012"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Test values shown are with
magnetic hold down

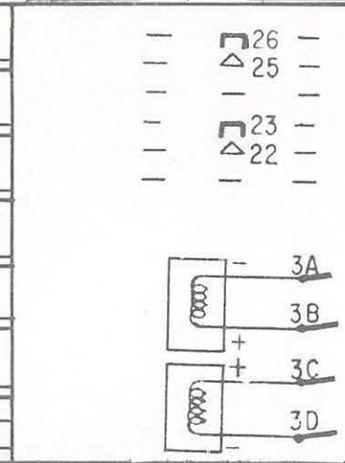
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	66	56001-785	13

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	V.-DC	24		24	
Min. Drop-away	A.	.007		.0049	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.049		.0539	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 20 Amps At 32 Volts

Front Contact Open .125"
Registration 1-2-10-21
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N Overload



REMARKS: Obsolete
Test values shown are for
230 Ohm coil
For Overload Test see S-419

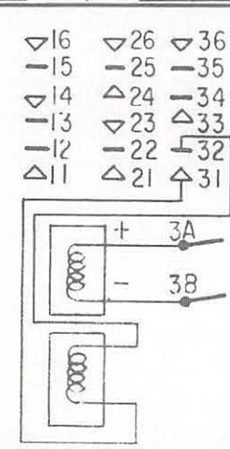
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	.068-230	56001-785	14

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.300		.300	
Min. Drop-away	A	.019		.0133	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.041		.045	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time .40 Sec. At 4.0 Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-10-26
Core Size .736"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N SPU-QDA



REMARKS: Obsolete

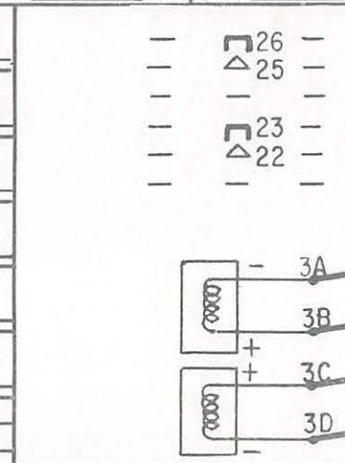
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	42	56001-785	15

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	V.-DC.	24		24	
Min. Drop-away	A.	.0089		.0062	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.0626		.069	
Max. Pol. P.U. & Work	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 20 Amps At 32 Volts

Front Contact Open .125"
Registration 1-2-12-31
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N Overload



REMARKS: Obsolete
Test values shown are for
135 Ohm coil
For Overload Test see S-419

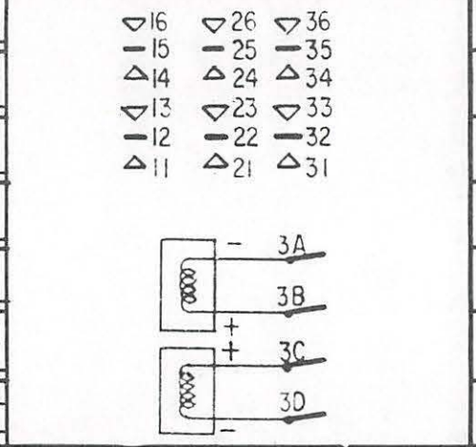
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	.068-135	56001-785	30

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.121		.121	
Min. Drop-away A.	.008		.0056	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0185		.0204	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-12-32
Core Size .736"
Air Gap .010"
Catalogue Reference A62-295
S-500 Reference 273
Class N



REMARKS:

Following Relays may be substituted
56001-85 GR.19
56001-85 GR.34
56001-732 GR.3

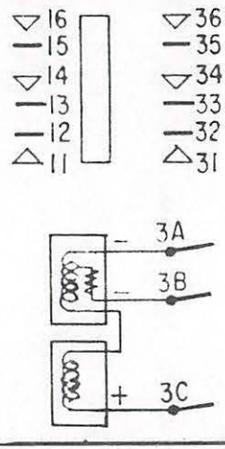
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	84	56001-785	31

S-393

CHARACTERISTICS	SHOP		FIELD	
	3A-3B	3B-3C	3A-3B	3B-3C
Initial Charge A	.300	.130	.300	.130
Min. Drop-away A.	.037	.0545	.026	.038
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.065		.0715	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-22
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

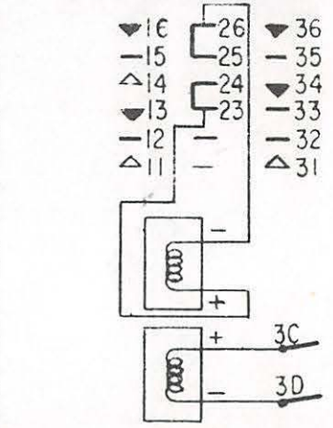
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	4	56001-785	36

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.061		.061	
Min. Drop-away A.	.010		.007	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0175		.0193	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-17-26
Core Size 9/16"
Air Gap .016"
Catalogue Reference
S-500 Reference
Class N Compound



REMARKS: Obsolete

Test Values shown are for
700 Ohm Coil
Pick-up of .04 Ohm Coil
not to exceed 2.5 Amp.

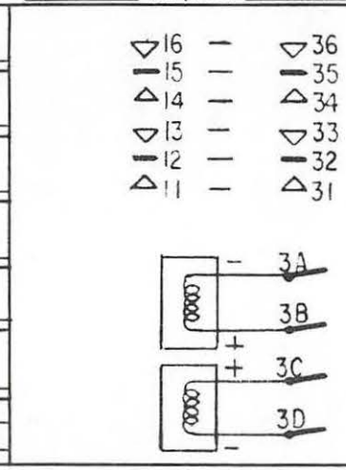
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	.04-700	56001-785	43

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.050		.050	
Min. Drop-away A.	.0064		.0045	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.013		.0143	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-24-26
Core Size 9/16"
Air Gap .010"
Catalogue Reference A62-215
S-500 Reference 327
Class N
Light out



REMARKS:
Test values shown are for 450 ohm coil

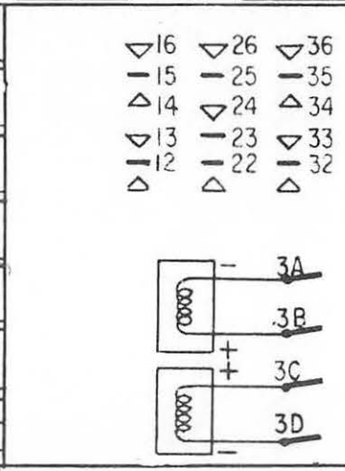
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	.45-450	56001-785	59

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.070		.070	
Min. Drop-away A.	.010		.007	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.034		.037	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time .80-.90 Sec. At 21.6 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-3-5-25
Core Size .736"
Air Gap .009" Min.
Catalogue Reference
S-500 Reference
Class N
SR



REMARKS: Obsolete
Test values shown are for each coil
Time test to be made using lower coil only

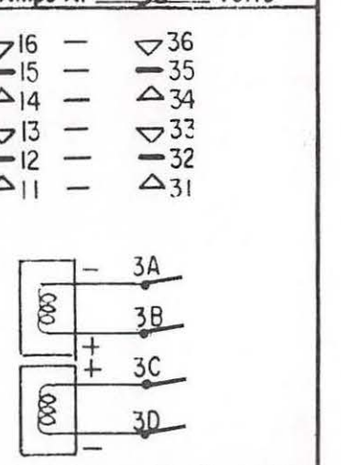
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	460-460	56001-785	85

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.400		.400	
Min. Drop-away A.	.070		.057	
Min. Pick-up A.	.095		.095	
Max. Pick-up A.				
Max. Working A.	.110		.121	
Max. Pol. P.U. & Work A.				
Max Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-3-6-11
Core Size 9/16"
Air Gap .032"
Catalogue Reference A62-293
S-500 Reference 272
Class N



REMARKS:

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	6	56001-785	91

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.080		.080	
Min. Drop-away A.	.0045		.0032	
Min. Pick-up A				
Max. Pick-up A.				
Max. Working A.	.020		.022	
Max. Pol. P.U. & Work. A.				
Max. Start V				

Flashes Per Min ____ At ____ Volts

Release Time 1.6 Sec. At 27.0 Volts

Pick-Up Time ____ Sec At ____ Volts

Max. Reversal Time ____ Sec. At ____ Volts

Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"

Registration 1-3-6-16

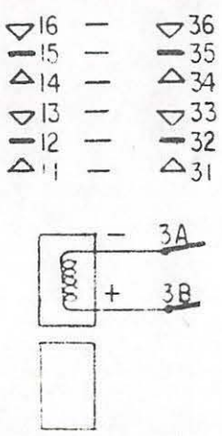
Core Size .736"

Air Gap .004"

Catalogue Reference

S-500 Reference

Class N SR



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	470	56001-785	93

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.076		.076	
Min. Drop-away A.	.0137		.0096	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A	.025		.0275	
Max. Pol. P.U. & Work. A.				
Max. Start V				

Flashes Per Min. ____ At ____ Volts

Release Time ____ Sec. At ____ Volts

Pick-Up Time ____ Sec. At ____ Volts

Max. Reversal Time ____ Sec. At ____ Volts

Contact Capacity 10 Amps At 175 Volts

Front Contact Open .050" *

Registration 1-3-5-12

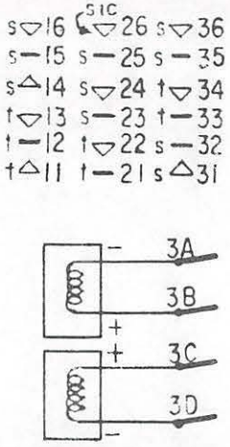
Core Size 9/16"

Air Gap .010"

Catalogue Reference

S-500 Reference

Class N Switch Control



REMARKS: Obsolete
Test values shown are for 450 ohm coil
* Except contact 25-26 which should be not less than .020"
Following Relay may be substituted 56001-785 GR.99

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	.045-450	56001-785	96

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.080		.080	
Min. Drop-away A.	.010		.007	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.030		.033	
Max. Pol. P.U. & Work A.				
Max Start V.				

Flashes Per Min ____ At ____ Volts

Release Time ____ Sec. At ____ Volts

Pick-Up Time ____ Sec. At ____ Volts

Max. Reversal Time ____ Sec. At ____ Volts

Contact Capacity 10 Amps At 175 Volts

Front Contact Open .090" *

Registration 1-3-5-12

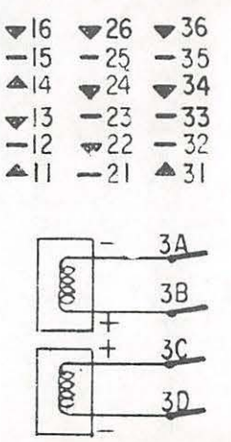
Core Size 9/16"

Air Gap .005

Catalogue Reference

S-500 Reference 306

Class N Switch Control



REMARKS:
Test values shown are for 450 ohm coil
* Except contact 25-26 which should be not less than .018"

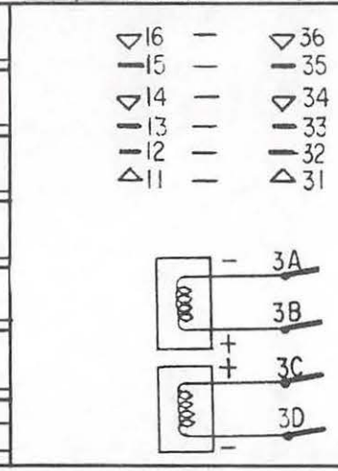
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	.045-450	56001-785	99

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.060		.060	
Min. Drop-away A.	.009		.0072	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.015		.0165	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-11-30
Core Size 9/16"
Air Gap .010"
Catalogue Reference A62-317
S-500 Reference 275
Class N



REMARKS:

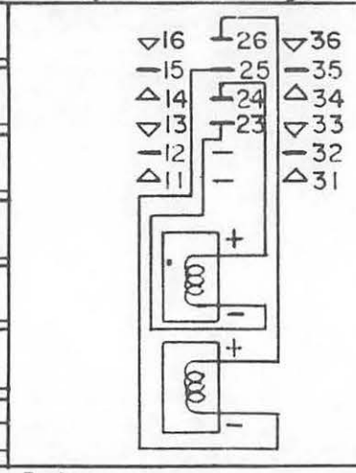
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	100	56001-789	3

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.112	.112	.112	.112
Min. Drop-away A.				
Min. Pick-up A.	.0225	.0225	.020	.020
Max. Pick-up A.	.028	.028	.031	.031
Max. Working A.				
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-12-13
Core Size 9/16"
Air Gap .004"
Catalogue Reference
S-500 Reference
Class Magnetic Stick



REMARKS: Obsolete

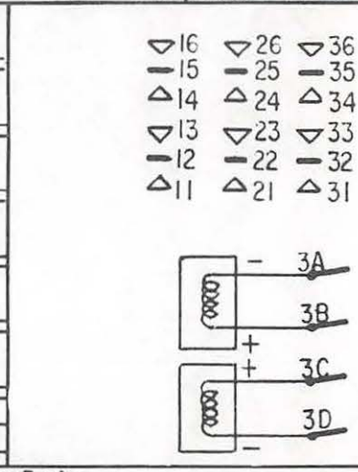
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	46	56001-791	2

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.058		.058	
Min. Drop-away A.	.007		.0049	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.016		.0176	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-13
Core Size 9/16"
Air Gap .014"
Catalogue Reference
S-500 Reference
Class Biased Neutral



REMARKS: Obsolete

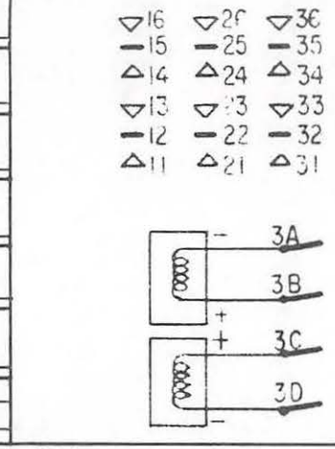
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	250	56001-801	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.030		.030	
Min. Drop-away A.	.0037		.0026	
Min. Pick-up A				
Max. Pick-up A				
Max. Working A.	.0084		.0092	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-13
Core Size 9/16"
Air Gap .014"
Catalogue Reference
S-500 Reference
Class Biased Neutral



REMARKS: Obsolete

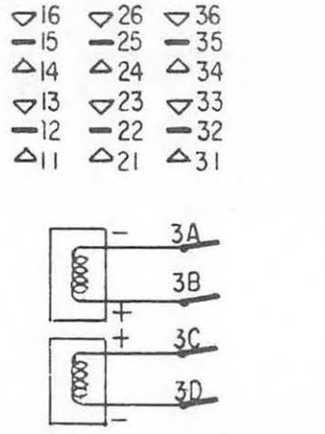
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	1000	56001-801	4

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.100		.100	
Min. Drop-away A.	.013		.0091	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.029		.0319	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-13
Core Size 9/16"
Air Gap .014"
Catalogue Reference
S-500 Reference
Class Biased Neutral



REMARKS: Obsolete

Following Relays may be substituted
56001-724 GR. 5
56001-922 GR. 5

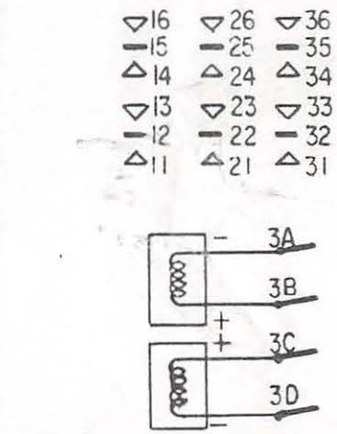
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	63	56001-801	5

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.068		.068	
Min. Drop-away A.	.008		.0056	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.018		.0198	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-13
Core Size 9/16"
Air Gap .014"
Catalogue Reference
S-500 Reference
Class Biased Neutral



REMARKS: Obsolete

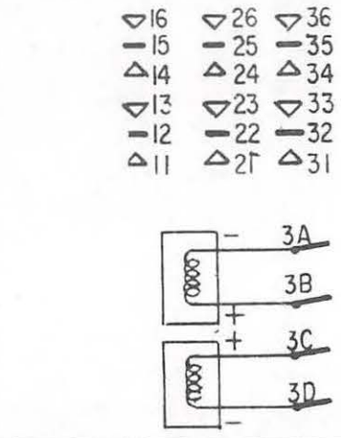
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	200	56001-801	8

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.120		.120	
Min. Drop-away A.	.014		.0098	
Min. Pick-up A				
Max. Pick-up A.				
Max. Working A.	.032		.035	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-13
Core Size 9/16"
Air Gap .014"
Catalogue Reference
S-500 Reference 328
Class Biased Neutral



REMARKS:

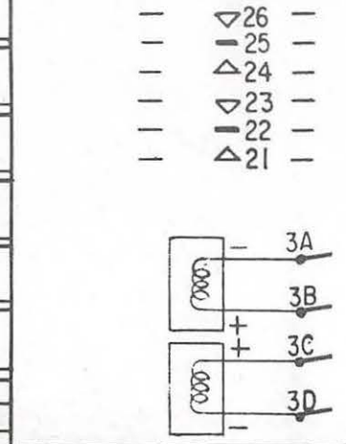
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	48	56001-801	9

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.0125		.0125	
Min. Drop-away A.	.0015		.0011	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0037		.0041	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-5-26
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

Following Relays may be substituted
56001-131 GR. 3
56001-737 GR. 3

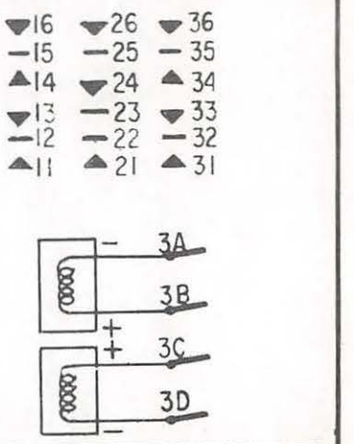
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	2240	56001-813	3

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.0194		.0194	
Min. Drop-away A.	.004		.0028	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.008		.0088	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 7.5 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-15-31
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

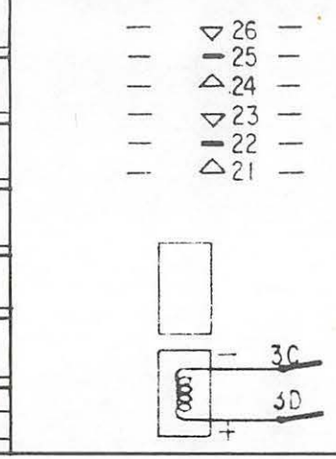
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-822	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.054		.054	
Min. Drop-away A.	.002		.0014	
Min. Pick-up A				
Max. Pick-up A				
Max. Working A.	.0135		.0149	
Max. Pol. P.U. & Work. A.				
Max. Start V				

Flashes Per Min _____ At _____ Volts
Release Time 3.0 Sec. At 9.0 Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-16-28
Core Size .736"
Air Gap .006"
Catalogue Reference A62-353
S-500 Reference 301
Class N SR



REMARKS:

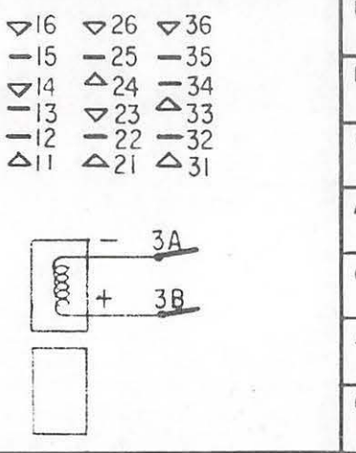
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	460	56001-830	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.620		.620	
Min Drop-away A.	.100		.082	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.155		.170	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-17-32
Core Size 9/16"
Air Gap .025"
Catalogue Reference
S-500 Reference 269
Class N



REMARKS:

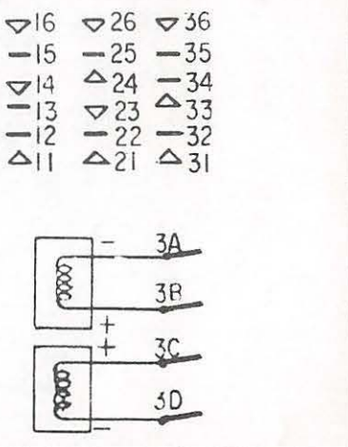
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	28.5	56001-838	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.620		.620	
Min. Drop-away A.	.100		.082	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.155		.171	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050
Registration 1-2-17-32
Core Size 9/16"
Air Gap .025"
Catalogue Reference
S-500 Reference 268
Class N



REMARKS:

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	4	56001-838	2

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	2.0		2.0	
Min. Drop-away A.	.800		.560	
Min. Pick-up A				
Max. Pick-up A.				
Max. Working A.	1.5		1.65	
Max. Pol. P.U. & Work. A.				
Max. Start V.				
Flashes Per Min.	____ At ____ Volts			
Release Time	____ Sec. At ____ Volts			
Pick-Up Time	____ Sec. At ____ Volts			
Max. Reversal Time	____ Sec. At ____ Volts			
Contact Capacity	4 Amps At 30 Volts			

Front Contact Open .050"

Registration 1-2-18-19

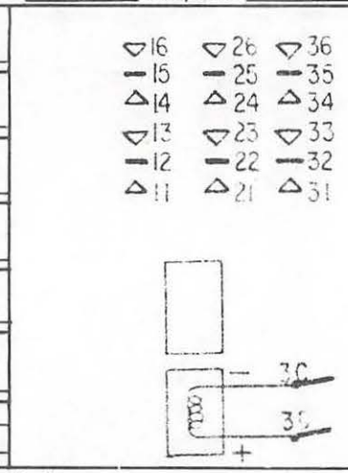
Core Size 9/16"

Air Gap .010"

Catalogue Reference

S-500 Reference

Class N
Light out



REMARKS: Obsolete

Values shown are A.C.

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	.12	56001-839	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.034		.034	
Min Drop-away A.	.004		.0028	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.016		.0176	
Max. Pol. P.U. & Work. A.				
Max. Start V.				
Flashes Per Min.	____ At ____ Volts			
Release Time	0.8-0.9 Sec. At 21.6 Volts			
Pick-Up Time	____ Sec. At ____ Volts			
Max. Reversal Time	____ Sec. At ____ Volts			
Contact Capacity	4 Amps At 30 Volts			

Front Contact Open .050"

Registration 1-2-18-23

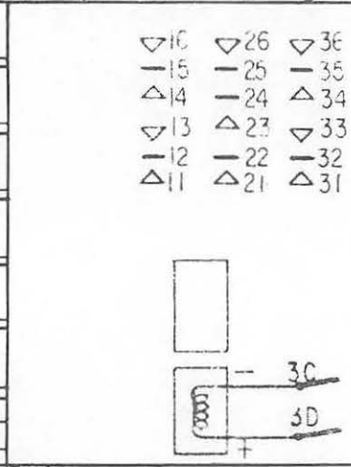
Core Size .736"

Air Gap .008"

Catalogue Reference

S-500 Reference

Class N
SR



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-841	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.176		.176	
Min. Drop-away A.	.011		.0077	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.044		.048	
Max. Pol. P.U. & Work A.				
Max. Start V.				
Flashes Per Min.	____ At ____ Volts			
Release Time	____ Sec. At ____ Volts			
Pick-Up Time	____ Sec. At ____ Volts			
Max. Reversal Time	____ Sec. At ____ Volts			
Contact Capacity	4 Amps At 30 Volts			

Front Contact Open .050"

Registration 1-2-19-32

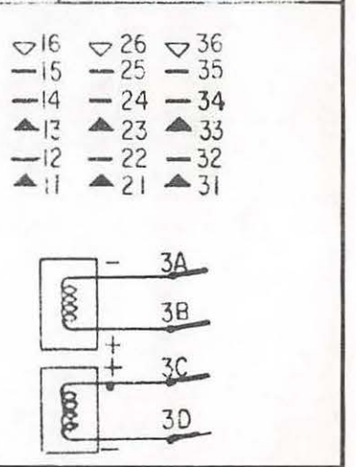
Core Size 9/16"

Air Gap .006"

Catalogue Reference

S-500 Reference

Class N
Lamp Control



REMARKS: Obsolete

6B - Contact capacity
7.5 AMP at 10 Volt

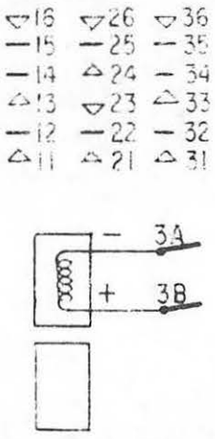
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	100	56001-855	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.620		.620	
Min. Drop-away	A.	.100		.082	
Min. Pick-up	A				
Max. Pick-up	A.				
Max. Working	A.	.155		.171	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-20-21
Core Size 9/16"
Air Gap .025"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

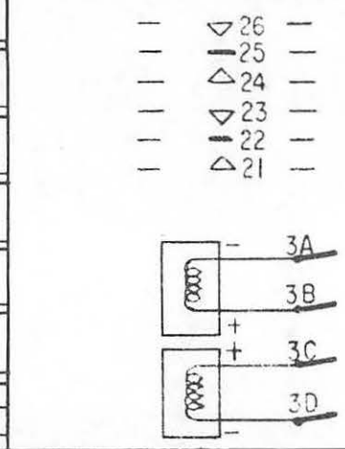
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	28.5	56001-857	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	1.2		1.2	
Min. Drop-away	A.	.230		.161	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A	.570		.627	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-20-22
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N
Light out



REMARKS: Obsolete

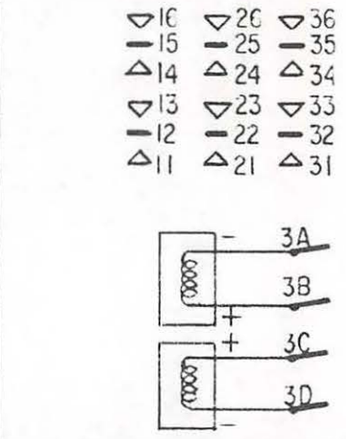
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	.138	56001-858	2

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.0194		.0194	
Min. Drop-away	A.	.004		.0028	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.010		.011	
Max. Pol. P.U. & Work	A.				
Max. Start	V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .090"
Registration 1-2-20-24
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-859	1

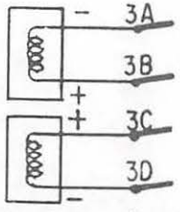
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.178		.178	
Min. Drop-away A.	.011		.0077	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0335		.0369	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-22-23
Core Size .736"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36
—15 —25 —35
△14 ▽24 △34
▽13 — 23 ▽33
—12 —22 —32
△11 △21 △31



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	50	56001-872	1

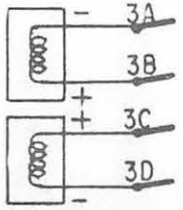
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.050		.050	
Min. Drop-away A.	.0064		.0045	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.011		.0121	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-22-25
Core Size 9/16"
Air Gap .010"
Catalogue Reference A62-221
S-500 Reference 325
Class N
Light out

▽16 — ▽36
—15 — —35
△14 — △34
▽13 — ▽33
—12 — —32
△11 — △31



REMARKS: Test values shown are for 450 ohm coil

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	.12-450	56001-873	1

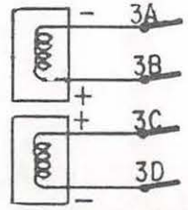
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.100		.100	
Min. Drop-away A.	.0065		.0046	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.019		.0209	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .090"
Registration 1-2-24-28
Core Size 9/16"
Air Gap .010"
Catalogue Reference A62-205
S-500 Reference 278
Class N
Lamp control

— — ▽36
—15 — —35
▲14 — △34
—13 — ▽33
▲12 — —32
— — △31



REMARKS:

2B - (.050 contact opening
(contact capacity 7.5 amp.
(at 10 volt.

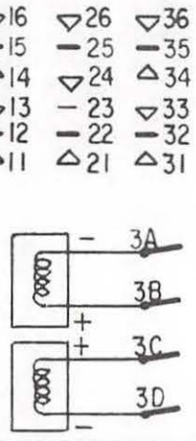
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	210	56001-880	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.130		.130	
Min. Drop-away A.	.026		.0182	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.052		.057	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-22-26
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference 321
Class N QPU



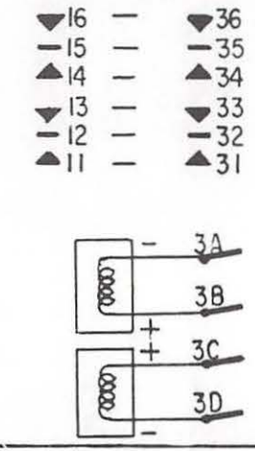
REMARKS:

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.040		.040	
Min. Drop-away A.	.0045		.0032	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.013		.0143	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time .15 Sec. At — Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 7.5 Amps At 10 Volts

Front Contact Open .050"
Registration 1-2-15-29
Core Size 9/16"
Air Gap .005"
Catalogue Reference
S-500 Reference
Class N SR



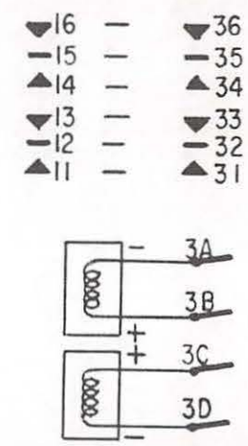
REMARKS: Obsolete

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.060		.060	
Min. Drop-away A.	.007		.0049	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.020		.022	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time .15 Sec. At — Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 7.5 Amps At 10 Volts

Front Contact Open .050"
Registration 1-2-15-29
Core Size 9/16"
Air Gap .005"
Catalogue Reference
S-500 Reference
Class N SR



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	270	56001-885	1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	140	56001-886	3

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	56	56001-886	4

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.075		.075	
Min. Drop-away A.	.012		.0084	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.026		.0286	
Max. Pol. P.U. & Work. A.				
Max. Start V.				
Flashes Per Min.	____ At ____ Volts			
Release Time	0.4 Sec. At 1.9 Volts			
Pick-Up Time	____ Sec. At ____ Volts			
Max. Reversal Time	____ Sec. At ____ Volts			
Contact Capacity	7.5 Amps At 10 Volts			

Front Contact Open .050"

Registration 1-2-28-33

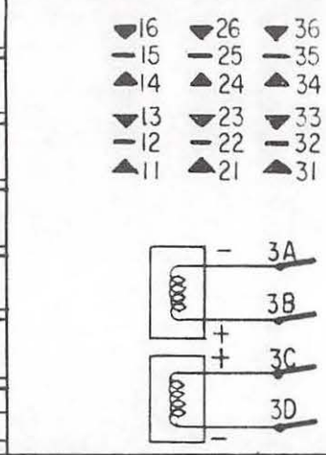
Core Size 9/16"

Air Gap .005"

Catalogue Reference

S-500 Reference

Class N SR



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	48	56001-890	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.034		.034	
Min. Drop-away A.	.0043		.003	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0086		.0095	
Max. Pol. P.U. & Work. A.				
Max. Start V.				
Flashes Per Min.	____ At ____ Volts			
Release Time	____ Sec. At ____ Volts			
Pick-Up Time	____ Sec. At ____ Volts			
Max. Reversal Time	____ Sec. At ____ Volts			
Contact Capacity	4 Amps At 30 Volts			

Front Contact Open .050"

Registration 1-3-4-9

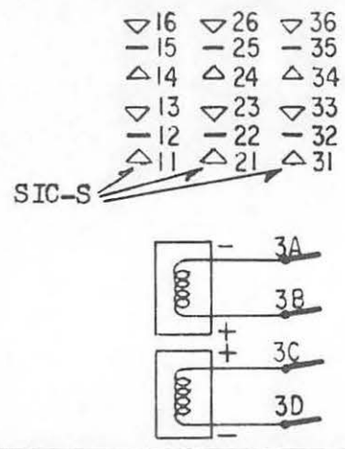
Core Size 9/16"

Air Gap .010"

Catalogue Reference

S-500 Reference

Class N



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	900	56001-896	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.480		.480	
Min. Drop-away A.	.060		.049	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.120		.132	
Max. Pol. P.U. & Work A.				
Max. Start V.				
Flashes Per Min.	____ At ____ Volts			
Release Time	____ Sec. At ____ Volts			
Pick-Up Time	____ Sec. At ____ Volts			
Max. Reversal Time	____ Sec. At ____ Volts			
Contact Capacity	4 Amps At 30 Volts			

Front Contact Open .050"

Registration 1-3-4-9

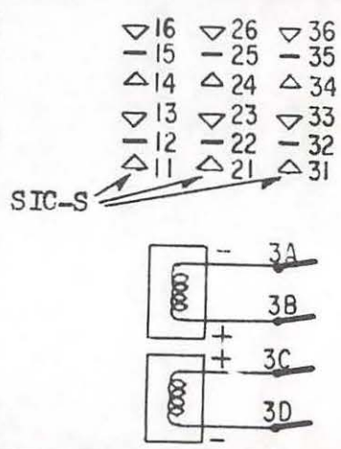
Core Size 9/16"

Air Gap .010"

Catalogue Reference

S-500 Reference

Class N



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	4	56001-896	8

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.0116		.0116	
Min. Drop-away A.	.0018		.0013	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0055		.006	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts

Release Time _____ Sec. At _____ Volts

Pick-Up Time 0.42 Sec At 30.0 Volts

Max. Reversal Time _____ Sec. At _____ Volts

Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"

Registration 1-3-4-17

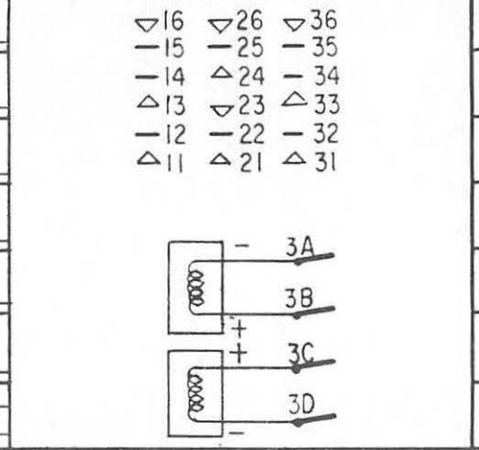
Core Size 9/16"

Air Gap .010"

Catalogue Reference

S-500 Reference

Class N SPU



REMARKS: Obsolete

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.				
Min. Drop-away A.				
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A				
Max. Pol. P.U. & Work. A.				
Max. Start V.	7.6		8.36	

Flashes Per Min. 49-52 At 11.0 Volts

Release Time _____ Sec. At _____ Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time _____ Sec. At _____ Volts

Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"

Registration 1-3-4-24

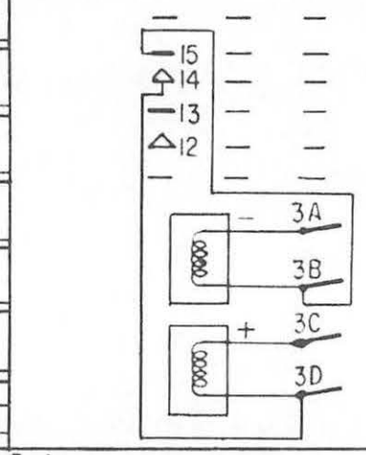
Core Size 9/16"

Air Gap .005"

Catalogue Reference

S-500 Reference

Class N Flasher



REMARKS: Obsolete

Following Relay may be substituted
56001-915 GR. 1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.260		.260	
Min. Drop-away A.	.051		.036	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.102		.112	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts

Release Time _____ Sec. At _____ Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time _____ Sec. At _____ Volts

Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"

Registration 1-2-22-26

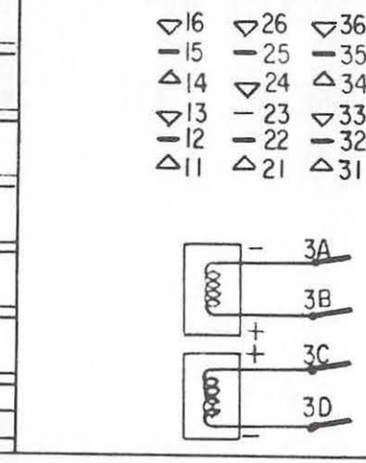
Core Size 9/16"

Air Gap .010"

Catalogue Reference A62-335

S-500 Reference 323

Class N QPU



REMARKS:

Test values shown are for
135 Ohm coil

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	3100	56001-901	1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	300	56001-903	1

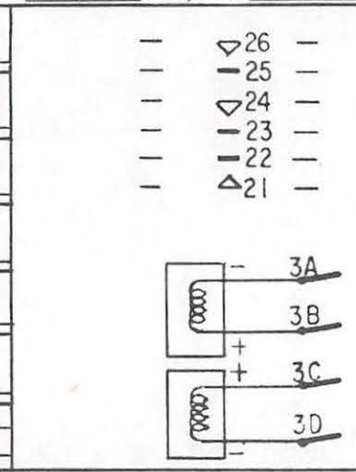
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	65-135	56001-909	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.012		.012	
Min. Drop-away A.	.0012		.0008	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.003		.0033	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-3-5-24
Core Size 9/16"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N



REMARKS: Obsolete

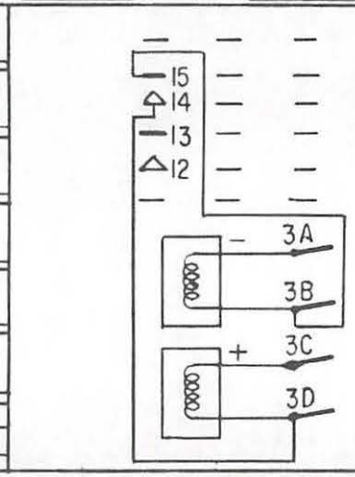
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	1400	56001-911	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.				
Min. Drop-away A.				
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.				
Max. Pol. P.U. & Work. A.				
Max. Start V.	7.5		8.25	

Flashes Per Min. 58-62 At 11.0 Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity _____ Amps At _____ Volts

Front Contact Open .050"
Registration 1-3-4-24
Core Size 9/16"
Air Gap .015"
Catalogue Reference A62-200
S-500 Reference 341
Class N Flasher



REMARKS:
Following Relay may be substituted
56001-903 GR. 1

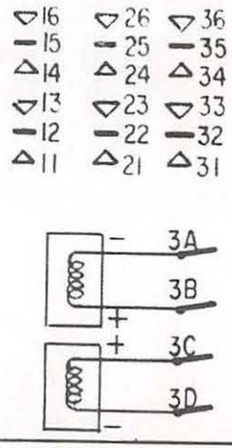
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	490	56001-915	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.104		.104	
Min. Drop-away A.	.014		.0098	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.026		.0286	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-13
Core Size 9/16"
Air Gap .020"
Catalogue Reference A62-140
S-500 Reference 329
Class Biased Neutral



REMARKS:
Following Relays may be substituted
56001-724 GR. 5
56001-801 GR. 5

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	1	63	56001-922	5

Printed in U. S. A.

D. C. RELAYS-TRACTIVE ARMATURE, PLUG-IN TYPE

SH. 51 CONT'D ON SH. 52
ISSUED 3-1-62

S-393

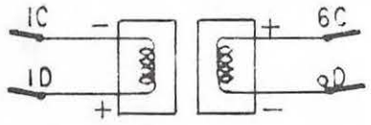
S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.026		.026	
Min. Drop-away A.	.0075		.0052	
Min. Pick-up A				
Max. Pick-up A.				
Max. Working A.	.014		.0154	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS: Obsolete
Following Relays may be substituted
56002-61 GR. 1
56002-85 GR. 5
56002-85 GR. 10
56002-703 GR. 1
56002-708 GR. 1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	500	56002-56	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.026		.026	
Min. Drop-away A.	.0075		.0052	
Min Pick-up A.				
Max. Pick-up A.				
Max. Working A	.014		.0154	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
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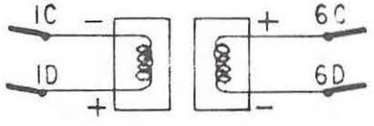
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS: Obsolete
Following Relays may be substituted
56002-56 GR. 1
56002-85 GR. 5
56002-85 GR. 10
56002-703 GR. 1
56002-708 GR. 1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	500	56002-61	1

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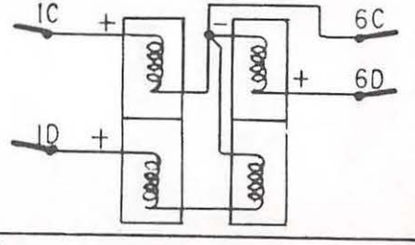
CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.160		.160	
Min. Drop-away A.	.021		.0147	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.041		.0451	
Max. Pol. P.U. & Work A.				
Max Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
—14 △24 —34 —44 △54 —64
△13 ▽23 △33 △43 ▽53 △63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS: Obsolete
Test values shown are for each winding
Following Relay may be substituted
56002-785 GR. 2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	180-180-180	56002-85	4

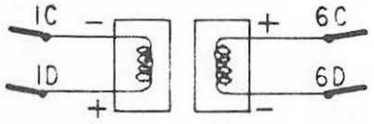
S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.026		.026	
Min. Drop-away	A.	.0050		.0035	
Min. Pick-up	A				
Max. Pick-up	A.				
Max. Working	A.	.0105		.0116	
Max. Pol. P.U. & Work.	A.				
Max. Start	V				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS: Obsolete

Following Relays may be substituted
56002-85 GR. 10 56002-703 GR. 1
56002-708 GR. 1
56002-56 GR. 1
56002-61 GR. 1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	500	56002-85	5

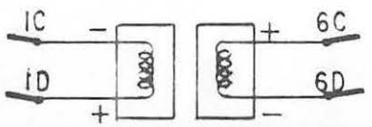
S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.160		.160	
Min. Drop-away	A.	.0375		.030	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A	.065		.072	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS: Obsolete

Following relays may be substituted
56002-85 GR. 9
56002-702 GR. 2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	16	56002-85	6

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CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.160		.160	
Min. Drop-away	A.	.0375		.030	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.065		.072	
Max. Pol. P.U. & Work	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
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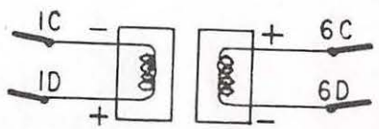
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS: Obsolete

Following relays may be substituted
56002-85 GR. 6
56002-702 GR. 2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	16	56002-85	9

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.026		.026	
Min. Drop-away A.	.005		.0035	
Min. Pick-up A				
Max. Pick-up A.				
Max. Working A.	.0105		.0116	
Max. Pol. P.U. & Work. A.				
Max. Start V				

Flashes Per Min _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
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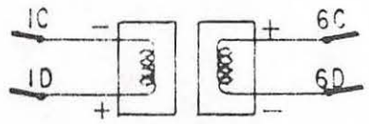

REMARKS: Obsolete

Following relays may be substituted
56002-85 GR. 5 56002-703 GR. 1
56002-708 GR. 1
56002-56 GR. 1
56002-61 GR. 1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	500	56002-85	10

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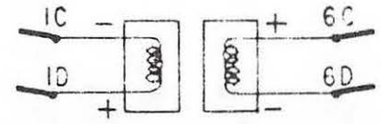
CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.300		.300	
Min. Drop-away A.	.076		.062	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A	.133		.146	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-25
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	4	56002-702	1

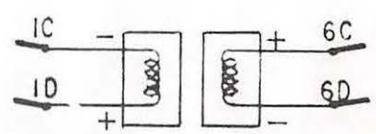
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.150		.150	
Min. Drop-away A.	.0375		.030	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.065		.072	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-25
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS: Obsolete

Following relays may be substituted
56002-85 GR. 6
56002-85 GR. 9

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	16	56002-702	2

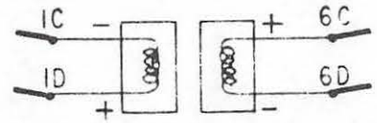
S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.026		.026	
Min. Drop-away	A.	.0075		.0052	
Min. Pick-up	A				
Max. Pick-up	A.				
Max. Working	A.	.014		.0154	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-4-33
Core Size 5/8"
Air Gap .010"
Catalogue Reference A62-330
S-500 Reference 360
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS:

Following relays may be substituted
56002-56 GR. 1
56002-61 GR. 1
56002-85 GR. 5
56002-85 GR. 10
56002-708 GR. 1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	500	56002-703	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.026		.026	
Min. Drop-away	A.	.0050		.0035	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.0105		.0116	
Max. Pol. P.U. & Work.	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-7-28
Core Size 5/8"
Air Gap .006"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
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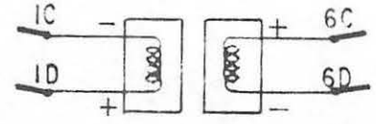
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS: Obsolete

Following relays may be substituted
56002-85 GR. 5 56002-703 GR. 1
56002-85 GR. 10
56002-56 GR. 1
56002-61 GR. 1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	500	56002-708	1

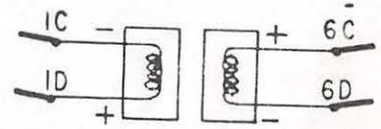
S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.112		.112	
Min. Drop-away	A.	.012		.084	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.028		.030	
Max. Pol. P.U. & Work	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .125"
Registration 1-2-10-12
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference 358
Class N

—16 — — ▽46 ▽56 ▽66
—15 — ▽35 —45 —55 —65
△14 — 34 △44 △54 △64
▽13 — — ▽43 ▽53 ▽63
—12 — ▽32 —42 —52 —62
△11 — 31 △41 △51 △61



REMARKS:

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	330	56002-710	1

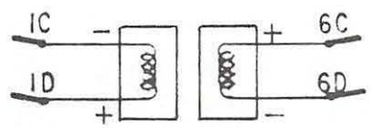
S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.080		.080	
Min. Drop-away A.	.010		.007	
Min. Pick-up A				
Max. Pick-up A.				
Max. Working A.	.020		.022	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .090"
Registration 1-2-22-32
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference 359
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS:

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	330	56002-713	3

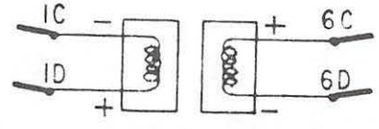
S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.064		.064	
Min. Drop-away A.	.008		.0056	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A	.016		.0176	
Max. Pol. P.U. & Work. A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-3-5-22
Core Size 5/8"
Air Gap .010"
Catalogue Reference A62-150
S-500 Reference 368
Class Biased Neutral

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS:

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	350	56002-720	1

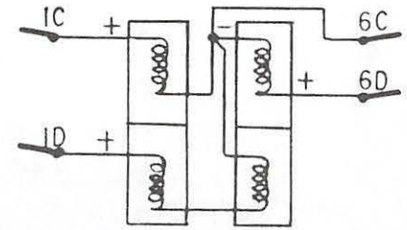
S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.160		.160	
Min. Drop-away A.	.021		.0147	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.041		.045	
Max. Pol. P.U. & Work A.				
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-7-29
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class N

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
—14 △24 —34 —44 △54 —64
△13 ▽23 △33 △43 ▽53 △63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61



REMARKS: Obsolete
Test values shown are for each winding
Following relay may be substituted
56002-85 GR. 4

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	180-180-180	56002-785	2

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.080		.080	
Min. Drop-away A.	.0145		.0102	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.032	.032	.035	.035
Max. Pol. P.U. & Work. A.	.0072	.0072	.0079	.0079
Max. Start V.				
Flashes Per Min. ____ At ____ Volts				
Release Time ____ Sec. At ____ Volts				
Pick-Up Time ____ Sec. At ____ Volts				
Max. Reversal Time	.67		7.95	
Contact Capacity	4 Amps At		30 Volts	

Front Contact Open .050"

Registration

Core Size 5/8"

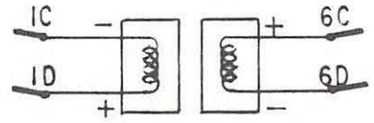
Air Gap .010"

Catalogue Reference

S-500 Reference

Class P

▽16	▽26	▽36	▽46	▽56	▽66	
—15	—25	—35	—45	—55	—65	
△14	△24	△34	△44	△54	△64	
▽13	▽23	▽33	▽43	▽53	▽63	
—12	—22	—32	—42	—52	—62	
△11	△21	△31	△41	△51	△61	
P	N	N	N	N	P	



REMARKS: Obsolete
Following relays may be substituted
56003-70 GR. 1
56003-710 GR. 1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	200	56003-56	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.027		.027	
Min. Drop-away A.	.0076		.0053	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0132	.0132	.0145	.0145
Max. Pol. P.U. & Work. A.	.0047	.0047	.0052	.0052
Max. Start V.				
Flashes Per Min. ____ At ____ Volts				
Release Time ____ Sec. At ____ Volts				
Pick-Up Time ____ Sec. At ____ Volts				
Max. Reversal Time	1.0		9.85	
Contact Capacity	4 Amps At		30 Volts	

Front Contact Open .050"

Registration

Core Size 5/8"

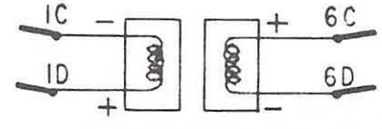
Air Gap .010"

Catalogue Reference

S-500 Reference

Class P

▽16	—	▽36	▽46	—	▽66	
—15	—	—35	—45	—	—65	
△14	—	△34	△44	—	△64	
▽13	—	▽33	▽43	—	▽63	
—12	—	—32	—42	—	—62	
△11	—	△31	△41	—	△61	
P		N	N		P	



REMARKS: Obsolete
Following relays may be substituted
56003-64 GR. 2
56003-701 GR. 2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	500	56003-57	2

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.041		.041	
Min. Drop-away A.	.0117		.0082	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0201	.0201	.0221	.0221
Max. Pol. P.U. & Work A.	.0072	.0072	.0079	.0079
Max. Start V.				
Flashes Per Min. ____ At ____ Volts				
Release Time ____ Sec. At ____ Volts				
Pick-Up Time ____ Sec. At ____ Volts				
Max. Reversal Time	.99		6.0	
Contact Capacity	4 Amps At		30 Volts	

Front Contact Open .050"

Registration

Core Size 5/8"

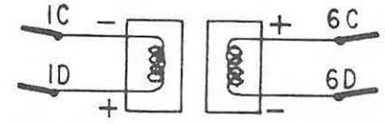
Air Gap .010"

Catalogue Reference

S-500 Reference

Class P

▽16	—	▽36	▽46	—	▽66	
—15	—	—35	—45	—	—65	
△14	—	△34	△44	—	△64	
▽13	—	▽33	▽43	—	▽63	
—12	—	—32	—42	—	—62	
△11	—	△31	△41	—	△61	
P		N	N		P	



REMARKS: Obsolete
Following relays may be substituted
56003-64 GR. 3
56003-701 GR. 3

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	200	56003-57	3

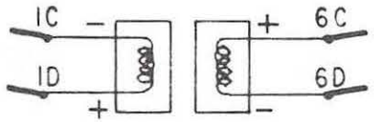
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.080		.080	
Min. Drop-away A.	.011		.0077	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.022	.022	.0242	.0242
Max. Pol. P.U. & Work. A.	.0075	.0075	.0083	.0083
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time .89 Sec. At 6.15 Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61
P P N N P P



REMARKS: Obsolete
Following relays may be substituted
56003-62 GR. 3
56003-707 GR. 3

TYPE	SIZE	RESTRICTANCE	DRAWING	GR.
B	2	200	56003-58	3

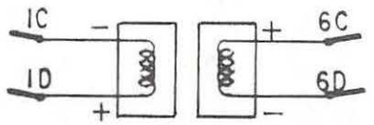
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.080		.080	
Min. Drop-away A.	.011		.0077	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.022	.022	.0242	.0242
Max. Pol. P.U. & Work. A.	.0075	.0075	.0083	.0083
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time .89 Sec. At 6.15 Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61
P P N N P P



REMARKS: Obsolete
Following relays may be substituted
56003-58 GR. 3
56003-707 GR. 3

TYPE	SIZE	RESTRICTANCE	DRAWING	GR.
B	2	200	56003-62	3

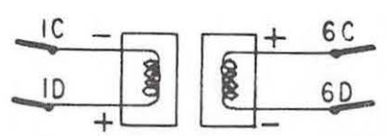
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.027		.027	
Min. Drop-away A.	.0076		.0053	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0132	.0132	.0145	.0145
Max. Pol. P.U. & Work A.	.0047	.0047	.0052	.0052
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time 1.0 Sec. At 9.85 Volts
Contact Capacity 4 Amps At 10 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P

▽16 — ▽36 ▽46 — ▽66
—15 — —35 —45 — —65
△14 — △34 △44 — △64
▽13 — ▽33 ▽43 — ▽63
—12 — —32 —42 — —62
△11 — △31 △41 — △61
P N N P



REMARKS: Obsolete
Following relays may be substituted
56003-57 GR. 2
56003-701 GR. 2

TYPE	SIZE	RESTRICTANCE	DRAWING	GR.
B	2	500	56003-64	2

Printed in U. S. A.

D. C. RELAYS-TRACTIVE ARMATURE, PLUG-IN TYPE

SH. 58 CONT'D ON SH. 59
ISSUED 3-1-62

S-393

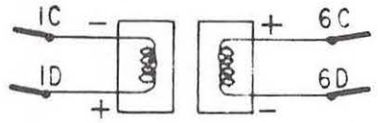
S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.041		.041	
Min. Drop-away A.	.0117		.0082	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0201	.0201	.0221	.0221
Max. Pol. P.U. & Work. A.	.0072	.0072	.0079	.0079
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time .99 Sec. At 6.0 Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P

▽16 — ▽36 ▽46 — ▽66
—15 — —35 —45 — —65
△14 — △34 △44 — △64
▽13 — ▽33 ▽43 — ▽63
—12 — —32 —42 — —62
△11 — △31 △41 — △61
P N N P



REMARKS: Obsolete
Following relays may be substituted
56003-57 GR. 3
56003-701 GR. 3

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	200	56003-64	3

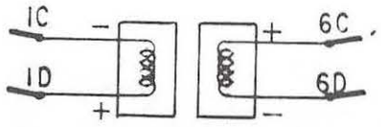
S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.080		.080	
Min. Drop-away A.	.0145		.0102	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.032	.032	.0352	.0352
Max. Pol. P.U. & Work. A.	.0072	.0072	.0079	.0079
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time .67 Sec. At 7.95 Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 —55 —65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
—12 —22 —32 —42 —52 —62
△11 △21 △31 △41 △51 △61
P N N N N P



REMARKS: Obsolete
Following relays may be substituted
56003-56 GR. 1
56003-710 GR. 1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	200	56003-70	1

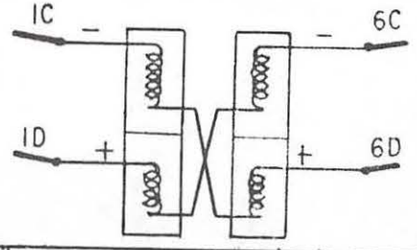
S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.148		.148	
Min. Drop-away A.	.015		.0105	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.036	.036	.040	.040
Max. Pol. P.U. & Work A.	.0075	.0075	.0083	.0083
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time .51 Sec. At 10.8 Volts
Contact Capacity 4 Amps At 175 Volts

Front Contact Open .090"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P

▽16 — ▽36 ▽46 — ▽66
—15 — —35 —45 — —65
△14 — △34 △44 — △64
▽13 — ▽33 ▽43 — ▽63
—12 — —32 —42 — —62
△11 — △31 △41 — △61
P N N P



REMARKS: Obsolete
Test values shown are for each winding

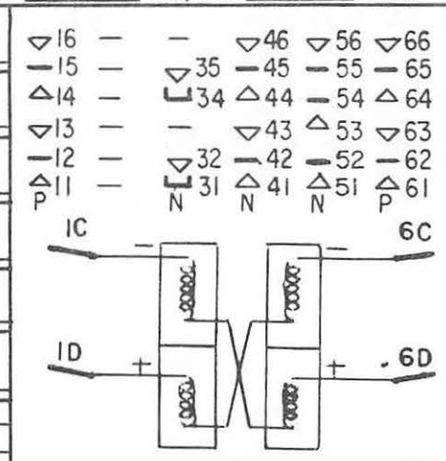
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	200-200	56003-85	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.148		.148	
Min. Drop-away A.	.020		.014	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.043	.043	.047	.047
Max. Pol. P.U. & Work. A.	.008	.008	.0088	.0088
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time .45 Sec. At 12.9 Volts
Contact Capacity 10 Amps At 175 Volts

Front Contact Open .125"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P



REMARKS: Obsolete
Test values shown are for each winding

Following relay may be substituted
56003-785 GR. 6

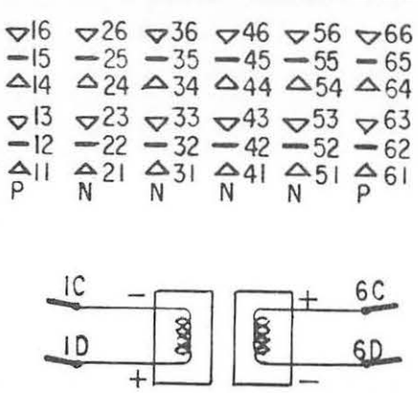
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	200-200	56003-85	12C

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.140		.140	
Min. Drop-away A.	.0232		.0162	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.052	.052	.057	.057
Max. Pol. P.U. & Work. A.	.012	.012	.0132	.0132
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time .55 Sec. At 12.0 Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P



REMARKS: Obsolete
Test values shown are for each winding

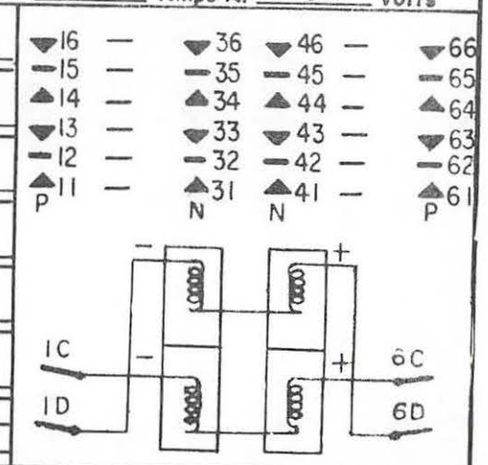
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	165-165	56003-85	14

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.043		.043	
Min. Drop-away A.	.0123		.0086	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0210	.0210	.0231	.0231
Max. Pol. P.U. & Work A.	.0076	.0076	.0084	.0084
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time .5 Sec. At 10.0 Volts
Max. Reversal Time .64 Sec. At 8.55 Volts
Contact Capacity 10 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P
Sw. Control



REMARKS: Obsolete
Test values shown are for 300 Ohm winding

Following relay may be substituted
56003-85 GR. 26

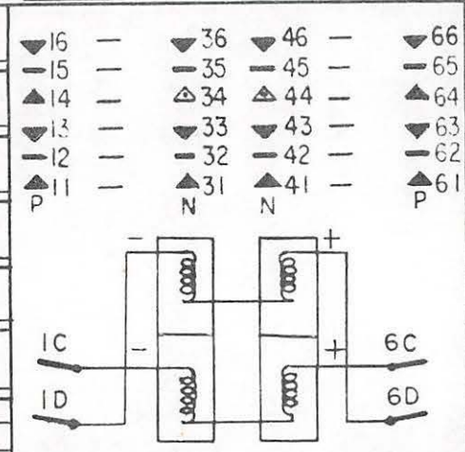
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	.14/300	56003-85	16

S-393

CHARACTERISTICS		SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge	A.	.043		.043	
Min. Drop-away	A.	.010		.007	
Min. Pick-up	A				
Max. Pick-up	A.				
Max. Working	A.	.021	.021	.0231	.0231
Max. Pol. P.U. & Work.	A.	.0076	.0076	.0084	.0084
Max. Start	V.				

Flashes Per Min ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time .5 Sec. At 10.0 Volts
Max. Reversal Time .64 Sec. At 8.55 Volts
Contact Capacity 10 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P
Sw. Control



REMARKS: Obsolete
Test values shown are for 300 Ohm winding
Following relay may be substituted
56003-785 GR. 1

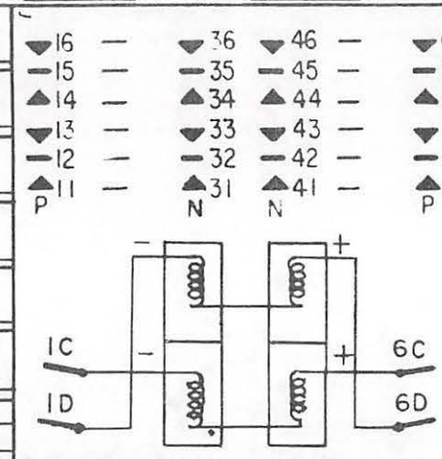
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	.14/300	56003-85	18

S-393

CHARACTERISTICS		SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge	A.	.043		.043	
Min. Drop-away	A.	.0123		.0086	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.0210	.0210	.0231	.0231
Max. Pol. P.U. & Work.	A.	.0076	.0076	.0084	.0084
Max. Start	V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time .5 Sec. At 10.0 Volts
Max. Reversal Time .64 Sec. At 8.55 Volts
Contact Capacity 10 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P
Sw. Control



REMARKS: Obsolete
Test values shown are for 300 Ohm winding
Following relay may be substituted
56003-85 GR. 16

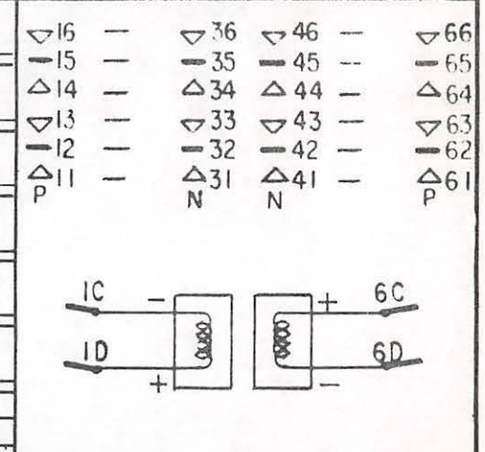
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	.14/300	56003-85	26

S-393

CHARACTERISTICS		SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge	A.	.027		.027	
Min. Drop-away	A.	.0076		.0053	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.0132	.0132	.0145	.0145
Max. Pol. P.U. & Work	A.	.0047	.0047	.0052	.0052
Max. Start	V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time 1.0 Sec. At 9.85 Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-12
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P



REMARKS: Obsolete
Following relays may be substituted
56003-57 GR. 2
56003-64 GR. 2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	500	56003-701	2

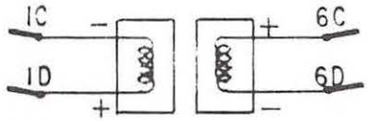
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.041		.041	
Min. Drop-away A.	.0117		.0082	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0201	.0201	.0221	.0221
Max. Pol. P.U. & Work. A.	.0072	.0072	.0079	.0079
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time .99 Sec. At 6.0 Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-12
Core Size 5/8"
Air Gap .010"
Catalogue Reference A62-390
S-500 Reference 371
Class P

▽16 — ▽36 ▽46 — ▽66
—15 — —35 —45 — —65
△14 — △34 △44 — △64
▽13 — ▽33 ▽43 — ▽63
—12 — —32 —42 — —62
△11 — △31 △41 — △61
P N N P



REMARKS:
Following relays may be substituted
56003-57 GR. 3
56003-64 GR. 3

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	200	56003-701	3

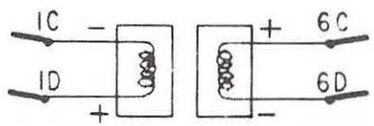
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.100		.100	
Min. Drop-away A.	.0285		.020	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.0488	.0488	.054	.054
Max. Pol. P.U. & Work. A.	.0175	.0175	.0192	.0192
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time ____ Sec. At ____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-3-12
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P

▽16 — ▽36 ▽46 — ▽66
—15 — —35 —45 — —65
△14 — △34 △44 — △64
▽13 — ▽33 ▽43 — ▽63
—12 — —32 —42 — —62
△11 — △31 △41 — △61
P N N P



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	34	56003-701	7

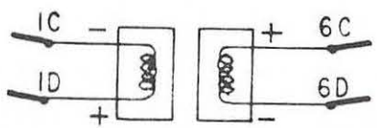
S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.080		.080	
Min. Drop-away A.	.011		.0077	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.022	.022	.0242	.0242
Max. Pol. P.U. & Work A.	.0075	.0075	.0083	.0083
Max. Start V.				

Flashes Per Min. ____ At ____ Volts
Release Time ____ Sec. At ____ Volts
Pick-Up Time ____ Sec. At ____ Volts
Max. Reversal Time .89 Sec. At 6.15 Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-5-29
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P

▽16 ▽26 ▽36 ▽46 ▽56 ▽66
—15 —25 —35 —45 — 55 — 65
△14 △24 △34 △44 △54 △64
▽13 ▽23 ▽33 ▽43 ▽53 ▽63
—12 —22 —32 —42 — 52 — 62
△11 △21 △31 △41 △51 △61
P P N N P P



REMARKS: Obsolete
Following relays may be substituted
56003-58 GR. 3
56003-62 GR. 3

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	200	56003-707	3

S-393

CHARACTERISTICS		SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge	A.	.049		.049	
Min. Drop-away	A.	.013		.0091	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.025	.025	.0275	.0275
Max. Pol. P.U. & Work.	A.	.0085	.0085	.0094	.0094
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts

Release Time .4 Sec. At 12 Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time 1.68 Sec. At 10.35 Volts

Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"

Registration 1-2-5-30

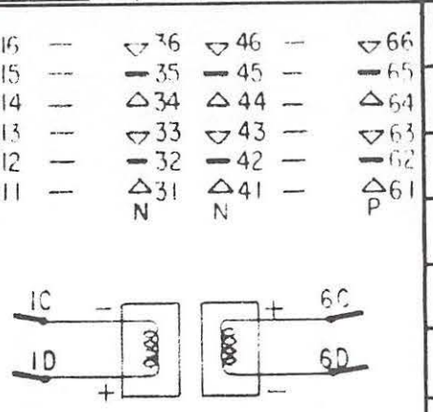
Core Size 5/8"

Air Gap .010"

Catalogue Reference

S-500 Reference

Class P
Slow Release



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	276	56003-708	26

S-393

CHARACTERISTICS		SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge	A.	.057		.057	
Min. Drop-away	A.	.016		.0112	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.028	.028	.031	.031
Max. Pol. P.U. & Work.	A.	.010	.010	.011	.011
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts

Release Time .08 Sec. At 10.0 Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time 1.02 Sec. At 5.0 Volts

Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"

Registration 1-2-6-33

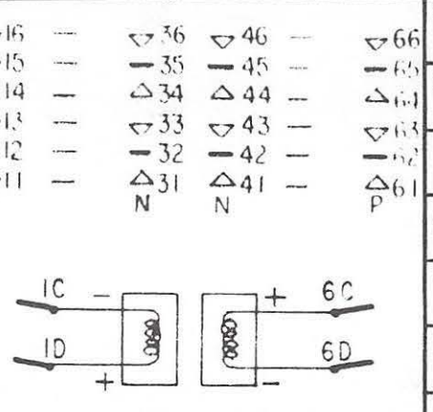
Core Size 5/8"

Air Gap .010"

Catalogue Reference

S-500 Reference 376

Class P
Slow Release



REMARKS:

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	120	56003-709	2

S-393

CHARACTERISTICS		SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge	A.	.030		.030	
Min. Drop-away	A.	.0077		.0054	
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.	.0135	.0135	.0149	.0149
Max. Pol. P.U. & Work	A.	.0052	.0052	.0057	.0057
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts

Release Time .08 Sec. At 10.0 Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time 1.1 Sec. At 9.65 Volts

Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"

Registration 1-2-6-33

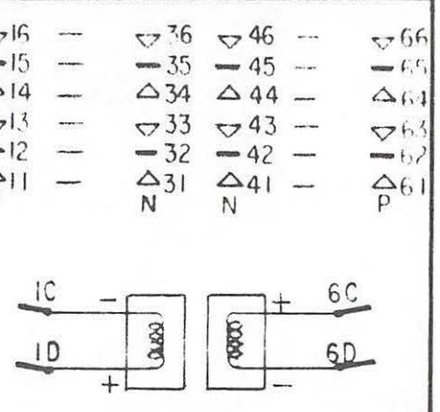
Core Size 5/8"

Air Gap .010"

Catalogue Reference

S-500 Reference

Class P
Slow Release



REMARKS: Obsolete

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	476	56003-709	3

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.080		.080	
Min. Drop-away A.	.0145		.0102	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.032	.032	.035	.035
Max. Pol. P.U. & Work. A.	.0072	.0072	.0079	.0079
Max. Start V.				

Flashes Per Min. _____ At _____ Volts

Release Time _____ Sec. At _____ Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time .67 Sec. At 7.95 Volts

Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"

Registration 1-2-7-33

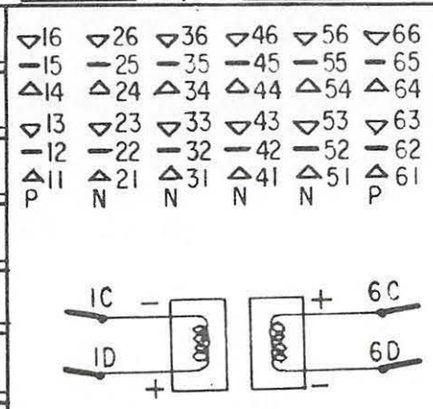
Core Size 5/8"

Air Gap .010"

Catalogue Reference

S-500 Reference

Class P



REMARKS: Obsolete

Following relays may be substituted
56003-56 GR. 1
56003-70 GR. 1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	200	56003-710	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.043		.043	
Min. Drop-away A.	.010		.007	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.021	.021	.0231	.0231
Max. Pol. P.U. & Work. A.	.0076	.0076	.0084	.0084
Max. Start V.				

Flashes Per Min. _____ At _____ Volts

Release Time _____ Sec. At _____ Volts

Pick-Up Time 0.5 Sec. At 10.0 Volts

Max. Reversal Time 0.64 Sec. At 8.55 Volts

Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"

Registration 1-2-5-28

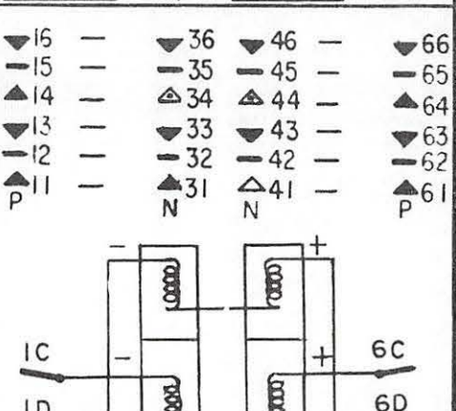
Core Size 5/8"

Air Gap .010"

Catalogue Reference

S-500 Reference

Class P
Sw. Control



REMARKS: Obsolete

Test values shown are for 300 Ohm winding
Following relay may be substituted
56003-85 GR. 18

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	.14-300	56003-785	1

S-393

CHARACTERISTICS	SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge A.	.148		.148	
Min. Drop-away A.	.020		.014	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.043	.043	.047	.047
Max. Pol. P.U. & Work A.	.008	.008	.0088	.0088
Max. Start V.				

Flashes Per Min. _____ At _____ Volts

Release Time _____ Sec. At _____ Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time 0.45 Sec. At 12.9 Volts

Contact Capacity 3 Amps At 30 Volts

Front Contact Open .125"

Registration 1-2-8-12

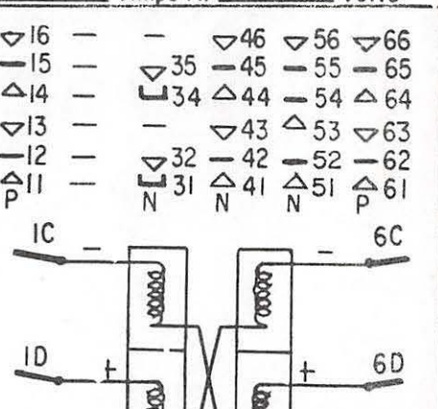
Core Size 5/8"

Air Gap .010"

Catalogue Reference

S-500 Reference

Class P



REMARKS: Obsolete

Following relay may be substituted
56003-85 GR. 12C

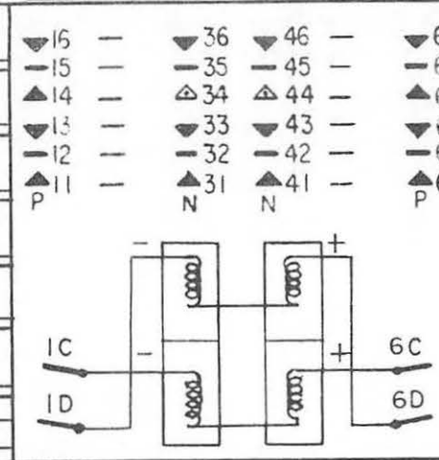
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	200-200	56003-785	6

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.120		.120	
Min. Drop-away A.	.0146		.0102	
Min. Pick-up A				
Max. Pick-up A.				
Max. Working A.	.031	.031	.034	.034
Max. Pol. P.U. & Work. A.	.011	.011	.0121	.0121
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-10-16
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class P Sw. Control



REMARKS: Obsolete

Values shown are for 125 Ohm winding

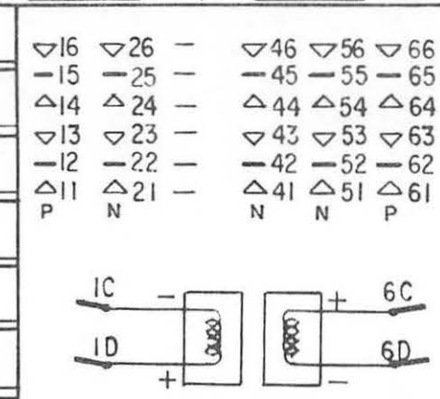
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	.14-125	56003-785	8

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.104		.104	
Min. Drop-away A.	.013		.0091	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.030	.030	.033	.033
Max. Pol. P.U. & Work. A.	.0075	.0075	.0083	.0083
Max. Start V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class RNP



REMARKS: Obsolete

Following relays may be substituted
56004-56 GR. 1
56004-702 GR. 1

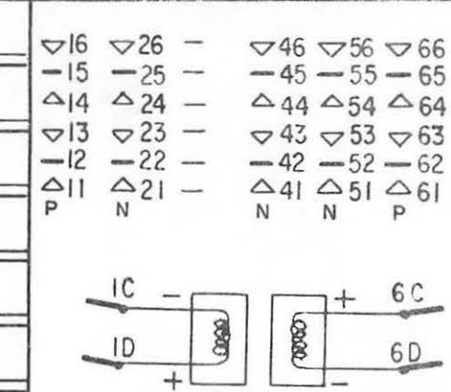
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	220	56004-54	1

S-393

CHARACTERISTICS	SHOP		FIELD	
	NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge A.	.104		.104	
Min. Drop-away A.	.013		.0091	
Min. Pick-up A.				
Max. Pick-up A.				
Max. Working A.	.030	.030	.033	.033
Max. Pol. P.U. & Work A.	.0075	.0075	.0083	.0083
Max. Stort V.				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class RNP



REMARKS: Obsolete

Following relays may be substituted
56004-54 GR. 1
56004-702 GR. 1

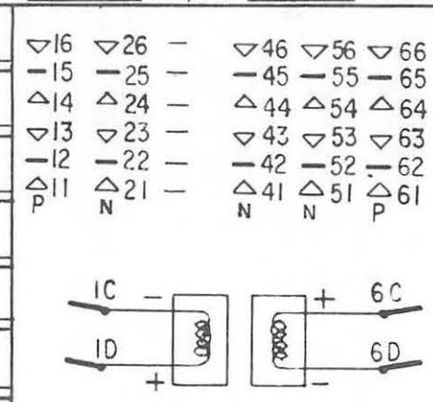
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	220	56004-56	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	A.	.104		.104	
Min. Drop-away	A.	.013		.0091	
Min. Pick-up	A				
Max. Pick-up	A.				
Max. Working	A.	.030	.030	.033	.033
Max. Pol. P.U. & Work.	A.	.0075	.0075	.0083	.0083
Max. Start	V				

Flashes Per Min. _____ At _____ Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 4 Amps At 30 Volts

Front Contact Open .050"
Registration 1-2-5-31
Core Size 5/8"
Air Gap .010"
Catalogue Reference
S-500 Reference
Class RNP



REMARKS: Obsolete

Following relays may be substituted
56004-54 GR. 1
56004-56 GR. 1

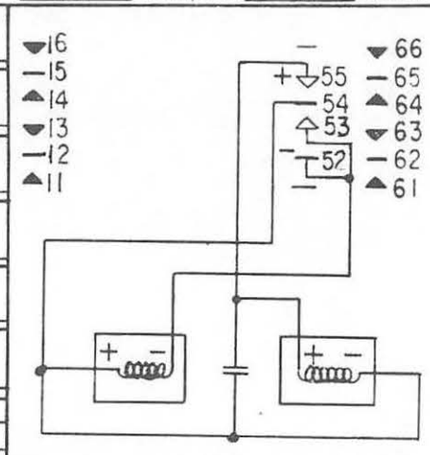
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	220	56004-702	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	V.	10.0		10.0	
Min. Drop-away	A.				
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.				
Max. Pol. P.U. & Work.	A.				
Max. Start	V.	6.0		6.6	

Flashes Per Min. 40-45 At 9.5-11.5 Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 10 Amps At 30 Volts

Front Contact Open .050"
Registration 1-3-5-9
Core Size 9/16"
Air Gap .008"
Catalogue Reference
S-500 Reference
Class FL



REMARKS: Obsolete

Following relay may be substituted
56008-53 GR. 1

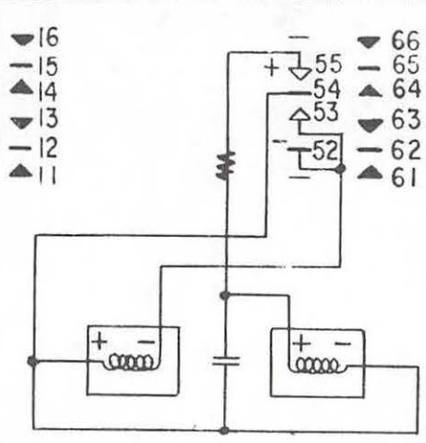
TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	136-136	56008-50	1

S-393

CHARACTERISTICS		SHOP		FIELD	
		NORMAL	REVERSE	NORMAL	REVERSE
Initial Charge	V.	12.0		12.0	
Min. Drop-away	A.				
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.				
Max. Pol. P.U. & Work	A.				
Max. Start	V.	7.2		7.9	

Flashes Per Min. 40-45 At 11.4-13.8 Volts
Release Time _____ Sec. At _____ Volts
Pick-Up Time _____ Sec. At _____ Volts
Max. Reversal Time _____ Sec. At _____ Volts
Contact Capacity 10 Amps At 30 Volts

Front Contact Open .050"
Registration 1-3-5-10
Core Size 9/16"
Air Gap .008"
Catalogue Reference
S-500 Reference
Class FL



REMARKS: Obsolete

Following relay may be substituted
56008-53 GR. 2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	136-136	56008-50	2

S-393

CHARACTERISTICS		SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge	V.	10.0		10.0	
Min. Drop-away	A.				
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.				
Max. Pol. P.U. & Work.	A.				
Max. Start	V.	6.0		6.6	

Flashes Per Min. 40-45 At 9.5-11.5 Volts

Release Time _____ Sec. At _____ Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time _____ Sec. At _____ Volts

Contact Capacity 10 Amps At 30 Volts

Front Contact Open .050"

Registration 1-3-5-9

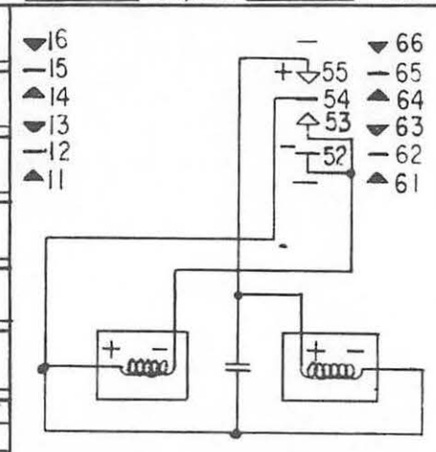
Core Size 9/16"

Air Gap .006"

Catalogue Reference A62-191

S-500 Reference 383

Class FL



REMARKS:

Following relay may be substituted
56008-50 GR. 1

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	136-136	56008-53	1

S-393

CHARACTERISTICS		SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge	V.	12.0		12.0	
Min. Drop-away	A.				
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.				
Max. Pol. P.U. & Work.	A.				
Max. Start	V.	7.2		7.9	

Flashes Per Min. 40-45 At 11.4-13.8 Volts

Release Time _____ Sec. At _____ Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time _____ Sec. At _____ Volts

Contact Capacity 10 Amps At 30 Volts

Front Contact Open .050"

Registration 1-3-5-10

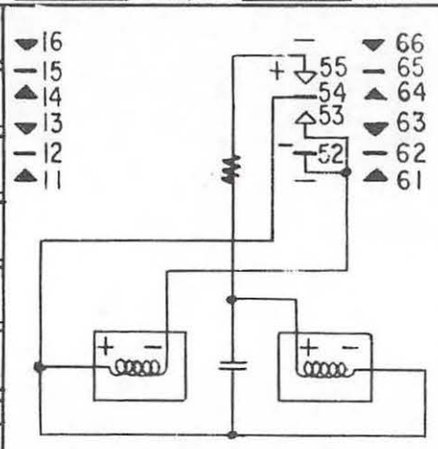
Core Size 9/16"

Air Gap .006"

Catalogue Reference A62-192

S-500 Reference 382

Class FL



REMARKS:

Following relay may be substituted
56008-50 GR. 2

TYPE	SIZE	RESISTANCE	DRAWING	GR.
B	2	136-136	56008-53	2

S-393

CHARACTERISTICS		SHOP NORMAL	SHOP REVERSE	FIELD NORMAL	FIELD REVERSE
Initial Charge	V.				
Min. Drop-away	A.				
Min. Pick-up	A.				
Max. Pick-up	A.				
Max. Working	A.				
Max. Pol. P.U. & Work	A.				
Max. Start	V.				

Flashes Per Min. _____ At _____ Volts

Release Time _____ Sec. At _____ Volts

Pick-Up Time _____ Sec. At _____ Volts

Max. Reversal Time _____ Sec. At _____ Volts

Contact Capacity _____ Amps At _____ Volts

Front Contact Open

Registration

Core Size

Air Gap

Catalogue Reference

S-500 Reference

Class

REMARKS:

TYPE	SIZE	RESISTANCE	DRAWING	GR.

D. C. RELAYS-TRACTIVE ARMATURE, PLUG-IN TYPE

SH. 67 CONT'D ON SH. 68

ISSUED 3-1-62

C.T.C TYPE "A" RELAYS

Type "F" System

The tests specified below in paragraphs A, B and C shall be made at least once every two years.

A. Measure pick-up and release currents of F, MB and MF line relays without opening the relay cabinet. Values shall be within the following limits;

"F" Neutral Office Relay
Dwg. No. 55850-20 Gr. 26 Res. 40 Ohms
Saturate – .252 Amps.
P.U.&W. – .056 Amps Max.
D.A. – .020 Amps Min.

"F" Polar Field Relay
Dwg. No. 54845-5 Gr. 1 Res. 40 Ohms
Saturate – .300 Amps.
P.U.&W. – .065 Amps Max.
D.A. – .010 Amps. Min.

"MB" & "MF" Line Relays
Dwg. No. 55850-20 Gr. 69 Res. 44 Ohms
Saturate – .300 Amps.
P.U.&W. – .069 Amps. Max.

D.A. – .020 Amps. Min.

If a C.T.C. line relay fails to meet these specifications, it should be replaced.

B. Reduce the voltage of the local energy for the C.T.C. code apparatus to 21 volts, as prescribed by the manufacturer and check the C.T.C. code system for proper operation. This test shall be made at the control office and at each field location.

C. Inspect C.T.C. type code relays through the window of the relay cabinet using binocular headband magnifier 35747. Excessive contact wear will be evidenced by badly deformed contact tips. If any relay appears to have badly worn contacts, the cabinet should be opened, and relay manually operated to estimate the loss of contact compression as compared to the contact compression of a new relay of the same type. If any contact has lost 50% of its compression, the relay must be replaced.

Type "K" System, Syncrostep, and Syncroscan

A tape record of several control and/or indication cycles shall be taken at least once each year to detect timing abnormalities which may eventually cause failure of the system. G.R.S. tape recorder 58840-1 Gr. 1 shall be used for the test. Detail descriptions of periodic tests are given in G.R.S. Maintenance Instruction Handbooks applicable to the particular system.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
D.C. RELAYS
IN CODE CONTROL SYSTEMS
INSTRUCTIONS

Approved L. S. Bottinelli
Chief Signal Engineer

S-394

Printed in U.S.A.

ISSUED 11-17-58

ITEM NO.	TEST AND/OR INSPECTION	RULES & INSTRUCTIONS ICC NO.	N.Y.C. NO.	TEST AND/OR INSPECTION INTERVAL	TEST AND/OR INSPECTION TO BE MADE BY MAINTAINER (M)	INSPECTOR (I)	RECORDED ON FORM NO.	DISPOSITION OF FORM	REMARKS
1	Ground Test	136.2	205,210	As Required	M		SC-29	Retained by Maintainer	
2	Ground Test	136.2	205,210	2 Years		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	*
3	Semaphore Arm Clearance	136.22	AAR Part 54	2 Years		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	*
4	Track Circuits (Overlay)		S-270	3 Months	M		Log Book	Retained by Maintainer	
5	Batteries – Primary		26	As Required	M		Log Book	Retained by Maintainer	
6	Batteries – Storage – Ni – Fe		30	1 Month	M		SC-27	Retained at Location	
7	Batteries – Storage – Lead		S-35	1 Month	M		SC-27	Retained at Location	
8	Arrester Inspection			See Remarks	M		Log Book	Retained by Maintainer	With routine apparatus inspection.
9	Arrester Ground	136.78	256	2 Years		I	SC-54	Dist.Sig.Engr.-Sig.Supvr.	
10	Signal Mechanism	136.102	410, Mfgrs & Special	See Remarks	M		SC-6	Signal Supervisor	Semaphore Signals to be inspected each month Colorlight " " " " " 6 months.
11	Signal Mechanisms	136.102	" " "	2 Years		I	SC-12 SC-38	Dist.Sig.Engr.-Sig.Supvr.	
12	Switch Circuit Controllers	136.103	415	1 Month	M		SC-6	Signal Supervisor	
13	Shunt Fouling Circuits	136.104	440	3 Months	M		SC-6	Signal Supervisor	
14	Insulated Joints	136.59	440	3 Months	M		Log Book	Retained by Maintainer	
15	Electric Locks		265	6 Months	M		Log Book	Retained by Maintainer	
16	Electric Locks	136.105	265	1 Year		I	SC-12, SC-38	Dist.Sig.Engr.-Sig.Supvr.	
17	Relays AC	136.106	40, Mfgrs.	See Remarks		I	SC-19, SC-12	Dist.Sig.Engr.-Sig.Supvr.	Vane Type relays to be tested every 2 years All other types each year.
18	Relays DC	136.106	390, 393, Mfgrs.	2 Years		I	SC-12	Dist.Sig.Engr.-Sig.Supvr.	
19	Relays DC Non Vital	136.106	S-394	2 Years		I	SC-12, Tape Rec.	Dist.Sig.Engr.-Sig.Supvr.	
20	Insulation Tests	136,108	S-425	As required		I	SC-47	Dist.Sig.Engr.-Sig.Supvr.	
21	Mechanical Locking		205,210,260	3 Months	M		Log Book	Retained by Maintainer	
22	Mechanical Locking	136.376	205,210,260	4 Years		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	
23	Approach Locking	136.377	S-426	1 Year		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	
24	Time Locking	136.378	S-426	1 Year		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	
25	Route Locking	136.379	205,210,265	3 Months	M		SC-6	Signal Supervisor	
26	Route Locking		205,210,265	2 Years		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	*
27	Indication Locking		205,210	6 Months	M		Log Book	Signal Supervisor	
28	Indication Locking	136.380	S-426,205,210	1 Year (See Remarks)		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	2 Years – Light Signals.
29	Traffic Locking	136,381	S-426	1 Year		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	
30	Switch Obstruction Test	136.382	205,210	1 Month	M		SC-6	Signal Supervisor	
31	Switch Obstruction Test		205,210	1 Year		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	*
32	E.P. Lock Valve Test	136.383		3 Months	M		SC-6	Signal Supervisor	
33	E.P. Lock Valve Test	136.383		2 Years		I	SC-28	Dist.Sig.Engr.	*

* Maintainer will make required tests under supervision of Inspector.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SCHEDULE OF FIELD TESTS AND INSPECTIONS

Approved _____ S-423
Chief Signal Engineer

Printed in U.S.A.

ISSUED 6-11-58

SHEET 1 Cont'd on Sh. 2

ITEM NO.	TEST AND/OR INSPECTION	RULES & INSTRUCTIONS I.C.C. NO.	RULES & INSTRUCTIONS N.Y.C. NO.	TEST AND/OR INSPECTION INTERVAL	TEST AND/OR INSPECTION TO BE MADE BY MAINTAINER (M)	TEST AND/OR INSPECTION TO BE MADE BY INSPECTOR (I)	RECORDED ON FORM NO.	DISPOSITION OF FORM	REMARKS
34	Cross protection Test	136.384	205	3 Months	M		SC-6	Signal Supervisor	
35	Cross Protection Test		205	2 Years		I	SC-28	Dist.Sig.Engr.-Sig.Supvr.	
36	Time Release or Time Relays	136.385	205,210	3 Months	M		SC-6	Signal Supervisor	
37	Time Release or Time Relays		205,210	2 Years		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	*
38	Restoring Feature Power Switches	136.386	205	3 Months	M		SC-6	Signal Supervisor	
39	Restoring Feature Power Switches		205	2 Years		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	*
40	Bridge Locking		210	1 Month	M		Log Book	Retained by Maintainer	
41	Bridge Locking	136.387	210	1 Year		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	*
42	ATS Inductor	136.576	S-436	1 Month	M		SC-6,S-436	Signal Supervisor	Test of gage, alignment, impedance
43	ATS Inductor	136.576	S-436	1 Year		I	SC-24	Dist.Sig.Engr.-Sig.Supvr.	Test in Spring.
44	ATS Inductor	136.576	S-436	1 Year		I	SC-26	Dist. Sig. Engr.	Car Test – Fall
45	Indication Magnets	136.8	205	See Remarks		I	SC-28	Dist.Sig.Engr.-Sig.Supvr.	Test Period – At least every 2 years at interlockings having complete slow speed network with WP circuits. At least once each year at others.
46	Switch Machine – Overload Relays		S-419	3 Months	M		Log Book	Retained by Maintainer	
47	Switch Machine – Overload Relays	136.8	S-419	2 Years		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	
48	Switch Machine – Brakes		S-419	3 Months	M		Log Book	Retained By Maintainer	
49	Switch Machine – Brakes	136.8	S-419	2 Years		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	
50	Switch Machine – Clutches		S-419	3 Months	M		Log Book	Retained by Maintainer	
51	Switch Machine – Clutches		S-419	2 Years		I	SC-38	Dist.Sig.Engr.-Sig.Supvr.	
52	Spring Switch		421	3 Months	M		Log Book	Retained By Maintainer	
53	Syncro-Scan Equipment				M Maint. Fore.		Special Form	Retained at Headquarters	
54	Highway Crossing Sigs. & Gates			1 Week	M		AAR 7054	Signal Supervisor	Operating Test
55	Highway Crossing Sigs. & Gates			2 Years		I	SC-12	Dist.Sig.Engr.-Sig.Supvr.	General Conditions Torque-Oper.Char.
56	General Inspection		215	2 Years		I	SC-38	" " " " "	

* Maintainer will make required tests under supervision of Inspector.

NOTES: 1. Signal Supervisor and Inspector will examine and sign Log Book at least annually.

2. Test or inspect at more frequent intervals if required by local conditions.

3. NYC requirements to be followed where more restrictive than I.C.C. R.S. &I.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SCHEDULE OF FIELD TESTS AND INSPECTIONS

Approved Hascall
Chief Signal Engineer

S-423

ISSUED 6-11-58

SHEET 2 Cont'd on Sh...

Printed in U.S.A.

1. Time release devices used for the release of approach or time locking must be adjusted as follows unless otherwise authorized by the Chief Signal Engineer:
   (a) Interlocking high signals in accordance with Figure A or B but not less than three minutes.
   (b) Interlocking dwarf signals governing movements at higher than slow speed in accordance with Figure A or B, but not less than three minutes.
   (c) Interlocking dwarf signals governing movements at slow speed, not less than 45 seconds.
   (d) Interlocking dwarf signals governing movements at restricted speed, not less than 15 seconds. (Note 1)
   (e) Electrically locked hand operated switches in accordance with Figure C or D, but not less than three minutes.
2. At interlockings equipped with adjustable releases, revised timing must be put into effect.
3. The release time setting shall be specified to the nearest 15 second interval of the calculated time and must be designated on the circuit plans.
4. The time setting must be maintained with $\pm$ 10 per cent of the designated time interval.
5. Required periodic test of time setting and operating condition of time release devices shall be made at intervals specified on Plan S-423, Items 36 and 37.
6. Time release devices on which specified timing cannot be obtained must be removed from service and sent to the signal shop for repair.
7. Method for computing the release time setting where:
   T = Time.
   30 Sec. = Preview time.
   A = Distance between approach signal and point where stop is required and braking distance at maximum authorized speed is provided.
   A^1 = Actual distance between first approach signal and the stop signal.
   A^2 = Actual distance between the first and second approach signal.
   C = Feet per second at train speed not to exceed 30 miles per hour (1.467 x m.p.h.)
   C^1 = Feet per second at train speed not to exceed 15 miles per hour (1.467 x m.p.h.)
   D = Feet per second traveled at maximum speed for which first approach signal provides braking distance.
   L = Actual distance between the electric lock and its protecting signal.
   (Note 2)

Note 1: Where, in addition to the restricted speed aspect, the interlocking dwarf signal displays aspects better than restricted speed, the longer time may be used for the restricted speed aspect.

Note 2: Where train speeds of less than 30 miles per hour or where physical conditions prevent trains from averaging 30 miles per hour, the time setting for train speed C in formula should be based on the distance traveled in feet per second at the average train speed attained.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TIME RELEASES
INSTRUCTION

S-434

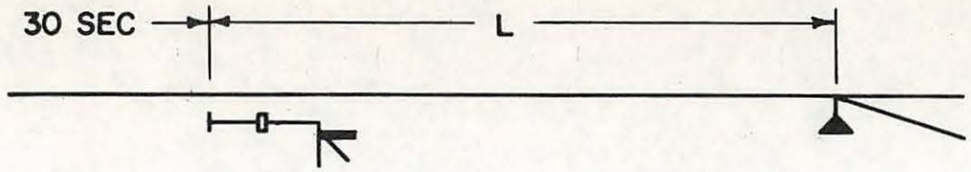
ISSUED 10-15-58

SHEET 1 Cont'd on Sh. 2

PRINTED IN U.S.A.

ASSUMPTIONS & EXAMPLES

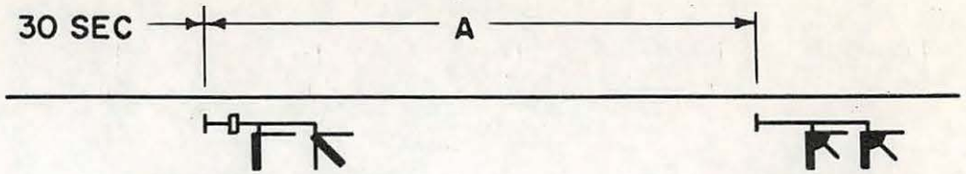
Fig. C



WHERE "L" IS GREATER THAN MAXIMUM SPEED BRAKING DISTANCE.

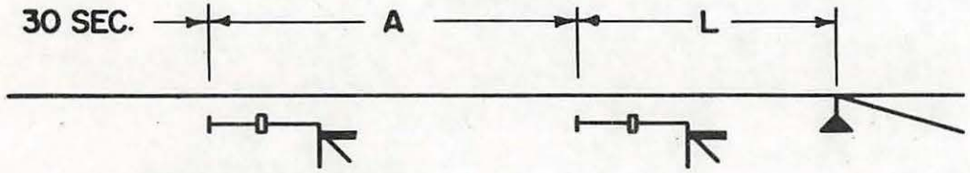
$T = 30 \text{ SEC.} + \frac{L}{C} = 30 + \frac{9900}{22} = 480$ SECONDS (8 MINUTES)

Fig. A



$T = 30 \text{ SEC.} + \frac{A}{C} = 30 + \frac{11880}{44} = 30 + 270 = 300$ SECONDS (5 MINUTES)

Fig. D



(1) WHERE "L" IS LESS THAN MAXIMUM SPEED BRAKING DISTANCE BUT MORE THAN 15 MPH BRAKING DISTANCE (700').

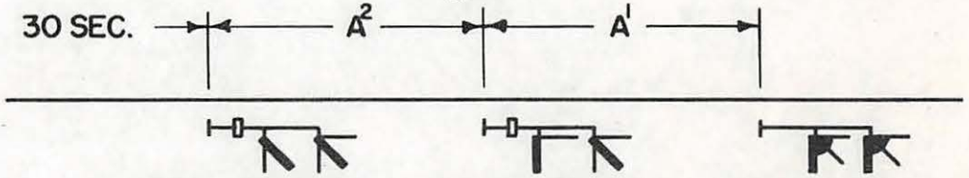
$T = 30 \text{ SEC.} + \frac{A}{C} + \frac{L}{C'} = 30 + \frac{10560}{44} + \frac{6600}{22} = 570$ SECONDS (9 MIN. 30 SEC.)

(2) WHERE "L" IS LESS THAN 15 MPH BRAKING DISTANCE (700').

$T = 30 \text{ SEC.} + \frac{A+L}{C'} = 30 + \frac{9460+440}{22} = 480$ SECONDS (8 MINUTES)

NOTE: WHERE TRACK IS SIGNALED IN BOTH DIRECTIONS, TIME SHALL BE FIGURED FOR EACH DIRECTION AND THE GREATER TIME SHALL BE USED IN SETTING THE TIMING DEVICE.

Fig. B



$T = 30 \text{ SEC.} + \frac{A^1}{C} + \frac{A^2}{D} = 30 + \frac{6650}{44} + \frac{10100}{85} = 30 + 151 + 119 = 300$ SECONDS (5 MINUTES)

NOTE: WHERE MORE THAN TWO APPROACH SIGNALS ARE REQUIRED, THE FORMULA FOR COMPUTING THE RELEASE TIME SETTING SHOULD BE EXPANDED AS REQUIRED.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TIME RELEASES

Approved. H. Abbott
Chief Signal Engineer

S-434

Printed in U.S.A.

ISSUED 10-15-58

SHEET 2 Cont'd on Sh.....

S-436A

NEW YORK CENTRAL SYSTEM
MAINTAINERS MONTHLY ATS INDUCTOR
INSPECTION REPORT

_____ DIVISION
_____ MTCE SECT.

Location	Gage	Impedance	Are Ties Properly Tamped?	Remarks	Date

INSTRUCTIONS: - Letters "OK" to be written in column titled "Gage" when requirements are met.
Measured impedance of inductor to be recorded in column titled "Impedance".
Special conditions must be described in column titled "Remarks".

WHEN INDUCTORS DO NOT MEET TEST REQUIREMENTS - THEY MUST BE CHANGED OUT IMMEDIATELY.

_____ Signature

White Manifold Paper 8"x 10-1/2"

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
WAYSIDE EQUIPMENT
AUTOMATIC TRAIN STOP
INSTRUCTIONS

Approved _____ Chief Signal Engineer

S-436

Printed in U.S.A.

ISSUED 3-28-58

SHEET 3 Cont'd on Sh. ___

S-436A

NEW YORK CENTRAL SYSTEM
MAINTAINERS MONTHLY ATS INDUCTOR
INSPECTION REPORT

_____ DIVISION
_____ MTCE SECT.

Location	Gage	Impedance	Are Ties Properly Tamped?	Remarks	Date

INSTRUCTIONS: - Letters "OK" to be written in column titled "Gage" when requirements are met.
Measured impedance of inductor to be recorded in column titled "Impedance".
Special conditions must be described in column titled "Remarks".

WHEN INDUCTORS DO NOT MEET TEST REQUIREMENTS - THEY MUST BE CHANGED OUT IMMEDIATELY.

_____ Signature

White Manifold Paper 8"x 10-1/2"

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
WAYSIDE EQUIPMENT
AUTOMATIC TRAIN STOP
INSTRUCTIONS

Approved _____ Chief Signal Engineer

S-436

Printed in U.S.A.

ISSUED 3-28-58

SHEET 3 Cont'd on Sh. ___

S-436A

NEW YORK CENTRAL SYSTEM
MAINTAINERS MONTHLY ATS INDUCTOR
INSPECTION REPORT

_____ DIVISION
_____ MTCE SECT.

Location	Gage	Impedance	Are Ties Properly Tamped?	Remarks	Date

INSTRUCTIONS: - Letters "OK" to be written in column titled "Gage" when requirements are met.
Measured impedance of inductor to be recorded in column titled "Impedance".
Special conditions must be described in column titled "Remarks".

WHEN INDUCTORS DO NOT MEET TEST REQUIREMENTS - THEY MUST BE CHANGED OUT IMMEDIATELY.

_____ Signature

White Manifold Paper 8"x 10-1/2"

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
WAYSIDE EQUIPMENT
AUTOMATIC TRAIN STOP
INSTRUCTIONS

Approved H.A. Scott
Chief Signal Engineer

S-436

Printed in U.S.A.

ISSUED 3-28-58

SHEET 3 Cont'd on Sh. ___

S-436A

NEW YORK CENTRAL SYSTEM
MAINTAINERS MONTHLY ATS INDUCTOR
INSPECTION REPORT

__________ DIVISION
__________ MTCE SECT.

Location	Gage	Impedance	Are Ties Properly Tamped?	Remarks	Date

INSTRUCTIONS: - Letters "OK" to be written in column titled "Gage" when requirements are met.
Measured impedance of inductor to be recorded in column titled "Impedance".
Special conditions must be described in column titled "Remarks".

WHEN INDUCTORS DO NOT MEET TEST REQUIREMENTS - THEY MUST BE CHANGED OUT IMMEDIATELY.

____
Signature

White Manifold Paper 8" x 10-1/2"

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
WAYSIDE EQUIPMENT
AUTOMATIC TRAIN STOP
INSTRUCTIONS

Approved __________
Chief Signal Engineer

S-436

TIES

12. Ties furnished by the Track forces, to support the inductor, must be sawed 7" x 9" x 9'-6" and kept properly tamped against base of rail. The rails must be fully spiked to the inductor ties.

TOOLS AND MATERIAL

13. Tools or material must not be permitted on top of inductor or above the level of the top of the rail near the path of the engine receiver.

REPORTED FAILURES

14. When an automatic train stop brake application is reported:

    (a) Test and inspect for requirements in paragraphs 1, 12 and 13.

    (b) Test and inspect for any defects of the signal and wayside automatic train stop apparatus including inductor circuit.

    (c) Consult other employes for evidence to show what may have occurred to cause the improper operation.

    (d) If the above tests and inspection do not disclose cause of automatic train stop brake application and after it has been reported as not due to failure of engine apparatus, the Signal Supervisor or other designated employe must make tests as required on Form SC-24 except impedance or resonance test.

15. When failure of forestalling whistle, bell or horn is reported:

    (a) Test signal circuits to determine that signal follows its relay controls.

    (b) Check impedance of inductor.

    (c) Investigate the possibility that signal indication may have changed at time of reported whistle, bell or horn failure.

    (d) Signal Supervisor or other designated employee must make test as required on Form SC-24

WIRES AND CABLES

16. Inductor wires and cables must be kept free from grounds, crosses and short circuits.

17. Insulation resistance between cables or between cables and ground must not be less than 1 megohm.

18. Resistance of inductor connections including relay contacts must not exceed 2 ohms.

TESTS AND INSPECTIONS

19. Signal forces must observe passing trains, and if hopper doors are down or other objectional conditions are noticed, must take such measures as are practicable to prevent damage to inductors.

20. Signal Forces must check the impedance of inductors monthly, record results on Form S-436A and forward to Signal Supervisor.

21. Signal forces must gage inductors monthly for height and alignment and maintain them in proper position, using proper inductor gage. If adjustments are necessary they must be made only after having determined that ties are securely tamped and rails securely fastened to ties.

22. Unwound inductors must be removed from the ties once each year, inverted, and examined carefully for disintegration of the core structure. Disintegration of the core structure is indicated by excessive rusting and spreading of the laminae.

23. When making tests the indication displayed by the Signal in the rear must not be changed in the face of an approaching train.

24. Inductors held for emergency, and inductors and connections in service must be tested annually and results recorded on Form SC-24.

25. Inductors and cables not meeting requirements of these tests must be repaired or replaced promptly.

26. Effectiveness of inductors must be tested twice a year. One test must be made to insure inductors meet requirements of paragraphs 1, 8, 9, 17 and 18 and results of tests recorded on Form SC-24. Where practicable, the second test must be made by means of a car equipped with apparatus suitable for running tests and results of tests recorded on Form SC-26.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
WAYSIDE EQUIPMENT
AUTOMATIC TRAIN STOP INSTRUCTIONS

S-436

Printed in U.S.A.

ISSUED 3-28-58

TIES

12. Ties furnished by the Track forces, to support the inductor, must be sawed 7" x 9" x 9'-6" and kept properly tamped against base of rail. The rails must be fully spiked to the inductor ties.

TOOLS AND MATERIAL

13. Tools or material must not be permitted on top of inductor or above the level of the top of the rail near the path of the engine receiver.

REPORTED FAILURES

14. When an automatic train stop brake application is reported:

    (a) Test and inspect for requirements in paragraphs 1, 12 and 13.

    (b) Test and inspect for any defects of the signal and wayside automatic train stop apparatus including inductor circuit.

    (c) Consult other employes for evidence to show what may have occurred to cause the improper operation.

    (d) If the above tests and inspection do not disclose cause of automatic train stop brake application and after it has been reported as not due to failure of engine apparatus, the Signal Supervisor or other designated employe must make tests as required on Form SC-24 except impedance or resonance test.

15. When failure of forestalling whistle, bell or horn is reported:

    (a) Test signal circuits to determine that signal follows its relay controls.

    (b) Check impedance of inductor.

    (c) Investigate the possibility that signal indication may have changed at time of reported whistle, bell or horn failure.

    (d) Signal Supervisor or other designated employee must make test as required on Form SC-24

WIRES AND CABLES

16. Inductor wires and cables must be kept free from grounds, crosses and short circuits.

17. Insulation resistance between cables or between cables and ground must not be less than 1 megohm.

18. Resistance of inductor connections including relay contacts must not exceed 2 ohms.

TESTS AND INSPECTIONS

19. Signal forces must observe passing trains, and if hopper doors are down or other objectional conditions are noticed, must take such measures as are practicable to prevent damage to inductors.

20. Signal Forces must check the impedance of inductors monthly, record results on Form S-436A and forward to Signal Supervisor.

21. Signal forces must gage inductors monthly for height and alignment and maintain them in proper position, using proper inductor gage. If adjustments are necessary they must be made only after having determined that ties are securely tamped and rails securely fastened to ties.

22. Unwound inductors must be removed from the ties once each year, inverted, and examined carefully for disintegration of the core structure. Disintegration of the core structure is indicated by excessive rusting and spreading of the laminae.

23. When making tests the indication displayed by the Signal in the rear must not be changed in the face of an approaching train.

24. Inductors held for emergency, and inductors and connections in service must be tested annually and results recorded on Form SC-24.

25. Inductors and cables not meeting requirements of these tests must be repaired or replaced promptly.

26. Effectiveness of inductors must be tested twice a year. One test must be made to insure inductors meet requirements of paragraphs 1, 8, 9, 17 and 18 and results of tests recorded on Form SC-24. Where practicable, the second test must be made by means of a car equipped with apparatus suitable for running tests and results of tests recorded on Form SC-26.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
WAYSIDE EQUIPMENT
AUTOMATIC TRAIN STOP INSTRUCTIONS

S-436

ISSUED 3-28-58

Printed in U.S.A.

INDUCTORS

1. Inductors must be located in accordance with Signal Department Plan 4930.

   (a) The following dimension limits on Plan 4930 must be maintained.

   (1) Where electric equipment with 3rd rail shoes is moved or operated.

VERTICAL (Above top of rail)		HORIZONTAL (From gage of rail)	
Min.	Max.	Min.	Max.
2-3/16"	2-1/4"	15-5/8"	15-7/8"

   (2) Other territory

VERTICAL (Above top of rail)		HORIZONTAL (From gage of rail)	
Min.	Max.	Min.	Max.
2-7/16"	2-9/16"	17"	17-1/2"

   (b) Gages shown on Signal Department Plan 4940 must be handled with care and frequent check made to determine that they are in proper alignment.

2. Strap iron inductors shown on Signal Department Plan 4942 must not be used except for test inductors at engine terminals.

3. Inductor case must be kept free from gravel and ballast. Drainage must be provided so inductor coil will not be continuously subjected to moisture. Drainage holes in bottom cover plate of inductor must be kept open. Ventilator screens must be kept clean and in place.

4. Inductors, fastenings, and plates must be kept painted, and threaded parts protected against corrosion.

5. Inductor top plates must be tight and insulating fillers in place.

6. Unless otherwise specified, wound inductors must be used at signals where aspects are displayed in accord with the following Operating Rules:

   281
   281C
   283
   287 - (Southern District only)
   501K)
   601N) - Northern District (Canada)
   601K)

   Unwound inductors must be used at all other locations.

TRACK CHANGES

7. When track forces are changing rail, installing or replacing tie plates, removing or adzing ties, applying or removing shims, or doing other work that may change the position of inductor with relation to the rail, the Track Supervisor must notify the Signal Supervisor and both Supervisors must co-operate to insure inductors are maintained within limits specified in paragraph 1, also that the cables to inductors are not disturbed.

8. Values for inductor winding shall be:

   (a) Resistance:

	Max. Ohms	Min. Ohms
G.R.S.Co.	3.6	2.4
U.S.&S.Co.	8.5	6.5

   (b) Impedance

   G.R.S.Co.—Min. 1250 ohms at 60 cycles. (Max current reading .080 amperes at 100 volts.)

   (c) Resonance:

   U.S.&S.Co. Capacity necessary to resonate must not exceed 2.5 M.F. without auxiliary reactor at 100 cycles. 1.5 M.F. with auxiliary reactor at 100 cycles.

9. Insulation resistance between inductor winding and case, or ground, must not be less than 10000 ohms.

INDUCTORS TORN OUT OR REPLACED

10. When an inductor is torn out, or cannot be adjusted to proper height, or is improperly open circuited, or for any other reason does not function as intended, the signal at that location must be arranged to display its most restrictive indication and the Superintendent notified.

11. When an inductor is replaced, circuit must be carefully checked. Complete tests must be made as required in paragraphs 1, 8, 9, 17 and 18, as soon as practicable and results recorded on Form SC-24.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
WAYSIDE EQUIPMENT
AUTOMATIC TRAIN STOP
INSTRUCTIONS

S-436

Printed in U.S.A.

ISSUED 3-28-58

INDUCTORS

1. Inductors must be located in accordance with Signal Department Plan 4930.

   (a) The following dimension limits on Plan 4930 must be maintained.

   (1) Where electric equipment with 3rd rail shoes is moved or operated.

VERTICAL (Above top of rail)		HORIZONTAL (From gage of rail)	
Min.	Max.	Min.	Max.
2-3/16"	2-1/4"	15-5/8"	15-7/8"

   (2) Other territory

VERTICAL (Above top of rail)		HORIZONTAL (From gage of rail)	
Min.	Max.	Min.	Max.
2-7/16"	2-9/16"	17"	17-1/2"

   (b) Gages shown on Signal Department Plan 4940 must be handled with care and frequent check made to determine that they are in proper alignment.

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   281C
   283
   287 - (Southern District only)
   501K)
   601N) - Northern District (Canada)
   601K)

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   (b) Impedance

   G.R.S.Co.—Min. 1250 ohms at 60 cycles. (Max current reading .080 amperes at 100 volts.)

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2-3/16"	2-1/4"	15-5/8"	15-7/8"

   (2) Other territory

VERTICAL (Above top of rail)		HORIZONTAL (From gage of rail)	
Min.	Max.	Min.	Max.
2-7/16"	2-9/16"	17"	17-1/2"

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   281C
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U.S.&S.Co.	8.5	6.5

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   G.R.S.Co.–Min. 1250 ohms at 60 cycles. (Max current reading .080 amperes at 100 volts.)

   (c) Resonance:

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11. When an inductor is replaced, circuit must be carefully checked. Complete tests must be made as required in paragraphs 1, 8, 9, 17 and 18, as soon as practicable and results recorded on Form SC-24.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
WAYSIDE EQUIPMENT
AUTOMATIC TRAIN STOP INSTRUCTIONS

S-436

Printed in U.S.A.

ISSUED 3-28-58

The purpose of this instruction is to establish uniform procedures in the adjustment of steady energy DC track circuits employing standard track relays fed from one cell of storage battery and to obtain maximum practical shunting sensitivity consistent with apparatus employed and variations in ballast resistance.

BATTERY END

The adjustments covered by this instruction are based upon a total resistance of 0.1 ohm in the battery leads to rail and an inserted resistance of 1.0 ohm with a lead cell and 0.65 ohm with a nickel iron cell or with primary cells. Primary cells must be connected in series, parallel, or series-parallel, so as to provide a shunt current of 1.6 amperes at a nominal voltage of 1.2. It is recommended that a minimum of 2000 ampere hours be installed for each track circuit.

Normally, a 1.0 ohm fixed resistor can be used with a lead cell and a Raco Type 602-3, 1.0 ohm adjustable resistor set at 0.65 ohm for a nickel iron cell or with primary cells; however, it is recommended that the adjustable unit be used for all circuits.

If the leads between the battery and the rails are longer than normal, the additional resistance introduced by the added length must be taken into account when making adjustments. To adjust the total limiting resistance (leads plus inserted resistance), connect a low resistance shunt (#6 AWG copper or larger) across the rails by means of clamps at the battery end of the track circuit and, with the charge *off*, set the adjustable resistor to allow approximately 2 amperes to flow. With primary cells, connect a voltmeter across the *battery terminals* and adjust the total resistance to .75 ohms by calculation using E/I.

When making adjustments, a low resistance ammeter with leads as short as practicable should be used and the current should be read on the 15 ampere scale of the meter.

RELAY END

To facilitate adjustment, the amount of series resistance which may be inserted in the relay leads has been calculated for various minimum ballast settings and the results plotted as curves which form a part of this instruction. The calculations are based upon a bonded track resistance of .025 ohm per thousand feet which is the equivalent of 127# rail with rail head bonds.

Three minimum ballast settings are plotted for each type of relay on storage battery circuits. In addition, a one ohm ballast curve is given for primary battery circuits. The four ohm ballast setting may be used where ballast and ties are in excellent condition, the three ohm setting may be used generally under average ballast and tie conditions, while the two ohm or one ohm setting should be used only where ballast and ties are poor.

USE OF ADJUSTMENT CURVES

After determining that proper limiting resistance has been inserted in the battery leads, select the Figure which covers the type of relay and cell to be used. From the minimum ballast curve (2, 3 or 4 ohms) read the series resistance to be inserted in the relay leads for the length of circuit under adjustment.

For example using Figure 1, which covers a B1 track relay Dwg. 56001-714 Gr. 1 with coils in multiple and a lead storage cell, the amount of resistance inserted to adjust a 3,000 foot circuit to 4 ohm ballast per thousand feet is found to be 5 ohms.

In some cases within interlocking limits, an additional relay is installed in a turnout along with the regular relay on the main track. This calls for adjusting a circuit with two relays fed from the same cell. To make this adjustment, the total length of track circuit is taken as the distance from the battery end to the relay end of the circuit on the main track plus the length of the turnout. Using this total circuit length, the amount of series resistance to be added is read from the curve and 85% of the value indicated inserted in each relay.

MEASURING BALLAST AND RAIL RESISTANCE

It is unnecessary to measure ballast and rail resistance in order to use the adjustment curves, however, when a circuit does not operate properly with normal adjustment or where it is suspected that some abnormal condition obtains within the circuit, it may be necessary to measure its characteristics.

To measure ballast and rail resistance, disconnect the track relay and place a low resistance shunt, attached to the rail with clamps, across the track at the relay end of the circuit. Measure the voltage (E) across the rails and the current (I) to track at the feed end with the circuit so shunted. The approximate rail resistance R_m is then determined by E/I. Remove the shunt and again read the voltage across the rails and the current to track at the feed end. The approximate ballast resistance B_m is then determined by E/I.

For all practical purposes these values for rail and ballast resistance may be assumed to be correct, however, on long circuits having very low ballast and high rail resistance, an appreciable error may exist. The degree of error can be readily determined by dividing R_m by B_m to arrive at a ratio. In Figure A, the ratios R_m/B_m are plotted as abscissae enabling a correction factor to be read from the curve. Multiplying R_m by the correction factor and dividing B_m by the correction factor will give true values for rail and ballast resistance. It will be noted from Figure A that ratios less than .15 result in errors of less than 5.5% which may be neglected.

Dividing the measured rail resistance for the circuit by the length of the circuit in thousands of feet will give the rail resistance per thousand feet of track, which value should not exceed .025 ohm.

Multiplying the measured ballast resistance for the circuit by the length of the circuit in thousands of feet will give the ballast resistance per thousand feet of track.

To determine minimum ballast resistance for a particular circuit, readings should be taken during, or shortly after a rain. The lowest ballast resistance for any circuit usually occurs at the start of a rain storm after a long dry spell, however, readings taken on wet track should be sufficiently accurate as the adjustment curves are based upon maximum rail resistance, minimum ballast resistance, maximum relay working current, and a minimum battery voltage all occurring at the same time.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TRACK CIRCUIT ADJUSTMENT
AND MEASUREMENT OF BALLAST AND RAIL RESISTANCE — INSTRUCTIONS

Approved H. Scott
Chief Signal Engineer

S-441

Printed in U. S. A.

ISSUED 6-11-58

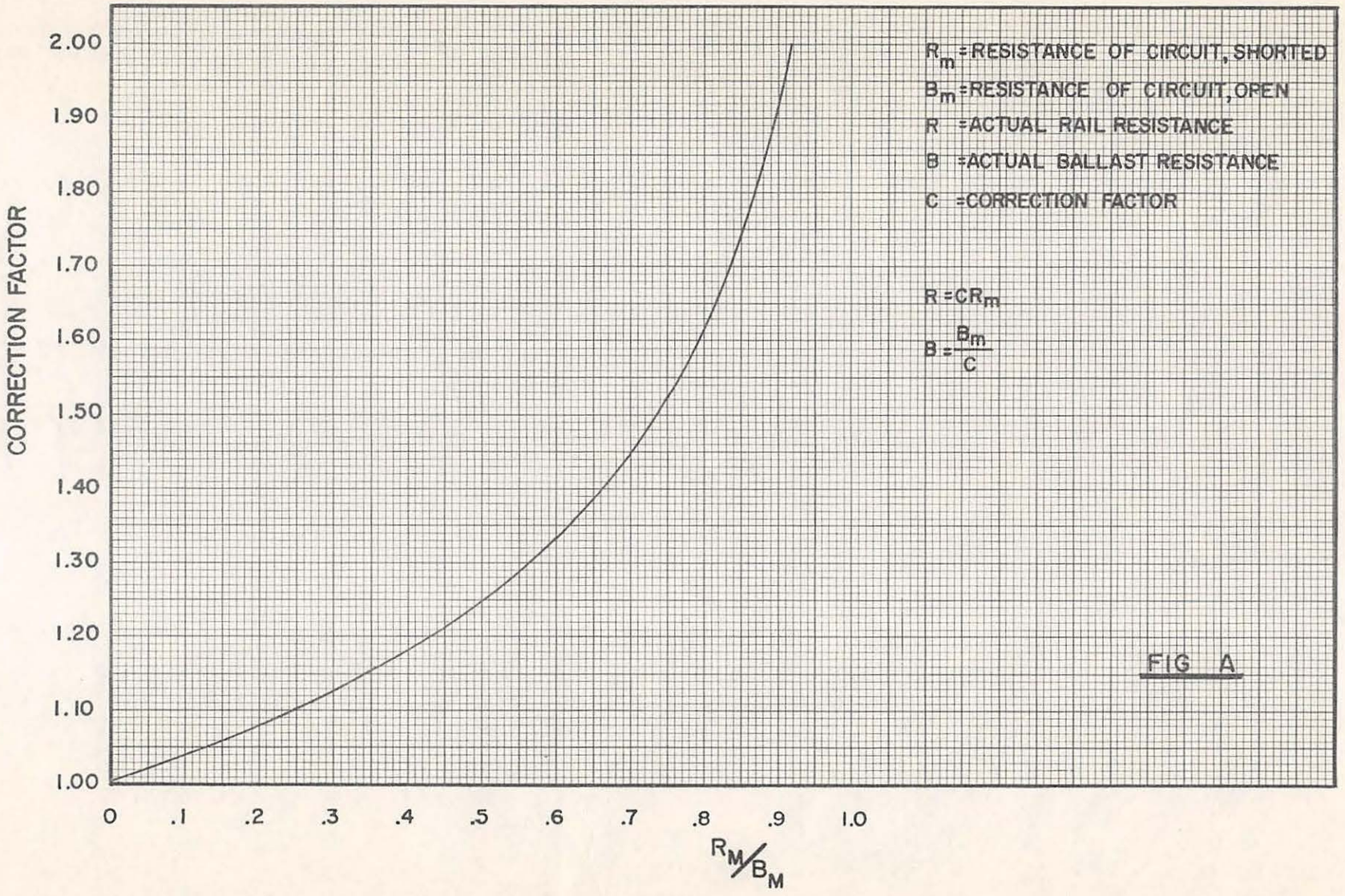

FIG A

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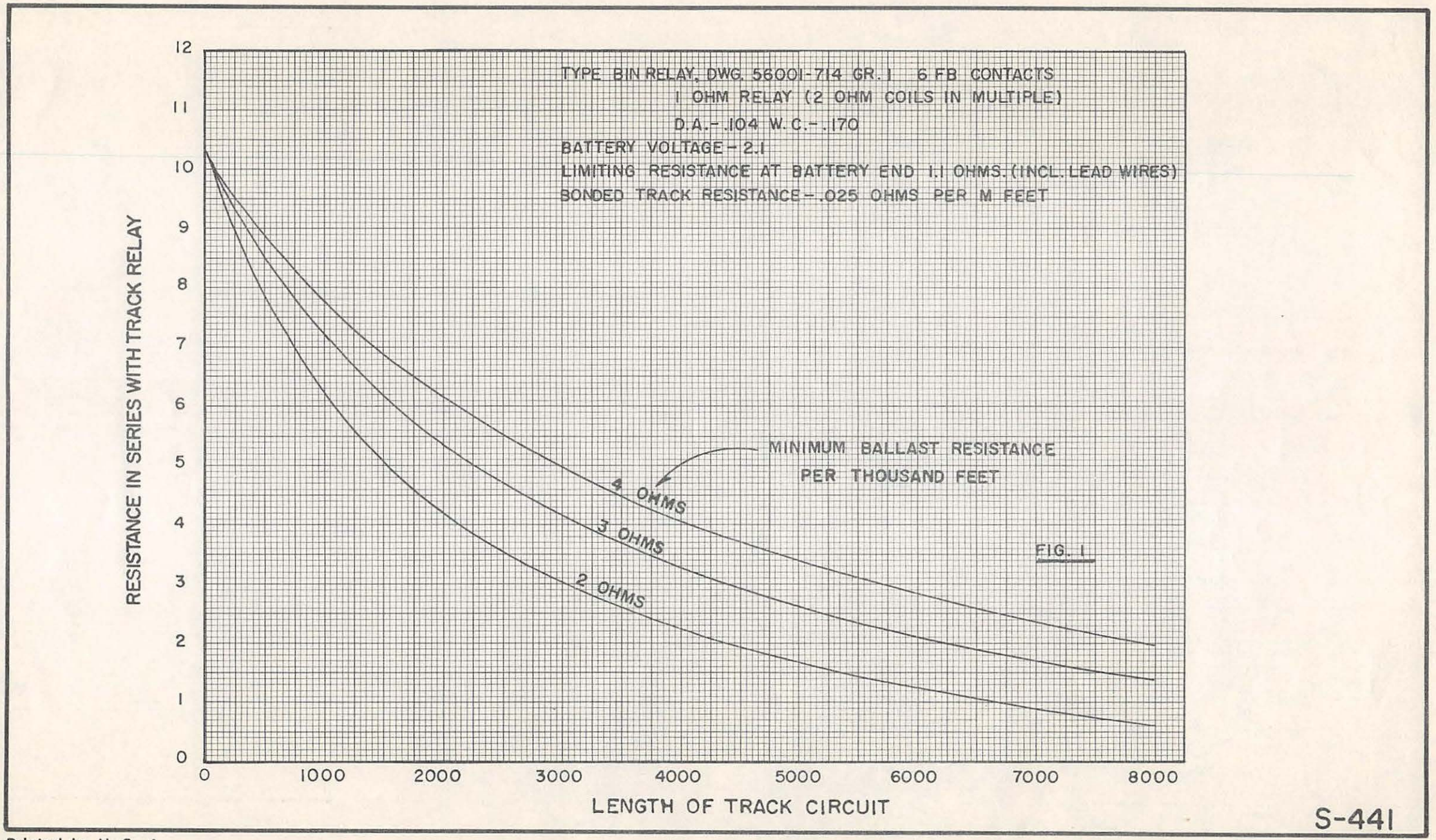
SHEET 2 Cont'd on SH 3



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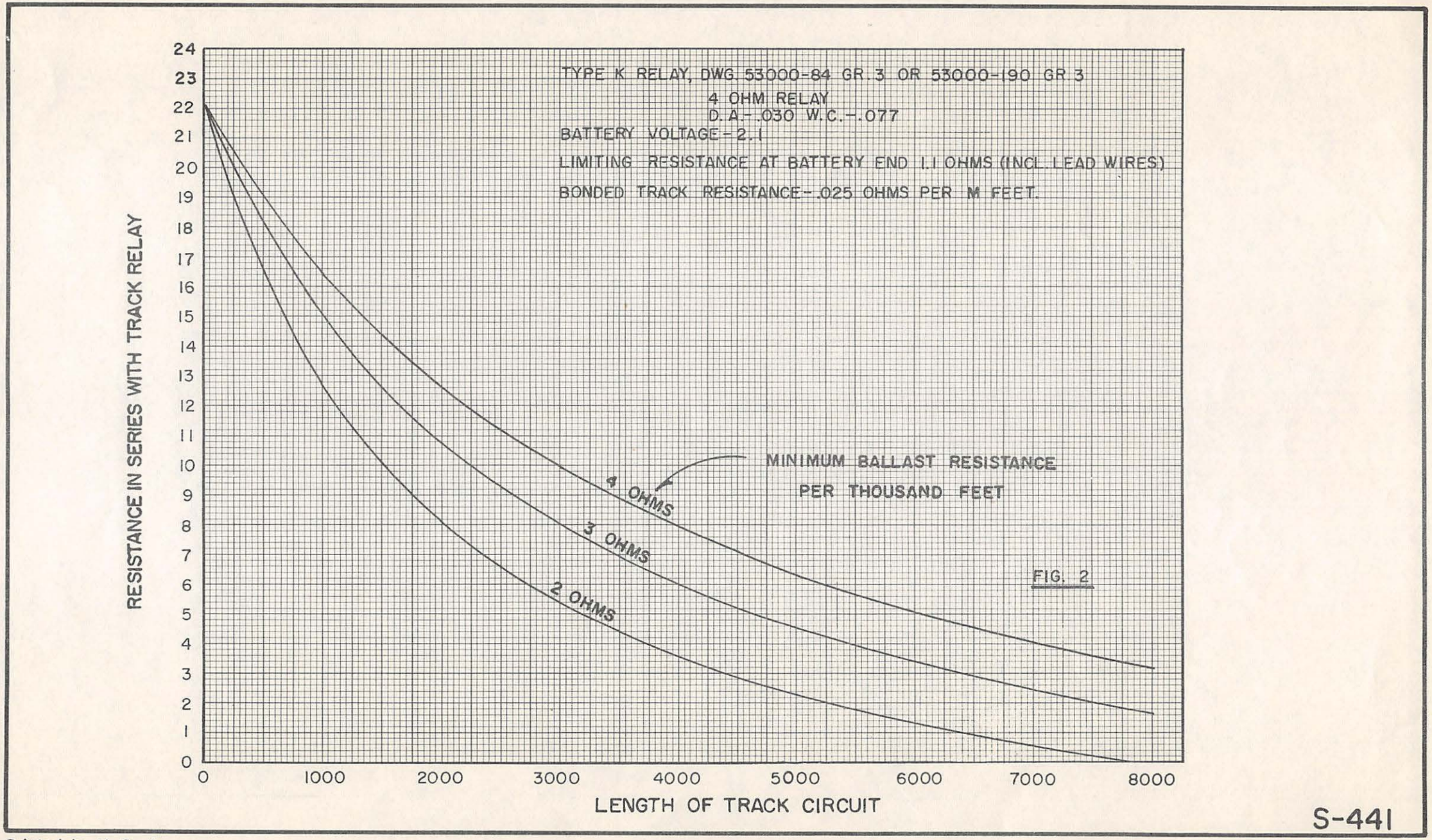
SHEET 3 Cont'd on SH 4



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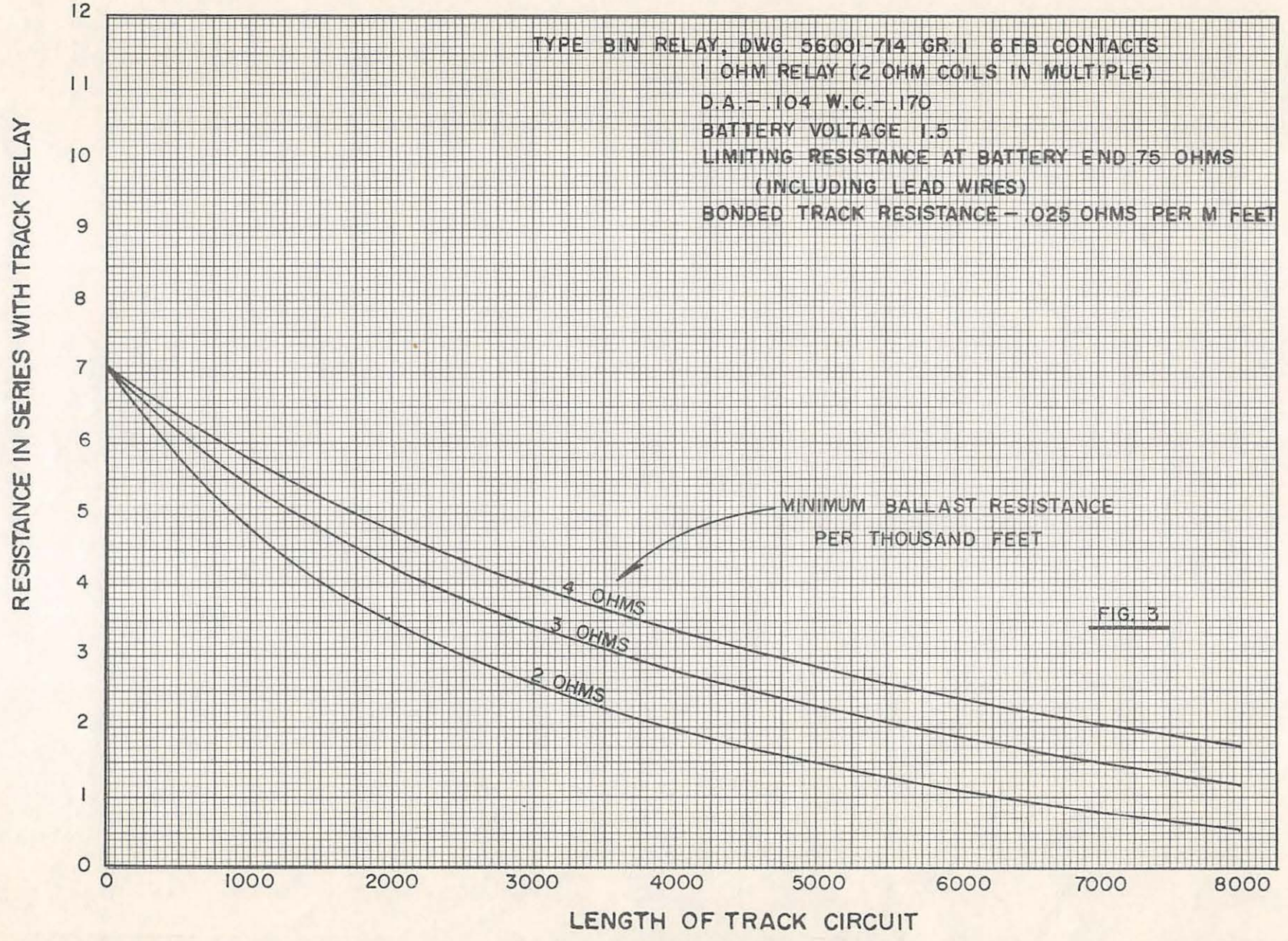
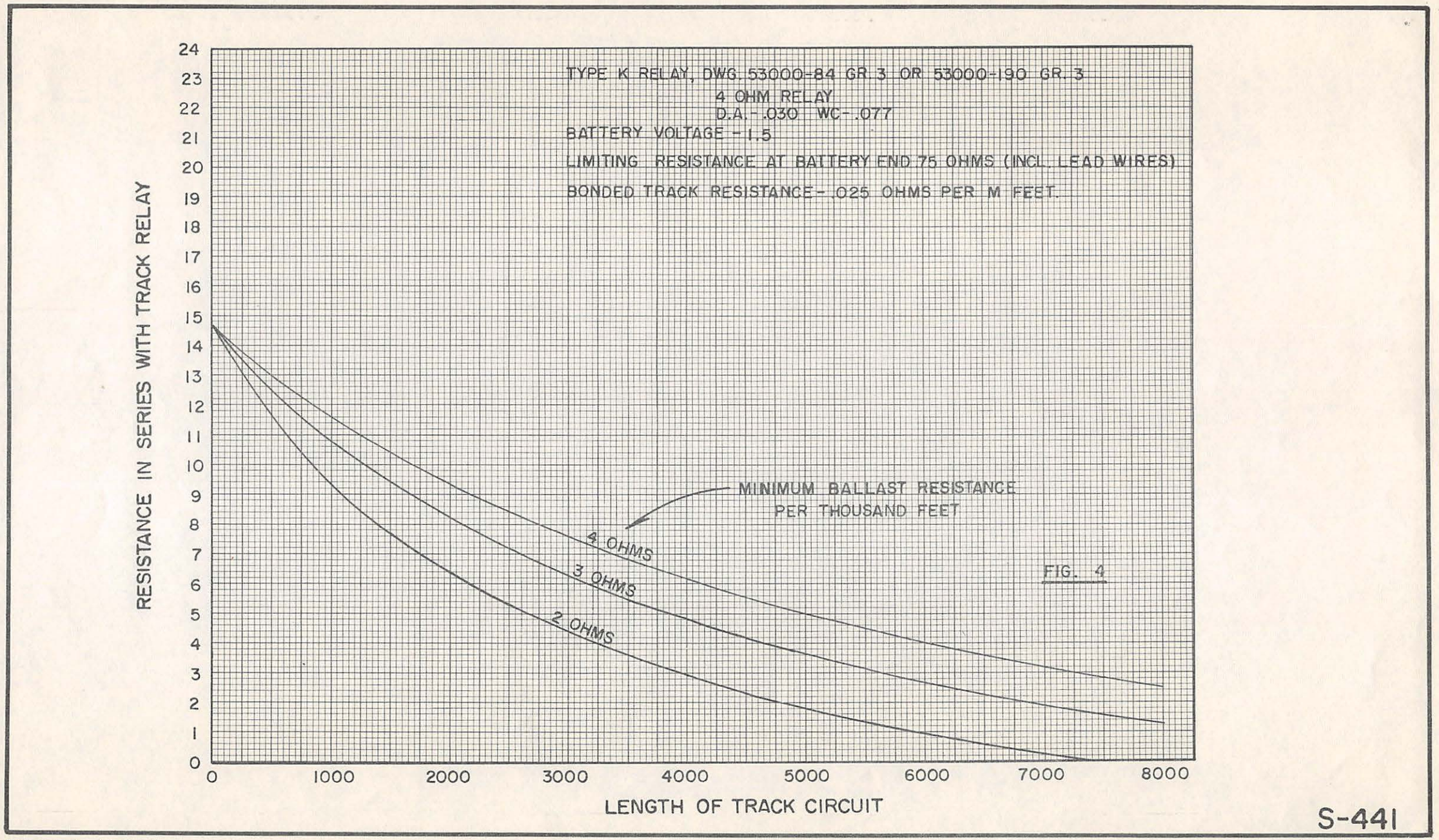

TYPE BIN RELAY, DWG. 56001-714 GR. I 6 FB CONTACTS
1 OHM RELAY (2 OHM COILS IN MULTIPLE)
D.A. - .104 W.C. - .170
BATTERY VOLTAGE 1.5
LIMITING RESISTANCE AT BATTERY END 75 OHMS
(INCLUDING LEAD WIRES)
BONDED TRACK RESISTANCE - .025 OHMS PER M FEET
MINIMUM BALLAST RESISTANCE
PER THOUSAND FEET
4 OHMS
3 OHMS
2 OHMS
RESISTANCE IN SERIES WITH TRACK RELAY
LENGTH OF TRACK CIRCUIT
0
1
2
3
4
5
6
7
8
9
10
11
12
0
1000
2000
3000
4000
5000
6000
7000
8000

FIG. 3

S-441


TYPE K RELAY, DWG. 53000-84 GR 3 OR 53000-190 GR. 3
4 OHM RELAY
D.A. - .030 WC - .077
BATTERY VOLTAGE - 1.5
LIMITING RESISTANCE AT BATTERY END 75 OHMS (INCL. LEAD WIRES)
BONDED TRACK RESISTANCE - .025 OHMS PER M FEET.
MINIMUM BALLAST RESISTANCE
PER THOUSAND FEET
4 OHMS
3 OHMS
2 OHMS
FIG. 4
RESISTANCE IN SERIES WITH TRACK RELAY
LENGTH OF TRACK CIRCUIT
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
0
1000
2000
3000
4000
5000
6000
7000
8000

S-441

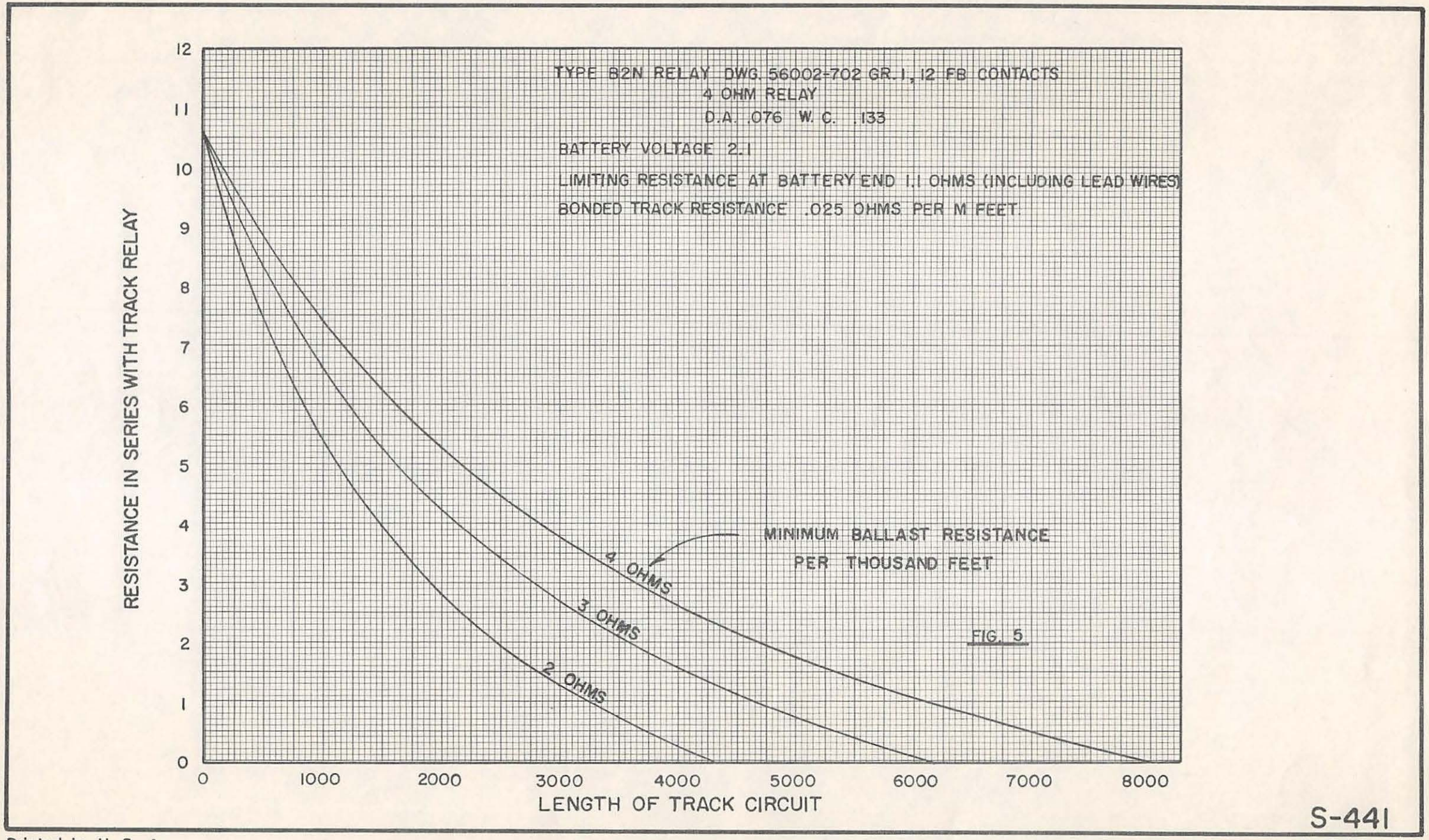
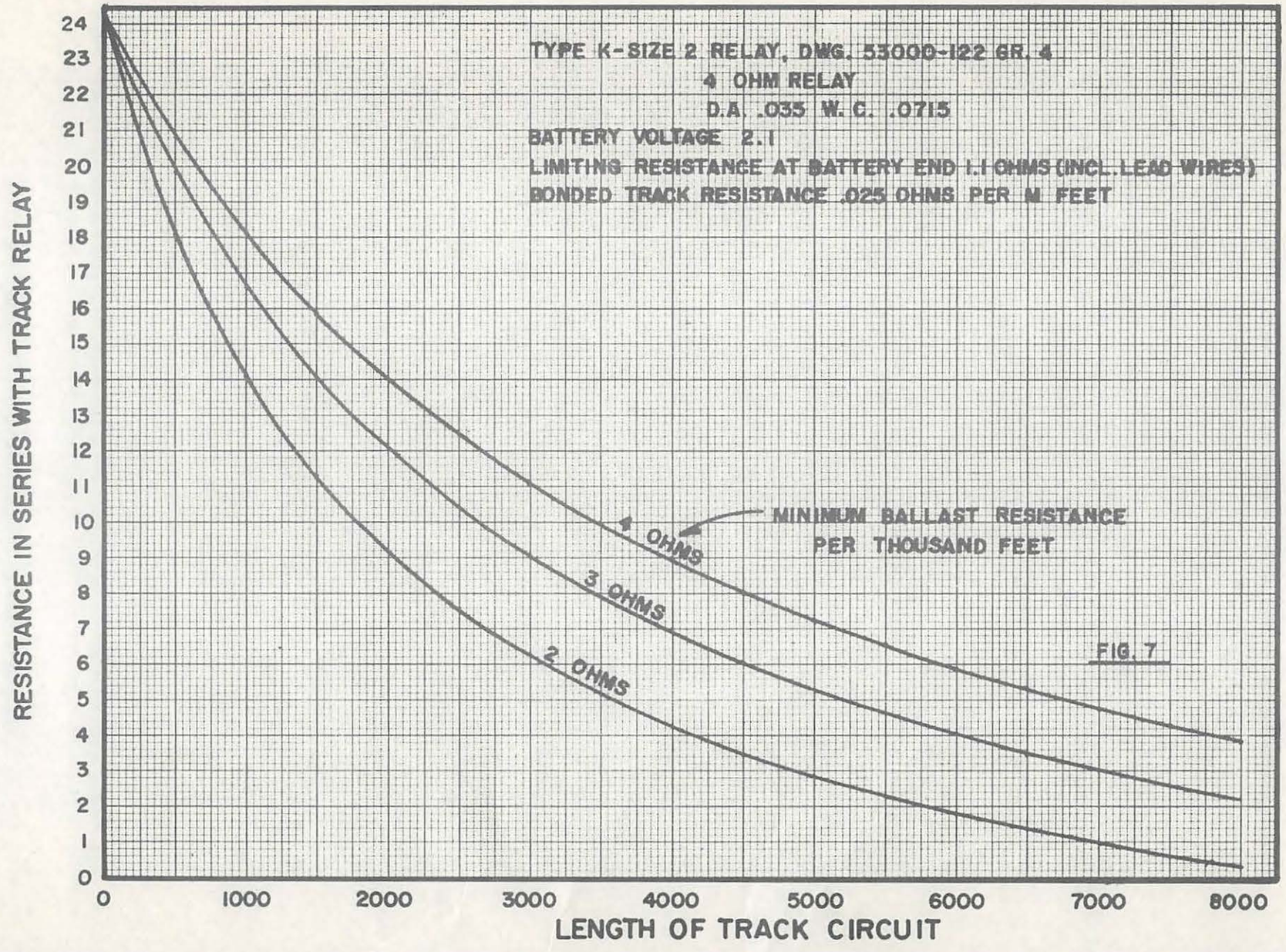

TYPE B2N RELAY DWG. 56002-702 GR. 1, 12 FB CONTACTS
4 OHM RELAY
D.A. .076 W.C. .133
BATTERY VOLTAGE 2.1
LIMITING RESISTANCE AT BATTERY END 1.1 OHMS (INCLUDING LEAD WIRES)
BONDED TRACK RESISTANCE .025 OHMS PER M FEET
RESISTANCE IN SERIES WITH TRACK RELAY
LENGTH OF TRACK CIRCUIT
0
1
2
3
4
5
6
7
8
9
10
11
12
0
1000
2000
3000
4000
5000
6000
7000
8000
4 OHMS
3 OHMS
2 OHMS
MINIMUM BALLAST RESISTANCE
PER THOUSAND FEET

FIG. 5

S-441



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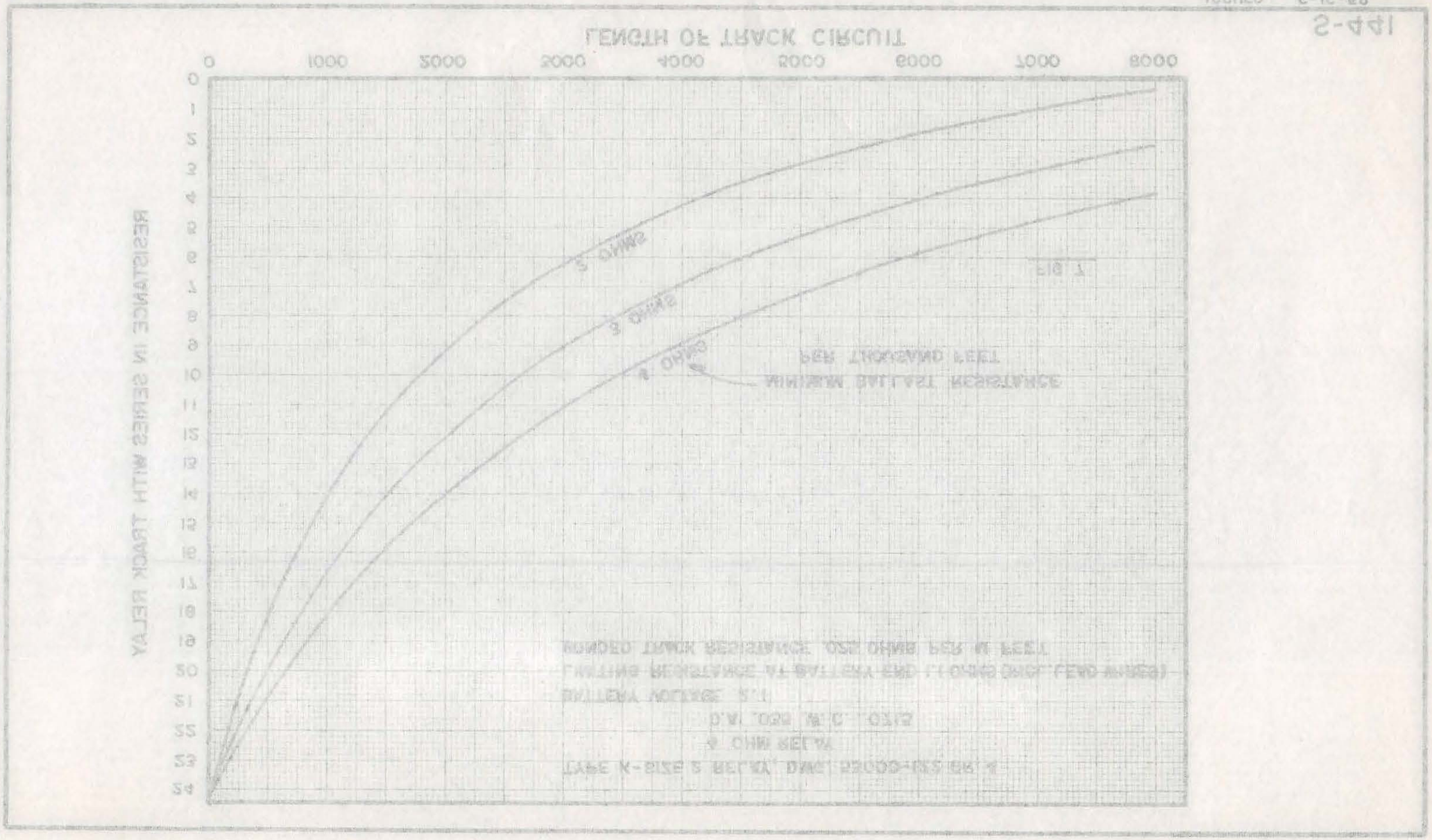
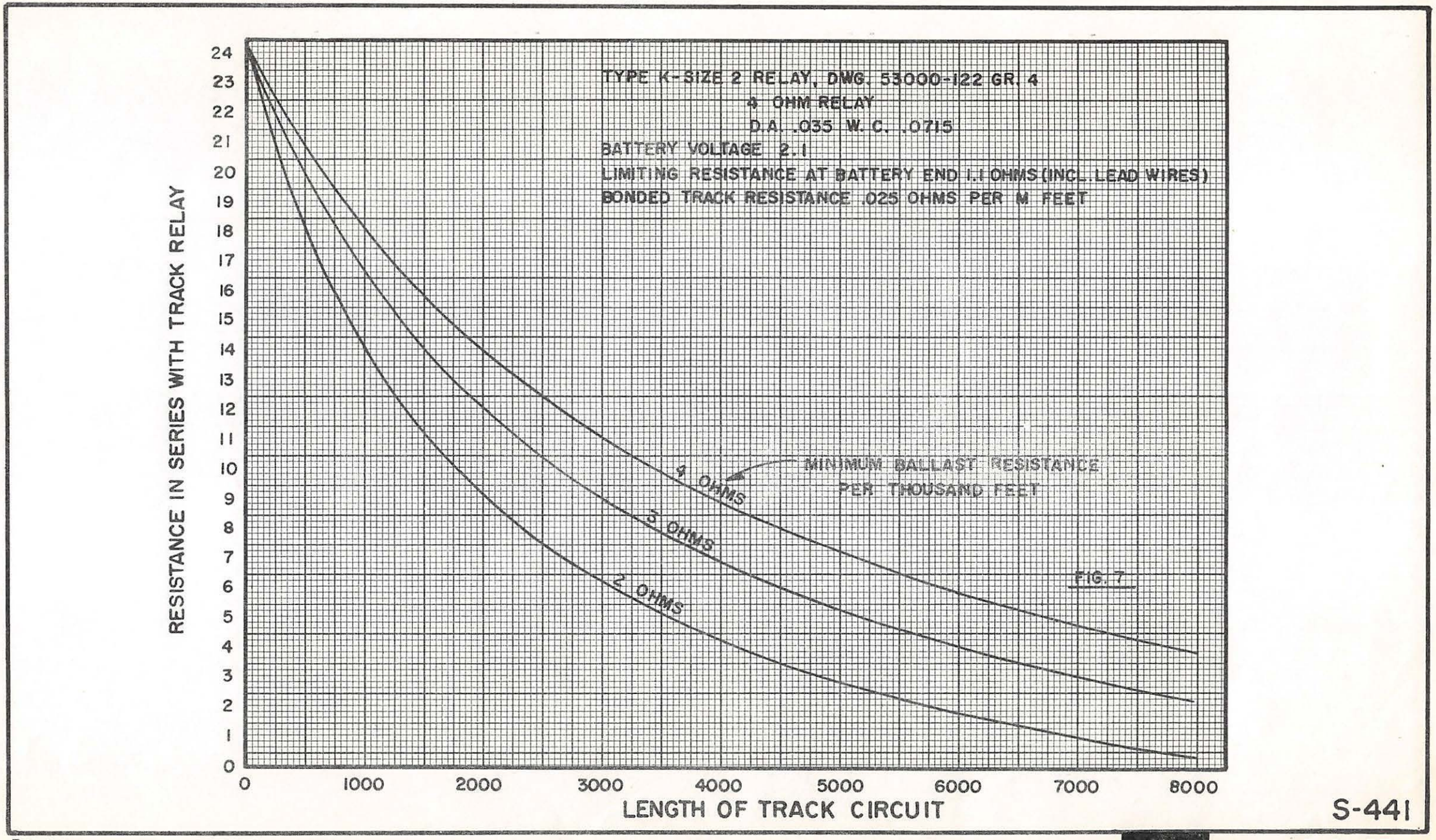
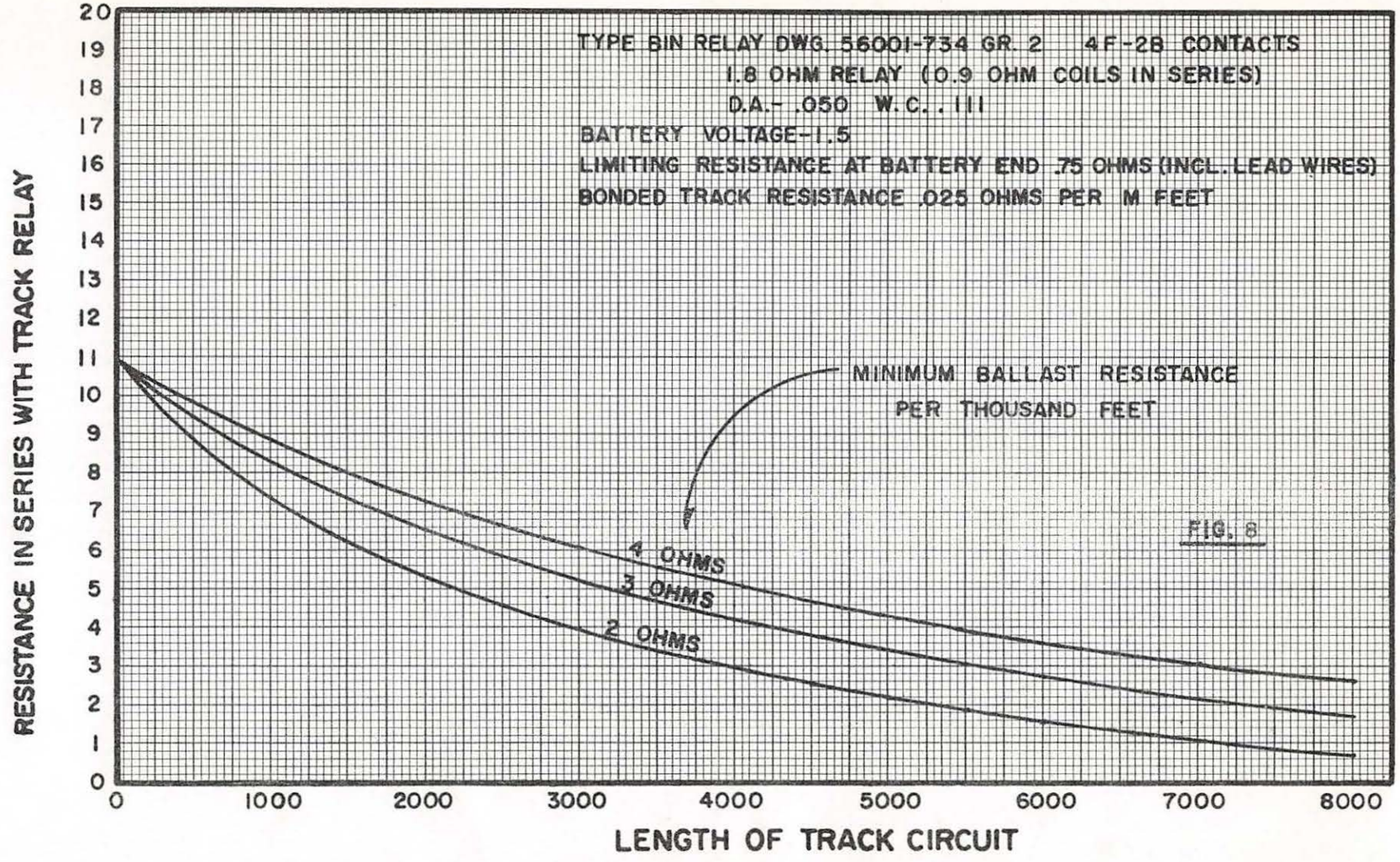
ISSUED 6-16-58

SHEET 9 Cont'd. on SH. 10



LENGTH OF TRACK CIRCUIT
0
1000
2000
3000
4000
5000
6000
7000
8000
RESISTANCE IN SERIES WITH TRACK RELAY
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
SMHO 2
SMHO 3
SMHO 4
PER THOUSAND FEET
MINIMUM BALLAST RESISTANCE
ROUNDED TRACK RESISTANCE .025 OHMS PER M FEET
FLATTING RESISTANCE AT BATTERY END (1 OHMS ONLY FEED WIRES)
BATTERY VOLTAGE 2.1
D.A. .025 W.C. .0312
4 OHM RELAY
TYPE K-SIZE 2 RELAY DWG. 22000-123 SH 4


TYPE K-SIZE 2 RELAY, DWG. 53000-122 GR. 4
4 OHM RELAY
D.A. .035 W.C. .0715
BATTERY VOLTAGE 2.1
LIMITING RESISTANCE AT BATTERY END 1.1 OHMS (INCL. LEAD WIRES)
BONDED TRACK RESISTANCE .025 OHMS PER M FEET
RESISTANCE IN SERIES WITH TRACK RELAY
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
0 1000 2000 3000 4000 5000 6000 7000 8000
LENGTH OF TRACK CIRCUIT
4 OHMS
3 OHMS
2 OHMS
MINIMUM BALLAST RESISTANCE
PER THOUSAND FEET
FIG. 7
S-441



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[redacted] ISSUED 5-21-57
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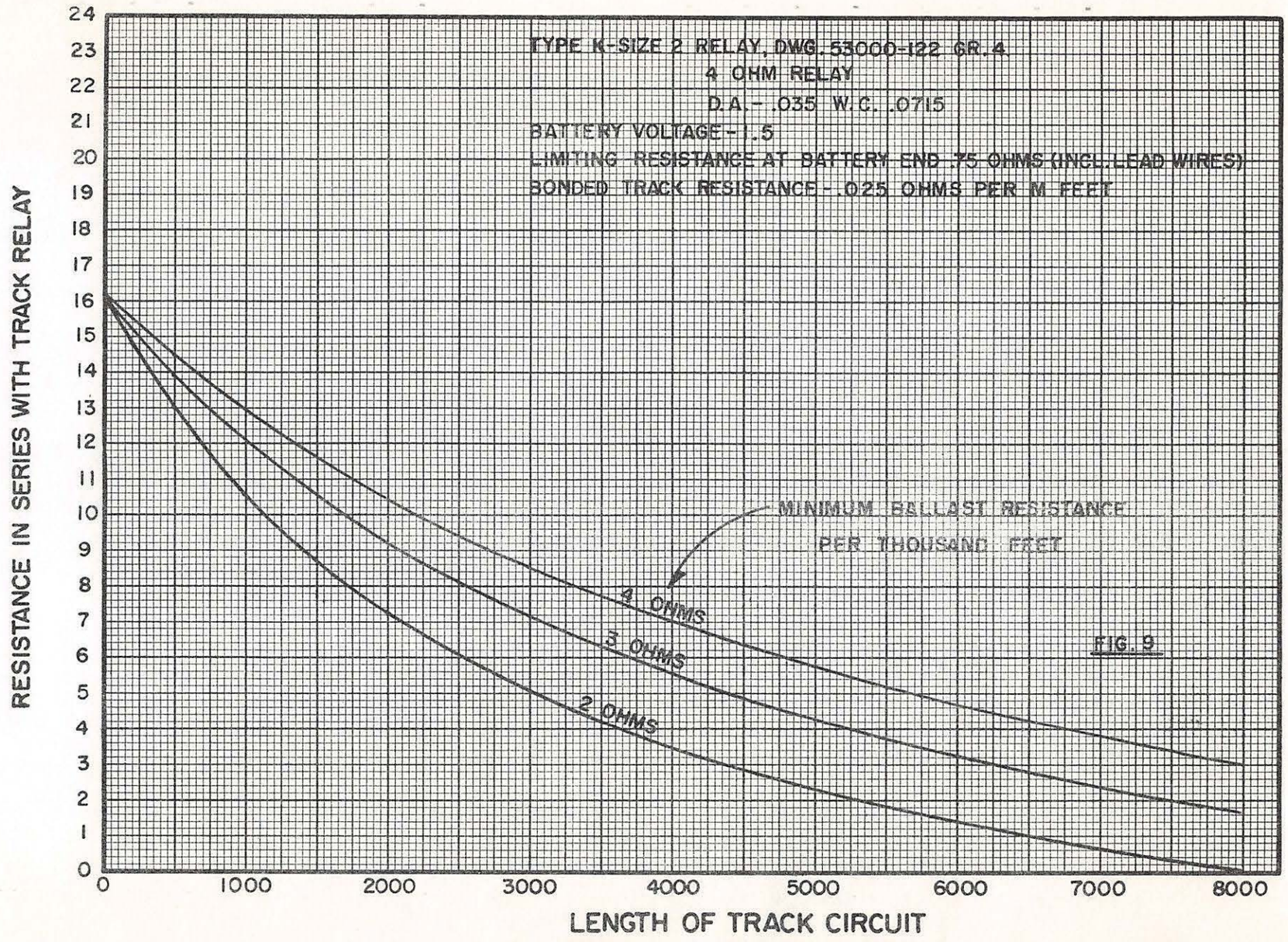

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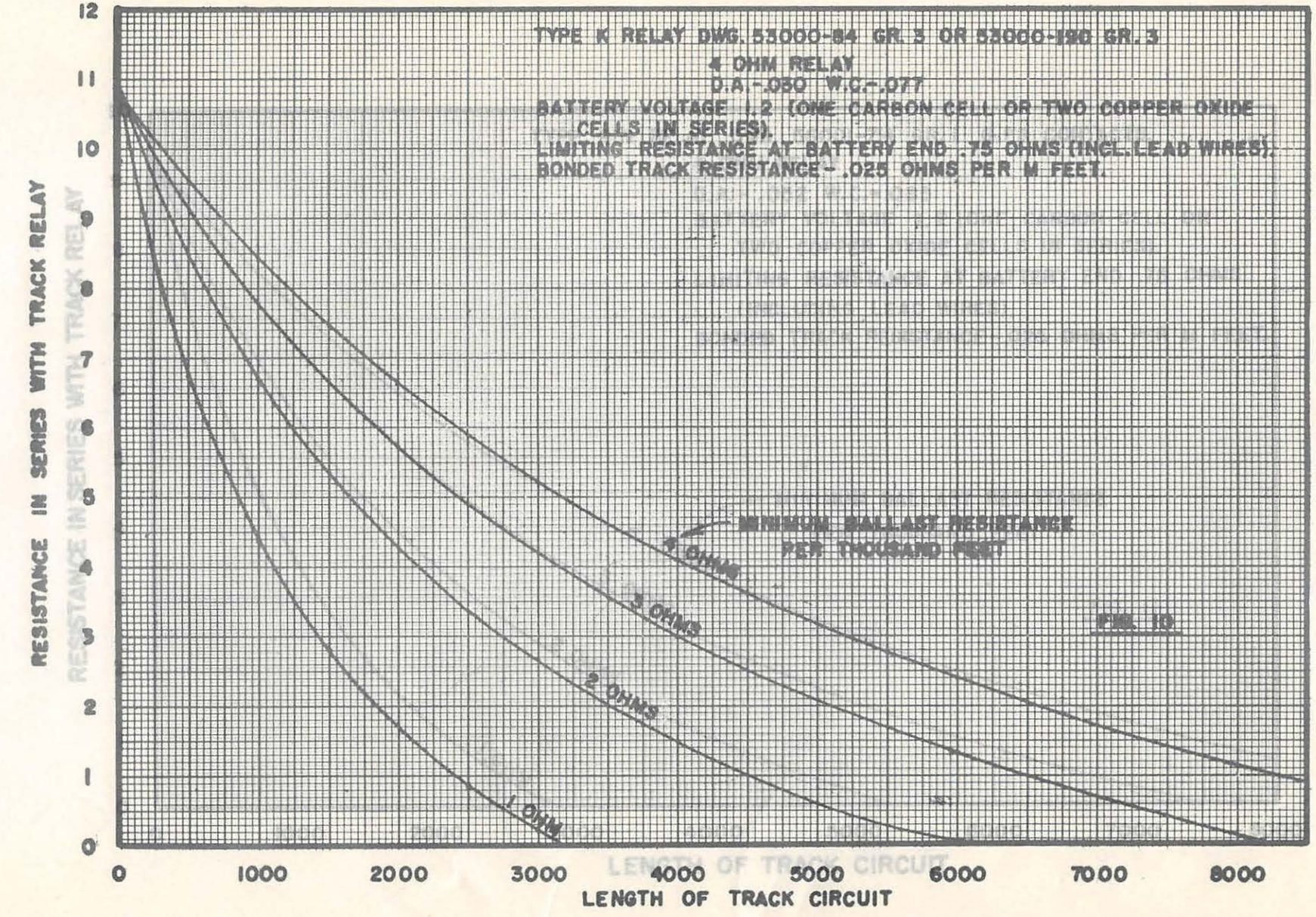

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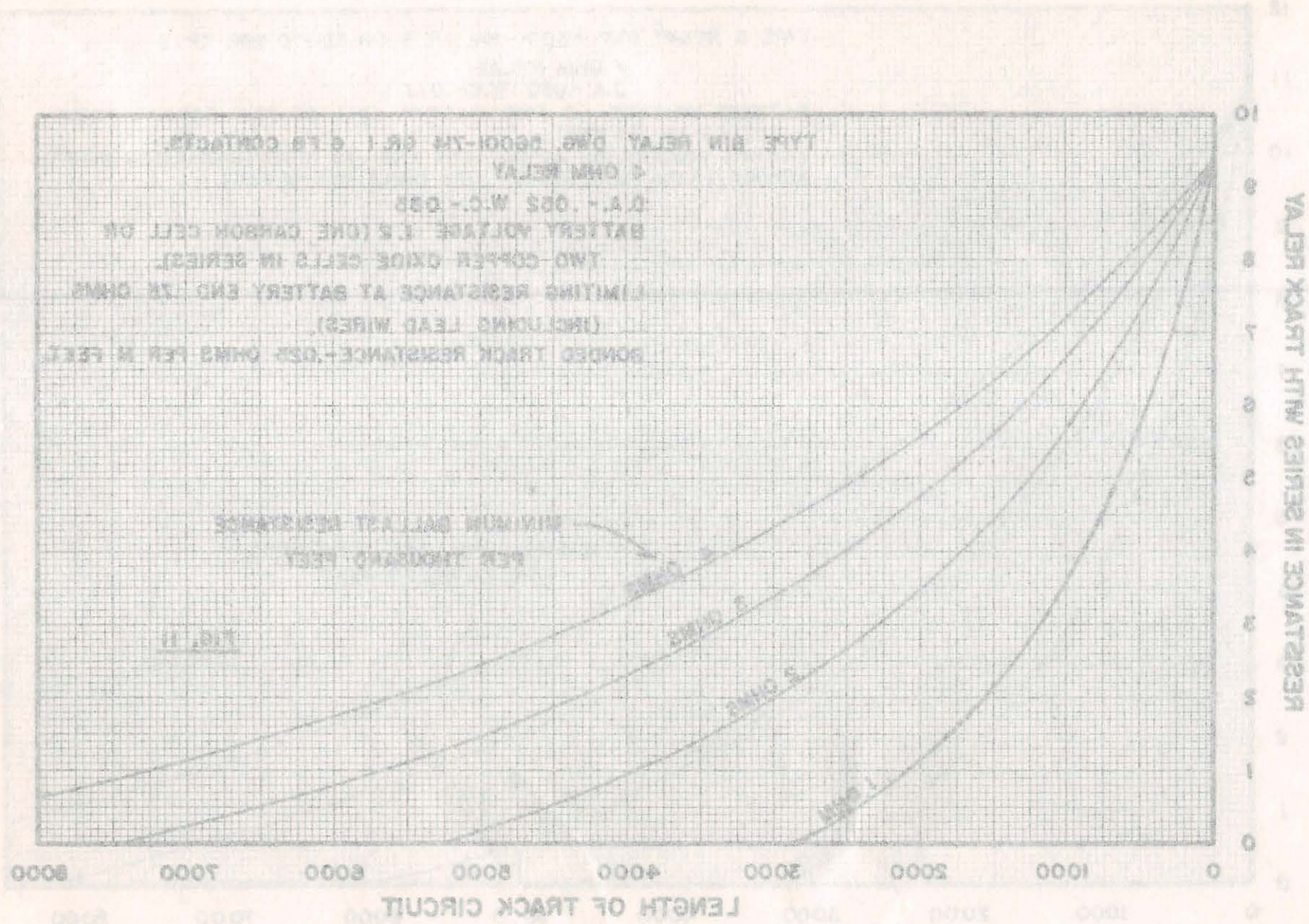
SHEET 12 Cont'd on SH. 13



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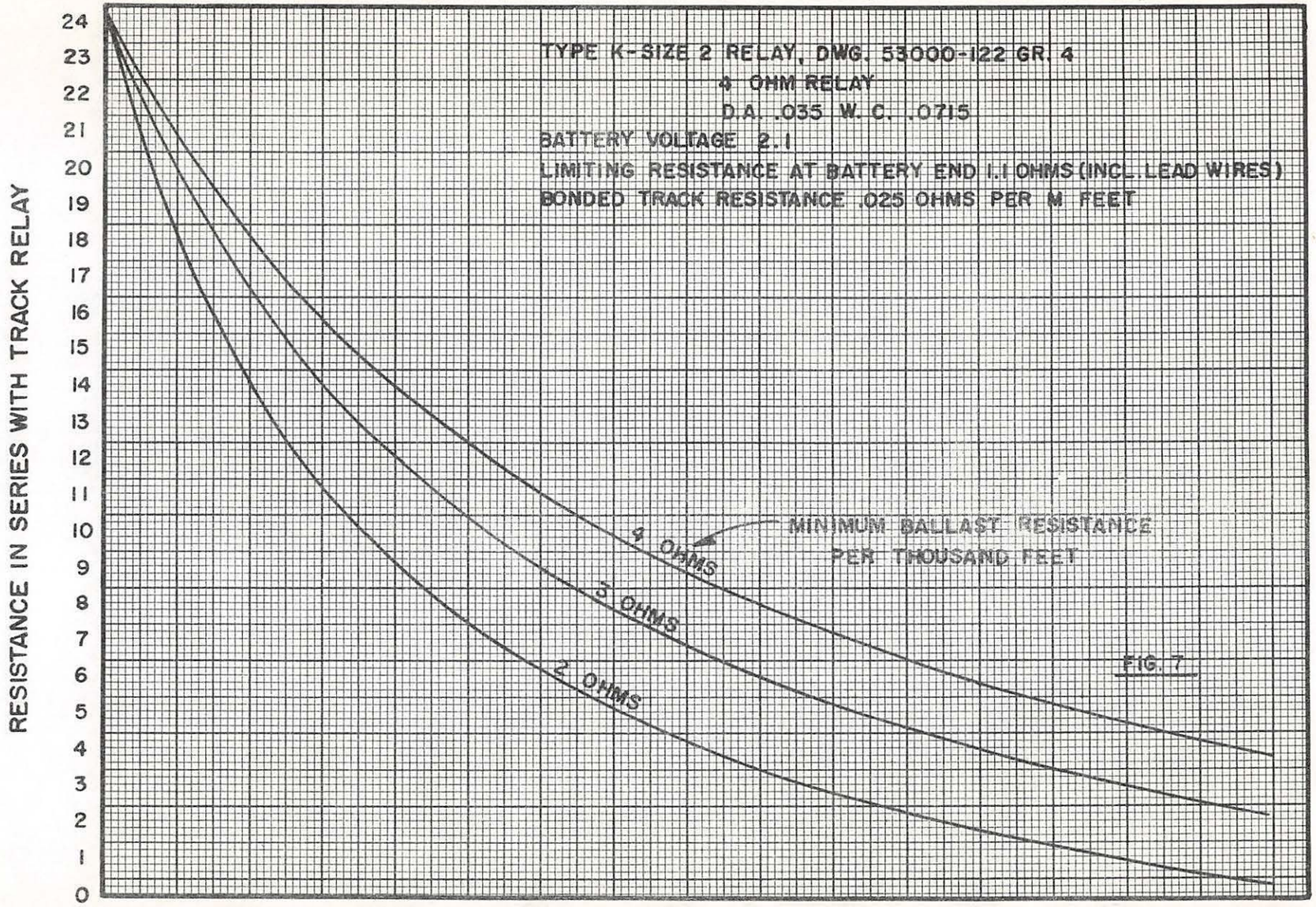

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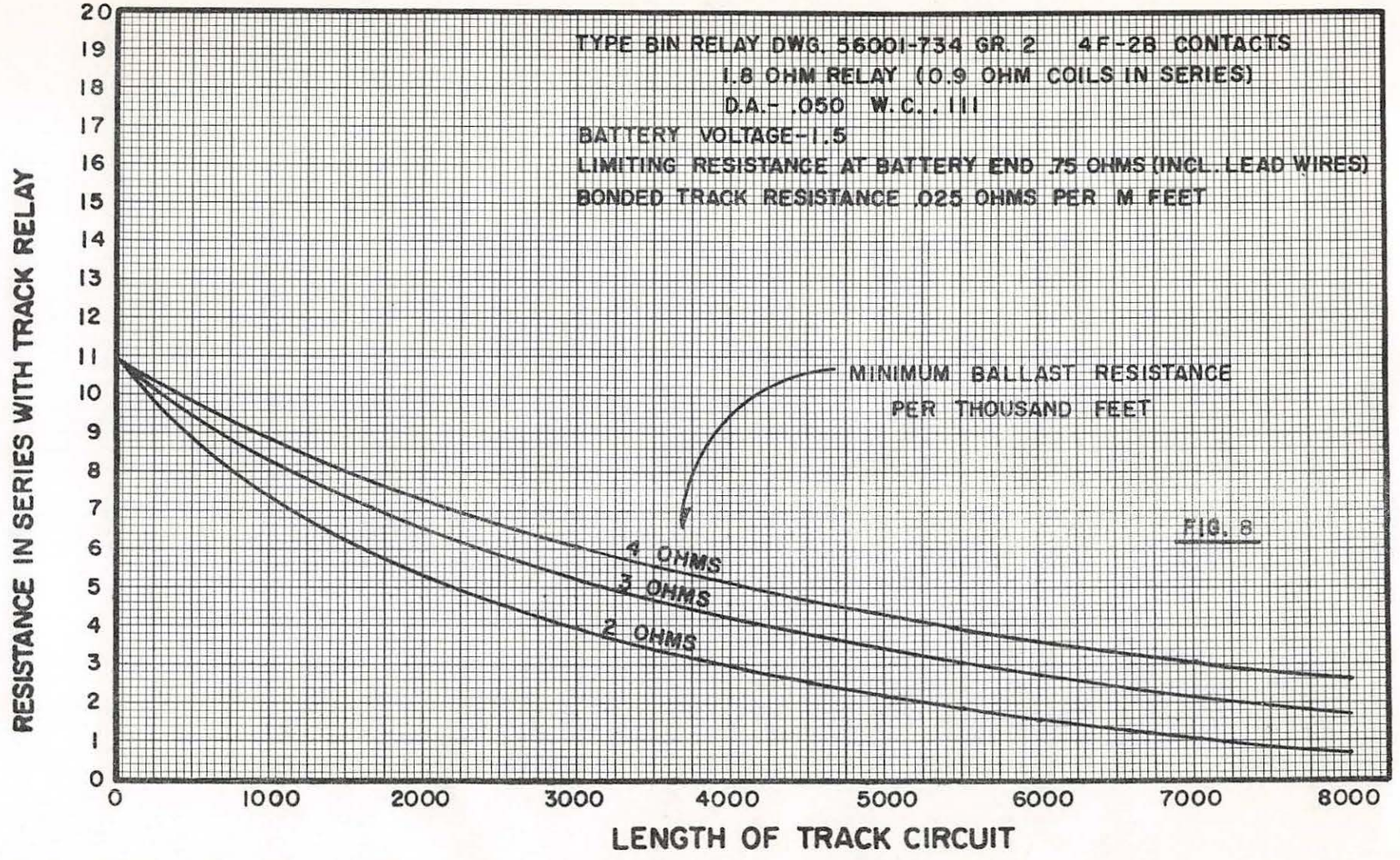

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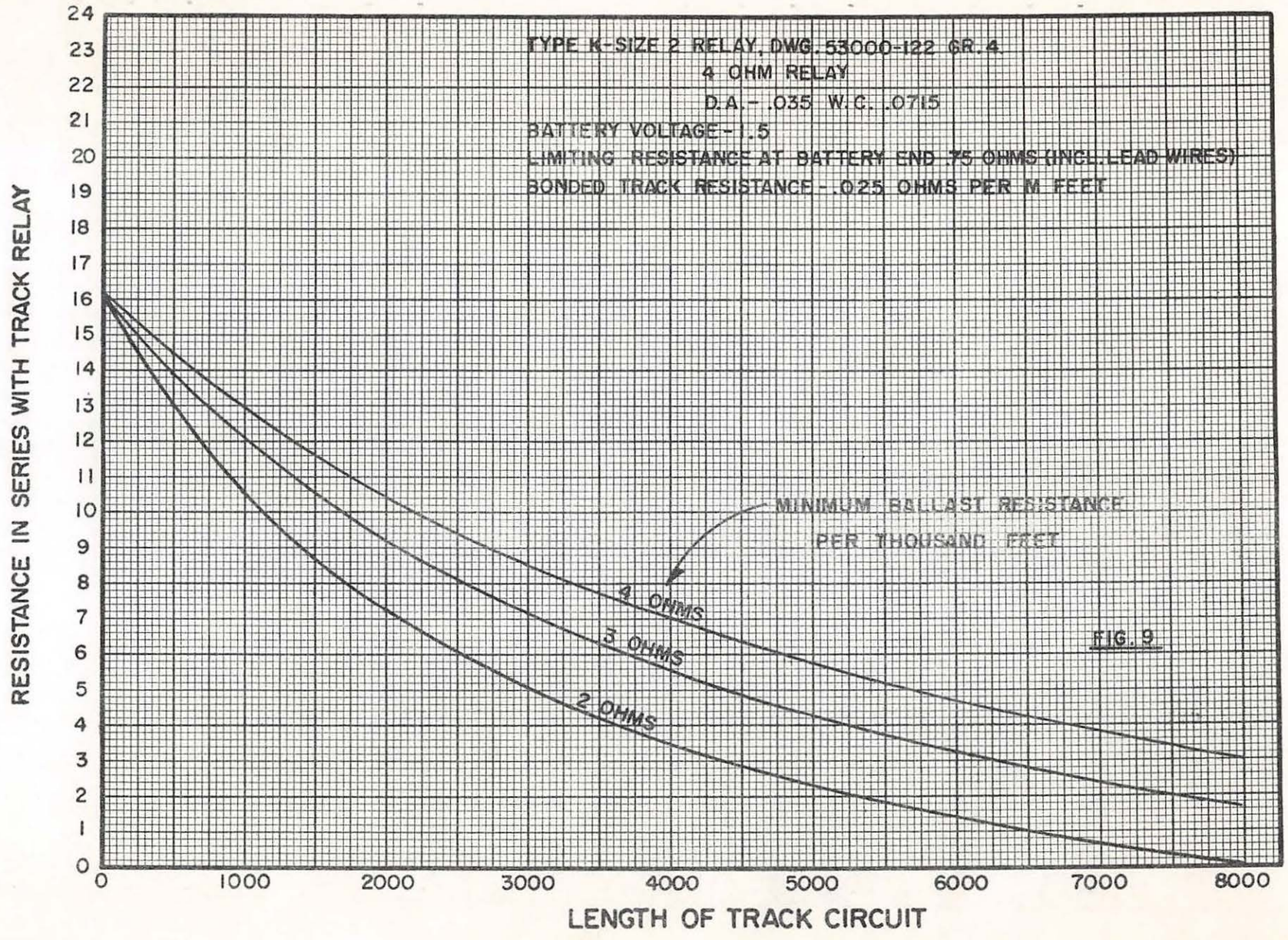
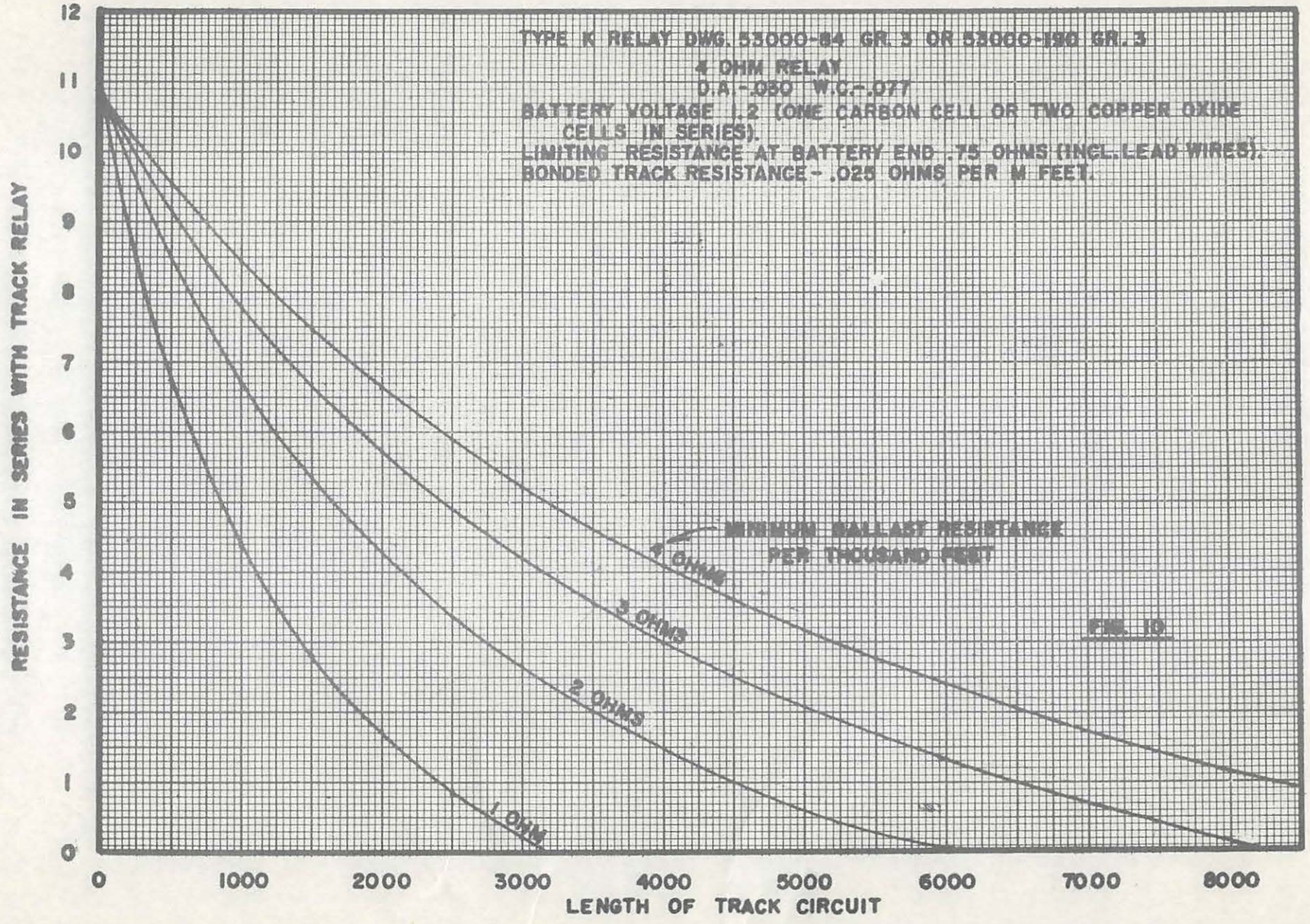

TYPE K-SIZE 2 RELAY, DWG. 53000-122 GR. 4.
4 OHM RELAY
D.A. - .035 W.C. .0715
BATTERY VOLTAGE - 1.5
LIMITING RESISTANCE AT BATTERY END .75 OHMS (INCL. LEAD WIRES)
BONDED TRACK RESISTANCE - .025 OHMS PER M FEET
MINIMUM BALLAST RESISTANCE
PER THOUSAND FEET
4 OHMS
3 OHMS
2 OHMS
RESISTANCE IN SERIES WITH TRACK RELAY
LENGTH OF TRACK CIRCUIT
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
0
1000
2000
3000
4000
5000
6000
7000
8000

FIG. 9

S-441



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SHEET 12 Cont'd on SH 13

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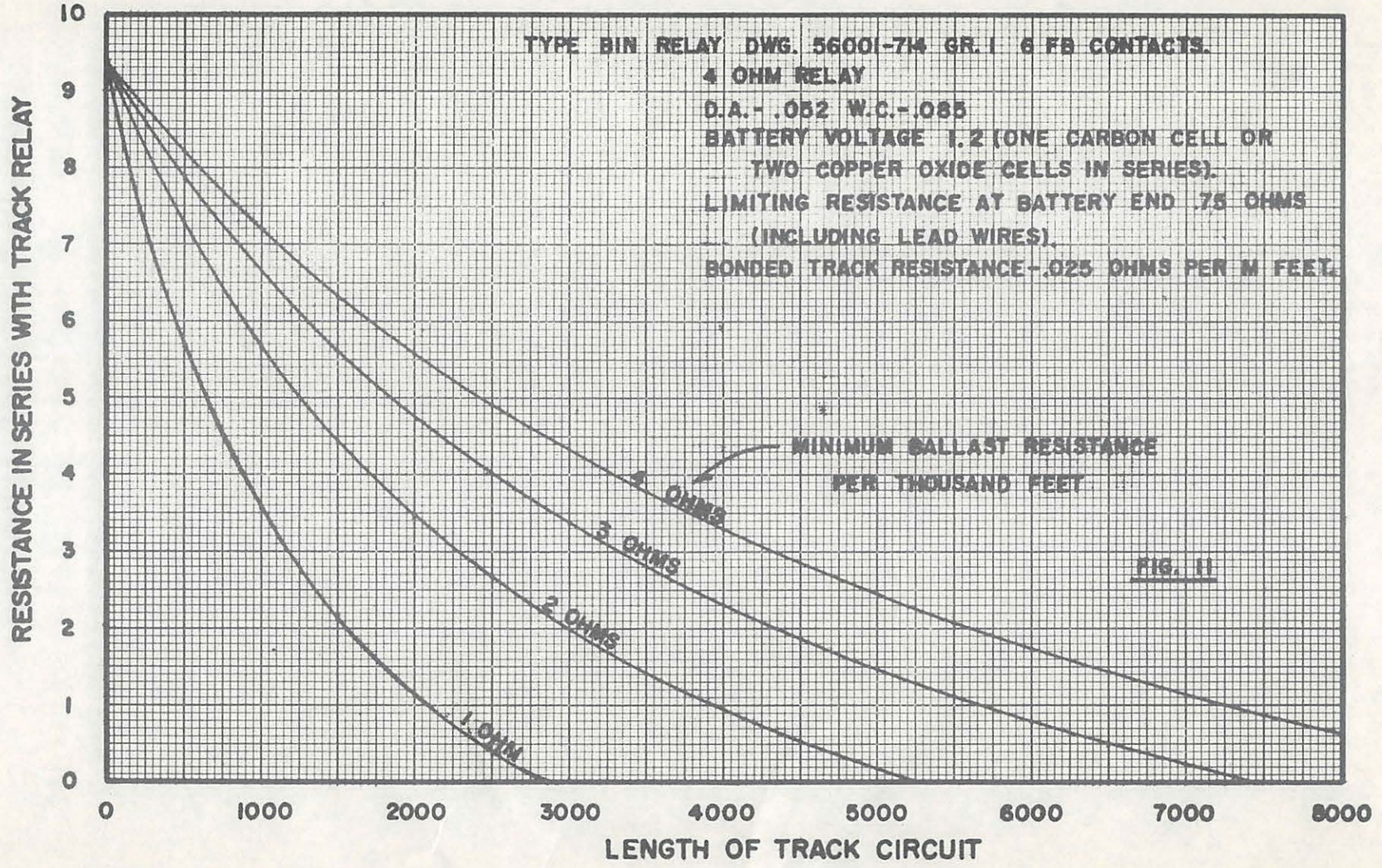

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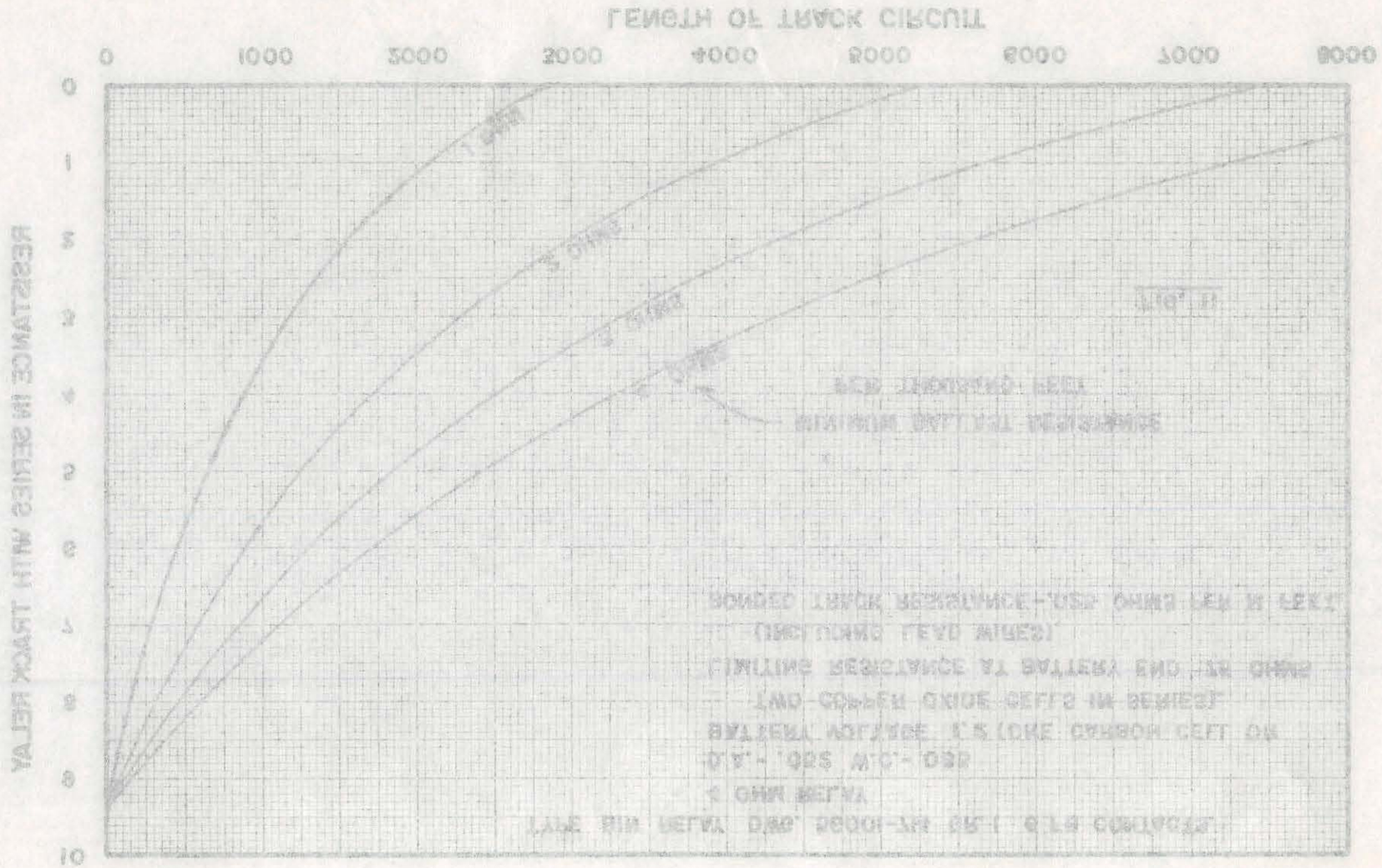
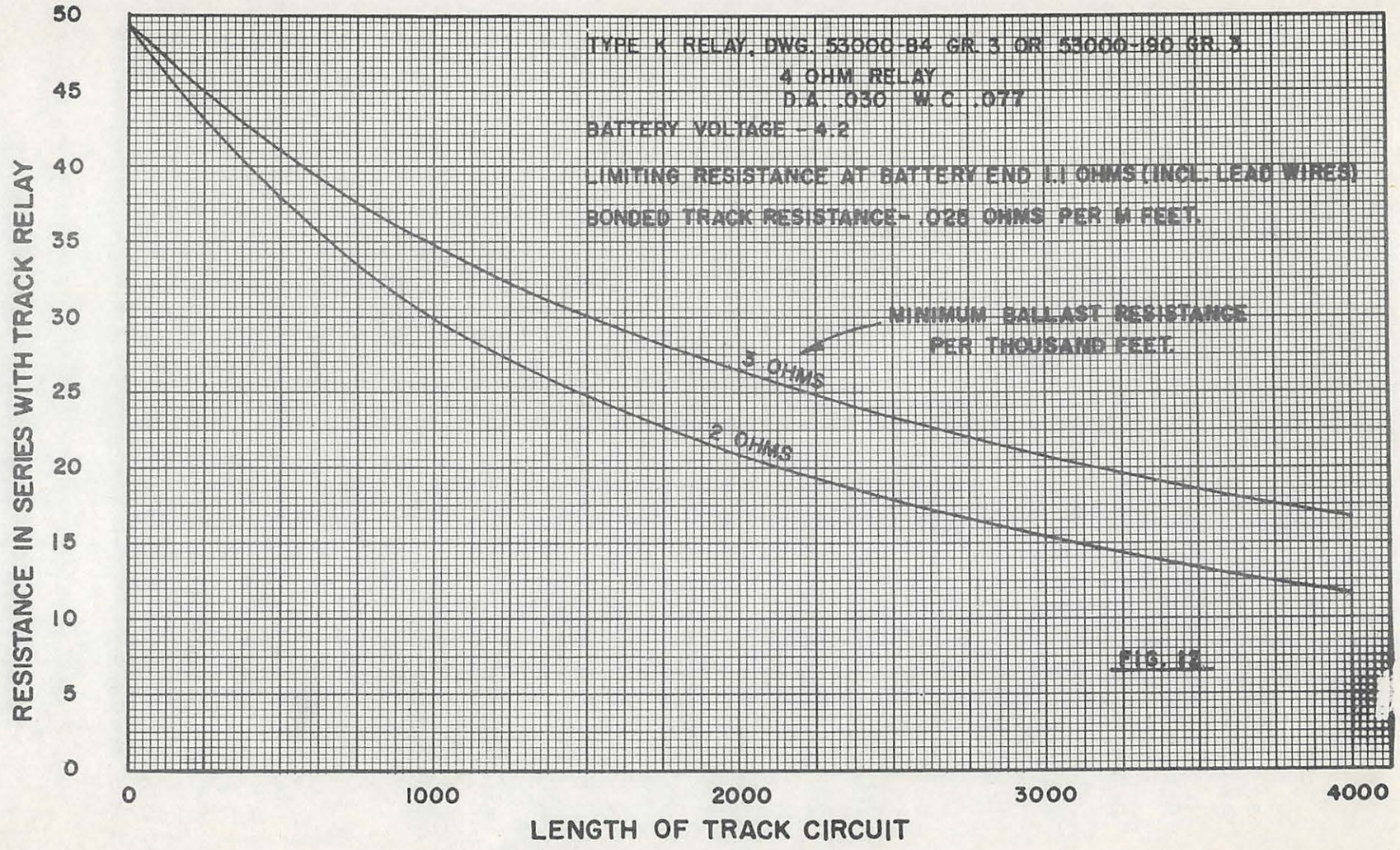
ISSUED 6-16-58
SHEET 13 Cont'd. on Sh


LENGTH OF TRACK CIRCUIT
0
1000
2000
3000
4000
5000
6000
7000
8000
RESISTANCE IN SERIES WITH TRACK RELAY
0
1
2
3
4
5
6
7
8
9
10
1 OHM
2 OHMS
3 OHMS
4 OHMS
PER THOUSAND FEET
MINIMUM BATTERY RESISTANCE
BONDED TRACK RESISTANCE-.025 OHMS PER M FEET
(INCLUDING LEAD WIRES)
LIMITING RESISTANCE AT BATTERY END 18 OHMS
(TWO COPPER OXIDE CELLS IN SERIES)
BATTERY VOLTAGE 1.5 (ONE CARBON CELL OR
D.A.-.025 W.C.-.025
4 OHM RELAY
TYPE SIN RELAY DWG. 25001-14 OR 1 S.P.S. CONTACTS



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ISSUED 12-15-58

SHEET 14 Cont'd. on SH 15

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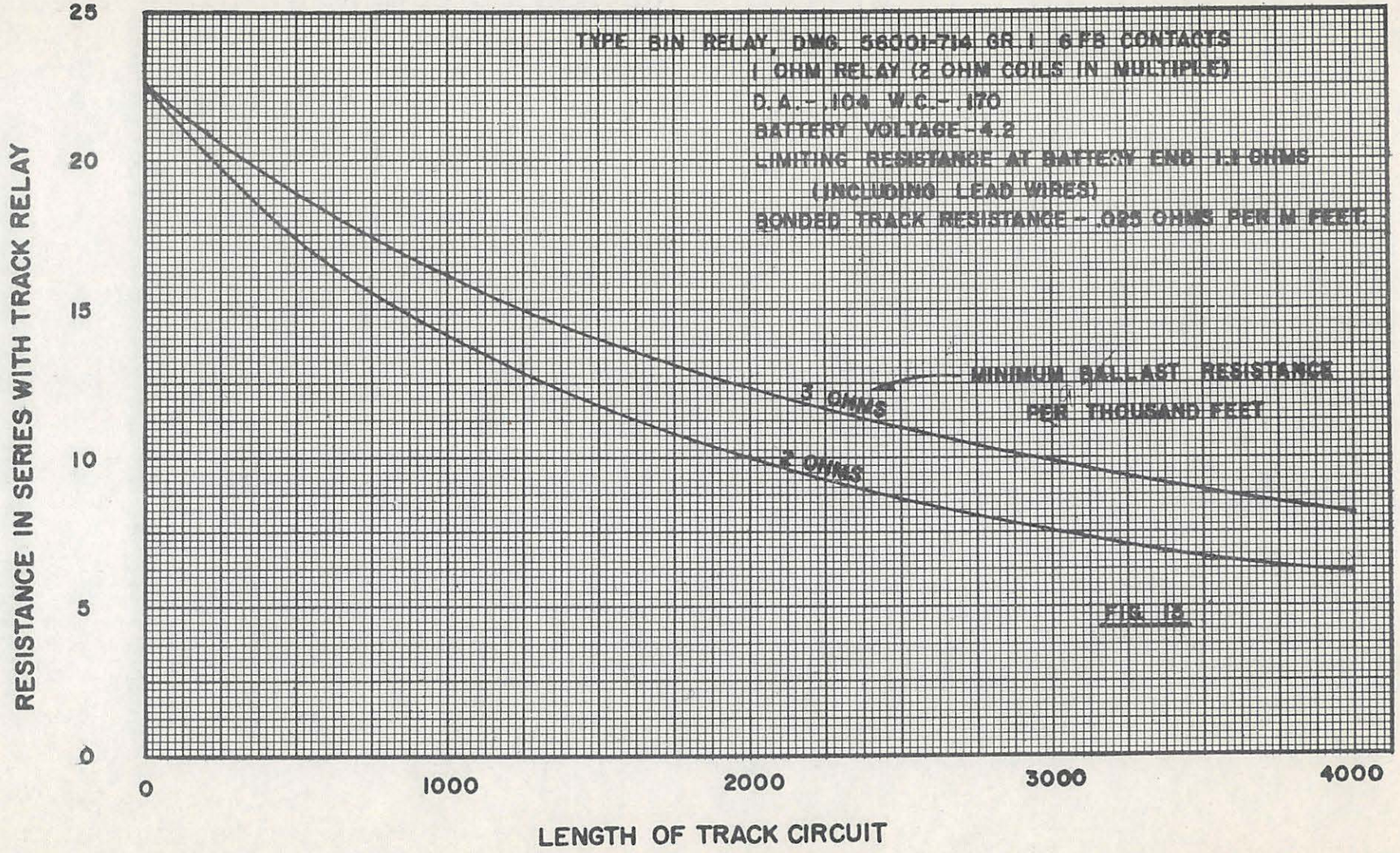
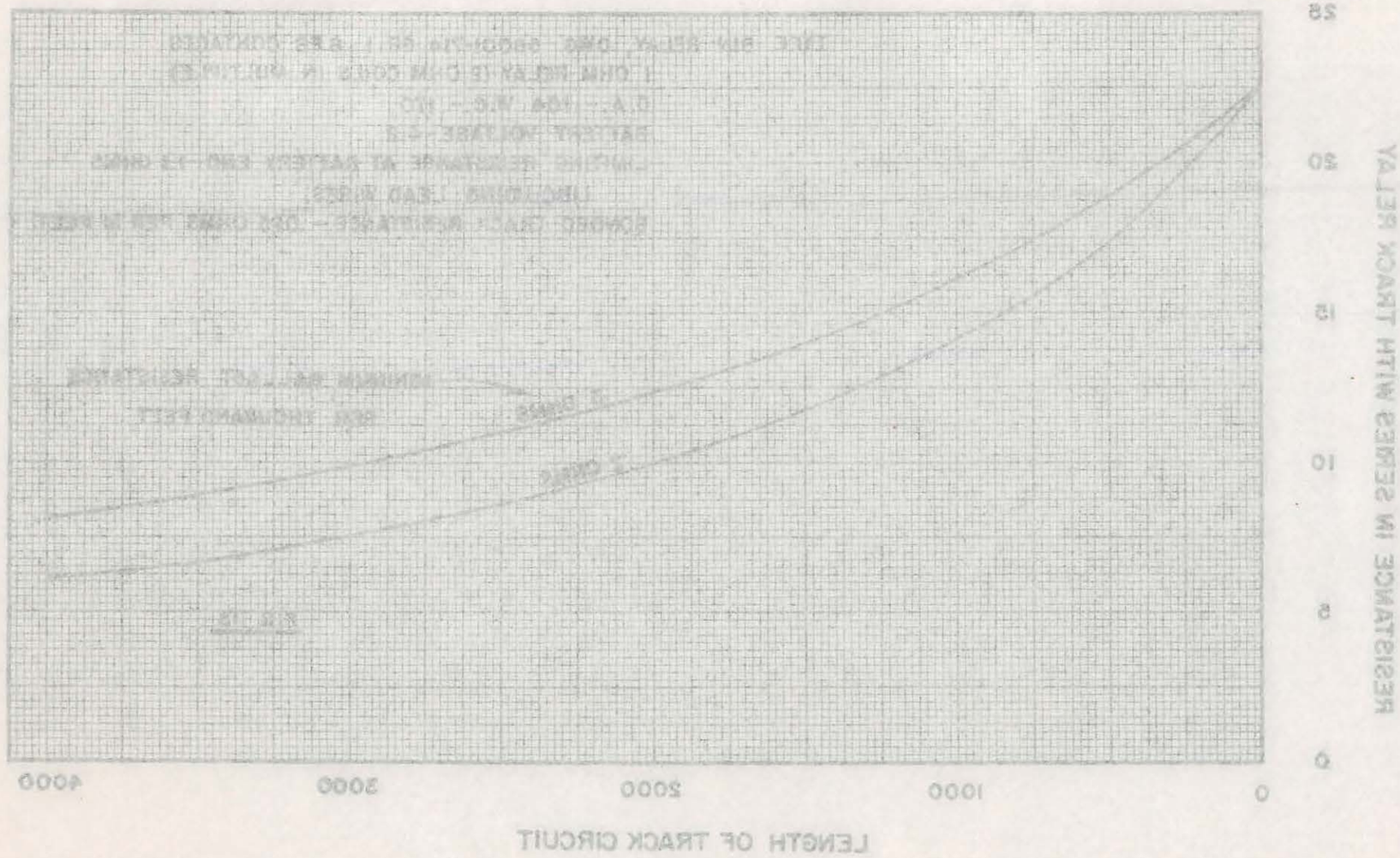

TYPE BIN RELAY, DWG. 36001-714 6R I 6FB CONTACTS
1 OHM RELAY (2 OHM COILS IN MULTIPLE)
D.A. - .104 W.C. - .170
BATTERY VOLTAGE - 4.2
LIMITING RESISTANCE AT BATTERY END 1.3 OHMS
(INCLUDING LEAD WIRES)
BONDED TRACK RESISTANCE - .025 OHMS PER M FEET
MINIMUM BALLAST RESISTANCE
PER THOUSAND FEET
3 OHMS
2 OHMS
FIG. 15
RESISTANCE IN SERIES WITH TRACK RELAY
25
20
15
10
5
0
0
1000
2000
3000
4000
LENGTH OF TRACK CIRCUIT

S-441



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ISSUED 12-15-58
SHEET 15 Cont'd. on SH
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REF.	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
1	ARRESTER—CLEARVIEW RACO 485-3	L.V.	56937-8	LINE
2	ARRESTER GE 9LA10A204	550V.	58745	DOUBLE
3	ARRESTER—THYRITE GE 9LA15B22	650V.		
4	ARRESTER—BALKITE FANSTEEL	L-5	56937-13	SIGNAL LIGHTING
5	ARRESTER GE 9LA15A7	650V.		SINGLE
6	ARRESTER L-M AS1A2	650V.		DOUBLE
7	ARRESTER L-M AS3A2	650V.		CODE LINE
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21	BUTTON, PUSH		31030-10 58855	
22	" & SHIELD	550V.	29493-16 47474-14	
23				
24				
25				
26	CAPACITOR UNIT-1000MF-18Ω		47630-3GR.1	USED WITH FRONT & FAILURE DETECTOR REPEATER RELAYS.
27	CAPACITOR-GE 23F-402-1.0MFD			
28				
29				
30				
31				
32				

REF.	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
33				
34				
35				
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38				
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41				
42				
43				
44				
45				
46				
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48				
49				
50				
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54				
55				
56				
57				
58				
59				
60				
61	CONVENIENCE OUTLET	110V.	46529-1	
62				
63				
64				

REF.	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
65	CUTOUT, FUSE L-M FSIA1	600V. 20A.		TYPE PSD USE 3A. FUSE REF. 135
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80	EQUALIZER — CLEARVIEW RACO 700-2	L.V.		FOR TRACK CONNECTIONS WITH OVERLAY CIRCUITS
81				
82				
83				
84				
85				
86				
87				
88				
89				

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
APPARATUS REFERENCE LIST

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REF	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
1	ARRESTER – CLEARVIEW RACO 485-3	L.V.	56937-8	LINE
2	ARRESTER GE 9LA10A204	550V	58745	DOUBLE
3	ARRESTER – THYRITE GE 9LA15B22	650V		
4	ARRESTER – BALKITE FANSTEEL	L-5	56937-13	SIGNAL LIGHTING
5	ARRESTER GE 9LA15A7	650V		SINGLE
6	ARRESTER L-M AS1A2	650V		DOUBLE
7	ARRESTER L-M AS3A2	650V		CODE LINE
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21	BUTTON, PUSH		31030-10 58855	
22	" & SHIELD	550V	29493-16 47474-14	
23				
24				
25				
26	CAPACITOR UNIT-1000MF-18#		47630-36R.1	USED WITH FRONT & FAILURE DETECTOR REPEATER RELAYS.
27	CAPACITOR-GE 23F-402-10MFD			
28				
29				
30				
31				
32				

REF	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
33				
34				
35				
36				
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41				
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50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	CONVENIENCE OUTLET	110V	46529-1	
62				
63				
64				

REF	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
65	CUTOUT, FUSE L-M FS1A1	600V 20A		TYPE PSD USE 3A FUSE REF 135
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80	EQUALIZER — CLEARVIEW RACO 700-2	L.V.		FOR TRACK CONNECTIONS WITH OVERLAY CIRCUITS
81				
82				
83				
84				
85				
86				
87				
88				
89				

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SHEET 1 Cont'd on Sh. 2

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REF.	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
90				
91				
92				
93				
94				
95				
96				
97				
98				
99				
100				
101	FILLER PLATE	B1	42812	FOR B1 RELAY SPACE
102				
103				
104				
105				
106				
107				
108				
109				
110	FUSE	250V. 10A.		NON-RENEWABLE
111	"	250V. 10A.		RENEWABLE
112	"	250V. 15A.		RENEWABLE
113	"	250V. 20A.		NON-RENEWABLE
114	"	250V. 30A.		" "
115	"	250V. 60A.		
116	"	600V. 10A.		
117	"	600V. 30A.		
118	" TYPE B FERRULE 600V.-30AMP.	BCF		NON-RENEWABLE FOR RACO 506-1
119				
120				
121				

REF.	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
122	FUSETRON	250V. 3.2A		
123	"	250V. 6.25A		
124	"	250V. 10A.		
125				
126				
127	FUSETRON	600V. 1A.		
128	"	600V. 2A.		
129	"	600V. 4A.		
130				
131	FUSE BLOCK-PORCELAIN	250V. 0-30A.		
132	" " -RACO 841	600V.		
133	FUSE CUTOUT BASE	600V. 31-60A		BRYANT-CAT.NO.1930 OR EQUAL
134	NON-FUSIBLE LINK			USED IN RACO 497 SWITCH
135	FUSE LINK L-M FLIA3	3A		FOR L-M TYPE PSD CUTOUT
136				
137				
138	IMPEDANCE, BALANCING		42960-1GR.1	SINGLE RAIL-RELAY-A.C. TRACK CIRCUITS
139				
140	INSULATING NUT	110V.		
141				
142	LIGHT, BOX		57956-BASE 57957-BODY	
143	JACK, PHONE		56215-1GR.1	
144				
145	KIT, PLUG BOARD	B1	A62-506 59686-5GR.1	COMPLETE WITH INSULATOR AND MOUNTING SCREWS
146	" " "	B2	A62-508 59686-7GR.1	COMPLETE WITH INSULATOR AND MOUNTING SCREWS
147				
148				
149	MOUNTING, RELAY	B1	A62-500	USE WITH REF. 145
150	" "	B2	A62-502	" " " " OR 146
151	" "	B4	A62-504	" " " " " "
152				
153				

REF.	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
154				
155	REACTOR, PORCELAIN BLOCK	L.V.	58235-GR.2	CHOKE TO SUPPRESS RADIO INTERFERENCE AT HWY. XINGS.
156	" , FIXED TRACK		42100-4GR.1	TO CONTROL FRONT CONTACT TIME OF C.T.P.R.
157	" , 30A., 0.5Ω		42100-2GR.1	USED IN FEED A.C. TRACK CIRCUITS
158				
159				
160				
161				
162				
163				
164				
165				
166				
167				
168				
169				
170	RECTIFIER-D.C. OUTPUT 3V. 2.2 AMPS. A.C. INPUT 5V.	B3X 104	57163GR.1	CHARGE 1 LEAD CELL
171				
172	RECTIFIER- D.C. OUTPUT 3V. 2.2 AMPS. A.C. INPUT 110V. 60~	B3T 104	57162GR.1	CHARGE 1 LEAD CELL
173	RECTIFIER- D.C. OUTPUT 3V. 2.2 AMPS. A.C. INPUT 110V. 25~	B3T 104	57162GR.2	" 1 " "
174	RECTIFIER- D.C. OUTPUT 7V. 2.2 AMPS. A.C. INPUT 110V. 60~	B3T 108	57162-2GR.1	FOR CHARGING 2-3 LEAD CELLS
175	RECTIFIER-D.C. OUTPUT 13.5V. 1.7 AMPS. A.C. INPUT 110V.	BT 232	54935-102GR.1	" " 4-6 " "
176	RECTIFIER-D.C. OUTPUT 13.5V. 1.7 AMPS. A.C. INPUT 110V. 25~	BT 232	54935-102GR2	" " 4-6 " "
177	RECTIFIER-D.C. OUTPUT 13.5 V. 27 AMPS. A.C. INPUT 110 V.	BT 432	54935-103GR.1	" " 4-6 " "
178	RECTIFIER-D.C. OUTPUT 2 2V. 1.5 AMPS. A.C. INPUT 110V.	BT 432	54935-3GR.9	" " 7-10 " "

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SHEET 2 Cont'd on Sh 3

REF.	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
179	RECTIFIER-D.C. OUTPUT 20-27V. .90 AMP. A.C. INPUT 110V.	BT 232	54935-102GR.3	FOR CHARGING 10-12 LEAD CELLS
180				
181				
182				
183				
184				
185	RECTIFIER-D.C. OUTPUT 22 V. 18 AMPS. A.C. INPUT 110 V.	BP 848	54725-5GR.21	FOR CHARGING 5-10 LEAD CELLS
186	RECTIFIER-D.C. OUTPUT 30 V. 6 AMPS. -A.C. INPUT 110 V.	BP 448	54725-4GR.13	" " 11-14 " "
187				
188	RECTIFIER-D.C. OUTPUT 20 V. 10.5 AMPS. A.C. INPUT 110 V.	BP 648	54725-5GR.15	FOR CHARGING 5-10 LEAD CELLS
189	RECTIFIER-D.C. OUTPUT 22 V. 4.5 AMPS. A.C. INPUT 110 V.	BP 248	54725-7GR.1	" " 5-10 " "
190	RECTIFIER-D.C. OUTPUT 30 V. 3.0 AMPS. A.C. INPUT 110 V.	BP 248	54725-7GR.11	" " 10-14 " "
191	RECTIFIER-D.C. OUTPUT 50 V. 3.0 AMPS. A.C. INPUT 110 V.	BP 448	54725-4GR.11	" " 14-20 " "
192				
193	RECTIFIER-D.C. OUTPUT 155 V. 0.20 AMPS. A.C. INPUT 110 V.	BPC 280	54725-8GR.1	FOR CHARGING 20-70 LEAD CELLS
194	RECTIFIER-D.C. OUTPUT 145 V. 0.75 AMPS. A.C. INPUT 110 V.	BP 248	54725-7GR.5	" " 55-65 " "
195	RECTIFIER-D.C. OUTPUT 145 V. 1.5 AMPS. A.C. INPUT 110 V.	BP 448	54725-4GR.5	" " 55-65 " "
196				
197	RECTIFIER-D.C. OUTPUT 12 V. 0.05 AMPS.	B1	57170 GR.1	RECTIFIER FOR USE WITH RELAY REF. 329 & 273
198	RECTIFIER-D.C OUTPUT 13.5 V. 0.05 AMPS.	B1	59605-3GR.2	RECTIFIER ONLY 59605-4 Gr. 1 USED TO MAKE RELAY S.R.
199	RECTIFIER-D.C. OUTPUT 13.5 V. 0.15 AMPS.	B1/4	54728-60GR.1	RECTIFIER ONLY 54728-5 Gr. 4 USED WITH P.T. RELAY REF.
200	RECTIFIER AND RESISTOR 51Ω		19375-1GR.1	284 & 285 USED WITH REF. 323
201	RECTIFIER 1/2 WAVE	B1/4	54728-62GR.1	USED WITH LIGHTOUT RELAY REF. 325 & 326 (HOT)
202	RECTIFIER-D.C. OUTPUT 12 V. 0.20 AMPS. A.C. INPUT 16 V.	B1/2	54941-104GR.1	USED WITH B1 LIGHT OUT RELAY REF. 325 (COLD)
203	RECTIFIER-D.C. OUTPUT 12 V. 0.20 AMPS. A.C. INPUT 55V. 25~	BQ1/2	54944-104GR.17	LOW MAG. I (.020a)
204	RECTIFIER-D.C. OUTPUT 8 V. .05 AMPS. A.C. INPUT 55V. 25~	BQ1/2	54944-104GR.26	HIGH MAG. I (.270a)
205	RECTIFIER-D.C. OUTPUT 12.5 V. .200 AMPS. A.C. INPUT 110 V.	BQ1/2	54944-104GR.16	USED WITH SNOW MELTER INDICATION RELAY
206	RECTIFIER-D.C. OUTPUT 1.5 V. 0.30 AMPS. A.C. INPUT 2.0 V.	BQ1/2	54944-104GR.10	USED FOR AC TRACK CIRCUIT WITH RELAY REF. 269
207				
208				
209				
210				

REF.	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
211				
212				
213	RESISTOR 510Ω ALLEN-BRADLEY 2 WATT	HB	57831-18GR.3	MOUNTS ON REAR OF PLUGBOARD
214				
215				
216				
217				
218				
219				
220				
221	RESISTOR 1Ω RACO 245-3	FIXED		
222	RESISTOR 2Ω RACO 245-3	FIXED		
223	RESISTOR 5Ω RACO 245-3	FIXED		
224	RESISTOR 10Ω RACO 245-3	FIXED		
225	RESISTOR 25Ω RACO 245-3	FIXED		
226	RESISTOR 50Ω RACO 245-3	FIXED		
227	RESISTOR 100Ω RACO 245-3	FIXED		
228	RESISTOR 200Ω RACO 245-3	FIXED		
229	RESISTOR 300Ω RACO 245-21	FIXED		
230	RESISTOR 500Ω RACO 245-21	FIXED		
231	RESISTOR 3000Ω RACO 245-21	FIXED		
232				
233				
234				
235				
236				
237				
238				
239				
240				
241				
242	RESISTOR 1.0Ω RACO 602-3	ADJ.		TRACK CIRCUITS

REF	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
243	RESISTOR 2.0Ω RACO 602-6	ADJ.		TRACK CIRCUITS AND SIGNAL LIGHTING
244	RESISTOR 4.95Ω RACO 603-2	ADJ.		TRACK CIRCUITS
245	RESISTOR 7.95 RACO 603-4	ADJ.		" "
246	RESISTOR 21.8Ω RACO 603-9	ADJ.		" "
247	RESISTOR 111.5Ω RACO 603-16	ADJ		TWO RATE CHARGE
248				
249	RESISTOR 0.5Ω RACO 258-80-1	TAP		A.C. TRACK CIRCUITS
250	RESISTOR 0.9Ω RACO 805	TAP		TRACK CIRCUITS
251	RESISTOR 1.5Ω RACO 810-2	TAP		TRACK CIRCUITS
252	RESISTOR 2.5Ω RACO 258-50-A2	TAP		A.C. TRACK CIRCUITS
253	RESISTOR 21Ω RACO 810-8	TAP		TRACK CIRCUITS
254				
255				
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264				
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266				
267				

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
APPARATUS REFERENCE LIST

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REF.	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REGISTRY	REMARKS
268					
269	RELAY-2FB-3F-3B 28.5Ω	BIN	56001-838GR.1	1-2-17-32	FOR AC TRACK CIR. WITH RECT. REF. 206
270	" 4F-2B 1.8Ω	BIN	A62-270 56001-734GR.2	1-2-5-21	TRACK
271	" 6FB 4Ω	BIN	A62-261 56001-714GR.1	1-2-3-26	"
272	" 4FB 6Ω	BIN	A62-293 56001-785GR.9	1-3-6-11	FOR OVERLAY CIR.
273	" 6FB 84Ω	BIN	A62-295 56001-785GR.31	1-2-12-32	USED WITH RECT. REF. 197 & RELAY REF. 295 & 329
274	" 6FB 100Ω	BIN	56001-762GR.5	1-2-9-14	
275					
276	RELAY 6FB 200Ω	BIN	56001-762GR.6	1-2-9-14	
277					
278	RELAY 2FB-2B HD CONTACTS 210Ω	BIN	A62-205 56001-880GR.1	1-2-24-28	LAMP CONTROL
279	RELAY 6FB 500Ω	BIN	56001-701GR.2	1-2-3-4	OBSOLETE USE REF. 281
280	RELAY 4FB HD CONTACTS 500Ω	BIN	56001-753GR.2	1-2-7-27	SS-F&B
281	RELAY 6FB 500Ω	BIN	A62-262 56001-762GR.2	1-2-9-14	REPLACES REF. 279
282					
283					
284	RELAY 2FB 50Ω HD CONTACTS 50Ω	BIN	A62-401 56001-721GR.1	1-2-3-33	POR USE RECT. REF. 199
285	RELAY 6FB 100Ω HD CONTACTS 100Ω	BIN	A62-406 56001-745GR.1	1-2-6-15	" " " " "
286					
287	RELAY 2FB 2240Ω	BIN	56001-813GR.3	1-2-5-26	
288					
289	RELAY 1B 1575 Ω	BIN	A62-476 56001-749GR.2	1-2-7-20	2 RATE CHARGE 10-14 CELLS LEAD
290	" 1B 14215 Ω	BIN	A62-477 56001-749GR.3	1-2-7-21	2 RATE CHARGE 50-60 CELLS LEAD
291					
292					
293					
294					
295	RELAY 2F-4B 80Ω .01 SEC. AT 2 VOLTS	BIN SR	A62-380 56001-759GR.1	1-2-9-10	AER USED WITH RELAY REF. 273 & 329
296	RELAY 6FB SINGLE COIL 3 SEC. AT 12 VOLTS 194Ω	BIN SR	56001-779GR.1	1-2-10-17	USED IN SERIES WITH RELAY REF. 336
297	RELAY 6FB SINGLE COIL 1.7 SEC. AT 8.4 VOLTS 300Ω	BIN SR	56001-744GR.1	1-2-6-14	
298	RELAY 6FB 1 SEC. AT 10 VOLTS 340Ω	BIN SR	A62-359 56001-780GR.1	1-2-4-23	SAME AS 56001-728 GR. 26
299					
300					
301	RELAY 2FB 3 SEC AT 9 VOLTS 460Ω	BIN SR	56001-830GR.1	1-2-16-28	XPR-ABPR-XBPR
302	RELAY 2F-1B 105Ω .18-25 SEC. AT 5 VOLTS 105Ω	BIN PSR	56001-713GR.2	1-2-3-25	COMPOUND
303	RELAY 6FB 165Ω .08 SEC. AT 10 VOLTS 165Ω	BIN PSR	56001-754GR.1	1-2-7-32	COMPOUND - .050" FRONT CONT. OPENING
304					
305					
306					
307					
308					
309					
310					
311					
312					
313					
314					
315					
316					
317	RELAY 6FB 1.4 SEC. AT 11 VOLTS 230Ω	BIN SPU	A62-345 56001-736GR.1	1-2-5-24	
318	RELAY 4FB 2.2 SEC. AT 10 VOLTS 300Ω	BIN SPU	56001-729GR.1	1-2-4-24	
319					
320					
321	RELAY 4FB-2F-1B 135Ω M.D. BACK CONTACTS 135Ω	BIN QPU	56001-885GR.1	1-2-22-26	OPERATES FROM STEPPER UNIT
322	RELAY 8F-1B 135Ω 135Ω	BIN QPU	56001-717GR.6	1-2-3-29	OPERATES FROM STEPPER UNIT
323	RELAY 4FB-2F-1B 65Ω 135Ω	BIN QPU	A62-335 56001-909GR.1	1-2-22-26	OPERATES FROM STEPPER UNIT
324					
325	RELAY 4FB 450Ω 60~ .12Ω	BILO	A62-221 56001-873GR.1	1-2-22-25	LIGHT OUT RELAY USED WITH RECT. REF. 201
326	RELAY 2FB .138Ω	BI	56001-858GR.2	1-2-20-22	LIGHT OUT RELAY USED WITH RECT REF. 201
327	RELAY 4FB 450Ω 25~ 45Ω	BILO	A62-215 56001-785GR.59	1-2-24-26	USED WITH RECT. REF. 201
328	RELAY 6FB BIASED NEUTRAL 48Ω	BIBN	56001-801GR.9	1-2-4-13	USED IN SERIES WITH SC MECHANISM
329	RELAY 6FB BIASED NEUTRAL 63Ω	BIBN	A62-140 56001-801GR.5	1-2-4-13	USED WITH RECT. REF. 197
330	RELAY 6FB BIASED NEUTRAL 250Ω	BIBN	56001-801GR.1	1-2-4-13	
331	RELAY 6FB BIASED NEUTRAL 1000Ω	BIBN	56001-801GR.4	1-2-4-13	
332					
333					
334					
335					
336	RELAY-4FB MAGNETIC STICK 46Ω	BIMS	56001-791GR.2	1-2-12-13	USED IN SERIES WITH REF. 296
337	RELAY-4NR POLAR STICK 34Ω	BNB	A62-246 58645-172GR.4	1-2-12-13	BUILT IN 150Ω RES. OPERATES FROM CODE
338	RELAY-4NR POLAR STICK 7Ω	BNB	A62-245 58645-172GR.6	1-3-5-20	OPERATES UNIT. FROM STEPPER UNIT
339					
340	RELAY 1B 300Ω	BIF	56001-903GR.1	1-3-4-24	50-60 FL./MIN. OBSOLETE USE 341
341	RELAY 1B 490Ω	BIF	A62-200 56001-915GR.1	1-3-4-24	58-60 FL./ MIN. REPLACES REF. 340
342					
343					
344					
345	RELAY 1F 9-11 SEC. 18.6 OHM HEATER RES.	BITA	A62-471 57100-702GR.10	1-3-4-6	
346					
347					
348					
349					
350					
351					
352					
353					
354					
355					
356					

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
APPARATUS REFERENCE LIST

S-500

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SHEET 4 Cont'd on Sh. 5

REF	DESCRIPTION	TYPE	GRS DRAWING NO. OR ORDERING REFERENCE	REGISTRY	REMARKS
357	RELAY 12 FB 4ω	B2N	56002-702 GR.1	1-2-4-25	
358	RELAY 8FB-2F EHD CONTACTS 330ω	B2N	56002-710 GR.1	1-2-10-12	SWITCH CONTROL LSR
359	RELAY 12 FB 330ω	B2N	56002-713 GR.3	1-2-22-32	CONTACT OPENING SECOND RANGE .090
360	" 12 FB 500ω	B2N	A62-330 56002-703 GR.1	1-2-4-33	
361					
362					
363					
364					
365					
366	RELAY 12 FB 0.5 SEC. AT 10.8V. 500ω	B2N PSR	56002-708 GR.1	1-2-7-28	USED WITH RECT. REF. 198
367					
368	RELAY 12 FB BIASED NEUTRAL 350ω	B2BN	A62-150 56002-720 GR.1	1-3-5-22	
369					
370					
371	RELAY 4FB 4NR 200ω	B2P	A62-390 56003-701 GR.3	1-2-3-12	
372	RELAY 4FB-4NR POLAR 34ω	B2P	56003-701 GR.7	1-2-3-12	SERIES (FR) TRAFFIC RELAY
373					
374					
375					
376	RELAY 4FB 4NR 120ω	B2P SR	56003-709 GR.2	1-2-6-33	
377					
378					
379					
380	RELAY 4FB FLASHER 12V.	B2FL	57261-802 GR.4	1-2-6-7	MOTOR OPERATED OBSOLETE
381	RELAY 4FB FLASHER 10V.	B2FL	57261-802 GR.3	1-2-5-33	MOTER OPERATED OBSOLETE
382	RELAY 4FB FLASHER 10V. OR 12V.	B2FL	56008-50 GR.2	1-3-5-10	TRACTIVE ARMATURE
383					
384					
385	RELAY IF ICK 12V. 400ω 4-64 SEC. MOTOR TIME	B2MT	A62-442 57263-802 GR.3	1-2-4-27	TIME NOT SEALED, TIME AND CHECKS CONTACTS INDEPENDENT
386	RELAY IF ICK 12V. 400ω 1-8 MIN. MOTOR TIME	B2MT	A62-443 57263-802 GR.2	1-2-4-26	TIME NOT SEALED, TIME AND CHECKS CONTACTS INDEPENDENT
387	RELAY 2F 2CK 12V. 400ω 1-8 MIN. MOTOR TIME	B2MT	A62-453 57263-806 GR.2	1-3-6-8	TIME NOT SEALED, TIME AND CHECK CONTACTS INDEPENDENT
388	RELAY 2F 2CK 12V. 400ω 4-64 SEC. MOTOR TIME	B2MT	A62-452 57263-806 GR.3	1-3-6-9	TIME NOT SEALED, TIME AND CHECK CONTACTS INDEPENDENT
389					
390	RELAY 2F-2B 75 CODE 150ω	B2	57490-75 GR.6	1-2-5-14	
391					
392					
393					
394					
395					
396					
397					
398					
399					
400	RELAY (N)IFB-3F 17ω (R)IFB-3F 250ω	VTB	59301-200 GR.1	1-2-3-18	2 ARMATURE
401					
402					
403					
404					
405					
406					
407					
408					
409					
410	RELAY 2F LOCAL 55V. 25~	B2 VANE	56005-100 GR.6	25-26-27-29	A.C. TRACK
411					
412					
413					
414					
415					
416					
417					
418					
419					
420					
421	RELAY 2FB 0.07ω SILV.-PLAT. CONTACTS	BI-CF	56001-663 GR.12	1-2-25-26	TR-AR-AER
422	RELAY 2FB 0.08ω SILV.-PLAT. CONTACTS	BI-CF	56001-663 GR.6	1-2-13-24	LOR
423	RELAY 2FB 10ω SILV-SILV. CONTACTS	BI-CF	56001-679 GR.2	1-2-11-14	TPPR
424	RELAY IF TUNG- 100ω IFB SILV.-PLAT. CONTACTS	BI-CF	58640-179 GR.21	1-2-25-28	CTPR 47ω INTERNAL TPBR RES. BETWEEN TPAR CONT. 21-26
425					
426					
427					
428					
429					
430					
431	RELAY MOUNTING	BI	58570-4 GR.3		
432	" "	BI	58570-4 GR.6		
433	" "	BI	58570-9 GR.6		CONTACTS IN SPACE 1-2-3
434	" "	B2	58570-10 GR.7		CONTACTS IN SPACE 1-2-3-4-5-6
435	RELAY SUPPORT		P5-183 58287 GR.1		I REQUIRED FOR FIRST ROW OF B RELAYS IN H.S. OR H.D. CASES
436	RELAY SUPPORT		P5-185 18481		I REQUIRED FOR EACH ADD'L ROW OF B RELAYS IN H.S. OR H.D. CASES
437	RELAY SUPPORT		P5-184		I REQUIRED FOR FIRST ROW OF B RELAYS IN HALF SIZE CASES
438	RELAY SUPPORT		P5-186		I REQUIRED FOR EACH ADD'L ROW OF B RELAYS IN HALF SIZE CASES
439					
440					
441					
442					
443					
444					
445					

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
APPARATUS REFERENCE LIST

S-500

REF.	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
446				
447				
448				
449				
450				
451				
452				
453				
454				
455				
456				
457				
458				
459				
460	SWITCH, DISCONNECT 250V. RACO 324	2 WAY		NON-RENEWABLE FUSES
461	SWITCH, DISCONNECT 600V. RACO 506-1	2 WAY		
462	SWITCH, DISCONNECT RACO 497	7 WAY		1-AMP. FUSETRON FOR FUSING CAPACITOR & 2-2 AMP. FUSE-TRON & 4 NON-FUSIBLE LINKS
463				
464				
465	SWITCH 125V. TRUMBULL 710	D.P.D.T.		
466	SWITCH-SNAP 6A-125V. 3A-250V.	125V. 250V.		
467				
468				
469				
470	TAG, RACO 585-1	CLEAR		WITH STRING LOOP
471	" , " 585-16	"		MULTI-UNIT
472	" , " 585-19	"		SINGLE UNIT
473				
474				
475	TERMINAL-RACO 390	12 WAY		
476				
477	TERMINAL-BAKELITE BASE		46048-22GR.2	USED FOR TERMINATING WIRE LARGER THAN NO.6 AWG.

REF.	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
478				
479				
480				
481				
482				
483				
484				
485	TERMINAL BOARD WITH 35 A.A.R. TERMINALS	B2	59681-2GR.1	COMP. WITH MOUNTING SCREWS
486				
487	TEST LINK-SAFETY RACO 620-1 1"			
488				
489				
490	TRANSFORMER 110V. 13D185	K2	38270-2GR.5	USE REF. 491
491	" 115 V-230V. 13D-255	K2	A95-230 38270-2GR.6	3 SECONDARYS 27.75V- 3.6A EACH
492	" 220V. 13D110	K2	38270-2GR.5	USE REF. 503
493	" 440V.-110V. 13D36	K2	38270-2GR.4	" " 504
494	" 550V.-110V. 13D203	K2	38270-2GR.16	" " 504
495	" 550V. 13D176	K2	38270-2GR.6	" " 502
496	" 13D191	K2	38270-2GR.9	AC SUPPLY FOR CODED TRACK AND SIGNAL LIGHTING
497	" 13D50	K2	38270-2GR.7	USE REF. 491
498	" 13D51 25~	K2	38270-2GR.8	" " 491 SPECIFY 25~
499	" 13D117 25~	K2	38270-2GR.12	A.C. TRACK CIRCUITS
500	" 13D93 25~	K2	38270-2GR.12	SIGNAL LIGHTING-14 AMP. SEC. 55V. DIMMING TRANS.
501	" 13D99 25~	K2	38270-2GR.12	SECONDARY 57.5V.-435 AMP. 12V. - 25 AMP.
502	" 460V.-575V. 13D-256	K2	A95-240 38270-2GR.6	3 SECONDARYS 27.75V-3.6A EACH
503	" 110V.-220V. 13D-257	K2	A95-220 38270-2GR.6	4 SECONDARYS-SIGNAL LIGHTING & L.V. RECTIFIER
504	" 460V.-575V. 13D-258	K2	A95-241 38270-2GR.20	110V. SECONDARY 1.0 KVA
505	" 13B-167 25~	K½	38270-3GR.8	SECONDARY .154 AMP. .308 AMP.
506	" 13AS-165	S1	53715-12GR.1	PRI. 110V. SEC. 10V.
507				
508				
509				

REF.	DESCRIPTION	TYPE	G.R.S. DRAWING NO. OR ORDERING REFERENCE	REMARKS
510	TRANSFORMER 13AU-217	U1	54940GR.9	APPROACH DECODING TRANS.
511	" 13AU-107	U1	54940GR.4	USE REF. 503
512	" 13AU-168	U1	54940GR.9	" " 503
513	" 13AU-105 25~	U1	54940GR.9	USE REF. 503 SPECIFY 25~
514	" 13AU-113 25~	U1	54940GR.9	USE REF. 491 SPECIFY 25~
515	" 13AU-157 25~	U1	54940GR.9	FOR 55 VOLT LOCAL A.C. TRACK RELAYS
516	" 13AU-205	U1	54940GR.4	CODED TRACK CIRCUITS
517	" 13AU-212	U1	54940GR.9	USE REF. 491
518	" 13AU-225 25~	U1	54940GR.9	PRI. 55V. SEC. 22V. - 4.55 AMP.
519	" 13AU-140	U1	54940GR.9	DECODING
520				
521				
522				
523				
524				
525	TRANSCEIVER		27359-1GR.1	FOR OVERLAY CIRCUIT
526	TUNER		27619-GR.1	FOR OVERLAY CIRCUIT
527				
528				
529				
530				
531				
532				
533				
534				

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
APPARATUS REFERENCE LIST

Approved R. J. Bottinelli
Chief Signal Engineer

S-500

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C.W. Bell 11

AAR ITEM NO. M.P. 91	VOLTS	AMPS WATTS OR CP	BULB	BASE	FILAMENT	USE	SERVICE VOLTAGE	CHANGE-OUT PERIOD	REMARKS
37	2.5	.150A	S8	SC	C-2R	SEM	2.4-2.5	12 Mos. & 10 Mos.	For use with National Carbon CG212 (12 Mos.) or Edison 2SJ1 Batteries (10 Mos.).
84	2.9	.150A	S8 I.F.	SC	C-2R	SL	2.4-2.5	12 Mos. & 10 Mos.	For use with National Carbon CG212 (12 Mos.) or Edison 2SJ1 Batteries (10 Mos.).
503	6	3CP	G6	S.CAN	C-2R	IND	-	Burnout	Replacement only.
516	6	15 CP	S8	SC	C-2R	IND		Burnout	Used in series with 6V., 21 CP. lamp in T.O. Sig.
517	6	21CP	S8	SC	C-2R	T.O.		Burnout	Used in series with 6V., 15 CP. IND lamp.
GE51	7.5	1CP	G 3-1/2	B MIN	C-2R	Ionization Lamp		Burnout	Used with cold cathode tubes.
94	10	18W	A15	3PS	C-2R	CLT	9.5	3 Mos.-1 Yr.	GRS Doublet lense-unit type-change cont. lighted 3 Mos., App. lighted 1 year.
95	10	18W	A15	2PS	C-2V	CLT	9.5	3 Mos.-1 Yr.	Union Doublet lense-unit type-change cont. lighted 3 Mos., App. lighted 1 year.
88	10	18W	S11	SC	CC6	SLT, SEM, XNG, CGA, SL, SIGNS, MC	8.3*	6 Mos.-2 Yr.	Change cont. lighted sigs.-6 mos., App. lighted signals at 2 yrs., all other at burnout. *9.5V Illinois and Canada for flashing light signals.
20	10	40W	A15	3PS	C2V	CLT	9.5	Burnout	Gibson and Blue Island Hump Signals.
505	12	4CP	G6	SC	C2R	LL, IND, ESL	10.3	Burnout	For Model 10 Sw.Locks, Burn at 9.5V and change out at 1 year.
507	12	4CP	G6	DC	C2R	LL, IND	10.3	Burnout	Replacement only.
506	12	4CP	G6	S.CAN	C2R	IND	10.3	Burnout	Replacement only.
532	12	.170A	T2	SL.1	C21	CTI, IND	9.5	Burnout	Panel machines.
28	14	.2A	G6	S.Min.	C2VS	CTI, IND		Burnout	
542	24	.032-.088A	T2	SL.1	C2F	CTI		Burnout	Type F, K, Synchroscan CTC machines.
558	35	.035-.045A	T2	SL.1	C5	CTI	28	Burnout	Synchrostep machines.
	60	20W	Clear	S.Med.	Carbon	2A Signals	55	Burnout	GCT - 2 lamps connected in multiple.
	64	6W	S6	SC	C7A		55	Burnout	Chart lights - GCT.
	75	2CP	S8	S.Min.	Carbon	IND, LL	55	Burnout	Lock lever lights.
521	120	10W	S14	S.Med.	C9	IND	110	Burnout	Interlocking switchboards.
49	125	10W	S11	SC	C7A	IND, SEM	110	Burnout	Power off indicators and sem. sigs.
	125	60W	A19-Clear	S.Med.	C9	P.T., Traffic Sigs.	110		

SEM - Semaphore
IND - Indicator
T.O. - Train Order
CLT - Colorlight
CGA - Crossing Gate Arm
SL - Switch Lamp
LL - Lever Light
SLT - Searchlight
XNG - Crossing
ESL - Electric Switch Lock
CTI - Chart Track Indicator
MC - Maintainer's Call
P.T. - Pole Target

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
ELECTRIC LAMPS
SIGNALS
SPECIFICATIONS

Approved R. S. Bottinelli
Chief Signal Engineer

S-750

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ISSUED 5-1-60

1. PURPOSE

(a) This specification is for the purpose of providing an electric light unit of the reflector type for highway crossing signals in accordance with AAR Signal Section Specification 190, Manual Part 166 except as modified herein.

2. ORDERING REFERENCE

Light unit for highway crossing signal in accordance with Specification 760. Roundels with range pattern having . . . . . degree horizontal spread and . . . . . degree downward deflection as detailed in Item 5 of this instruction.

3. SPECIFICATIONS

(a) Specifications referred to in the body of this specification form an essential part hereof.

4. CASE

(a) Case and door shall be of die cast zinc alloy in accordance with ASTM current specifications B86, alloy number and treatment as required.

(b) The door at locking point shall be provided with triangular head bolt for locking with Raco Screw Key 99-7.

5. ROUNDELS

(a) Roundels shall be Highway Crossing Red, 8-3/8 inches diameter, convex and shall be in accordance with AAR Signal Section Specification 69, Manual Part 136 except as modified herein.

(b) Roundels for use in electric light units on ground mast, unless otherwise specified, shall have 30 degrees horizontal spread with 15 degree downward deflection, Corning Code 553311 or Kopp No. RR 4564.

(c) Roundels for use in electric light units on cantilever attachment, unless otherwise specified, shall have 20 degree horizontal spread with 32 degree downward deflection, Corning Code 554721.

(d) Roundels with 30 degree horizontal spread only, to be specified for use in Massachusetts or where otherwise required, Corning Code 553361 or Kopp No. RR 4562.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
ELECTRIC LIGHT UNIT
FOR HIGHWAY CROSSING SIGNAL INSTRUCTIONS

Approved H A Scott
Chief Signal Engineer

S-760

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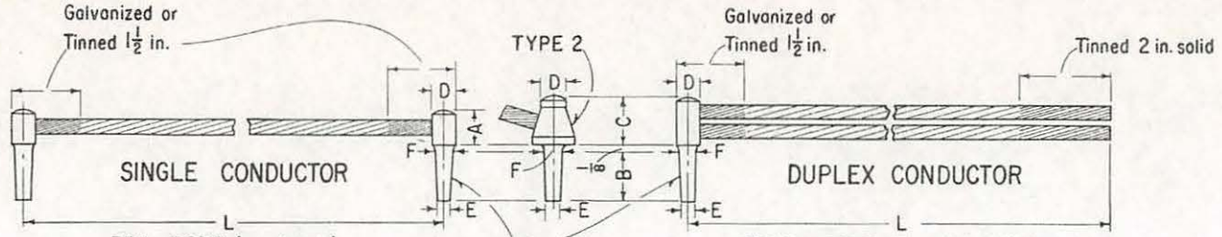
ISSUED 4-4-58
SHEET 1 Cont'd on Sh.

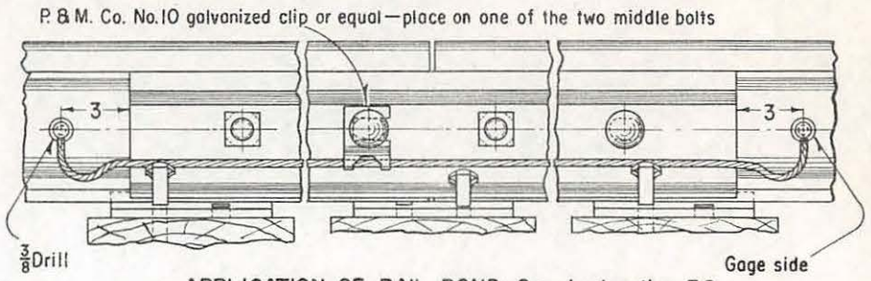


RAIL BOND (as shown)
TRACK CIRCUIT CONNECTOR (one plug only, stub end tinned 2 inches)

A=9/16 Min. 11/4 Max.
B=11/8 ± .006
C=1 Min. 11/2 Max.

D=1/2 Min. 3/4 Max.
E=.370 +.001
F=.416 −.004

TRACK CIRCUIT CONNECTOR



APPLICATION OF RAIL BOND-See Instruction 36

PLUG TYPE RAIL BONDS AND CONNECTORS

ORDER NO.	CONDUCTOR DESCRIPTION: AAR TYPE	WIRES IN EACH STRAND	DIAMETER: WIRE	DIAMETER: STRAND	LENGTH OF STRAND LAY	PLUG TYPE	LENGTH: BOND	LENGTH: CONNECTOR	USE
1156-3	B1631	3 copper, 16 galvanized steel	.0661	.330	2.54	2	36		26 in. joint bar & fouling circuit connection
1156-5	"	" " " " "	"	"	"	"	48		36 in. & 38 in. joint bar & fouling circuit connection
1156-6	"	" " " " "	"	"	"	1	72		Oil unloading siding
1156-7	"	" " " " "	"	"	"	"	102		Fouling circuit connection
1156-8	"	" " " " "	"	"	"	"	144		" " "
1156-9	"	" " " " "	"	"	"	"	180		Frogs, etc.
1156-47	B1632	7-40% copper covered steel	.081	.243	2.75	"		60	Rail connection (Duplex Conductor)
1156-52	D1631	" " " " "	"	"	"	"		36	Oil unloading siding
1156-53	"	" " " " "	"	"	"	"		60	" " "
1156-61	"	" " " " "	"	"	"			lg'th as reqd.	" " "

NOTES:
1. All bonds to be butt welded and annealed.
2. Plugs, bonds, and connectors shall be in accordance with A.A.R. Specification 151, Manual Part 112.
3. See Instruction 36 for general bonding instructions.

All dimensions given inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
PLUG TYPE RAIL BONDS
AND TRACK CIRCUIT CONNECTORS

Approved H A Scott
Chief Signal Engineer

S-1156

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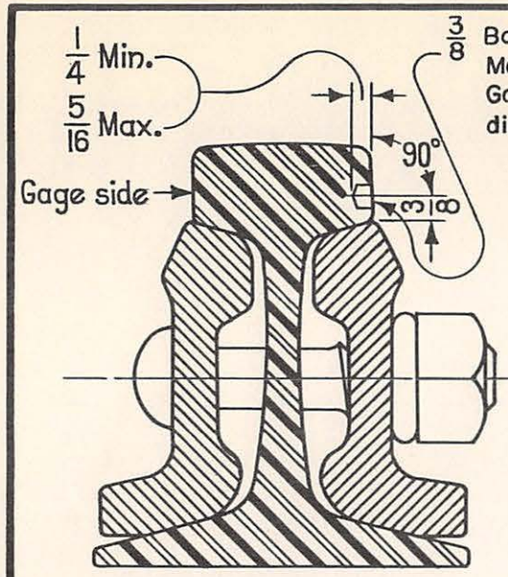
ISSUED 1-16-58

SHEET 1 Cont'd on Sh.



SECTION A-A

Bonding drill - AAR Manual Part 259. Gage shall be used to check diameter and depth.

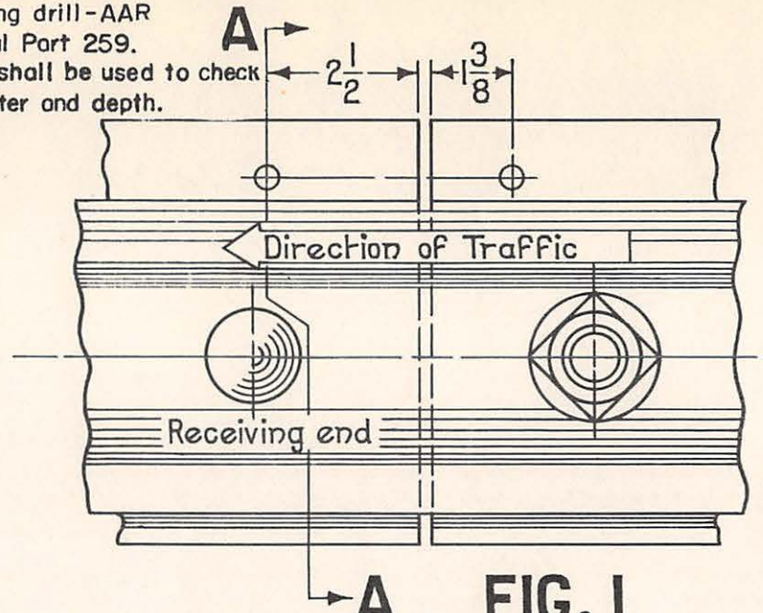


FIG. 1

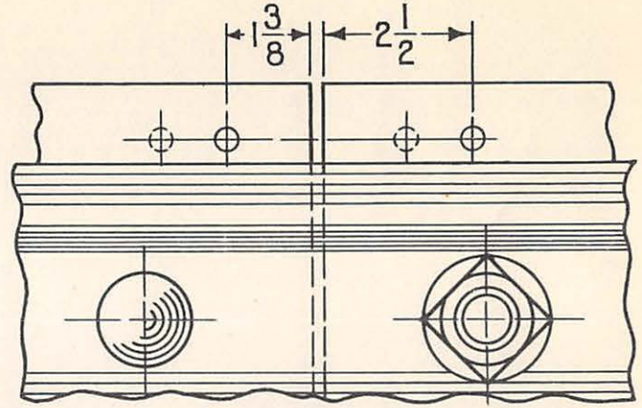
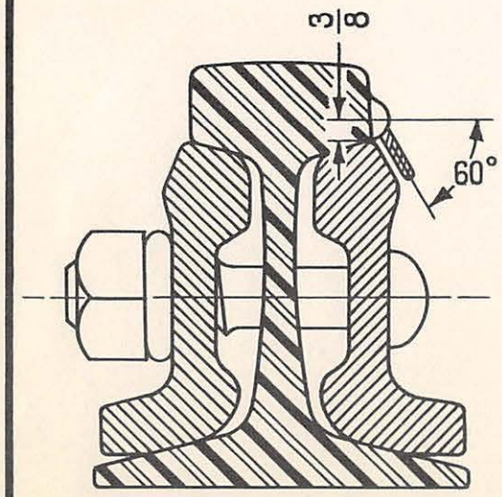


FIG. 2



SECTION B-B

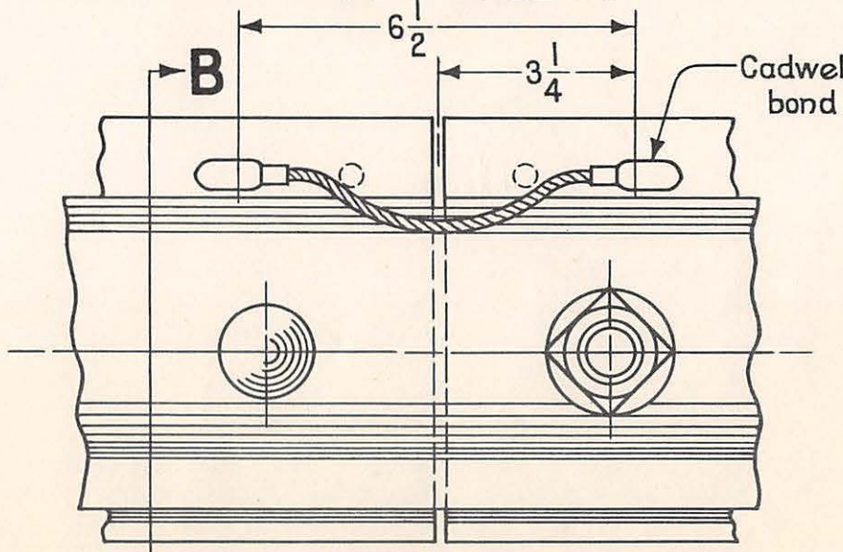


FIG. 3

NOTES:

1. Fig. 1 1st. Application
   " 2 2nd. "
   " 3 3rd. "
2. See Instruction 36 for General Bonding Instructions.
3. Limitations shown apply to all weights of rail.
4. Drilling and dimensions based on Engineering Committee Plan EC G-25.

0 1 2 3 6 inches.

All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
RAIL HEAD SIGNAL BONDS
DRILLING AND APPLICATION

Approved J. A. Corcoran
Chief Signal Engineer

S-1157

ISSUED 10-1-54

SHEET ....1.... Cont. on Sh. .....

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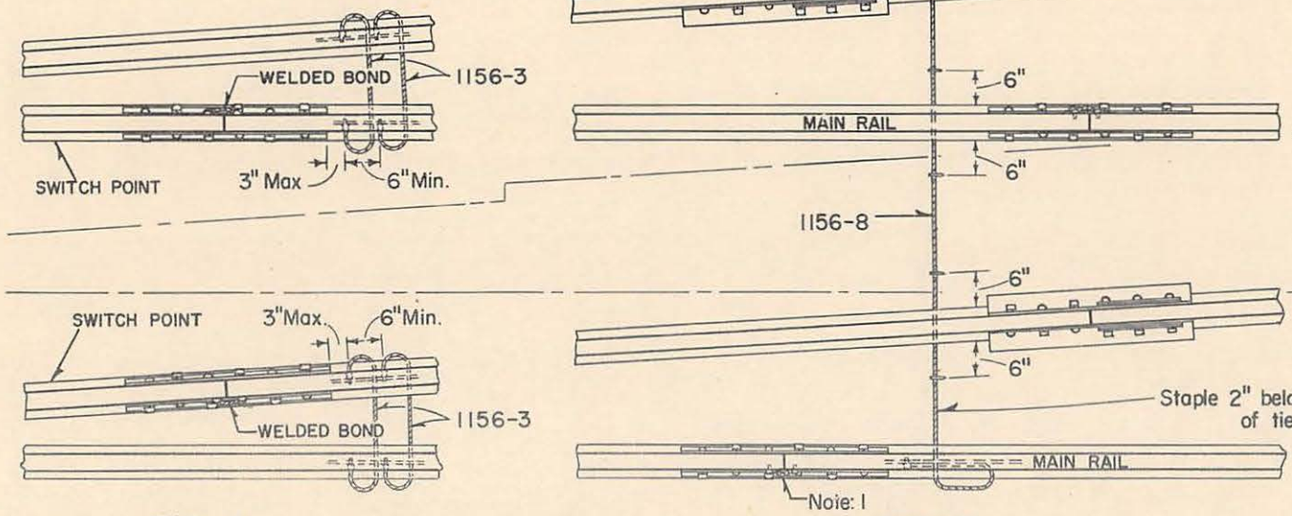

FIG. 1

FIG. 2
(NOTE 4)

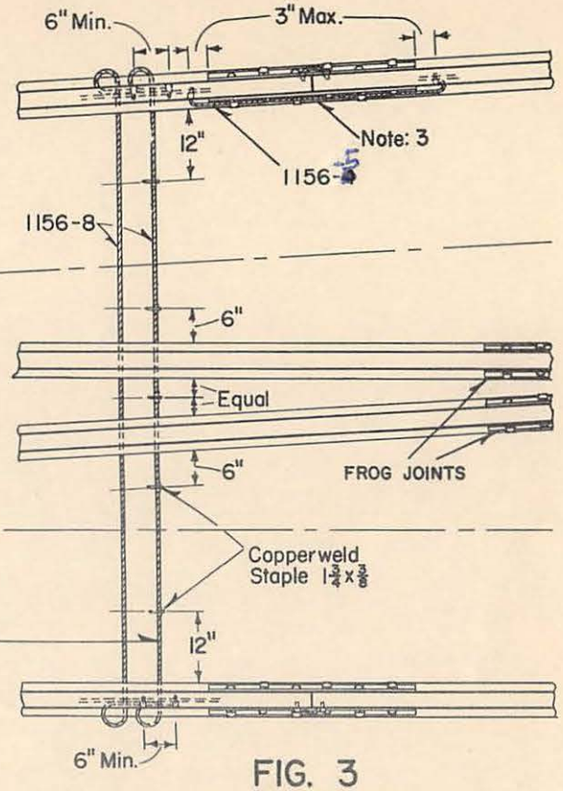

FIG. 3
(NOTE 4)

NOTES:
1. Rail Head Bonds see Plan 1157.
2. All bonding in accordance with Instruction 36.
3. Each Non-Insulated Joint in fouling circuit shall be bonded with one web bond and one rail head bond except where track relay or track feed is located on end of fouling section, then the web bond shall be omitted.
4. Fig. 2 to be installed where track relay or track feed is located on end of fouling section, otherwise install Fig. 3.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
BONDING
FROGS, SWITCH POINTS AND FOULING CIRCUITS

Approved L. S. Bottinelli
Chief Signal Engineer

S-1158

ISSUED 7-15-60

SHEET 2 Cont'd on Sh.....

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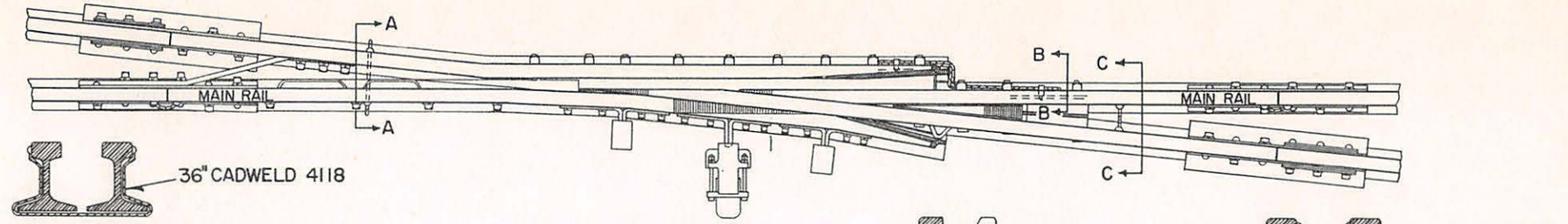

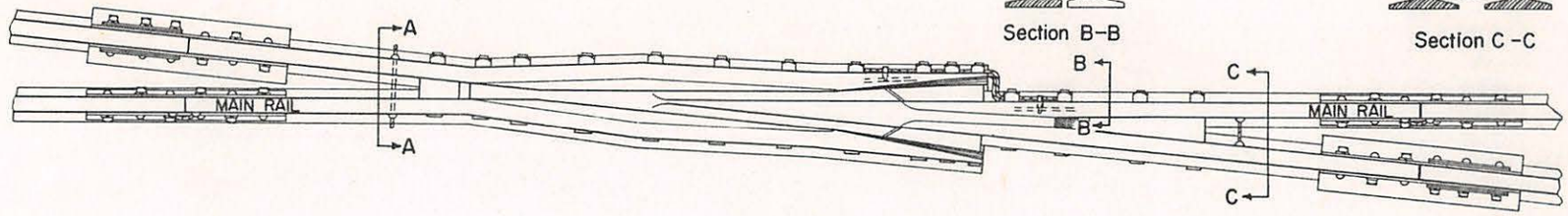

RIGID FROG

NOTES:

1. Frog and Frog Joints to be bonded with welded type bonds as indicated (Section B-B).
2. All bonding in accordance with Instruction 36.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

BONDING

FROGS, SWITCH POINTS AND FOULING CIRCUITS

S-1158

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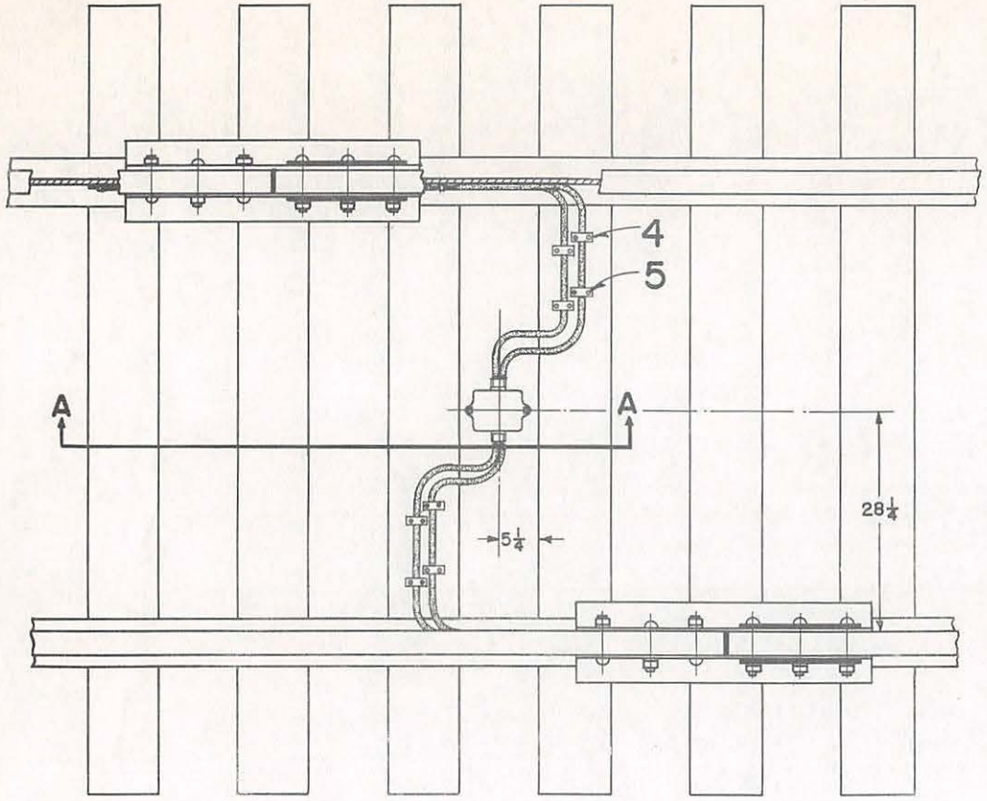
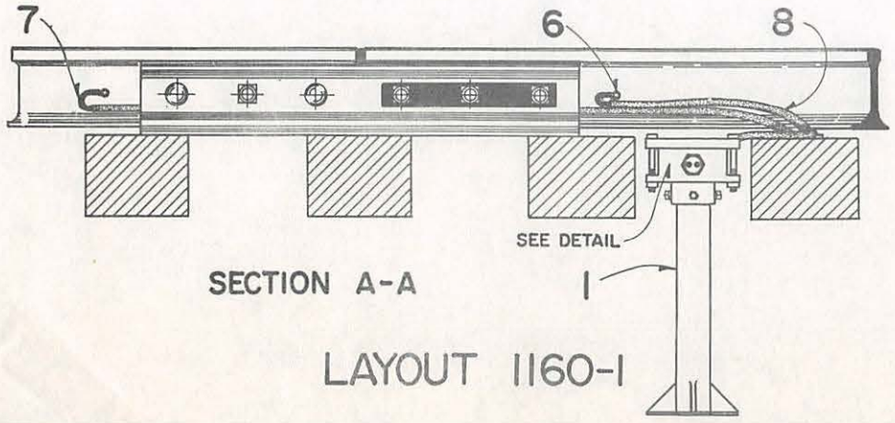
ISSUED 4-2-57.

SHEET 1 Cont'd on Sh. 2





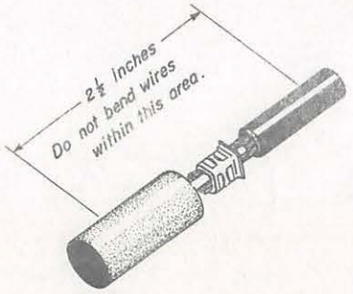
SECTION A-A

LAYOUT 1160-I

NO.	ITEM (See Note)		REF.	LAYOUT 1160-I ITEMS	SPECIFY AS REQUIRED	REMARKS
1	Box, Junction - Complete With Connectors, (2-S-815)	Raco	463-85	1		
2						
3	Connector, Compression Joint	T. & B.	54615	4		
4	Guard, Fibre	Raco	378-12	8		
5	Nails, Roofing - Barbed Copperweld 1-1/2 In.			16		
6	Stran-Pin	Raco	624-5	4		
7	Bond Strand, Insulated	Raco	624-2		30 Ft. (Est.)	State length req.
8	Sleeving, Protective	Raco	625		30 Ft. (Est.)	" " "

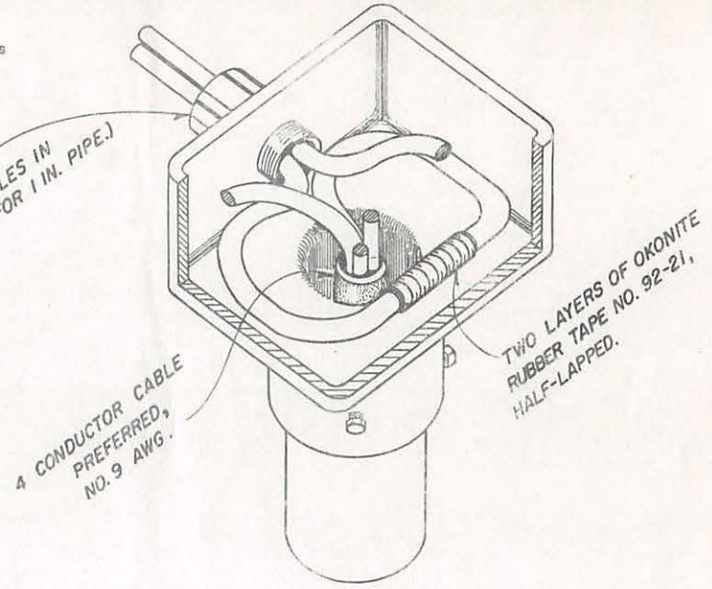
NOTE:

Assembly, RACO, Reference 463-94, includes Items 1, 4, 5 & 6. Otherwise see individual items as listed above.



DETAIL-FIG. 1
WIRE SPLICE

COMPRESSION JOINT TO BE MADE WITH THOMAS & BETTS INSTALLATION TOOL TBM 2 WHICH PROVIDES COLOR CODED DIES. GRAY DIE MUST BE USED WHEN INSTALLING ITEM 3.



DETAIL-FIG. 2
TYPICAL CONNECTION
IN JUNCTION BOX

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TRACK LEAD CONNECTIONS

Approved L. J. Fortinelli
Chief Signal Engineer

S-1160

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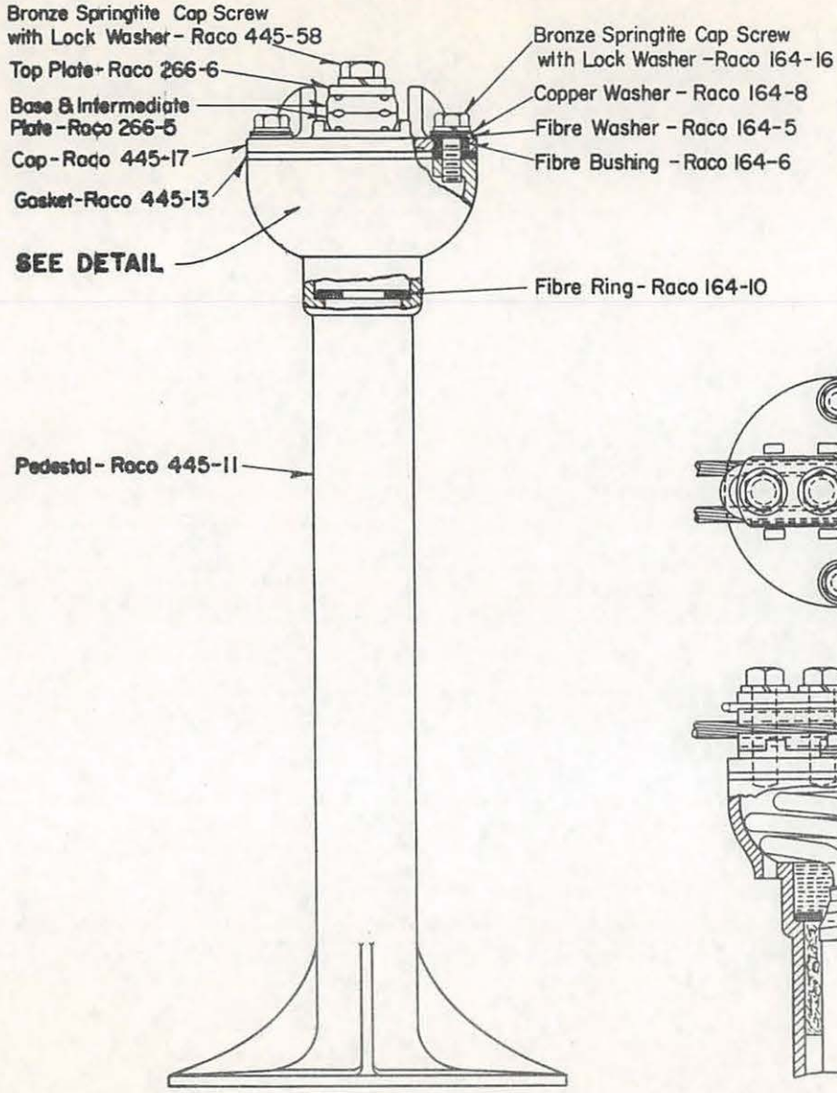
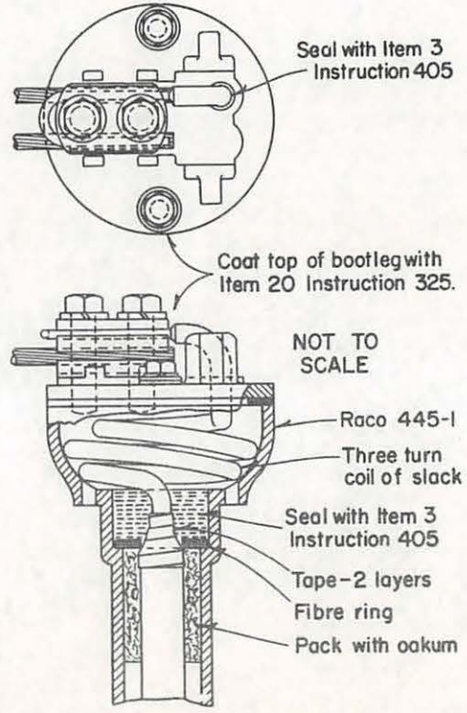
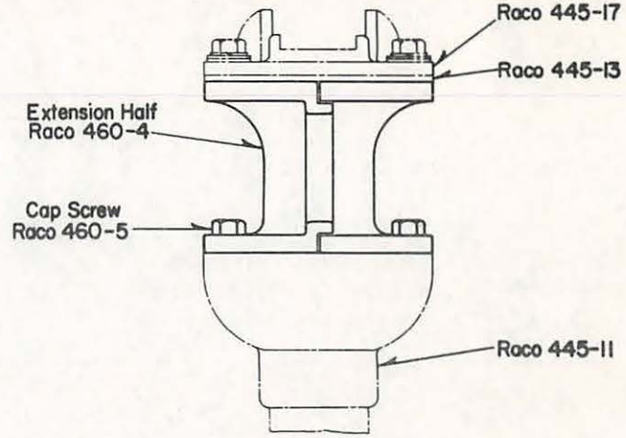
ISSUED 12-7-59
SHEET 1 Cont'd.on Sh.



RACO 445-1, BOOTLEG COMPLETE



DETAIL



RACO 460-9 3IN. BOOTLEG EXTENSION COMPLETE

0 1 2 3 6

All dimension given in inches

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

BOOTLEG ASSEMBLY

Approved H.A. Scott
Chief Signal Engineer

S-1165

ISSUED 10-15-58

SHEET 1 Cont'd on Sh.

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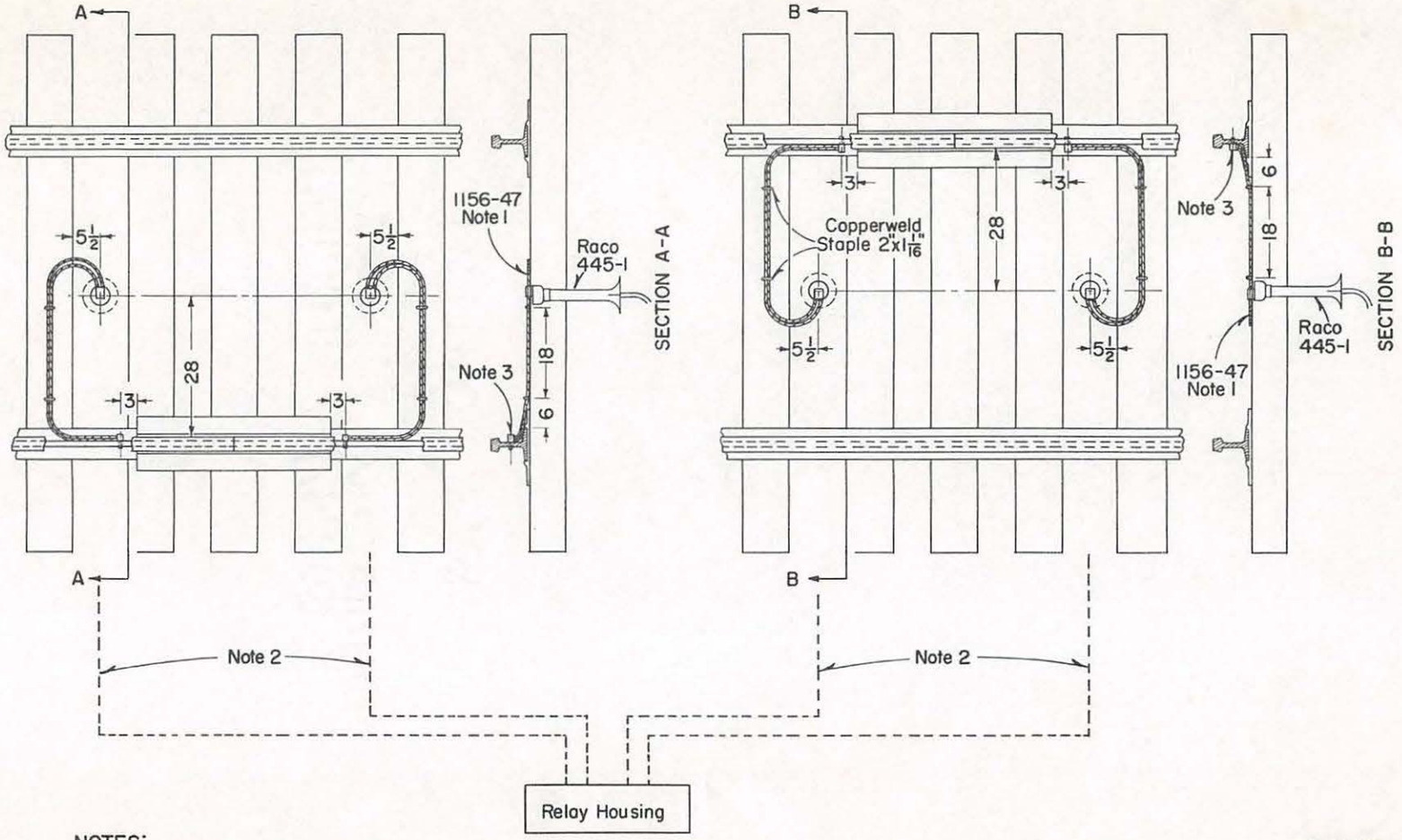

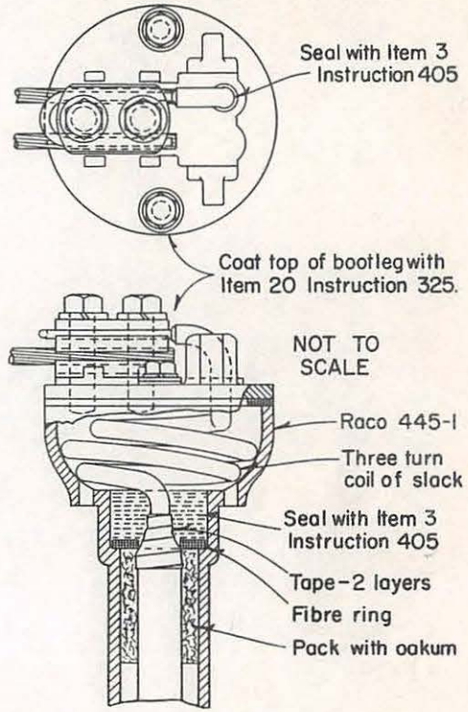

0 12 24 36

All dimension given in inches

NOTES:

1. Keep conductors free of ballast
2. Single conductor No. 9 AWG. solid in accordance with Instruction 485 paragraph 1 unless otherwise specified
3. All bonding in accordance with Instruction 36.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

BOOTLEG APPLICATION

Approved B S Converse
Asst. Vice President-Engineering

I E Dunn
Engr. Mtce. of Way

H A Scott
Chief Signal Engineer

S-1165

ISSUED 11-19-57

SHEET 2 Cont'd on Sh.

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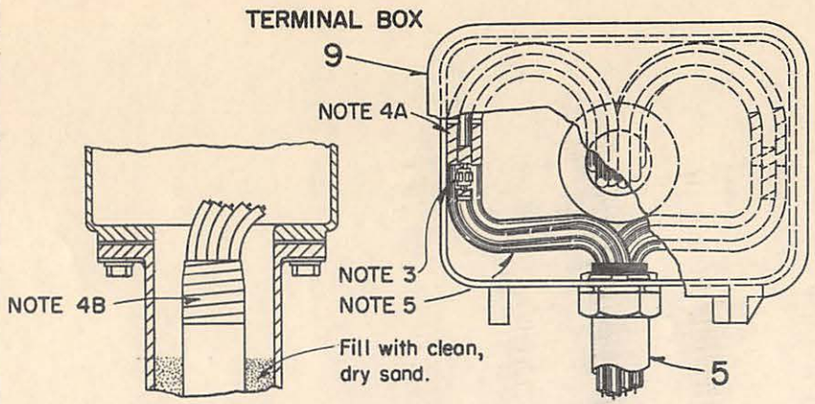
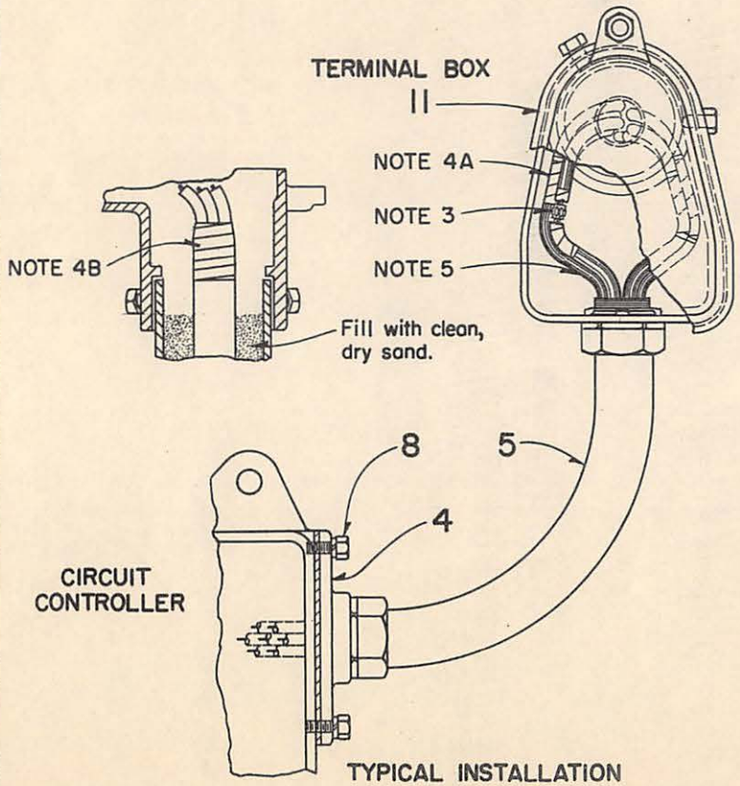
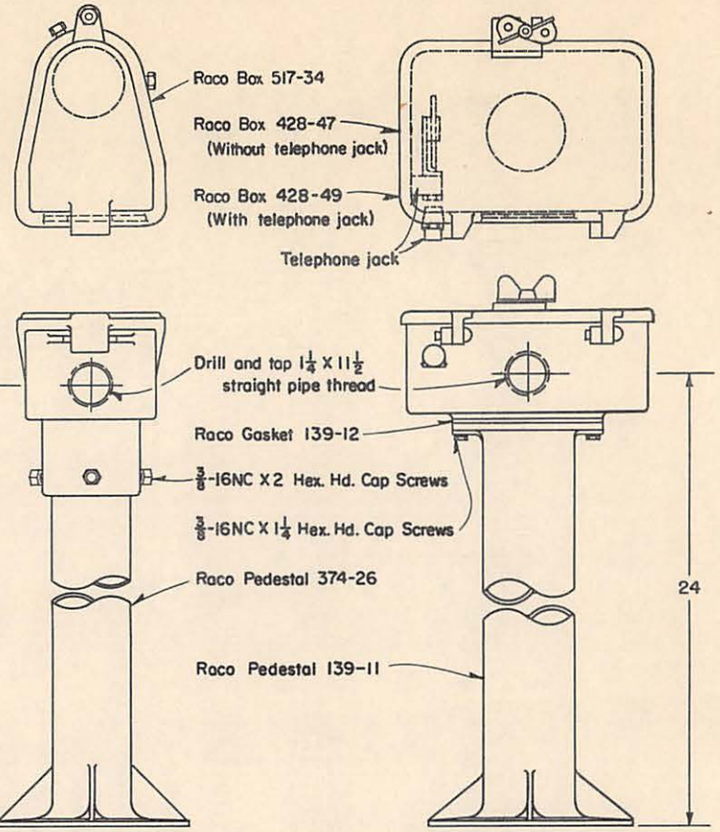




TYPICAL INSTALLATION
NO SCALE



TERMINAL BOX COMPL.
RACO 517-32

TERMINAL BOX COMPL.
RACO 428-40, Without phone jack.
RACO 428-42, With phone jack.

0 6 9 12 18
All dimensions given in inches.

NOTES:

1 - Applications shown may vary to meet requirements of local conditions.

2 - Stranded wire AAR Spec. 111. No. 12 wire preferred, larger diameter wire may be used.

3 - Amp parallel connector No. 34318 applied with Certi-Crimp tool No. 59070.

4A - Two layers of Scotch No. 33 tape, half-lapped.
B - Two layers of Scotch No. 33 tape, half-lapped followed by two layers of friction tape.

5 - Each conductor to be tagged with Raco Cleartag 585-1. See Plan 2700.

6 - Reference numbers indicate items shown on Sheet 2, Material List.

7 - Protective treatment - Paint, Item 32, Instruction 350.

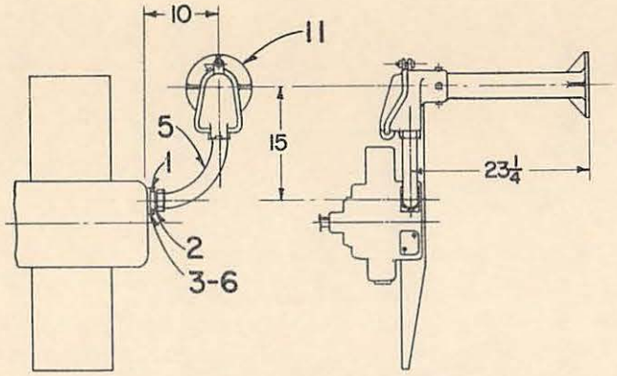
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TERMINAL BOXES

S-1170

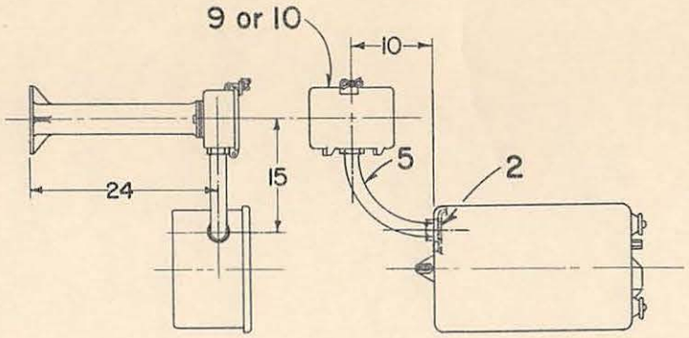
Printed in U. S. A.

ISSUED 4-10-59

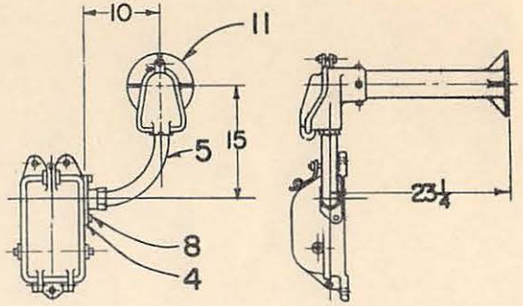
SHEET 1 Cont'd on Sh 2



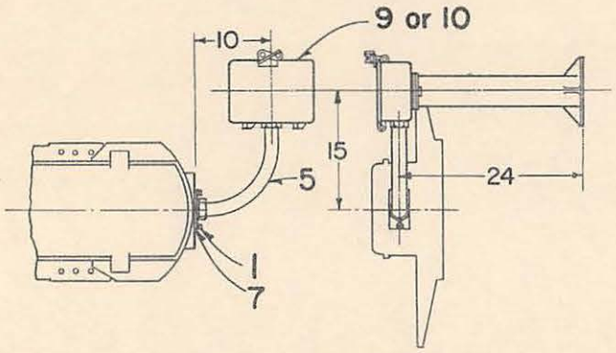
G.R.S. MODEL 9 SWITCH MACHINES



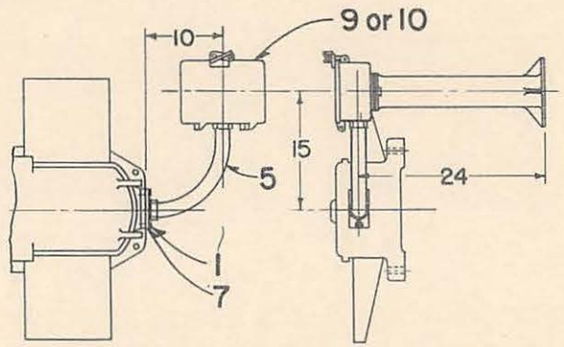
G.R.S. MODEL 13 SWITCH MACHINES



G.R.S. SWITCH CIRCUIT CONTROLLER



G.R.S. MODEL 6 SWITCH MACHINES



G.R.S. MODEL 5 SWITCH MACHINES

NOTES:

1.- Model 9 Switch Machine to provide 1-1/2 inch tapped hole. Items 3 & 6 are required only when removal of Raco Entrance Seal is necessary.

0 6 12 24 36
All dimensions given in Inches

NO.	MATERIAL SPECIFY ITEMS 5, 9, 10 & 11 AS REQUIRED. OTHER ITEMS AS PROVIDED ON SWITCH LAYOUTS.	REFERENCE	MODEL 9 MACH.	MODEL 13 MACH.	SWITCH CIR. CONT.	MODEL 6 MACH.	MODEL 5 MACH	REMARKS
1	Bolts, 5/16-18 X 1 in. Hex. Hd. & Nut & Spring Lock Washers		2			2	2	
2	Bushing, Reducing 1-1/2 X 1-1/4	GRS 41892-13	1	1				
3	Cap, Tapped 1-1/2 Pipe Thread	GRS 35491-25	1					See Note 1
4	Cap, Tapped 1-1/4 Pipe Thread	GRS 35491-24			1			
5	Conduit Assembly	1173-1	1	1	1	1	1	
6	Gasket	GRS 13014-287	1					See Note 1
7	Plate	GRS 52106-12				1	1	
8	Screw 3/8-16 X 1 Hex. Hd. & Lock Washer				2			
9	Terminal Box	RACO 428-40		1		1	1	
10	Terminal Box	RACO 428-42						
11	Terminal Box	RACO 517-32	1		1			
12								

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TERMINAL BOXES

Approved R. J. Baccinelli
Chief Signal Engineer

S-1170

ISSUED 6-28-60

SHEET 2 Cont'd on Sh.

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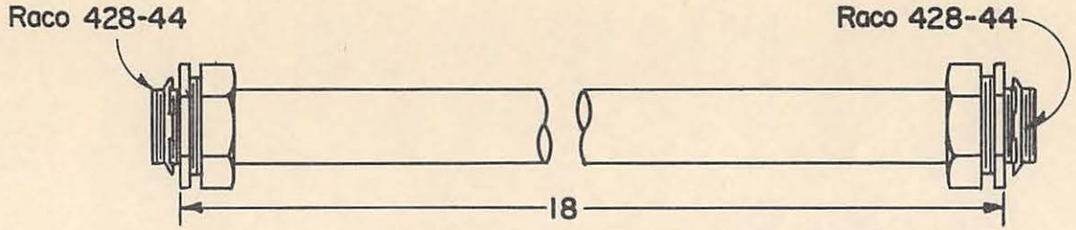
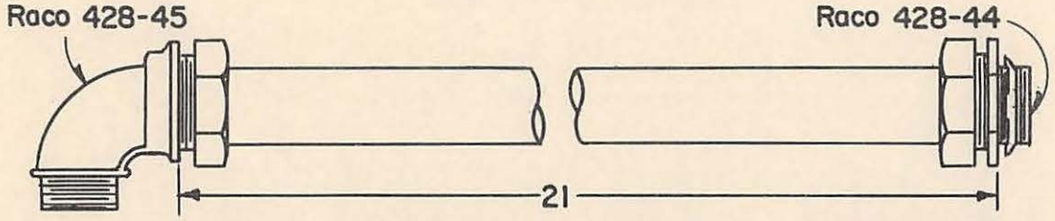


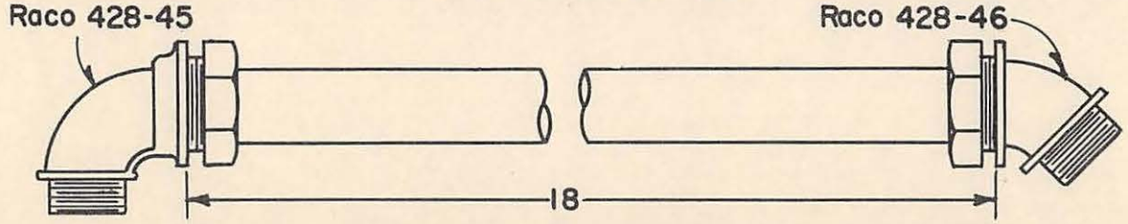
1173-1, CONDUIT ASSEMBLY, COMPLETE

Raco 428-39 or equal.



1173-2, CONDUIT ASSEMBLY, COMPLETE

Raco 428-52 or equal.



1173-3, CONDUIT ASSEMBLY, COMPLETE

Raco 428-53 or equal.

NOTES:

1 - Conduit to be liquid tight, 1-1/4 inch diameter.

2 - 1173-1 to be mounted as indicated on Plan 1170.

3 - 1173-2 to be mounted on automatic gates. Gate mechanism to be equipped with GRS Cover Plate 52106-12. Base to have AAR Cap 14723, drilled and tapped 1-1/4 X 11-1/2 straight pipe thread.

4 - 1173-3 to be mounted as indicated on Plan 3100.

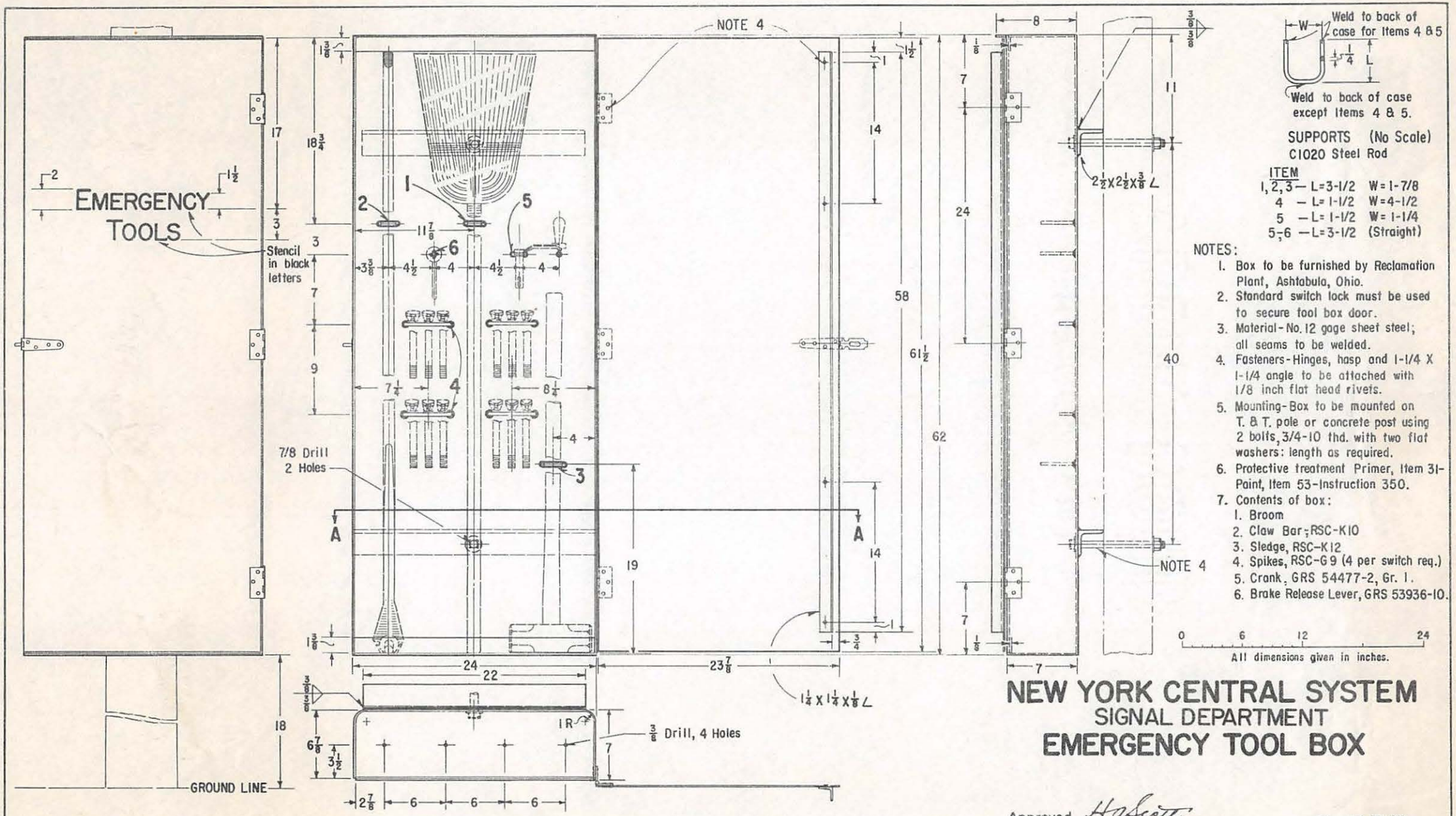
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
CONDUIT ASSEMBLIES

Approved L. J. Bottinelli
Chief Signal Engineer

S-1173

Printed in U.S.A.

ISSUED 4-10-59



SUPPORTS (No Scale)
C1020 Steel Rod

ITEM	
1, 2, 3	L=3-1/2 W=1-7/8
4	L=1-1/2 W=4-1/2
5	L=1-1/2 W=1-1/4
5, 6	L=3-1/2 (Straight)

NOTES:

1. Box to be furnished by Reclamation Plant, Ashtabula, Ohio.
2. Standard switch lock must be used to secure tool box door.
3. Material - No. 12 gage sheet steel; all seams to be welded.
4. Fasteners - Hinges, hasp and 1-1/4 X 1-1/4 angle to be attached with 1/8 inch flat head rivets.
5. Mounting - Box to be mounted on T. & T. pole or concrete post using 2 bolts, 3/4-10 thd. with two flat washers: length as required.
6. Protective treatment Primer, Item 31-Paint, Item 53-Instruction 350.
7. Contents of box:
   1. Broom
   2. Claw Bar, RSC-K10
   3. Sledge, RSC-K12
   4. Spikes, RSC-G9 (4 per switch req.)
   5. Crank, GRS 54477-2, Gr. 1.
   6. Brake Release Lever, GRS 53936-10.

0 6 12 24
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
EMERGENCY TOOL BOX

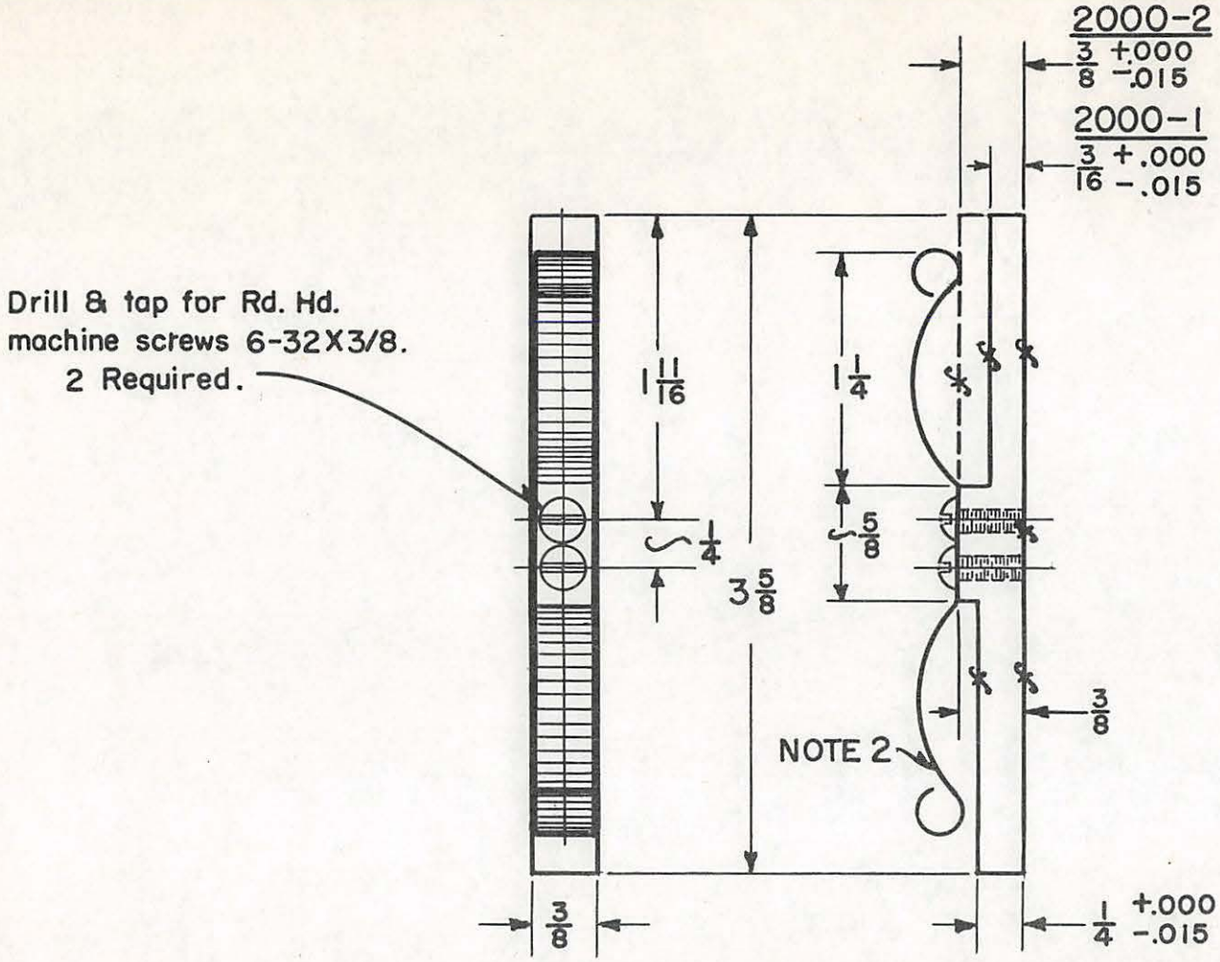
Approved H.A. Scott
Chief Signal Engineer

S-1175

Printed in U.S.A.

ISSUED 10-31-57

SHEET 1 Cont'd on Sh



NOTES:

1. Gage 2000-2 is to be used for testing classification yard switches only.
2. Heller Spring No. 0.
3. - C-1020 steel bar, Case hardened after milling and drilling and before assembly.

0 1 2 3

All dimensions given in inches.

2000-1 SWITCH ADJUSTMENT GAGE

2000-2 SWITCH ADJUSTMENT GAGE

(SEE NOTE 1)

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
GAGE
SWITCH ADJUSTMENT

Approved H A Scott
Chief Signal Engineer

S-2000

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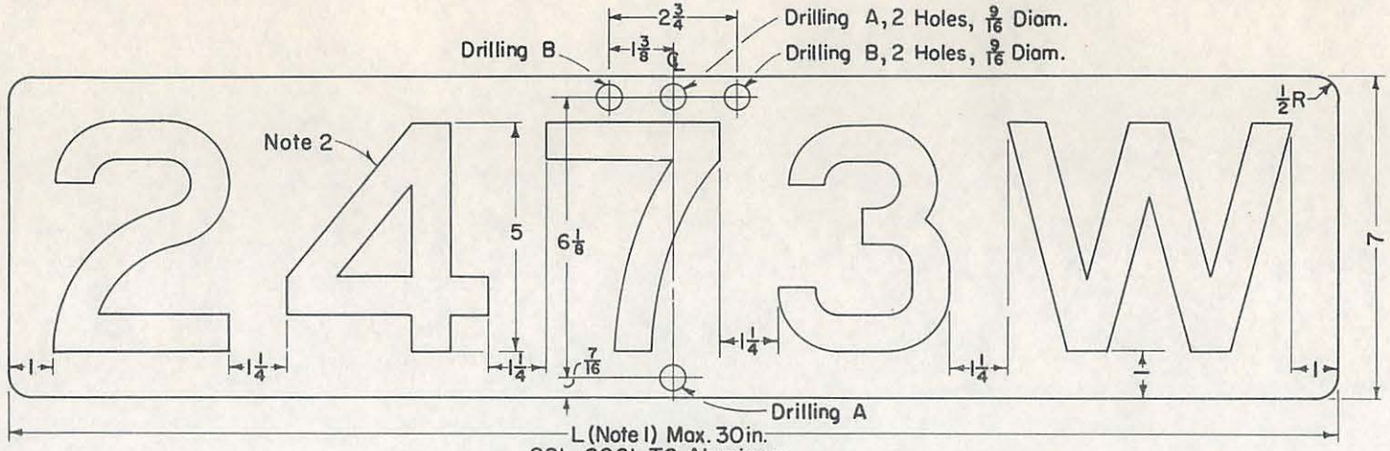
ISSUED 10-15-58

SHEET 1 Cont'd on Sh___



.081 - 6061-T6 Aluminum

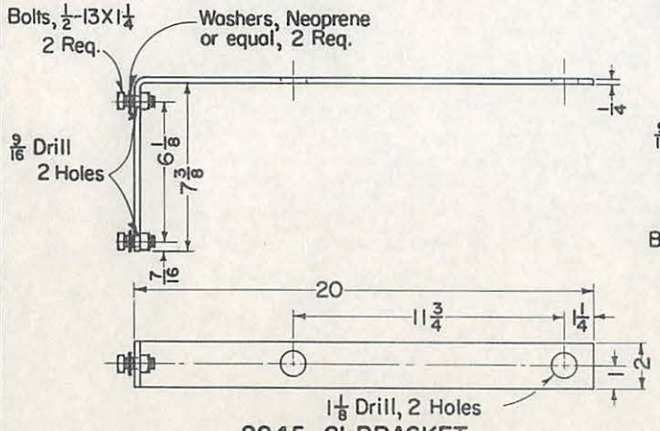
2245-11 TYPICAL NUMBER PLATE ONLY (Note 5)

Scale 1

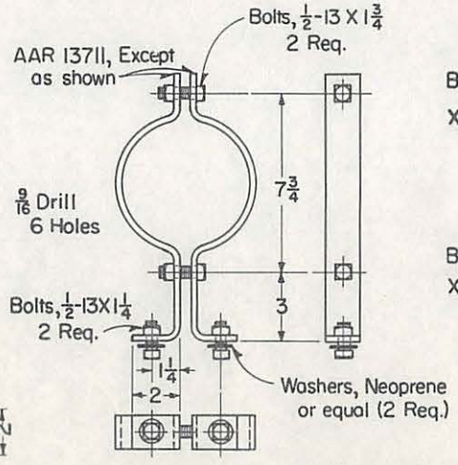
NOTES:

1. Dimension "L" will be determined by number of letters and numerals required on each sign.
2. See Roadway Standard Plan J-2B for proportion of letters and numerals.
3. Face of plate to be covered with Minn. Mining & Mfg. No. 605 Black Scotchcal.
4. Letters and numerals to be Minn. Mining & Mfg. No. 2270 wide angle Silver Flat-Top Scotchlite.
5. Specify letters and numerals required on each sign.
6. All bolts and nuts to be galvanized or cadmium plated after threads have been cut. Bolts, nuts and threads shall be in accordance with AAR Specification, Manual Part 17.

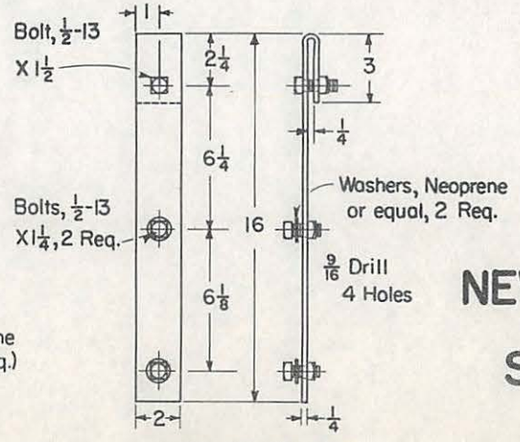
TYPICAL NUMBER PLATE COMPL. (Note 5)			
ORDER NO.	BRACKET	DRILLING	FOR MOUNTING ON
2245-1	2245-21	A	BRACKET POST
2245-2	2245-22	B	MAST
2245-3	2245-23	A	SIGNAL BRIDGE



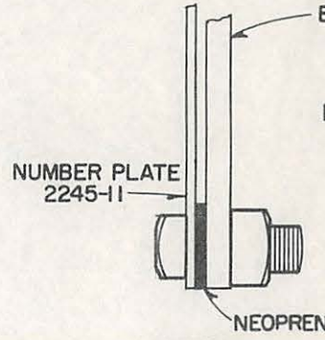
2245-21 BRACKET
C1020 Steel
Scale 2



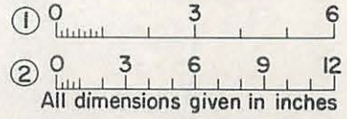
2245-22 BRACKET
C1020 Steel
Scale 2



2245-23 BRACKET
C1020 Steel
Scale 2



DETAIL



NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SIGNAL NUMBER PLATES

Approved L. J. Bottnell
Chief Signal Engineer

S-2245

ISSUED 1-23-59

SHEET 1 Cont'd on Sh

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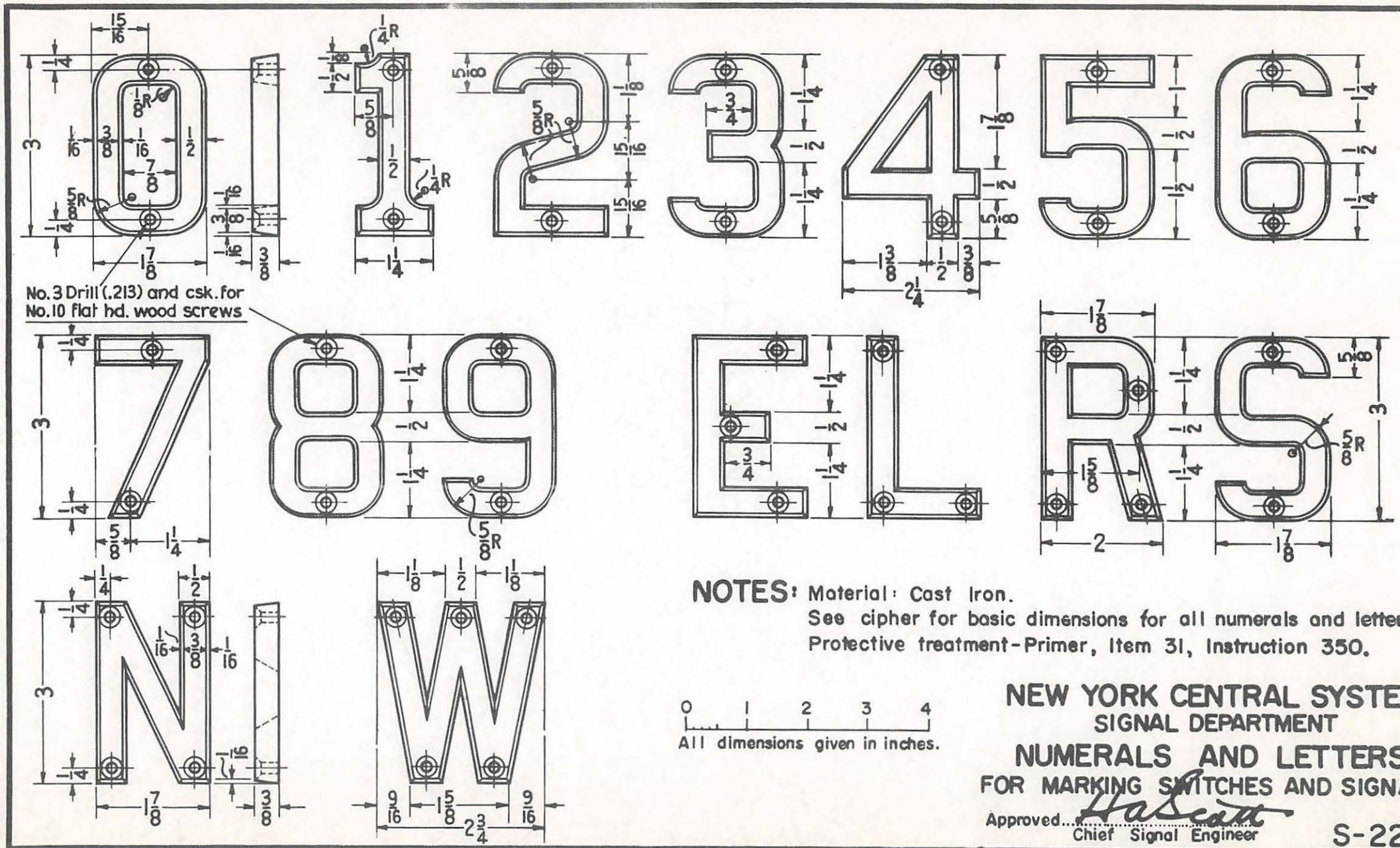

NOTES: Material: Cast Iron.
See cipher for basic dimensions for all numerals and letters.
Protective treatment - Primer, Item 31, Instruction 350.

0 1 2 3 4
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
NUMERALS AND LETTERS
FOR MARKING SWITCHES AND SIGNALS

Approved... Chief Signal Engineer

S-2280

ISSUED 12-23-57
SHEET 1 Cont'd on Sh....

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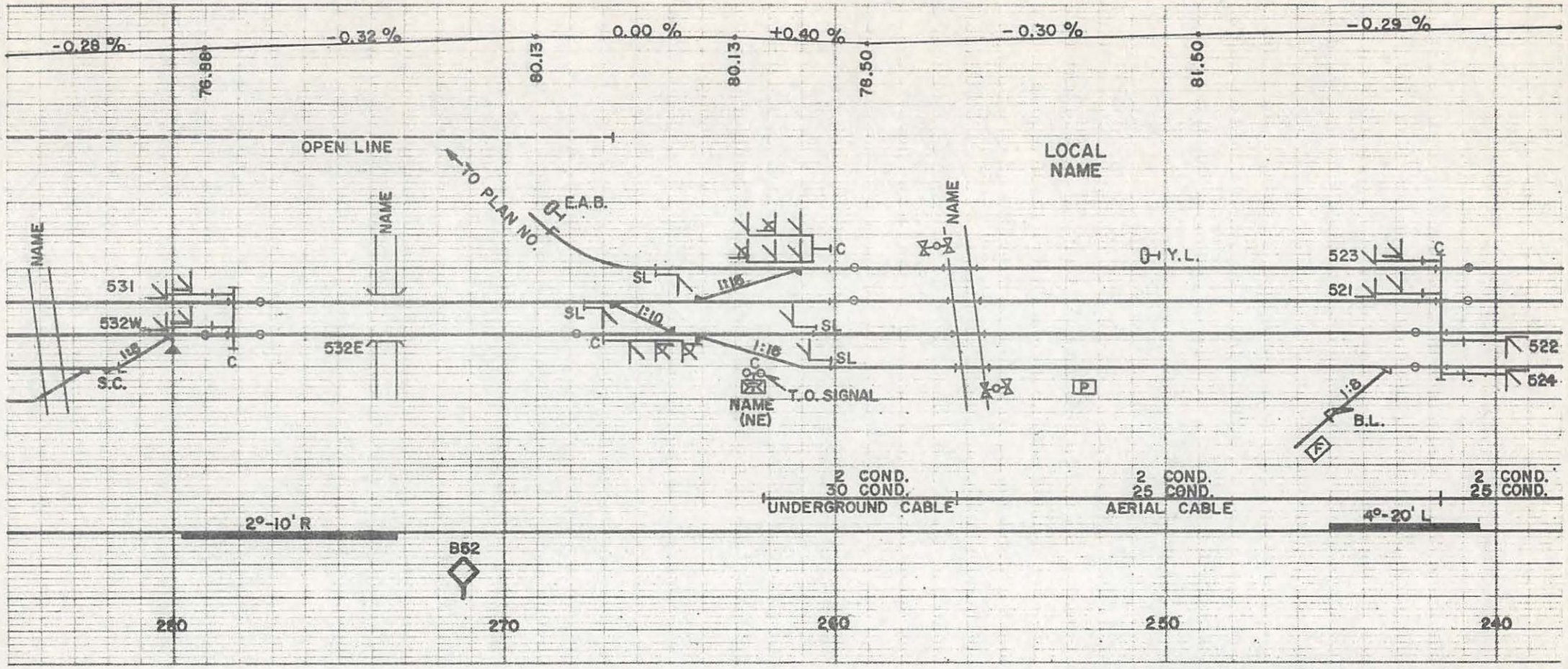

Scale: Horizontal - 1 in. = 400 Ft., Vertical - 1 in. = 40 Ft.
Vertical scale applies to grade profile only.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
ROAD DIAGRAM

Approved L. J. Bottinelli
Chief Signal Engineer

S-2300

NOTES:

1 - All graphical symbols to be in accordance with AAR standards. Where special apparatus is shown, indicate name or discription.

2 - Indicate curves and grades in direction of increasing chaining: Curves; L=Left, R=Right.
Grades; +=Ascending, -=Descending, 0.00 =Level.

3 - Local name of location to be retained on Road Diagram if station is discontinued.

4 - Tracings to be prepared on standard profile cloth 12 inches wide, Keuffel & Esser Co., Plate A-4 X 20 or equal. Tracings to be of sufficient length to show approximately five road miles. Each tracing will show approximately ten miles of road consisting of two five mile lengths.

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ISSUED 10-19-59

SHEET ___ L. Cont'd. on Sh ____

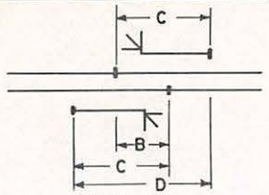

FIG. 1

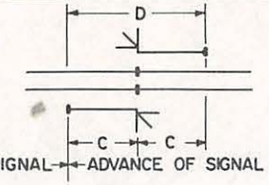

FIG. 2

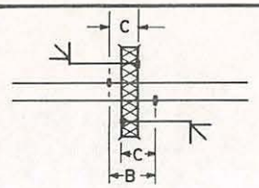

FIG. 3

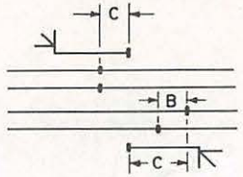

FIG. 4

AUTOMATIC SIGNALS

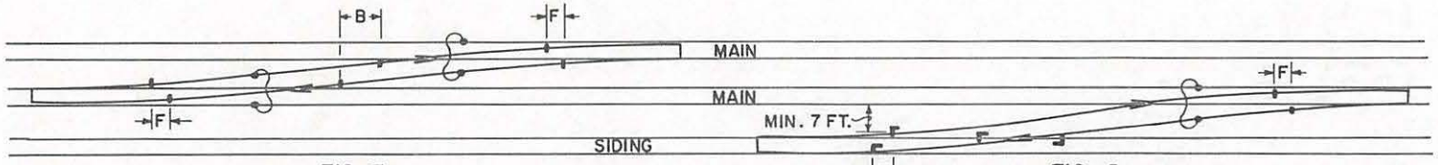

FIG. 5
MAIN TO MAIN
BOLT LOCKED

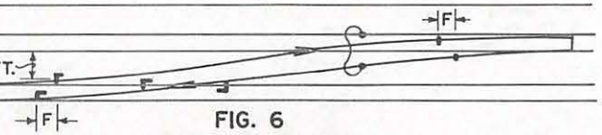

FIG. 6
MAIN TO SIDING
BOLT LOCKED WHERE REQUIRED

NON-INTERLOCKED CROSSOVERS

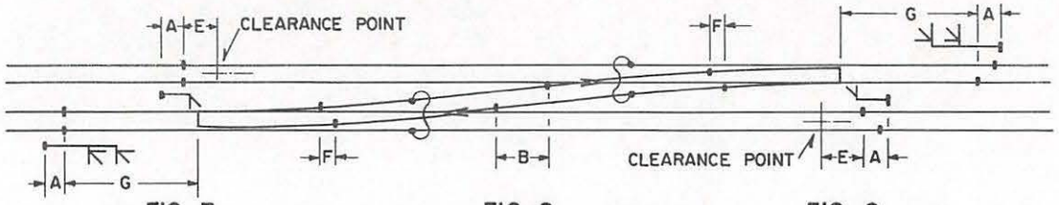

FIG. 7 FIG. 8 FIG. 9

INTERLOCKED CROSSOVER

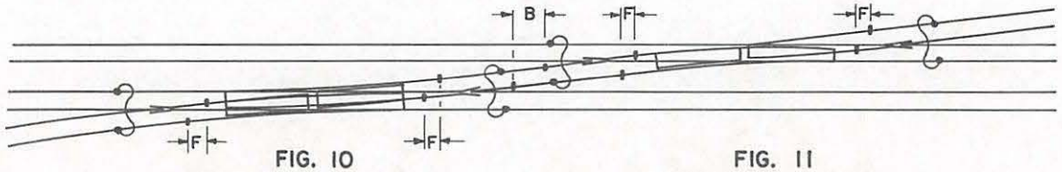

FIG. 10
DOUBLE SLIP

FIG. 11
SINGLE SLIP

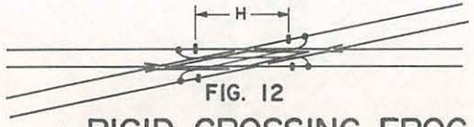

FIG. 12
RIGID CROSSING FROG

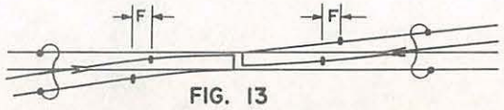

FIG. 13
RIGID OR M. P. FROG

GENERAL NOTES

1 - Minimum clearance point, 13 feet between track centers. Where track centers are less than 13 feet, clearance point to be equal to track centers.

2 - No joint shall be in rear of a signal except as in Fig. 3, Sheet 1.

3 - Where a signal is provided to govern movement through a turnout at better than restricted speed, an additional track relay shall be installed at end of turnout.

4.- Minimum length of track circuit 60 feet between effective insulated joints.

5.- Joints may be reversed as to rails except as noted on Sheet 3.

6.- Where foreign current is present joints shall be placed opposite as illustrated in Figs. 2, 4 and 7. Where joints are required to be opposite, stagger shall not exceed 1 inch.

7.- Location of joints is based on the following:

Minimum wheel base of equipment	= 28 Ft.
Minimum wheel base of truck	= 5 Ft.
Maximum clear span of equipment.	= 60 Ft.
Maximum overhang of equipment	9 Ft.-7 In.

8.- At cut sections, tolerance is allowable as per dimension B.

NOTATION

A - May vary from 0 Ft. to 5 Ft.

B - Not more than 5 Ft.

C - May vary from 0 Ft. to 28 Ft.

D - May vary from 20 Ft. to 36 Ft. Recommended distance 20 Ft.

E - Not less than 8 Ft.

F - Not more than 4 Ft. 6 In.

G - Not less than 43 Ft. except in terminal territory where it shall not be less than 5 Ft.

H - Not more than 28 Ft.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
INSULATED JOINT LOCATION

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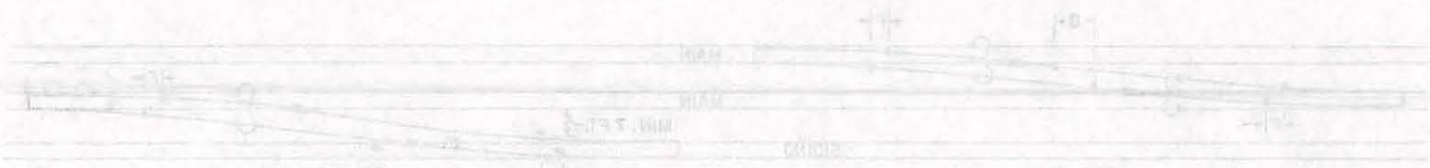
SHEET 1 Cont'd on Sh 2



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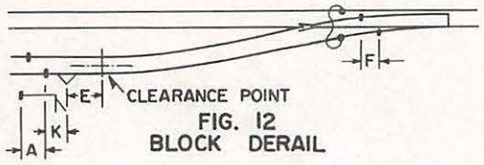

FIG. 12
BLOCK DERAIL

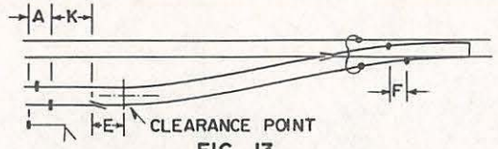

FIG. 13
POINT DERAIL

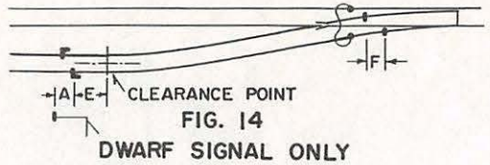

FIG. 14
DWARF SIGNAL ONLY

INTERLOCKED TURNOUTS

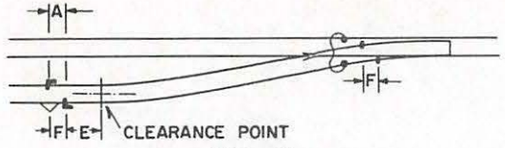

FIG. 15
BLOCK DERAIL

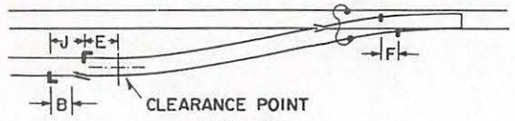

FIG. 16
POINT DERAIL

NON-INTERLOCKED TURNOUTS

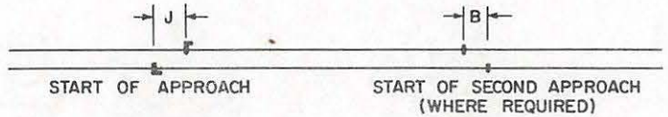

FIG. 17
NON-SIGNALED TRACK

FIG. 18
NON-SIGNALED TRACK

APPROACH CIRCUITS

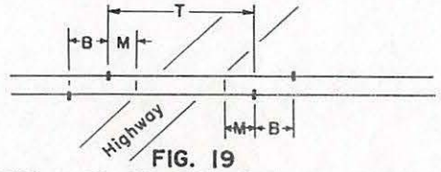

FIG. 19
SIGNALED OR NON-SIGNALED TRACK

HIGHWAY CIRCUIT

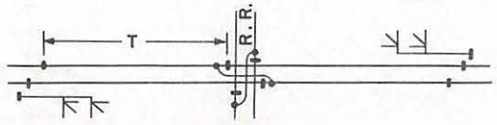

FIG. 20
ONE COMMON RAIL

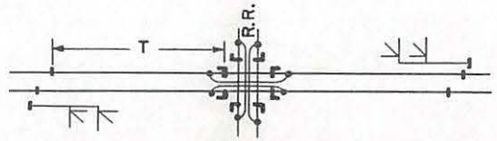

FIG. 21
INSULATED FROGS

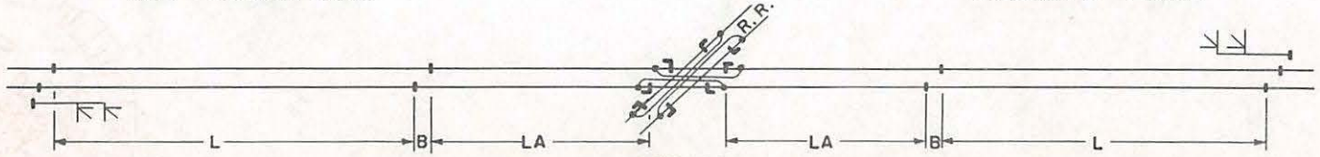

FIG. 22
TRAP CIRCUIT - FOR DEAD SECTION OF MORE THAN 28 FEET

RAILROAD GRADE CROSSINGS

SEE GENERAL NOTES - SHEET 1

NOTATION

A - May vary from 0 Ft. to 5 Ft.

B - Not more than 5 Ft.

E - Not less than 8 Ft.

F - Not more than 4 Ft.-6 In.

J - Not more than 20 Ft.

K - Not less than 5 Ft.

L-LA - Not less than 60 Ft. Where insulated joints cannot be located as shown, L + LA may be not less than 60 Ft. provided B is not more than 4 Ft. 6 In. and neither L nor LA is less than 20 Ft.

M - May vary from 10 Ft. to 200 Ft. on single track or to 100 Ft. on multiple tracks in order to utilize existing signals or cut-section location.

T - Not less than 60 Ft.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
INSULATED JOINT LOCATION

S-2301

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SHEET 2 Cont'd on Sh. 3

FIG. 12
BLOCK DERAIL

FIG. 13
POINT DERAIL

FIG. 14
DWARF SIGNAL ONLY

SEE GENERAL NOTES- SHEET 1

INTERLOCKED TURNOUTS

FIG. 15
BLOCK DERAIL

FIG. 16
POINT DERAIL

NON-INTERLOCKED TURNOUTS

FIG. 17
NON- SIGNALED TRACK

FIG. 18
NON-SIGNALED TRACK
(WHERE REQUIRED)

START OF APPROACH

START OF SECOND APPROACH

FIG. 19
SIGNALED OR NON-SIGNALED TRACK

APPROACH CIRCUITS

HIGHWAY CIRCUIT

FIG. 20
ONE COMMON RAIL

FIG. 21
INSULATED FROGS

FIG. 22
TRAP CIRCUIT - FOR DEAD SECTION OF MORE THAN 28 FEET

RAILROAD GRADE CROSSINGS

NOTATION

A - May vary from 0 Ft. to 5 Ft.

S - Not more than 5 Ft.

E - Not less than 8 Ft.

F - Not more than 4 Ft.-8 In.

J - Not more than 20 Ft.

K - Not less than 5 Ft.

L-LA-Not less than 60 Ft. Where insulated joints cannot be located as shown, L + LA may be not less than 60 Ft. provided S is not more than 4 Ft. 6 In. and neither L nor LA is less than 20 Ft.

M - May vary from 10 Ft. to 200 Ft. on single track or to 100 Ft. on multiple tracks in order to utilize existing signals or suitable location.

T - Not less than 50 Ft.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
INSULATED JOINT LOCATION

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SHEET 2 Continued on Sh. 3

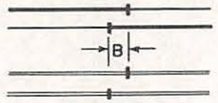


FIG. 23
TRANSPOSITION
SINGLE OR DOUBLE RAIL
TRACK CIRCUITS

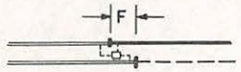


FIG. 24
DOUBLE RAIL TRACK CIRCUIT
ABUTTING
NO TRACK CIRCUIT

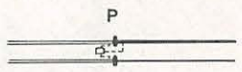


FIG. 25
DOUBLE RAIL TRACK CIRCUIT
ABUTTING
SINGLE RAIL TRACK CIRCUIT

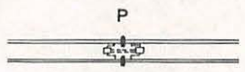


FIG. 26
DOUBLE RAIL TRACK CIRCUIT
ABUTTING
DOUBLE RAIL TRACK CIRCUIT

SEE GENERAL NOTES - SHEET 1

ADJOINING TRACK CIRCUITS

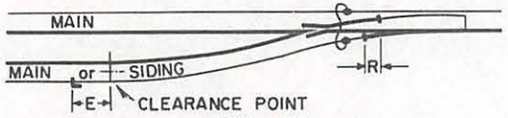


FIG. 27
MAIN TO MAIN OR SIDING

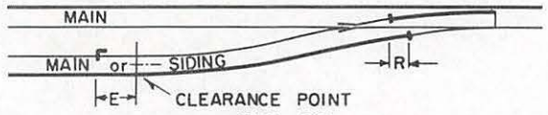


FIG. 28
MAIN TO MAIN OR SIDING

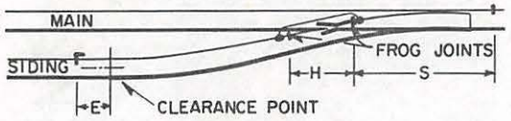


FIG. 29
MAIN TO SIDING

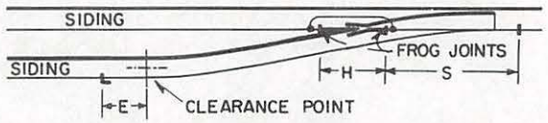


FIG. 30
SIDING TO SIDING OR IN TERMINAL TERRITORY

TURNOUTS

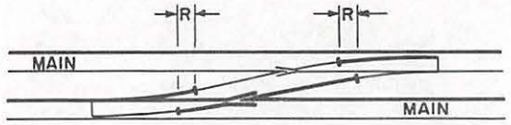


FIG. 31
MAIN TO MAIN

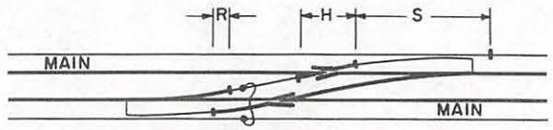


FIG. 32
MAIN TO MAIN

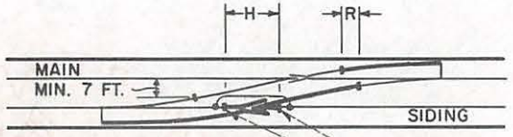
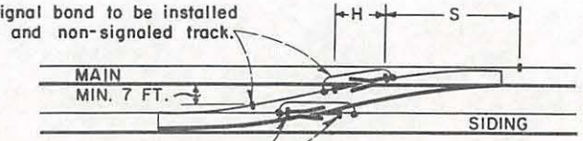


FIG. 33
MAIN TO SIDING

This joint and signal bond to be installed between main and non-signaled track.



FROG JOINTS
These joints and bond omitted in non-signaled track.

FIG. 34
MAIN TO SIDING

CROSSOVERS

NOTATION

ALL FIGURES ON SHEET 3 APPLY TO ELECTRIFIED TERRITORY.

SIGNAL RAIL

PROPULSION RAIL

SIGNAL & PROPULSION RAIL

B - Not more than 5 Ft. Propulsion rails to overlap in single rail track circuit.

E - Not less than 8 Ft.

F - Not more than 4 Ft. 6 In.

H - Not more than 28 Ft.

P - Stagger not to excede 1 In.

R - Not more than 4 Ft.-6 In. Propulsion rails to overlap.

S - Where S is less than 60 Ft. or H is more than 28 Ft.,-

In Figs. 29 & 30 - Transposition shall be made to obtain arrangement as per Figs. 27 and 28.

In Figs. 32 & 34 - Transposition shall be made to obtain arrangement as per Figs. 31 and 33.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
INSULATED JOINT LOCATION

Approved B. D. Converse
Asst. Vice President-Engineering

K. E. Dunn
Engineer Mtce. of Way

H. A. Scott
Chief Signal Engineer

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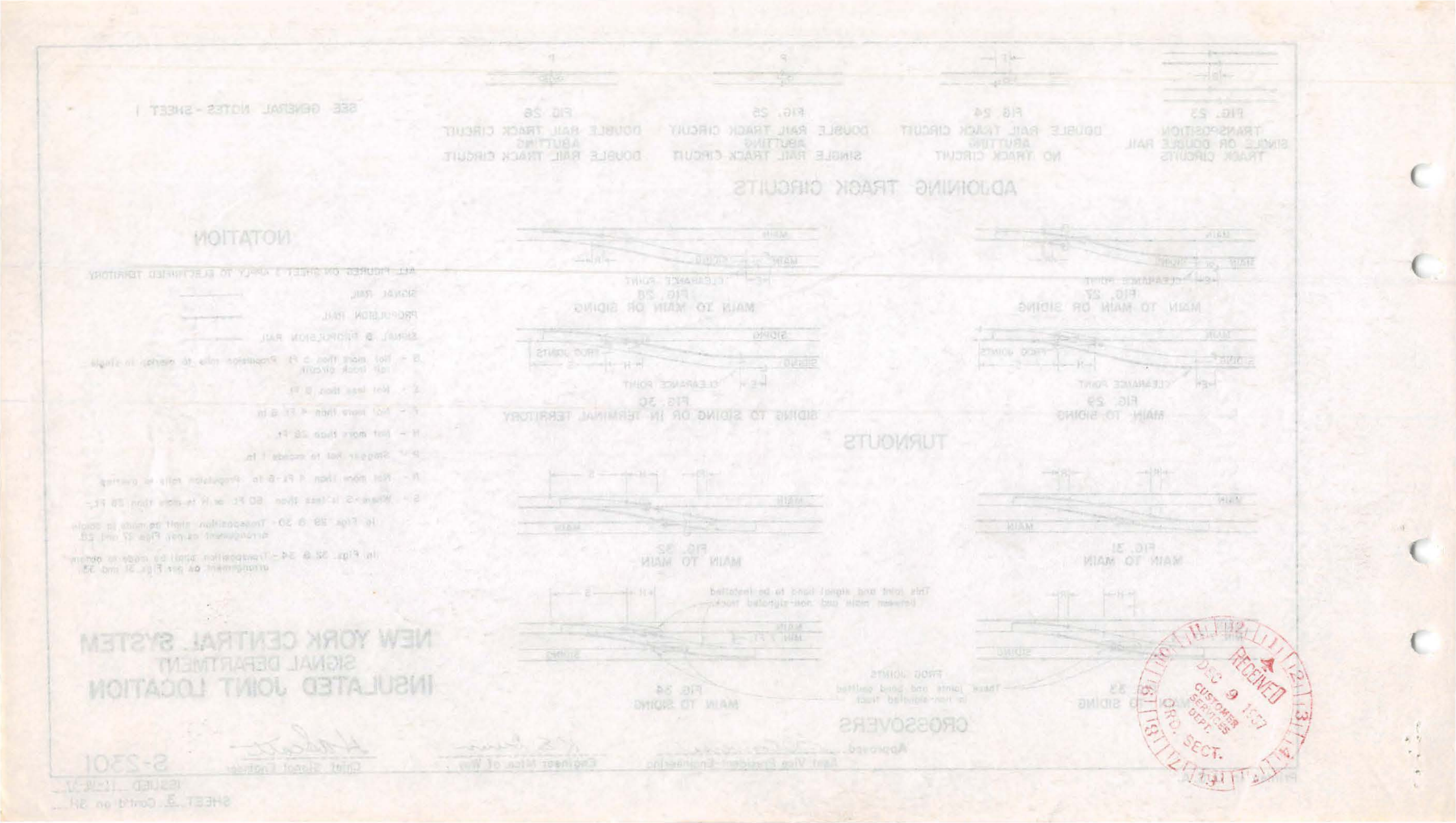
SHEET 3 Cont'd on SH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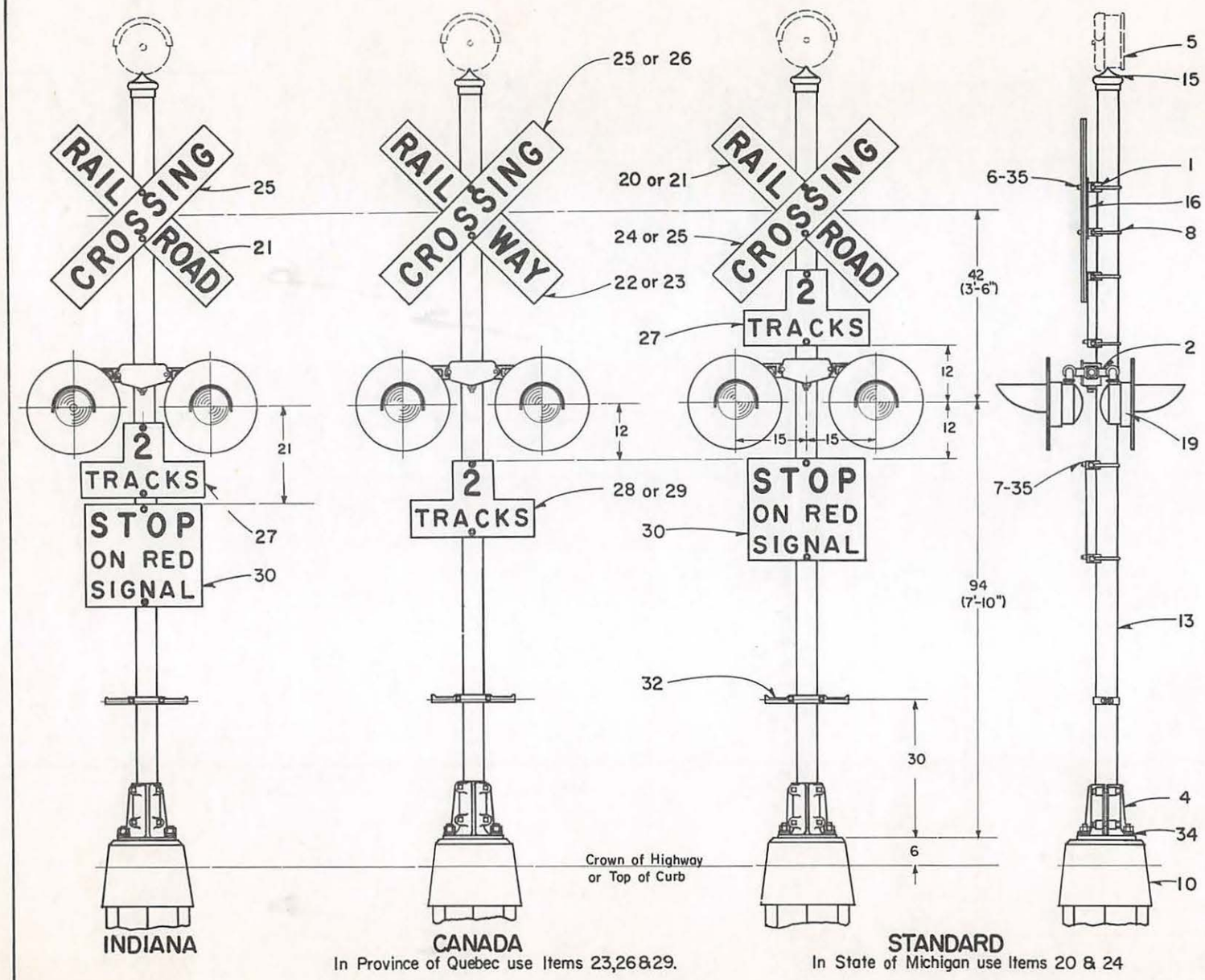
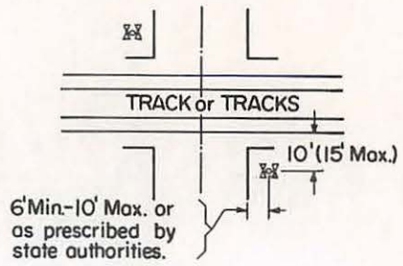


INDIANA

CANADA
In Province of Quebec use Items 23,26&29.

STANDARD
In State of Michigan use Items 20 & 24

TYPICAL LOCATION



NOTES:

1- This plan is typical for parts references. These may be varied when authorized by Chief Signal Engineer.

2- Requirements of individual States or Canadian Provinces shall be met.

3- May be varied by highway authorities to fit grade conditions.

4- Michigan requires track sign at all crossings. Other states and Canada require track sign only at crossings with two or more tracks. The number of tracks shown on the sign shall be the total number of tracks lying between the highway crossing signals.

5- Protective treatment:
Mast, pinnacle, base, crossarm, bell and pole steps- Aluminum, Item 53, Instruction 350.
Lamp cases, lamp hoods and circular backgrounds- Flat Black, Item 46, Instruction 350.

0 12 24 36 48 60

All dimensions given in inches unless otherwise indicated.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
FLASHING LIGHT TYPE

S-2312

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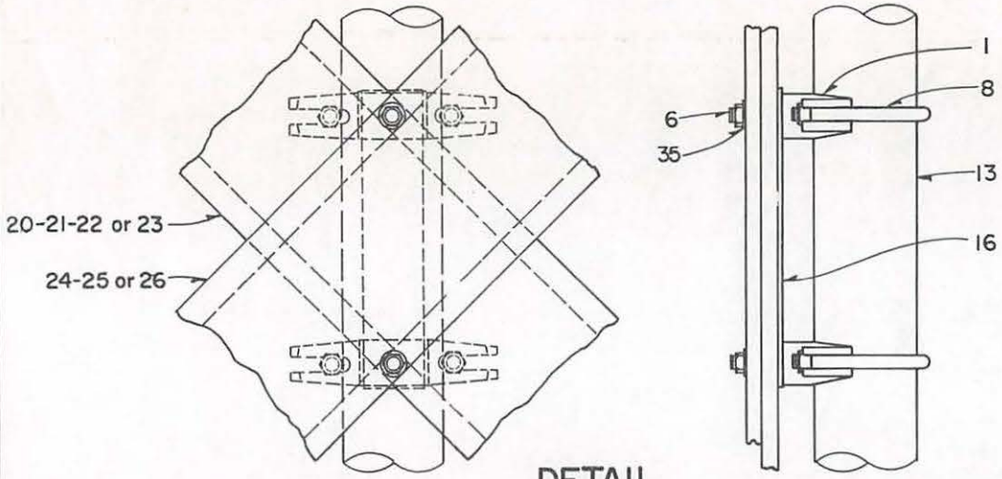
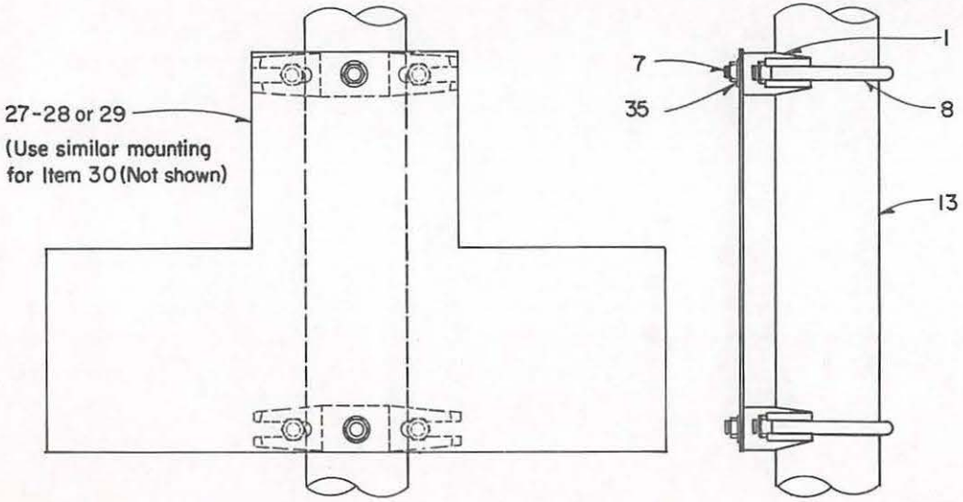
SHEET 1 Cont'd on Sh 2



DETAIL
SIGN MOUNTING
(NO SCALE)



DETAIL
SIGN MOUNTING
(NO SCALE)

NO.	ITEM (See Note 1)	REFERENCE	REQUIRED			REMARKS
			STANDARD	MICHIGAN	CANADA	
1	Adapter	AAR 16477	As Req.	As Req.	As Req.	
2	Arm, Cross-4 Way Complete	AAR 16565	1	1	1	
3						
4	Base	AAR 14492	1	1	1	
5	Bell	WRS Co. Type 222	1-If Req.	1-If Req.	1-If Req.	
6	Bolts 5/8-11 X3 Sq. Hd., Hex. Nut. *	Coml.	2	2	2	Items 20 to 26
7	Bolts 5/8-11 X1-3/4 Sq. Hd., Hex. Nut. *	"	As Req.	As Req.	As Req.	Items 27-28-29
8	Bolts, U	AAR 16554	As Req.	As Req.	As Req.	Item 1
9						
10	Foundation 3'-6"	Permacrete S1	1	1	1	
11						
12						
13	Mast 4 Inch	2656-1	1	1	1	
	Pinnacle	AAR 12452	1	1	1	
16	Plate, Backer	4844-13	1	1	1	Items 20 to 26
17						
18						
19	Signal Units	760	4	4	4	
20	Sign "Railroad"	4844-4		1		
21	Sign "Railroad"	4844-3	1			
22	Sign "Railway"	4844-5			1	
23	Sign "Railway Crossing"	4844-9				Quebec only.
24	Sign "Crossing"	4844-2		1		
25	Sign "Crossing"	4844-1	1		1	
26	Sign "Traverse du Chemin de Fer"	4844-7				Quebec only.
27	Sign, Number of Tracks. Specify Numeral	4844-10	1-If Req.	1-If Req.	-	
28	Sign, Number of Tracks. " "	4844-11			1-If Req.	
29	Sign, Number of Tracks " "	4844-14				Quebec only.
30	Sign, "Stop on Red Signal"	4844-12	1	1	-	
31						
32	Step	2655-1	1	1	1	
33						
34	Washer 1-1/16 I.D. 2-1/2 O.D.	U. S. Std.	8	8	8	
35	Washer 21/32 I.D. 1-5/16 O.D. *	SAE Std.	As Req.	As Req.	As Req	Items 6 & 7

* Bolts, nuts and threads to be in accordance with AAR Spec., Manual Part 17.

Washers to be in accordance with AAR Spec., Manual Part 35.

Bolts, Items 6 and 7, and Washers, Item 35, to be cadmium plated.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
FLASHING LIGHT TYPE

Approved L. S. Pottinger
Chief Signal Engineer

S-2312

ISSUED 6-22-59

SHEET 2 Cont'd on Sh.

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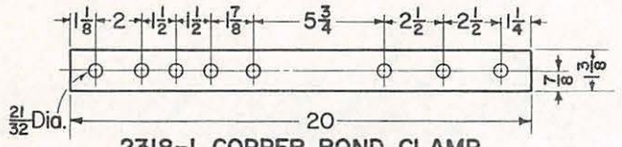
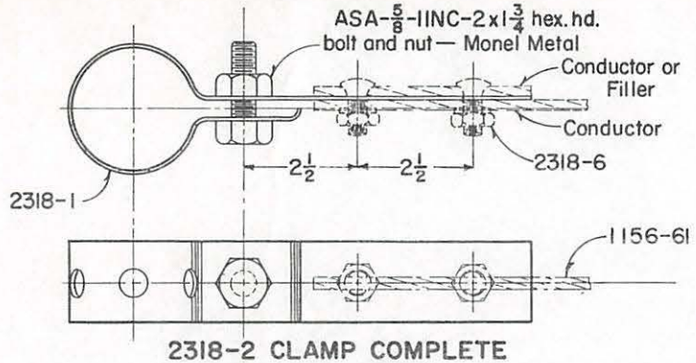
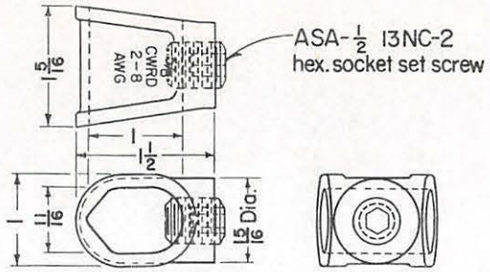


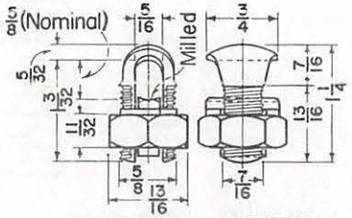
2318-1 COPPER BOND CLAMP
No. 9 A.W.G. (Tinned)



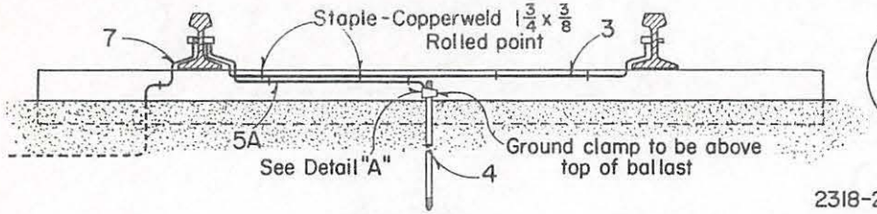
2318-2 CLAMP COMPLETE
(Except connectors)



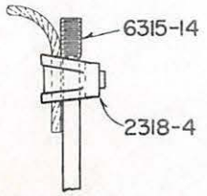
2318-4 GROUND ROD CLAMP
Hubbard-Copperweld No. 9592



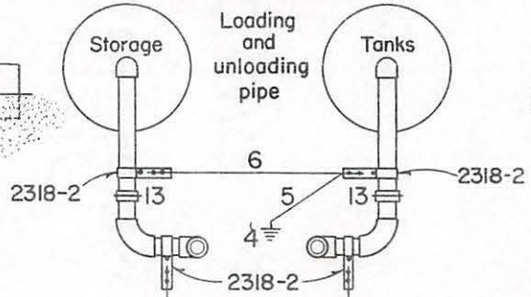
2318-6 CONNECTOR
Burndy 'Servit' Type K-23

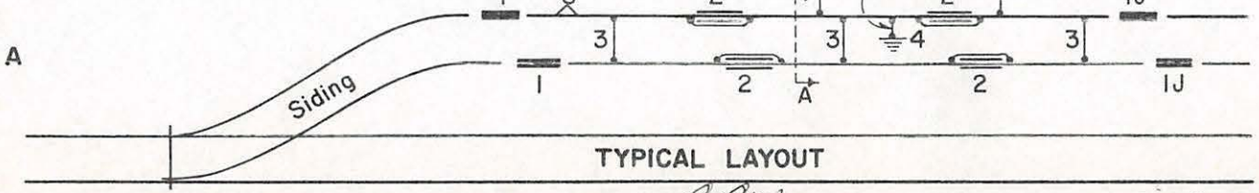


SECTION A-A



DETAIL A





TYPICAL LAYOUT

REFERENCE LIST

BONDING IN ACCORDANCE WITH N.Y.C. SYSTEM ENGINEERING COMMITTEE BOOK OF RULES GOVERNING TRANSFER OF INFLAMMABLE LIQUIDS, EFFECTIVE APRIL 10, 1943.

1-1J. Insulated rail joints: Bonded section to be of length to hold cars connected to tanks for loading or unloading only. Insulated joints "1J" not required if station is located at end of spur track.

2. Bonded rail joints: Railroad's standard plug bond, 1156-25 -one bond per joint.

3. Cross-bond: Railroad's standard cross-bond, 1156-26

7. Each pipe to be bonded to rails with 1156-53. If longer strand is required splice on 1156-61 length as required, with connector 2318-6.

8. Derail, if installed, locate back of insulated joint as shown. If pipe connected with switch point, insulate operating pipe at a point opposite insulated joint 1.

13. Insulated joints in the permanent piping system.

THE FOLLOWING BONDING AND GROUNDING SHALL BE PROVIDED ONLY WHEN SPECIFIED BY THE N.Y.C. SYSTEM MECHANICAL AND ELECTRICAL ENGINEER.

4. Ground rod with clamp.

5. Ground connection to pipe, 1156-61 length as required.

5A. Ground connection to rail, 1156-52

6. Bonding of unloading pipes, 1156-61 length as required.

Scales various: All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
BONDING OIL SIDINGS
DETAILS AND INSTRUCTIONS

Approved R. R. Mossoss
Asst. Vice President-Engineering

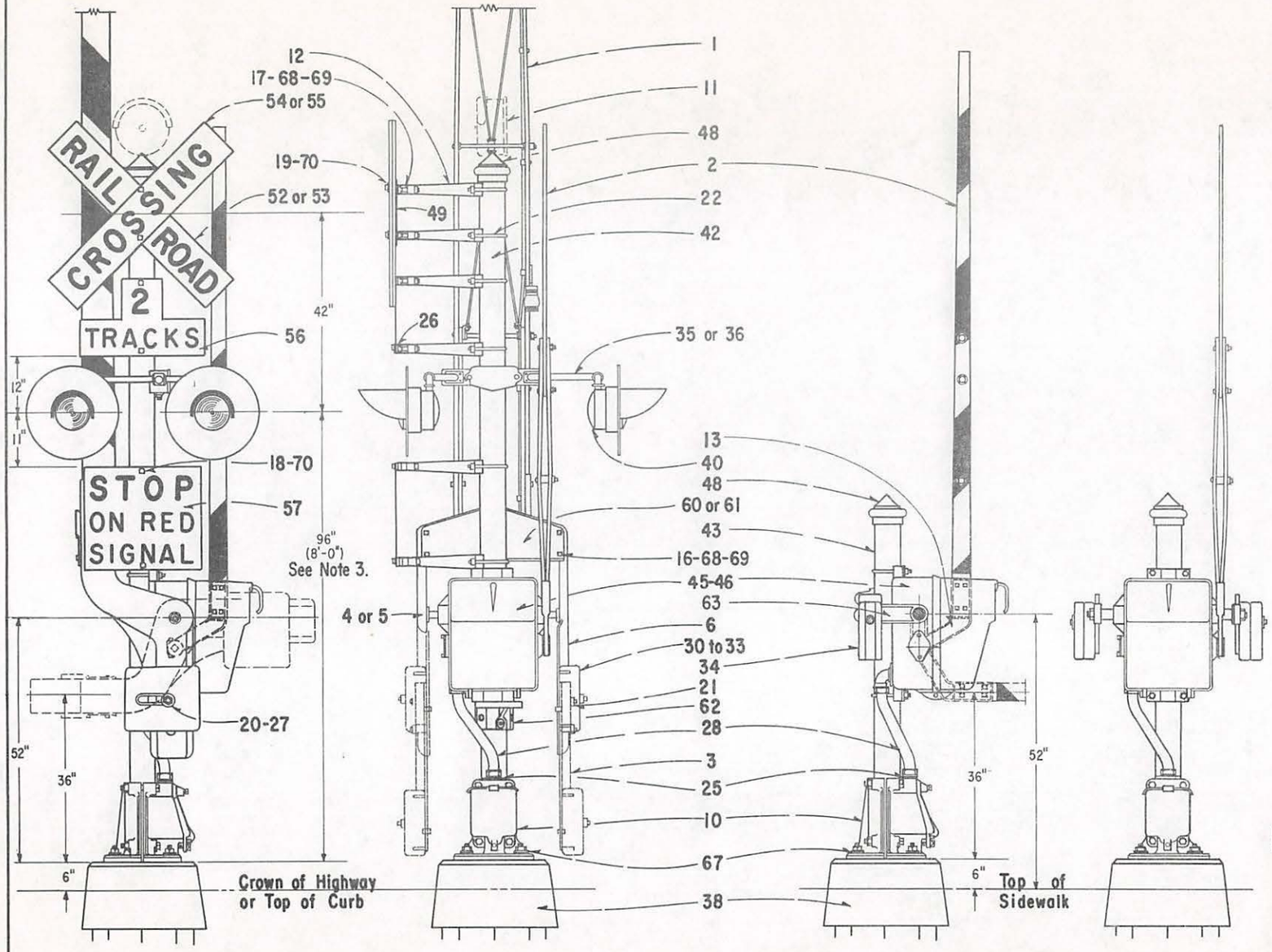
J. H. Simpson
Chief Engineer

H. A. Scott
Chief Signal Engineer

S-2318

ISSUED 9-1-52

SHEET 1 Cont'd on Sh



ROADWAY GATE

SIDEWALK GATE

NOTES:

1 – This plan is typical for parts references. These may be varied when authorized by the Chief Signal Engineer.
2 – Requirements of individual States or Canadian Provinces shall be met. For special sign requirements in Indiana and Canada see Plan 2312.
3 – May be varied by highway authorities to fit grade conditions.
4 – For details of gates and spacing of gate lamps see Plan 2330.
5 – Michigan requires track sign at all crossings. Other States and Canada require track sign only with two or more tracks. The number of tracks shown on the sign shall be the total number of tracks lying between the highway crossing signals.
6 – Protective treatment:
Lamp cases, hoods and circular backgrounds; Flat Black, Item 46, Instruction 350.
Other exposed metallic surfaces; Aluminum, Item 53, Instr. 350.
Gates; See Plan 2330.

0 12 24 36 48 60

All dimensions given in inches unless otherwise indicated.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
GATE TYPE

S-2325

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ISSUED 9-15-59

SHEET 1 Cont'd on Sh 2

FIG. 1

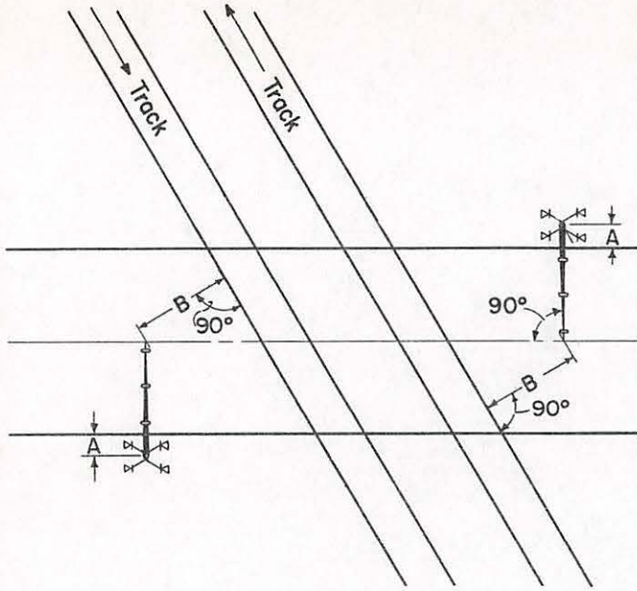


FIG. 2

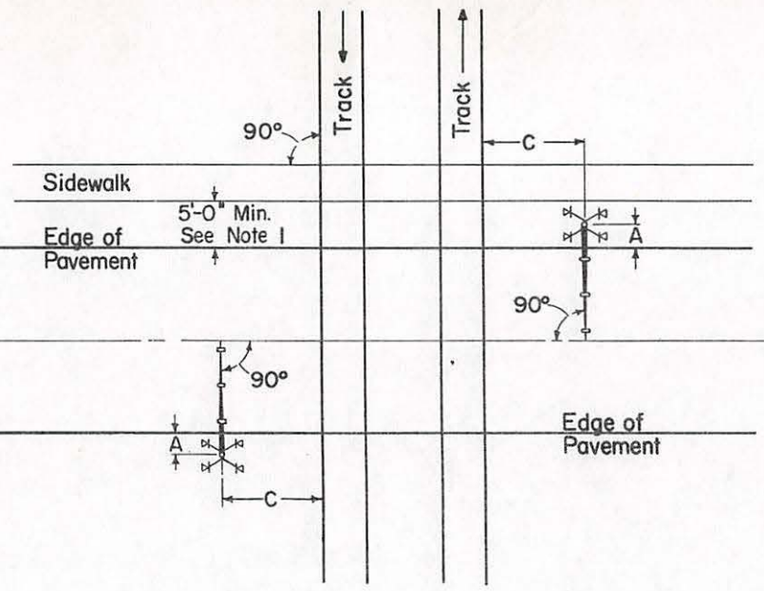
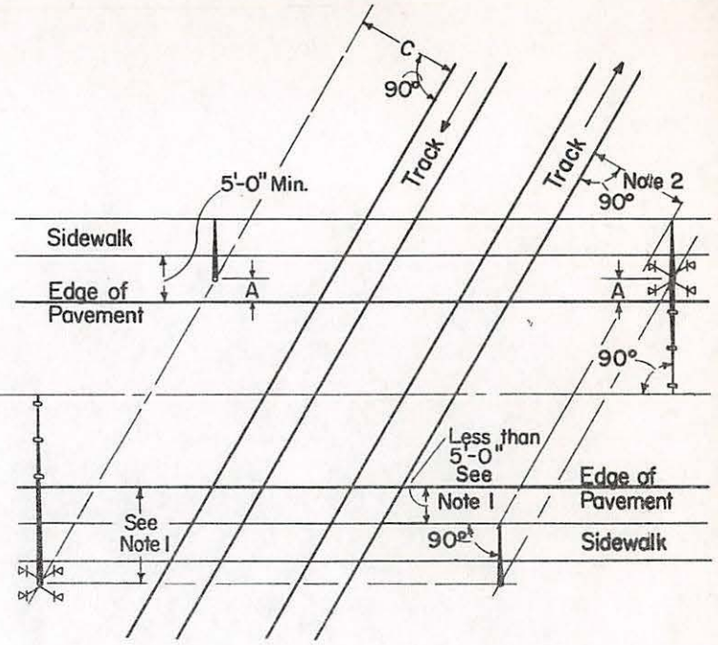


FIG. 3



Automatic gates to be located as prescribed by highway authorities.
Preferred dimensions are to be used where they do not conflict with State requirements.

REQUIREMENTS:	A	B	C
Preferred, N. Y. C. S.	2' 6" Min., 6' 0" Max. (See Note 1)	11'-0"	11'-0"
A A R	6' 0"	7'-7 3/4"	9'-7 3/4"
Illinois	6' 0"	8'-7 3/4"	8'-7 3/4"
Indiana	6' 0" Min., 10' 0" Max.	——	12' 7 3/4" Max.
New York	3' 0" Min., 10' 0" Max.	15'-0" Max.	15'-0" Max.
Ohio	6' 0"	12' 7 3/4"	12' 7 3/4"
Massachusetts	AS PRESCRIBED BY HIGHWAY AUTHORITIES		
Michigan	" " " " "		
New Jersey	" " " " "		
Pennsylvania	AAR RECOMMENDED PRACTICE		
West Virginia	" " "		

NOTES:

1 - Automatic gates to be located midway between edge of pavement and sidewalk but not to exceed 6'-0" from edge of pavement. Where sidewalk is less than 5'-0" from edge of pavement, automatic gates shall be located 2'-6" min. on other side of sidewalk but not more than 12'-0" from edge of pavement.

2 - When sidewalk gates are installed, neither gate tip nor center of mast shall be less than 11'-0" from gage of near rail.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
GATE TYPE
LOCATION PLAN

S-2325

Printed in U.S.A.

ISSUED 3-17-60

SHEET 2 Cont'd on Sh. 3

NUMBER	ITEM	REF.	REQUIRED ROADWAY GATE	REQUIRED SIDEWALK GATE	REMARKS
1	Arm, Roadway Gate	2330	1		Specify length
2	Arm, Sidewalk Gate	2330		1	" "
3	Arm, Counterweight Extension WRRS	3565-174	As Req.		
4	Arm, Gate Support L. H. WRRS	3565-101	1		Gates 14 to 24 ft. long.
5	Arm, Gate Support L. H. WRRS	3565-102			Gates 25 to 30 ft. long.
6	Arm, Gate Support R. H. WRRS	3565-103	1		Gates 14 to 44 ft. long.
7					
8					
9					
10	Base, Junction Box AAR	14711	1	1	With Cap, Item 25
11	Bell, 12 V. D.C. WRRS	0222FR	(1)		If required.
12	Bracket, Extension AAR	16963	As Req.		
13	Bracket, Sidewalk Arm WRRS	3565-111		1	
14	Buffer Leg Assembly (Not shown) WRRS	3562-316A	If Req.		Gate Arm 31 to 44 ft.
15					
16	Bolts, 1/2-13 X 1-3/4 Hex. Hd., Sq. Nut	Coml.	8		Gate Arm Support
17	Bolts, 1/2-13 X 3-1/2 Sq. Hd. Hex. Nut	Coml.	As Req.		Use with Item 12
18	Bolts, 5/8-11 X 1-3/4 Sq. Hd., Hex. Nut *	Coml.	As Req.		Signs, Items 56-57
19	Bolts, 5/8-11 X 3 Sq. Hd., Hex. Nut *	Coml.	2		Signs, Items 52-55
20	Bolts, Machine, - Complete WRRS	PL-G244-15	As Req.		Items 5 & 6
21	Bolts, Counterweight Mounting WRRS	3562-182	As Req.		Specify length
22	Bolts, U AAR	16551	As Req.		Use with Item 12
23					
24					

NUMBER	ITEM	REF.	REQUIRED ROADWAY GATE	REQUIRED SIDEWALK GATE	REMARKS
25	Cap	2326-1	1	1	With Item 10
26	Clamp, Adapter AAR	16477	As Req.		With Item 12
27	Clamp Washer WRRS	3565-104	As Req.		Use with Item 3
28	Conduit Assembly	1173-2	1	1	
29					
30	Counterweight, 200 Lbs. WRRS	3562-230	AS REQUIRED		
31	Counterweight, 100 Lbs. WRRS	3562-229			
32	Counterweight, 50 Lbs. WRRS	3562-227			
33	Counterweight, 25 Lbs. WRRS	3562-228			
34	Counterweight, 30 Lbs. WRRS	3562-428		As Req.	
35	Crossarm AAR	14681	1		With roadway arm only.
36	Crossarm AAR	14683			Roadway & sidewalk arm.
37					
38	Foundation, Precast 5'-6" Permacrete	S-2	1	1	
39					
40	Lamps	Spec. 760	As Req.		
41					
42	Mast, 5"	2656-2	1		
43	Mast, 5"	2656-3		1	
44					
45	Mechanism # GRS	59840-2Gr.1	1	1	Provides for 1 roadway or 1 sidewalk arm counterwgtted
46	Mechanism # GRS	59840-2Gr.2			Provides for 1 roadway and 1 sidewalk arm or 1 sidewalk arm with counterweights replacing roadway arm.
47					
48	Pinnacle AAR	12451	1	1	

NUMBER	ITEM	REF.	REQUIRED ROADWAY GATE	REQUIRED SIDEWALK GATE	REMARKS
49	Plate, Backer	4844-13	1		Items 52-55
50					
51					
52	Sign "RAILROAD"	4844-3	1		
53	Sign "RAILROAD"	4844-4			Michigan
54	Sign "CROSSING"	4844-1	1		
55	Sign "CROSSING"	4844-2			Michigan
56	Sign, Number of tracks. Specify numeral.	4844-10	(1)		If required
57	Sign, "STOP ON RED SIGNAL"	4844-12	1		Not req. in Canada.
58					
59					
60	Support, Gate Arm-14 to 38 ft. arm. WRRS	3565-105	1		Specify length of arm.
61	Support, Gate Arm-39 to 44 ft. arm. WRRS	3565-105X			" " " "
62	Support, Mechanism WRRS	3565-380A	1		
63	Support Arm, Counterweight	3565-203		1 or 2	As required
64					
65					
66					
67	Washer, 1-1/16 I. D.; 2-1/2 O. D.	U. S. Std.	8	8	Use with Item 10
68	Washer, Spring Lock - 1/2 in.	Com'l.	As Req.	A	Use with Items 16-17
69	Washer, 9/16 I. D, 1-3/8 O. D.	Com'l.	As Req.		" " " " "
70	Washer, 21/32 I. D., 1-5/16 O. D *	SAE Std.	As Req		Use with Items 18-19
71					
72					

* Bolts, nuts and threads to be in accordance with AAR Spec., Manual Part 17 unless otherwise noted.

Washers to be in accordance with AAR Spec., Manual Part 35.

Bolts, Items 18 and 19, and Washers, Item 70, to be cadmium plated.

Mechanism to be equipped with GRS Cover Plate 52106-12 or equal to provide connection for conduit assembly 1173-2, Item 28.

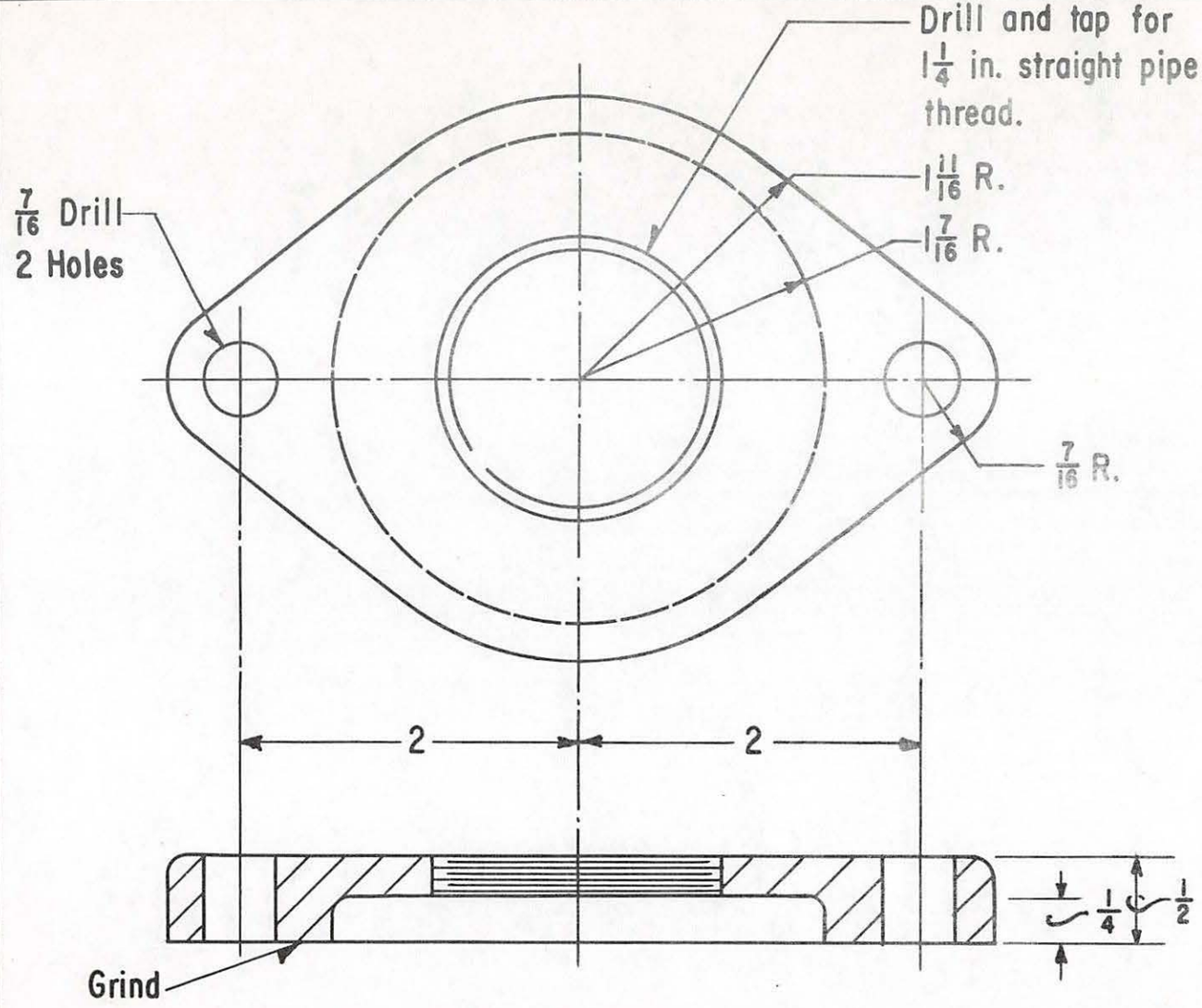
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
GATE TYPE

Approved L. S. Pottinell
Chief Signal Engineer.

S-2325

ISSUED 9-15-59

Printed in U. S. A.



2326-1, CAP

Cast Iron

NOTES:

1. - Cap is modification of AAR 14723 required on Junction Box Base AAR 14713 to provide connection for Conduit Assembly 1173-2.

2. - Protective treatment- Primer, Item 31, Instruction 350.

0 1 2 3

All dimensions given in inches.

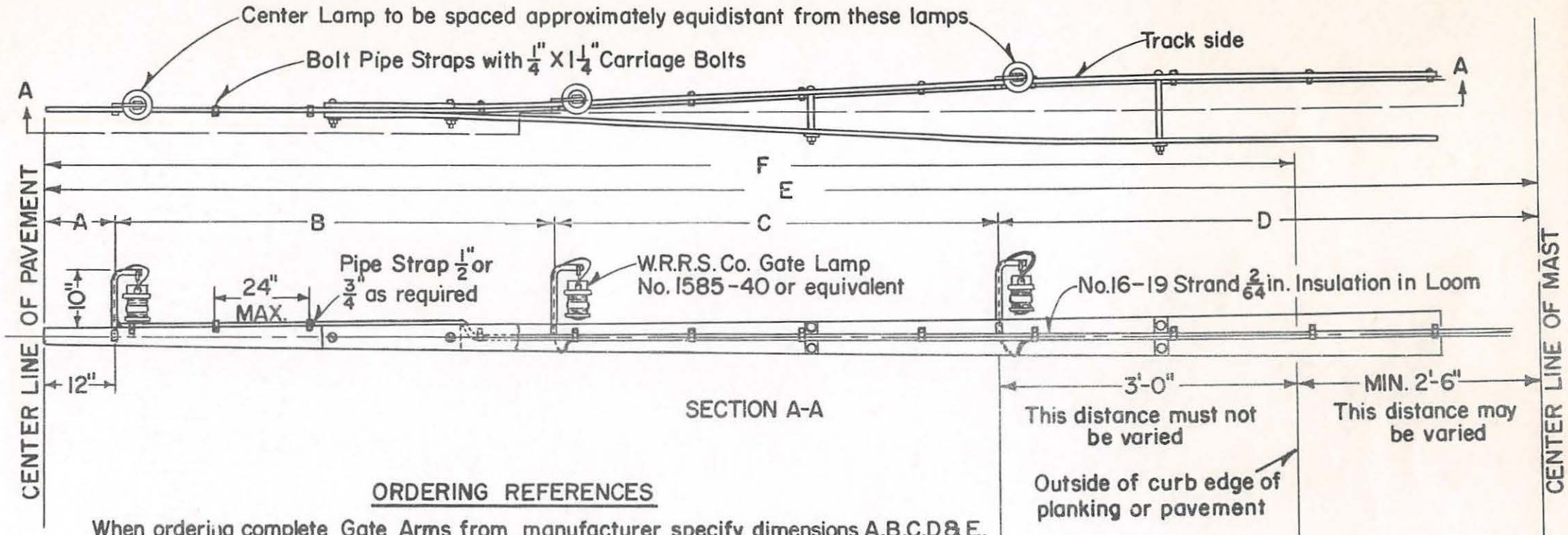
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
CAP
JUNCTION BOX BASE
HIGHWAY CROSSING SIGNAL-GATE TYPE

Approved R. S. Bottinelli
Chief Signal Engineer

S-2326

Printed in U. S. A.

ISSUED 9-29-59
SHEET 1 Cont'd on Sh____



SECTION A-A

ORDERING REFERENCES

When ordering complete Gate Arms from manufacturer specify dimensions A,B,C,D & E.

When ordering replacement Gate Arms specify type mechanism (Manufacturer & Model) and dimensions E & F.

Note:
Lamp spacing does not apply for State of Michigan.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
GATE ARMS
WIRING DETAILS

S-2330

Printed in U.S.A.

ISSUED 10-31-57

SHEET 1 Cont'd on Sh. 2

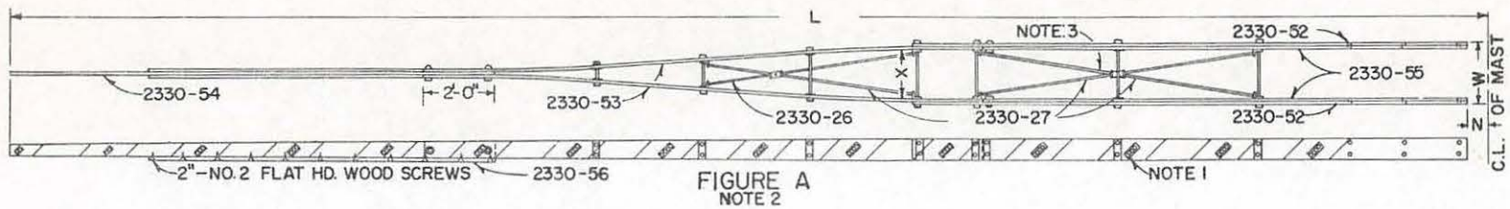


FIGURE A
NOTE 2

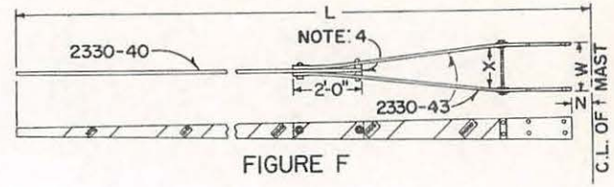


FIGURE F

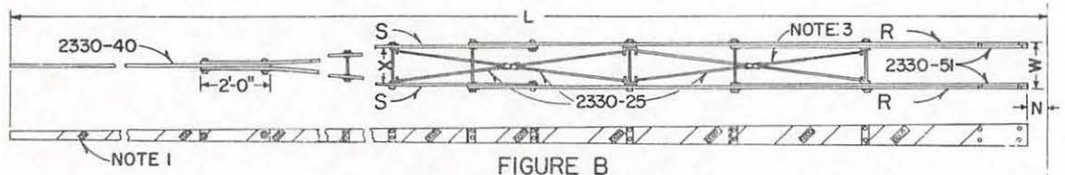


FIGURE B
NOTE 2

GATE	R	S
2330-2or12	2330-59	2330-61
2330-3or13	2330-60	2330-50

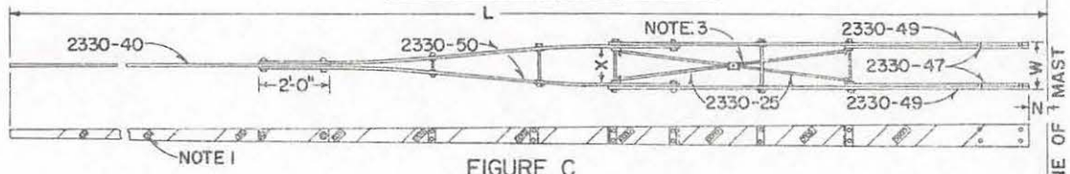


FIGURE C

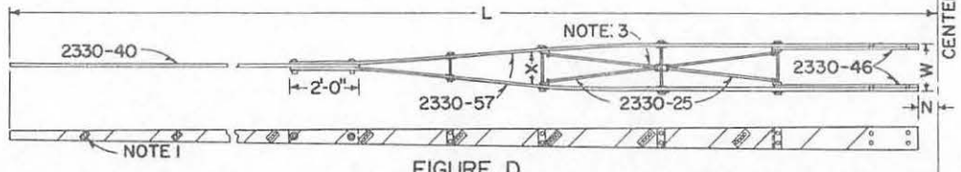


FIGURE D

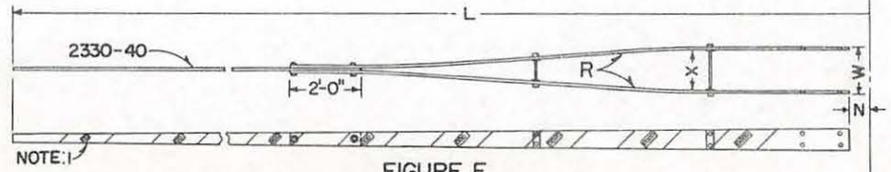


FIGURE E

GATE	R
2330-6or16	2330-58
2330-7or17	2330-48

CENTER LINE OF MAST

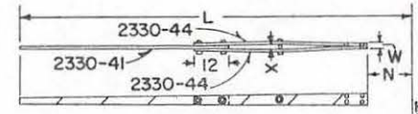


FIGURE G

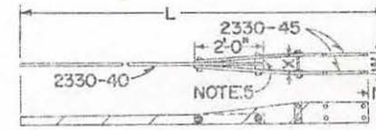


FIGURE H

CENTER LINE OF MAST

* Use with W.R.R.S. gate support 3565-205

NOTES
1. Reflector Buttons to be mounted on black stripes only and on side of gate facing approaching highway traffic.
2. Gate Arms longer than 30 ft. to be equipped with W.R.S. Co. Buffer Leg 3562-316A
3. See enlarged detail A sheet 5.
4. " " " B " ".
5. " " " C " ".

ROADWAY ARMS - GRS. TYPE B-WRS. 3566 & T. P. Mod. S					
FIG.	ORDER NO.	L	W	X	N
A	2330-11	38'-6½" TO 42'-6½"	21½"	17"	6½"
B	2330-12	34'-6½" TO 38'-5½"	16"	12½"	6½"
B	2330-13	30'-6½" TO 34'-5½"	16"	12½"	6½"
C	2330-14	26'-6½" TO 30'-5½"	16"	12½"	6½"
D	2330-15	24'-6½" TO 26'-5½"	16"	12½"	6½"
E	2330-16	20'-6½" TO 24'-5½"	16"	14¼"	6½"
E	2330-17	16'-6½" TO 20'-5½"	16"	14¼"	6½"
F	2330-18	11'-7¼" TO 16'-5½"	16"	14¼"	6½"
SIDEWALK ARMS					
G	2330-19	6'-9½" TO 11'-9½"	2"	3¾"	21½"
*H	2330-20	5'-6½" TO 13'-6½"	7½"	5¾"	6½"

ROADWAY ARMS - GRS. TYPE A-WRS. 3563-41 GL					
B	2330-2	35'-5" TO 39'-5"	11¾"	8¼"	17"
B	2330-3	31'-5" TO 35'-4"	11¾"	8¼"	17"
C	2330-4	27'-5" TO 31'-4"	11¾"	8¼"	17"
D	2330-5	25'-5" TO 27'-4"	11¾"	8¼"	17"
E	2330-6	21'-5" TO 25'-4"	11¾"	10"	17"
E	2330-7	17'-5" TO 21'-4"	11¾"	10"	17"
F	2330-8	12'-6" TO 17'-4"	11¾"	10"	17"
SIDEWALK ARMS					
G	2330-9	6'-3½" TO 11'-3½"	2½"	3¾"	15½"

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
GATE ARMS

S-2330

ISSUED 10-31-57

SHEET 2 Cont'd on Sh 3

Printed in U.S.A.

GATE ARMS COMPLETE		SIDE PLATE													TONGUE			REINFORCING PLATE					BRACE ROD			BRACE BRACKET	BRACE BRACKET	CLEVIS	2" NO. 10 FLAT HEAD WOOD SCREWS	WASHER PLATE			3/8" X 3" CARRIAGE BOLT WITH PLAIN WASHER	3/8" CARRIAGE BOLT LENGTH AS REQUIRED**	1/2" THIN WALL CONDUIT LENGTH AS REQ'D	3/8" PLAIN WASHER	W.R.S. CO. CATAPHOTE REFLECTOR BUTTONS (CRYSTAL) NO.5 CHAIN OR EQUIVALENT			FILLER BLOCK		
G.R.S. TYPE B W.R.S TYPE 3566 TRAN. PROD. MOD.S	G.R.S. TYPE A W.R.S. TYPE 3563-41GL	2330-43	2330-44	2330-45	2330-48	2330-49	2330-50	2330-52	2330-53	2330-57	2330-58	2330-59	2330-60	2330-61	2330-40	2330-41	2330-54	2330-46	2330-47	2330-51	2330-55	2330-56	2330-25	2330-26	2330-27	2330-30	2330-31	2330-32		2330-34	2330-35	2330-36					2 BUTTON	3 BUTTON	4 BUTTON	2330-37	2330-38	2330-39
ORDER NO.	ORDER NO.																																									
2330-11								2	2								1				2	1		2	6	2	6	2			10	14	2	18	14		2	4	9			
2330-12	2330-2											2		2	1					2			8			8		2		4	18		2	16	12		2	3	8		2	
2330-13	2330-3						2						2		1					2			8			8		2		4	18		2	16	12		2	3	6		2	
2330-14	2330-4					2	2								1				2				4			4		1		4	16		2	14	10		2	3	5			
2330-15	2330-5									2					1			2					4			4		1		4	8		2	8	8		2	3	3			
2330-16	2330-6										2				1																8		2	4	4		2	3	3			
2330-17	2330-7				2										1															4	4		2	4	4		2	2	2			
2330-18	2330-8	2													1																4		2⊘	2	2		2	2	1	2⊛		
2330-19	2330-9		2													1																	2	1*	1	5						
2330-20				2											1																4		1	3*	4	6						2

*Use with Plain Washer
**Over 13" use $\frac{3}{8}$" Aluminum rod.
⊛For Gate 2330-18 only
⊘ " " " " " one bolt shall be $\frac{3}{8}$"x5"

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
GATE ARMS
SCHEDULE FOR ASSEMBLY

S-2330

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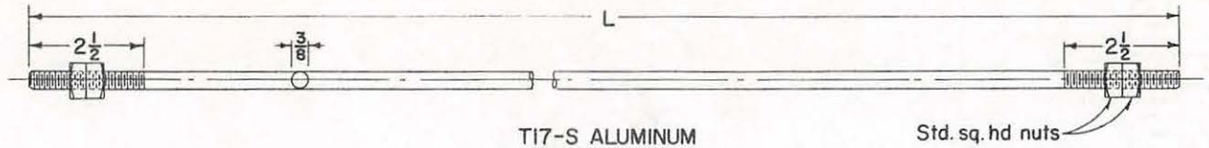
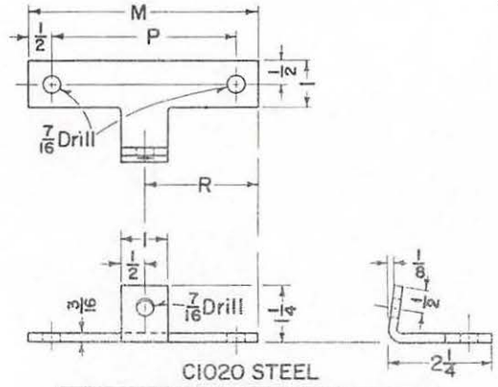
ISSUED 10-31-57

SHEET 3 Cont'd on Sh. 4



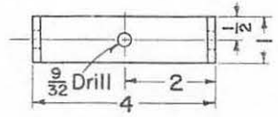
T17-S ALUMINUM

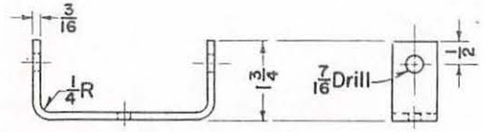
BRACE ROD	
ORDER NO.	Dim.L
2330-25	40
2330-26	24
2330-27	48



C1020 STEEL

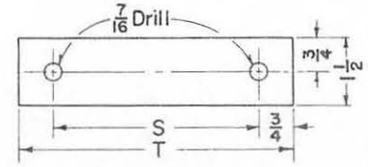
BRACE BRACKET			
ORDER NO	Dim.R	Dim.P	Dim.M
2330-30	2 1/2	4	5
2330-31	2 3/4	4 1/2	5 1/2





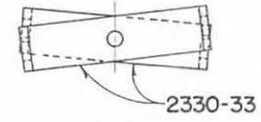
C1020 STEEL

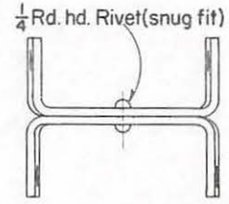
2330-33 CLEVIS



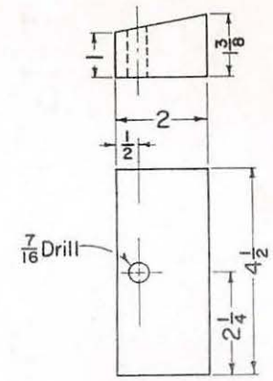
.125 24S-T4 ALUMINUM

WASHER PLATE		
ORDER NO.	Dim.S	Dim.T
2330-34	3 1/2	5
2330-35	4	5 1/2
2330-36	4 1/2	6

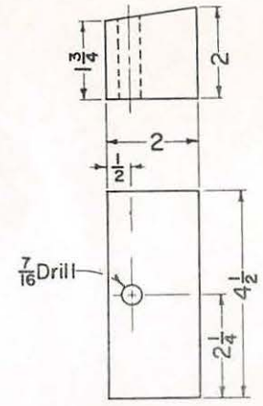




2330-32 CLEVIS ASSEMBLY

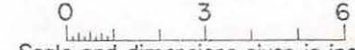


WHITE PINE
2330-37
FILLER BLOCK

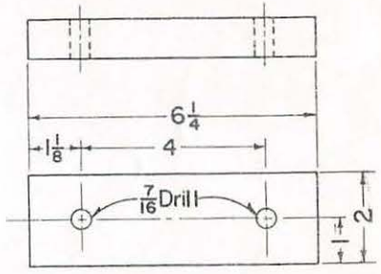


WHITE PINE
2330-39
FILLER BLOCK

See General Notes Sheet 5



Scale and dimensions given in inches



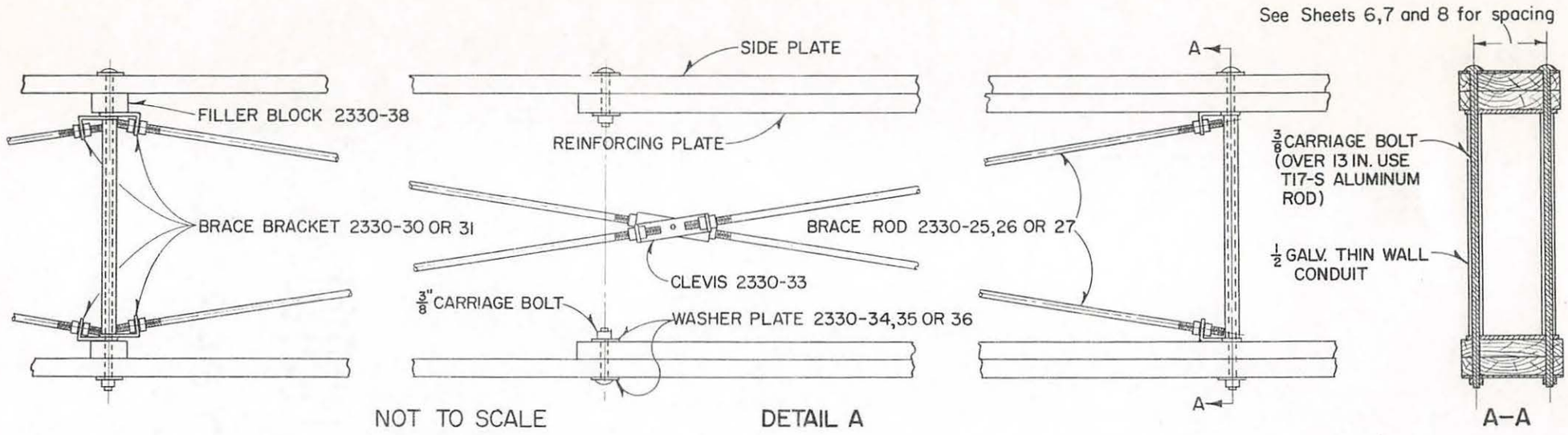
WHITE PINE
2330-38 FILLER BLOCK

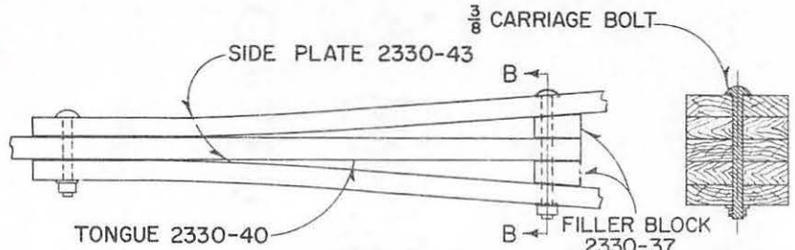
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
GATE ARMS

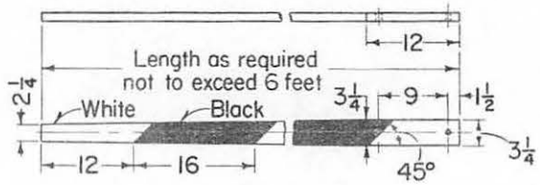
S-2330

ISSUED 10-31-57

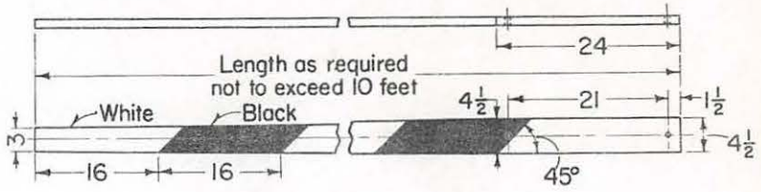
SHEET 4 Cont'd on Sh 5



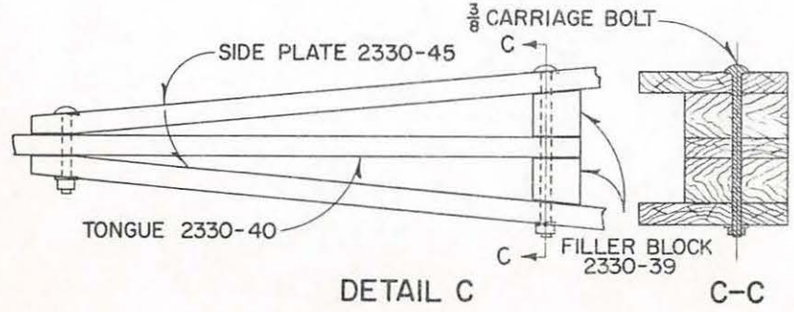




2330-41 TONGUE



2330-40 TONGUE



GENERAL NOTES

1. Material - White Pine, Sugar Pine or Prince Rupert Cedar, kiln dried, free of knots, not to exceed 2 lbs. per board foot, 1in. S4S.
2. Protective treatment:
   a. Metal surfaces (excepting Aluminum) - Primer, Item 31, Paint, Item 53 Instruction 350.
   b. Wood surfaces - Item 42 (White), Instruction 350. Stripe Side Plates and Tongues with Item 42 (Black), Instruction 350, on face side as indicated.

Note: All holes 7/16 in. diameter

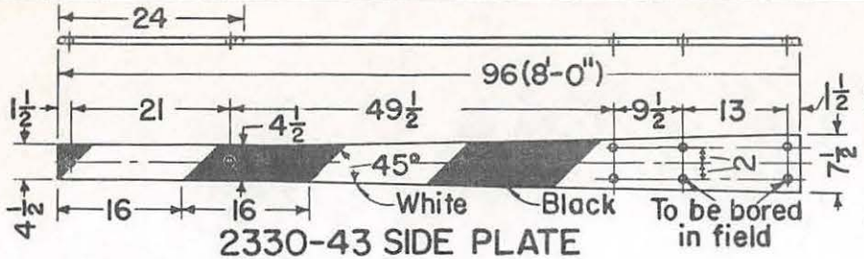
0 12 24 36
Scale and dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
GATE ARMS

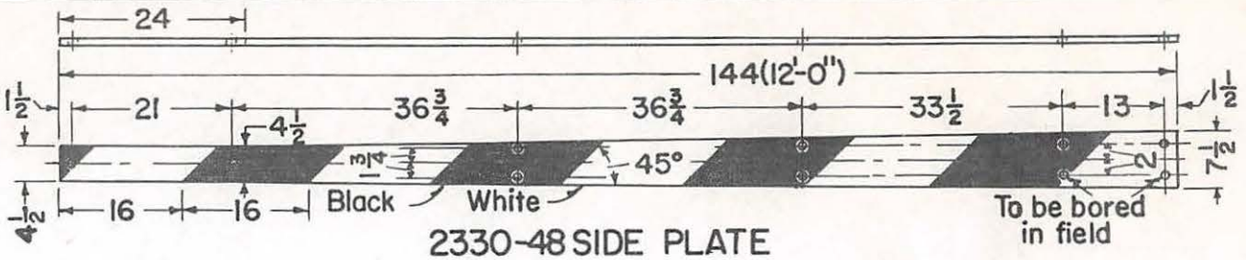
S-2330

ISSUED 10-31-57

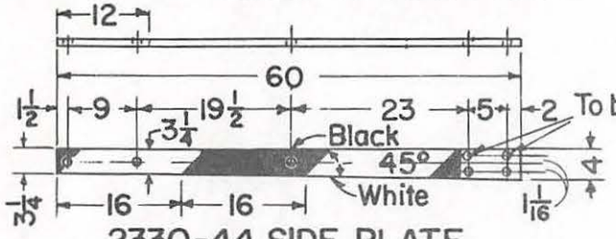
SHEET 5 Cont'd on Sh 6



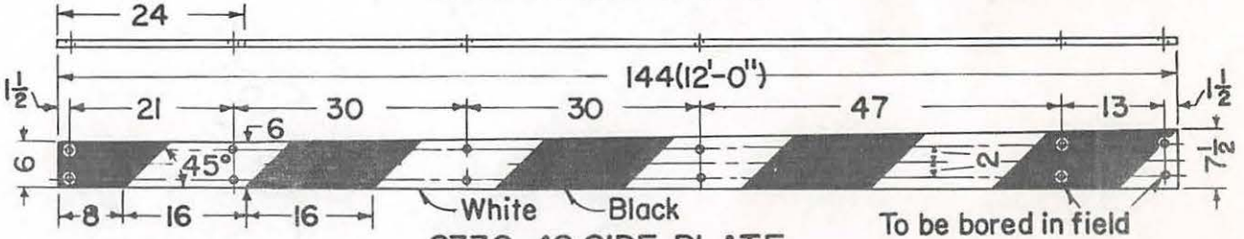
2330-43 SIDE PLATE



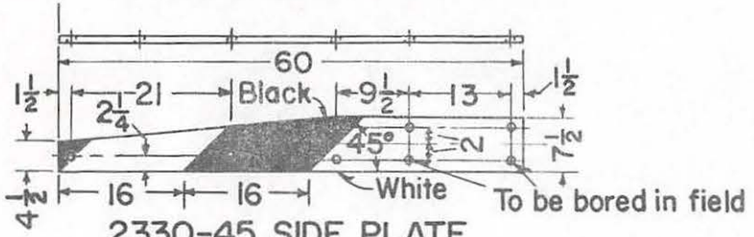
2330-48 SIDE PLATE



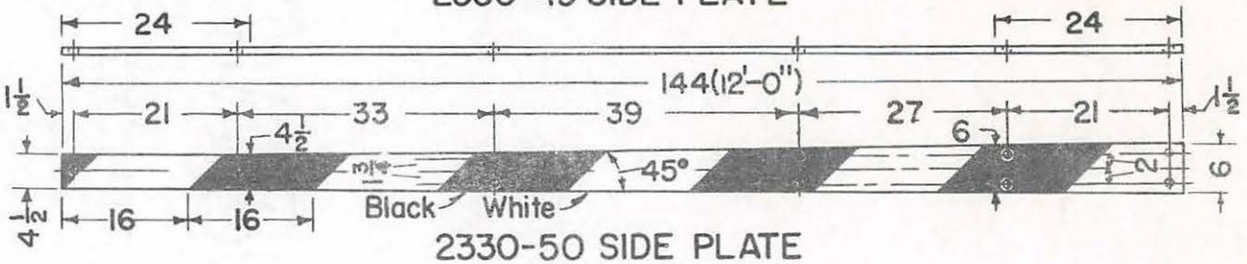
2330-44 SIDE PLATE



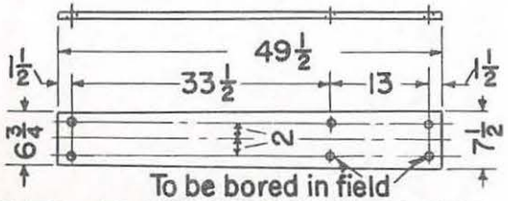
2330-49 SIDE PLATE



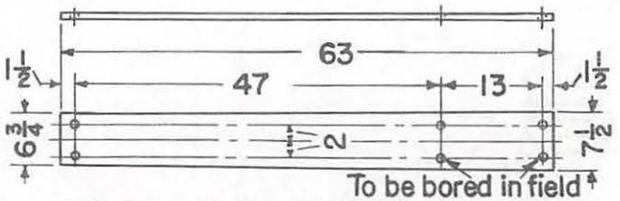
2330-45 SIDE PLATE



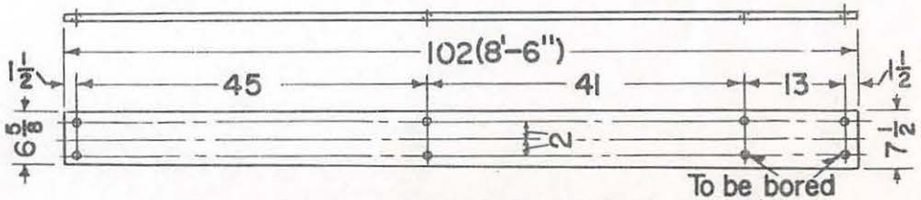
2330-50 SIDE PLATE



2330-46 REINFORCING PLATE



2330-47 REINFORCING PLATE



2330-51 REINFORCING PLATE

NOTE : 1. All holes shall be $\frac{7}{16}$ in. diameter

Scale: 0 12 24 36

All dimensions given in inches

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

HIGHWAY CROSSING SIGNAL GATE ARMS

See General Notes Sheet 5

S-2330

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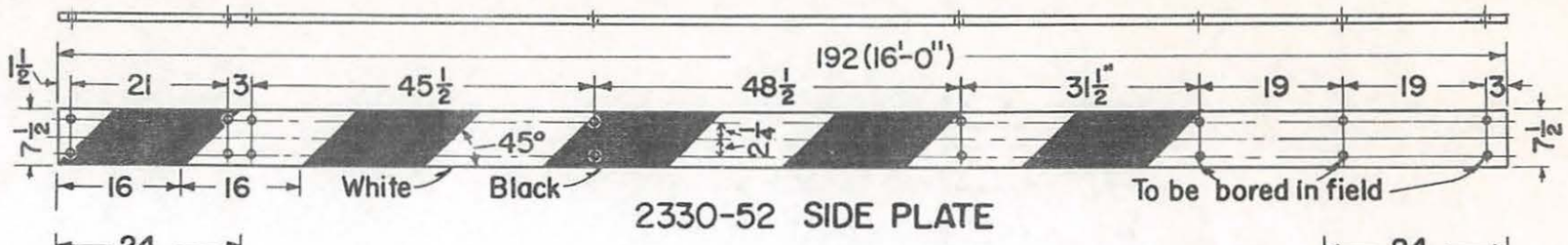
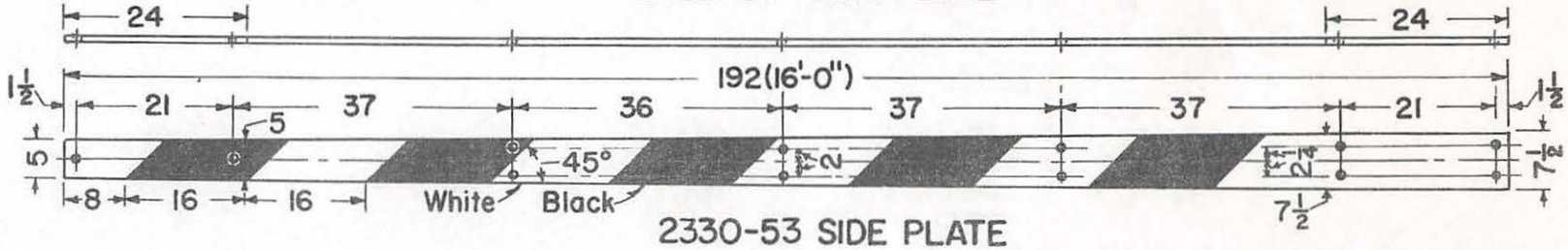
SHEET 6 Cont'd on Sh 7



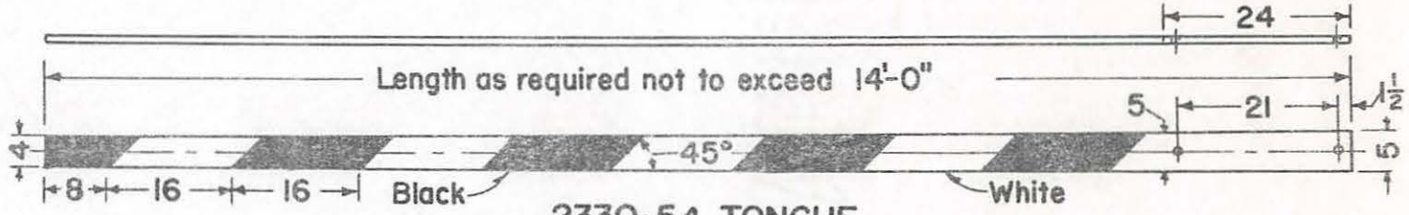
2330-52 SIDE PLATE



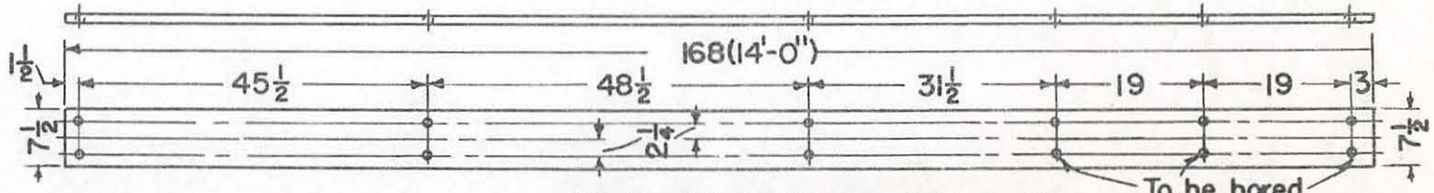
2330-53 SIDE PLATE

NOTE:
1. All holes shall be $\frac{7}{16}$ in. diameter.

See General Notes Sheet 5

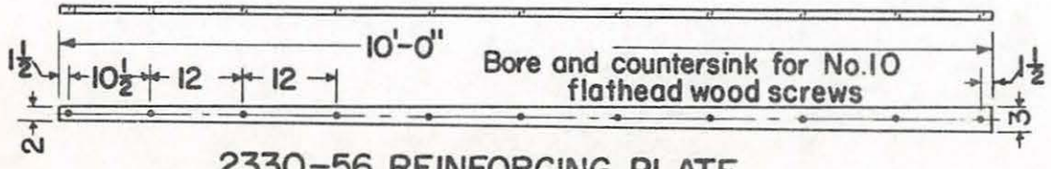


2330-54 TONGUE



2330-55 REINFORCING PLATE

Scale 0 12 24 36
All dimensions given inches



2330-56 REINFORCING PLATE

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT

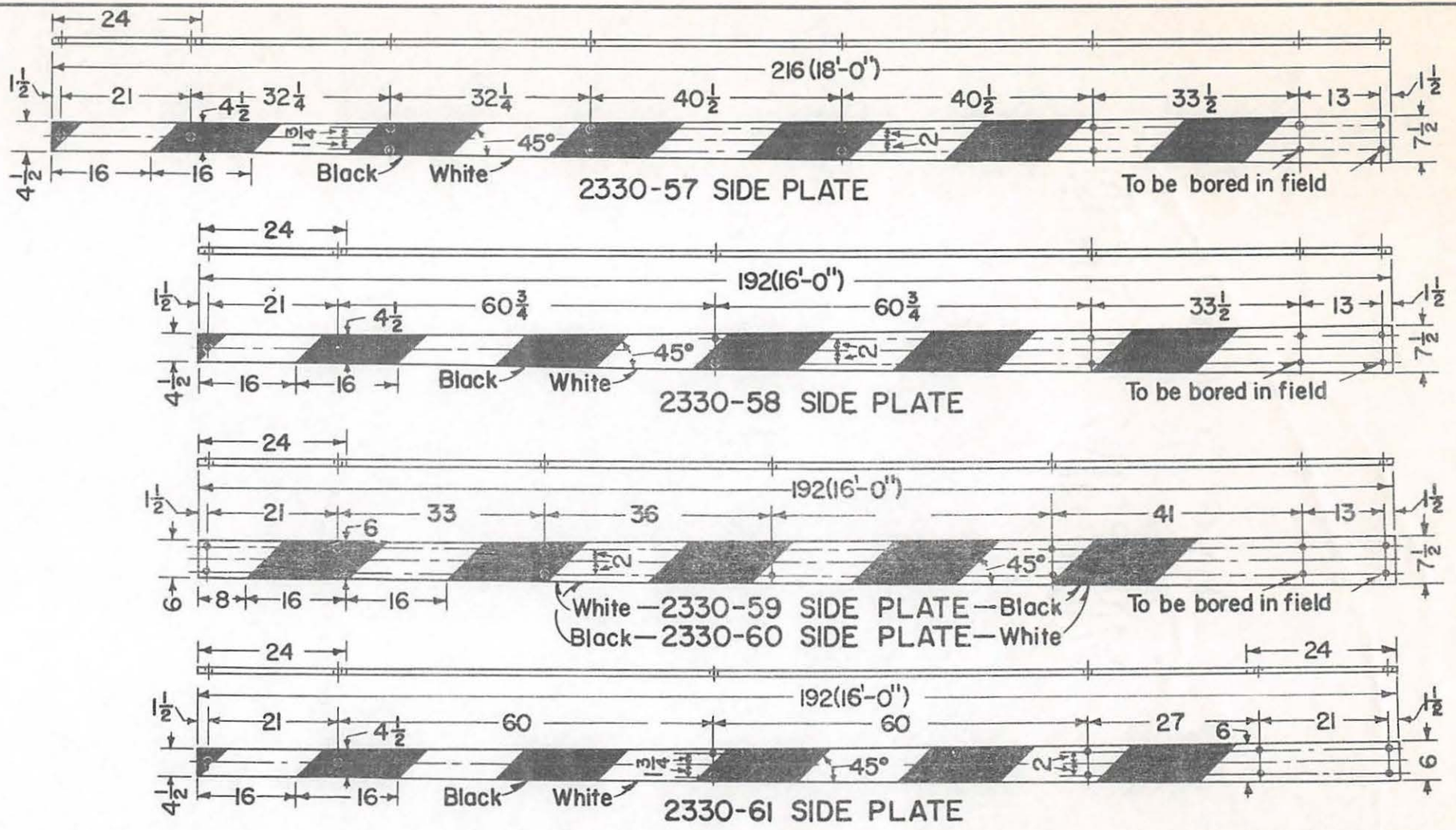
HIGHWAY CROSSING SIGNAL
GATE ARMS

S-2330

Printed in U.S.A.

ISSUED 10-31-57

SHEET 7 Cont'd on Sh 8



Scale 0 12 24 36
All dimensions given in inches

NOTES: 1. All holes shall be $\frac{7}{16}$ inches in diameter,

See General Notes Sheet 5

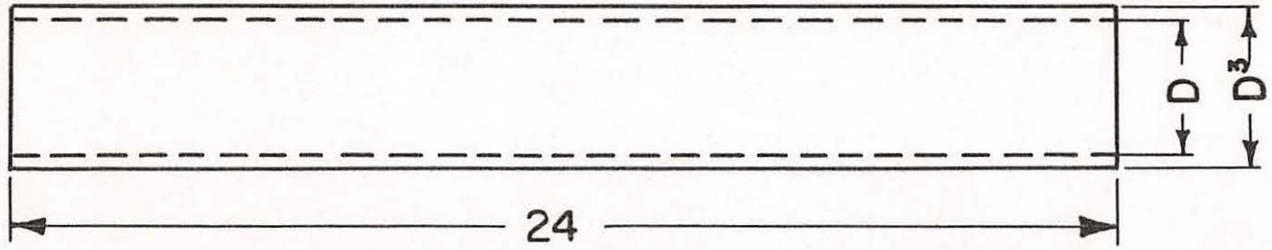
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
GATE ARMS

Approved H.A. Scott
Chief Signal Engineer

S-2330

Printed in U.S.A.

ISSUED 10-31-57.



Transite Korduct EL-I-IB cut in 24 inch lengths

SOIL PIPE		
ORDER NO.	D	D^3
2440-2	2	2.50
2440-3	3	3.54
2440-4	4	4.54
2440-6	6	6.60

All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SOIL PIPE

Approved H A Scott
Chief Signal Engineer

S-2440

ISSUED 4-2-57

SHEET 1 Cont'd on Sh.....

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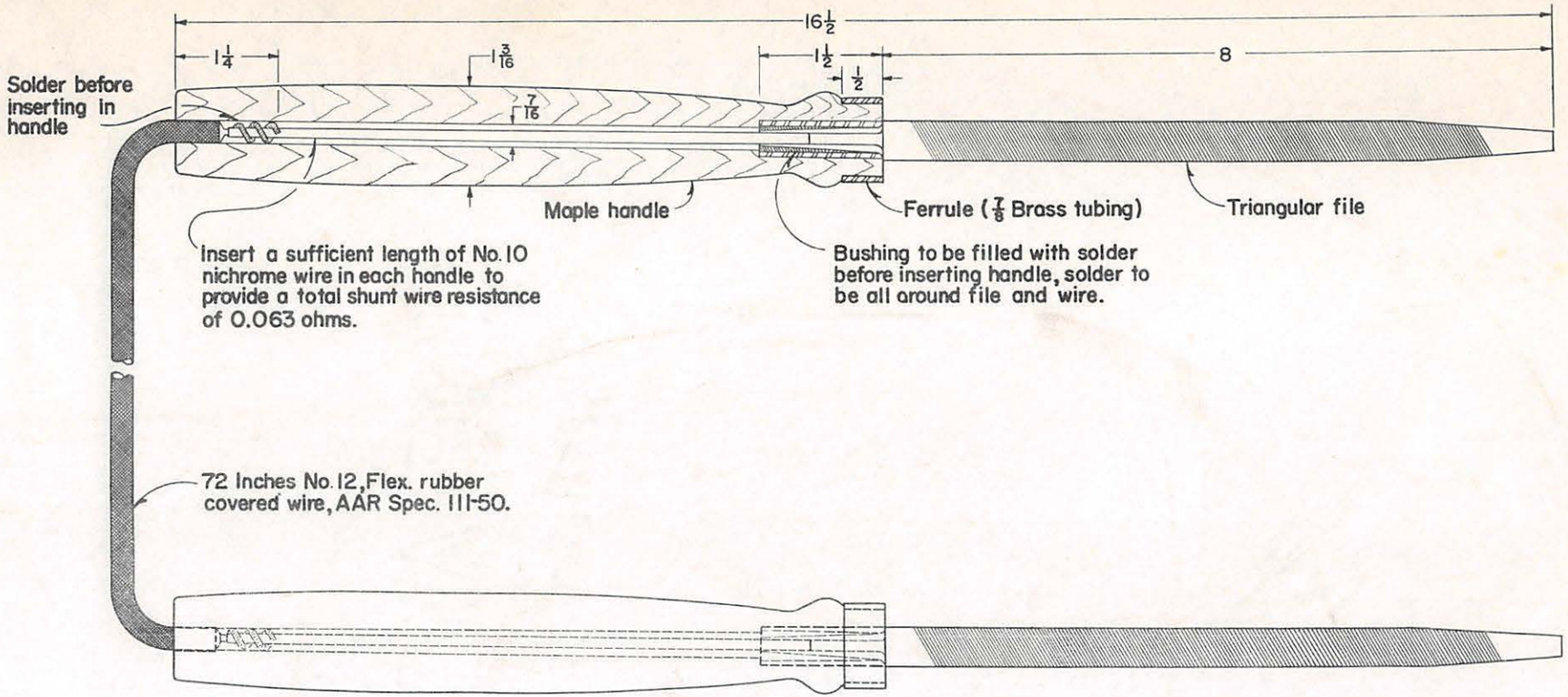

2635-1, TRACK SHUNT, COMPLETE

0 1 2 3
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TRACK SHUNT

Approved H. A. Scott
Chief Signal Engineer

S-2635

ISSUED 8-1-57

SHEET 1 Cont'd on Sh.

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TYPICAL DESIGNATION OF WIRES

LOCAL CIRCUITS

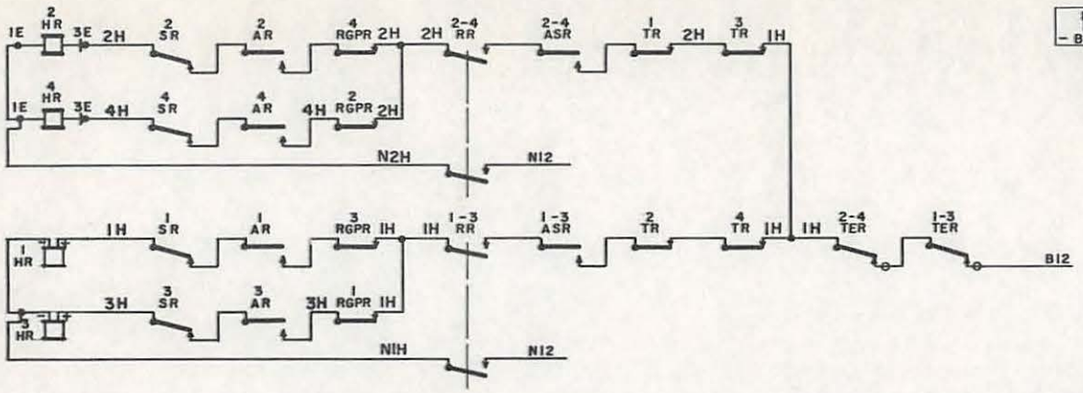


Figure 1

TYPICAL TAG INSCRIPTION

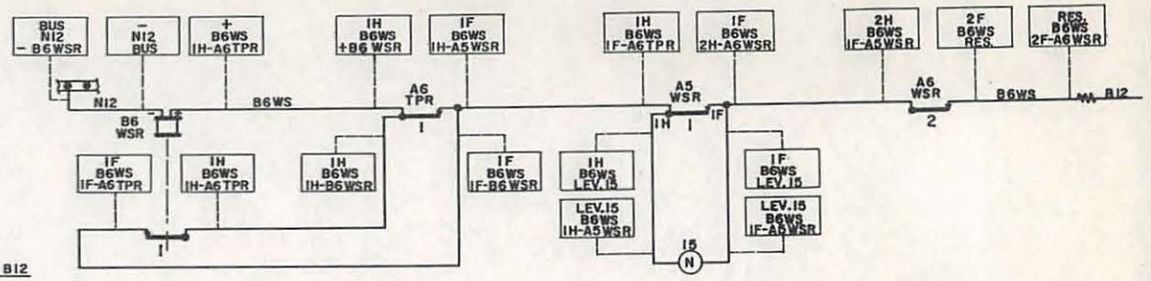


Figure 2

TYPICAL DESIGNATION OF WIRES

LINE CIRCUITS

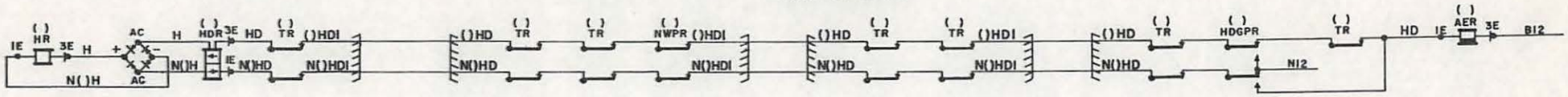


Figure 3

NOTES:

1.- Connections to Type B relay plug boards shall be marked at the terminals with wrap-around tags which will show identification of terminal to which wire is connected.

2.- All wires connected to AAR type terminal posts on transformers, rectifiers, relays, terminals etc., shall be marked as shown in Figure 2.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TAGGING
IDENTIFICATION OF WIRES

S-2700

Printed in U. S. A.

ISSUED 11-24-58

SHEET 1 Cont'd. on Sh. 2

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

TAGGING

IDENTIFICATION OF WIRES

S-2700

ISSUED JI-24-58

SHEET 1 Cont'd. on Sh. 2

Printed in U. S. A.

TYPICAL TAG INSCRIPTION

TYPICAL DESIGNATION OF WIRES

LOCAL CIRCUITS

Figure 1

Figure 2

TYPICAL DESIGNATION OF WIRES

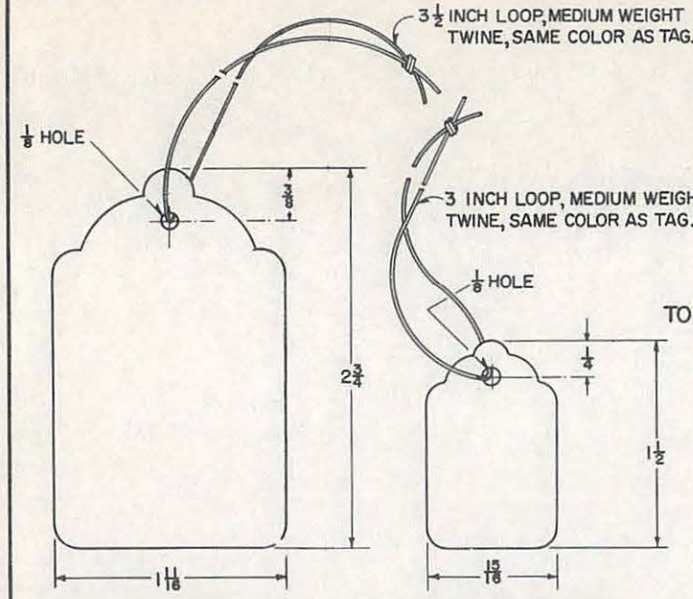
LINE CIRCUITS

Figure 3

NOTES:

1.- Connections to Type B relay plug boards shall be marked at the terminals with wrap-around tags which will show identification of terminal to which wire is connected.

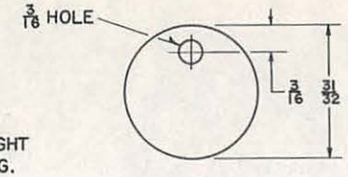
2.- All wires connected to AAR type terminal posts on transformers, rectifiers, relays, terminals etc., shall be marked as shown in Figure 2.



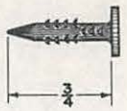
2700-1 - RED
2700-2 - YELLOW
2700-3 - GREEN
2700-4 - WHITE

2700-10 - RED
2700-11 - YELLOW
2700-12 - GREEN
2700-13 - WHITE

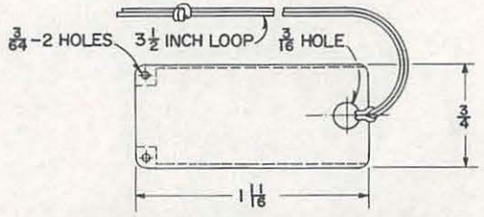
SUITABLE GRADE OF CARDBOARD
.014 TO .020 INCH THICKNESS.



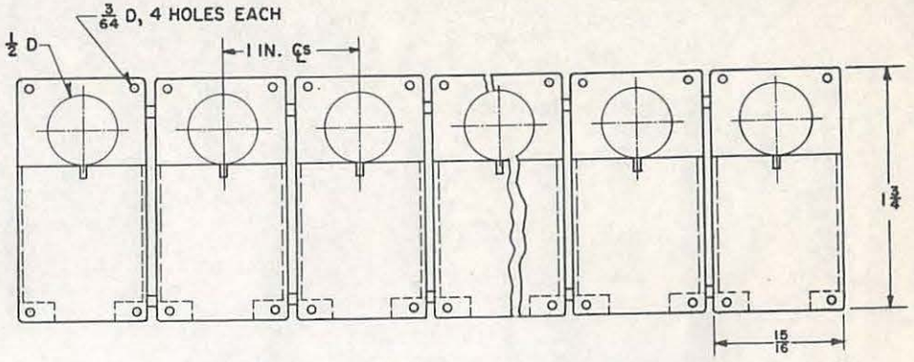
2700-8
ALUMINUM, NO. 20 AWG.
TO BE MARKED WITH STENCILS



2700-9
NO. 13 ROOFING NAILS
REGULAR HEAD
TINNED BARBED WIRE



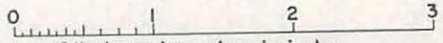
CLEARTAGS, RACO 585-1
IN 1000 TAG LOTS COMPLETE WITH LOOPS AND CLEARTAG SHEETS 585-11.



CLEARTAGS, MULTIUNIT, RACO 585-16
IN 1000 TAG LOTS (100-10 TAG STRIPS) COMPLETE WITH CLEARTAG SHEETS 585-15 & ESCUTCHEON PINS.

11	12	13	14	15	16	21	22	23	24	25	26	31	32	33	34	35	36	3A	3B	3C	3D	1E	1E	1E	3E	3E	3E	3E	3E
11	12	13	14	15	16	21	22	23	24	25	26	31	32	33	34	35	36	3A	3B	3C	3D	1E	1E	1E	3E	3E	3E	3E	3E
11	12	13	14	15	16	21	22	23	24	25	26	31	32	33	34	35	36	3A	3B	3C	3D	1E	1E	1E	3E	3E	3E	3E	3E
11	12	13	14	15	16	21	22	23	24	25	26	31	32	33	34	35	36	3A	3B	3C	3D	1E	1E	1E	3E	3E	3E	3E	3E
11	12	13	14	15	16	21	22	23	24	25	26	31	32	33	34	35	36	3A	3B	3C	3D	1E	1E	1E	3E	3E	3E	3E	3E
11	12	13	14	15	16	21	22	23	24	25	26	31	32	33	34	35	36	3A	3B	3C	3D	1E	1E	1E	3E	3E	3E	3E	3E

2700-20, WRAP-AROUND TAGS, B-1 RELAYS - GRS 59539-405 OR EQUAL, (AS SHOWN).
2700-21, WRAP-AROUND TAGS, B-2 RELAYS - GRS 59539-405 AND 59539-406 OR EQUAL.



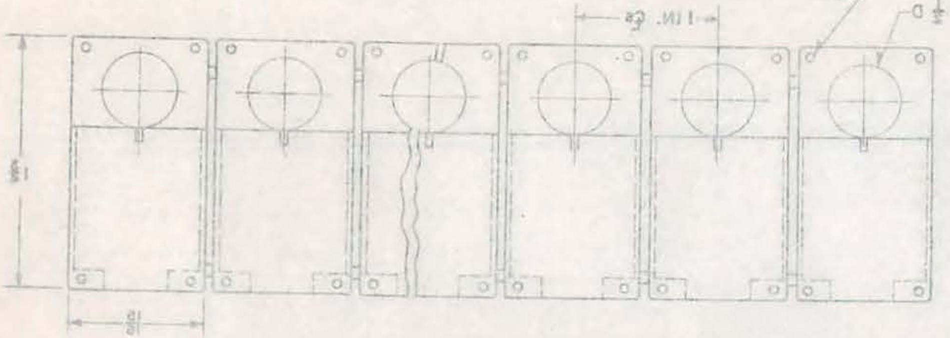
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TAGGING
IDENTIFICATION OF WIRES

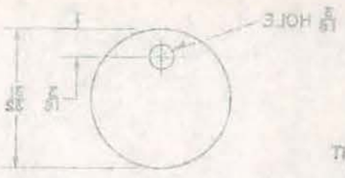
Approved L. S. Bottinelli
Chief Signal Engineer

S-2700
ISSUED 11-24-58

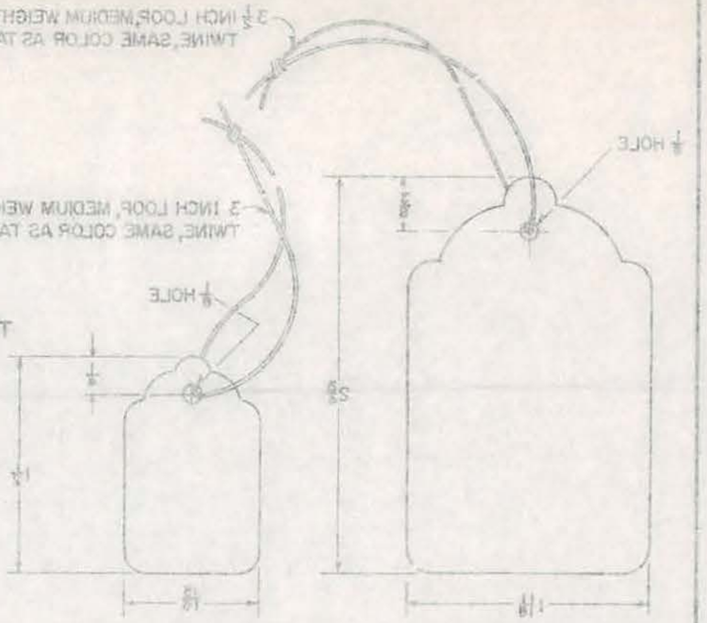
Printed in U. S. A.



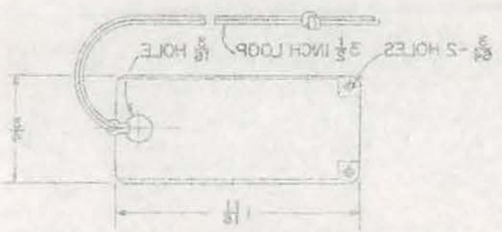
2700-9
NO. 13 ROOFING NAILS
REGULAR HEAD
TINNED BARBED WIRE



2700-8
ALUMINUM, NO. 20 AWG.
TO BE MARKED WITH STENCILS



CLEARTAGS, MULTIUNIT, RACO 585-16
IN 1000 TAG LOTS (100-10 TAG STRIPS) COMPLETE
WITH CLEARTAG SHEETS 585-15 & ESCUTCHEON PINS.



CLEARTAGS, RACO 585-1
IN 1000 TAG LOTS COMPLETE WITH
LOOPS AND CLEARTAG SHEETS 585-11.

2700-10 - RED
2700-11 - YELLOW
2700-12 - GREEN
2700-13 - WHITE

2700-1 - RED
2700-2 - YELLOW
2700-3 - GREEN
2700-4 - WHITE

SUITABLE GRADE OF CARDBOARD
.014 TO .020 INCH THICKNESS.

All dimensions given in inches.

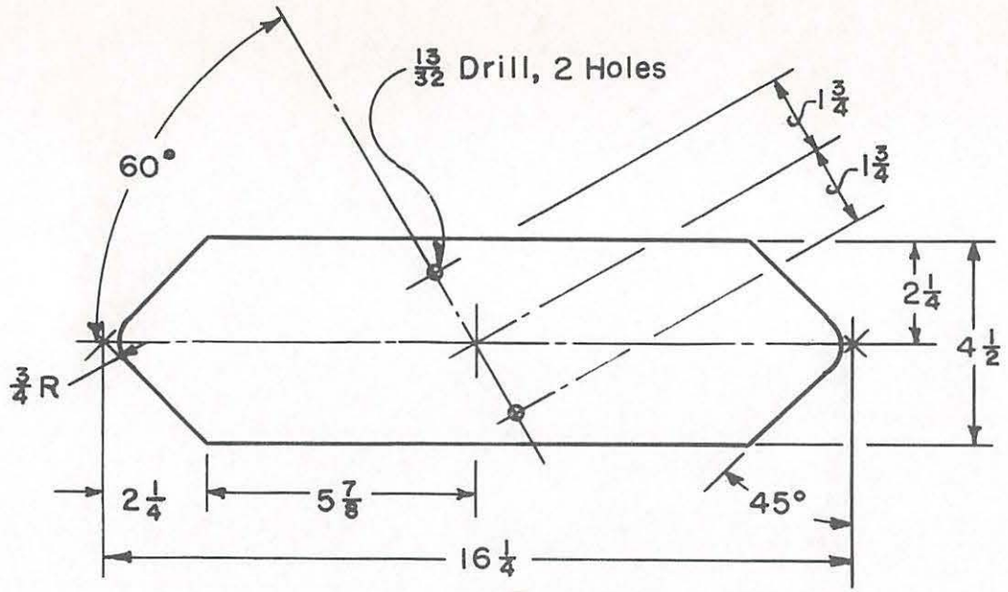
2700-20, WRAP-AROUND TAGS, B-1 RELAYS-GRS 59539-405 OR EQUAL, (AS SHOWN).
2700-21, WRAP-AROUND TAGS, B-2 RELAYS-GRS 59539-405 AND 59539-406 OR EQUAL.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TAGGING
IDENTIFICATION OF WIRES

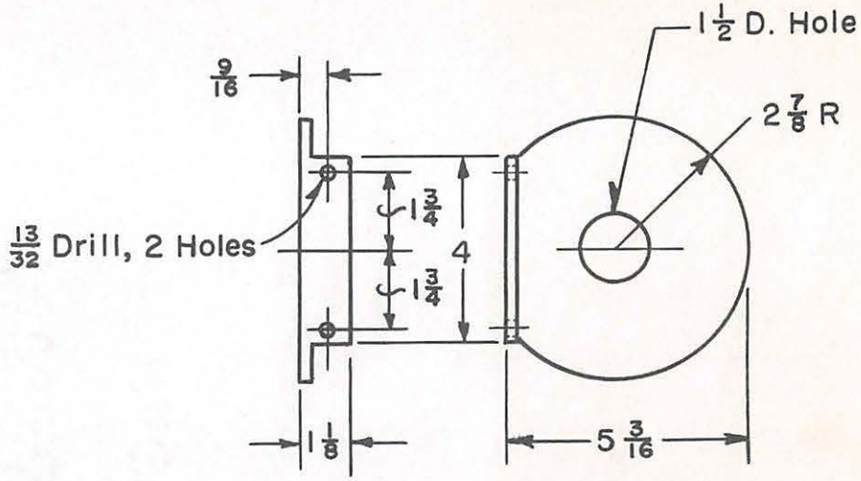
Approved ....
Chief Signal Engineer

S-2700
ISSUED 11-24-58
SHEET 2 Cont'd. on Sh. ......

Printed in U.S.A.



2720-14 DIAGONAL TARGET BANNER



2720-15 TARGET DISC.

0 3 6 12

All dimensions given in inches.

NOTES:

1.- Target plates to be made of No. 13 U.S.S.G. (.092) sheet steel.

2.- Protective treatment, Enamel, Item 42, Instruction 350.
2720-14 to be No. 1310, Yellow.
2720-15 to be No. 1105, Red.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TARGETS
SWITCH & DERAIL

Approved B S Converse
Asst. Vice President—Engineering

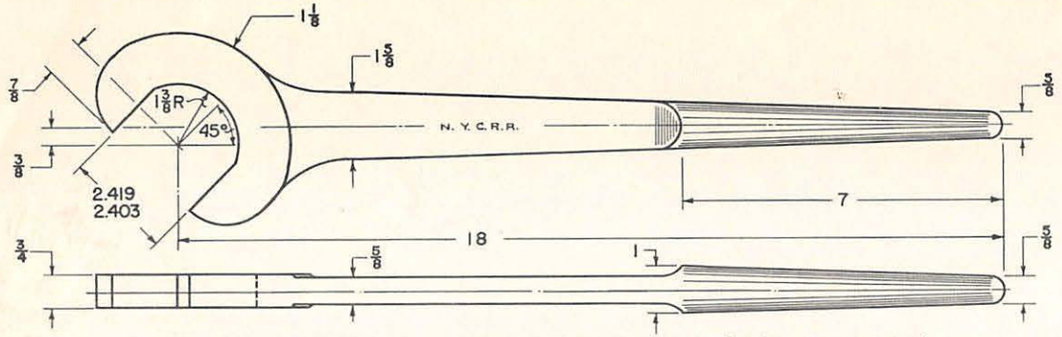
K E Dunn
Engineer Maintenance of Way

H A Scott
Chief Signal Engineer

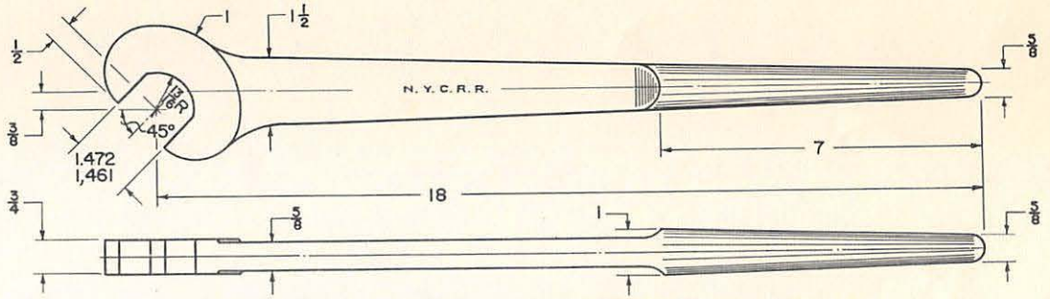
S-2720

Printed in U. S. A.

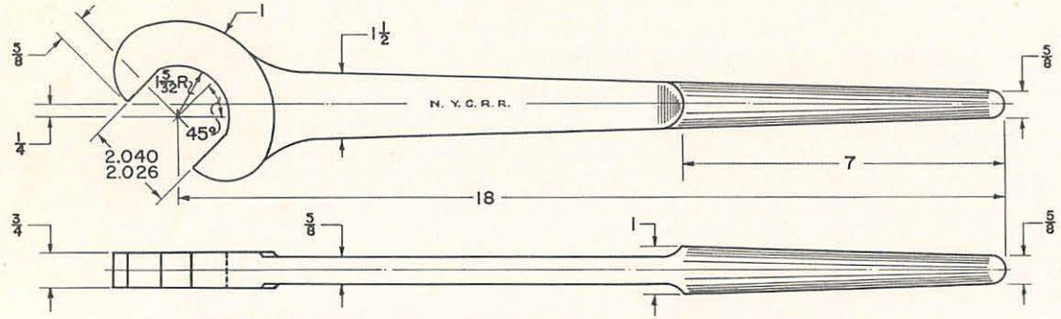
ISSUED 12-23-57
SHEET 1 Cont'd on Sh.....



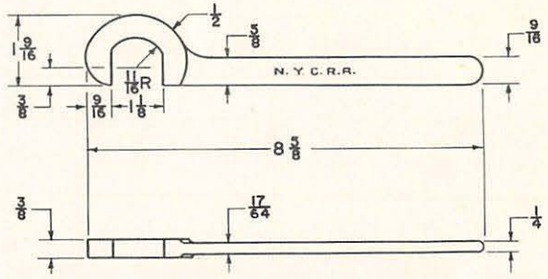
2920-1 WRENCH, SLIP SWITCH ADJUSTMENT (Weight 5 3/4 Lbs.)
For 1 1/2 Std. Hex. Nuts



2920-4 WRENCH, LOCK ROD ADJUSTMENT (Weight 4 1/2 Lbs.)
Raco 249-3 or equivalent for 3/4 special adjustment nuts.



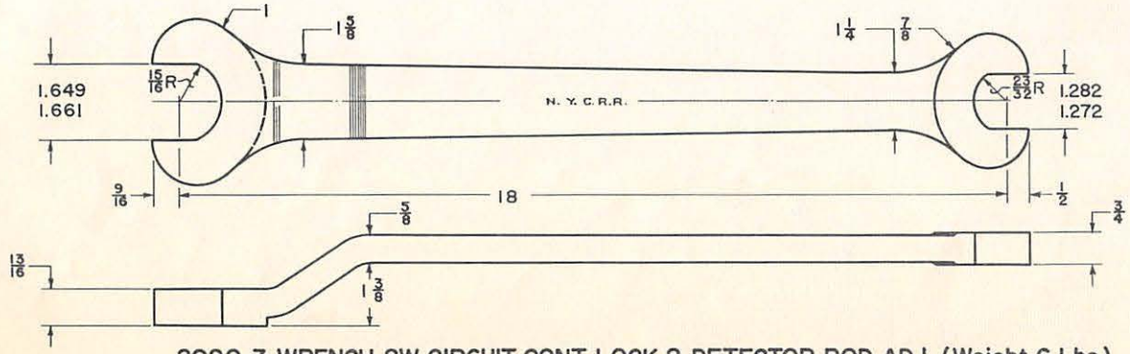
2920-2 WRENCH, SWITCH ADJUSTMENT (Weight 4 1/2 Lbs.)
Raco 249-4 or equivalent for 1 1/4 Std. Hex. Nuts



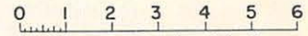
2920-5 WRENCH, DETECTOR ROD ADJ. (Weight 6 1/2 oz.)
GRS 36593-18 or equal for 5/8 Std. Hex. Nuts

NOTES:

1. Wrench 2920-5 to be chrome vanadium steel; all others to be chrome molybdenum steel.
2. Each tool to be initialed "N. Y. C. R. R" with 1/8 inch letters as shown.



2920-3 WRENCH, SW. CIRCUIT CONT., LOCK & DETECTOR ROD ADJ. (Weight 6 Lbs.)
Raco 249-1 or equivalent for 3/4 & 1 inch Std. Hex. Nuts.



All dimensions given in inches.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

WRENCHES

SWITCH ADJUSTMENT

Approved H A Scott
Chief Signal Engineer

S-2920

ISSUED 2-1-55

SHEET 1 Cont'd. on Sh.....

Printed in U.S.A.

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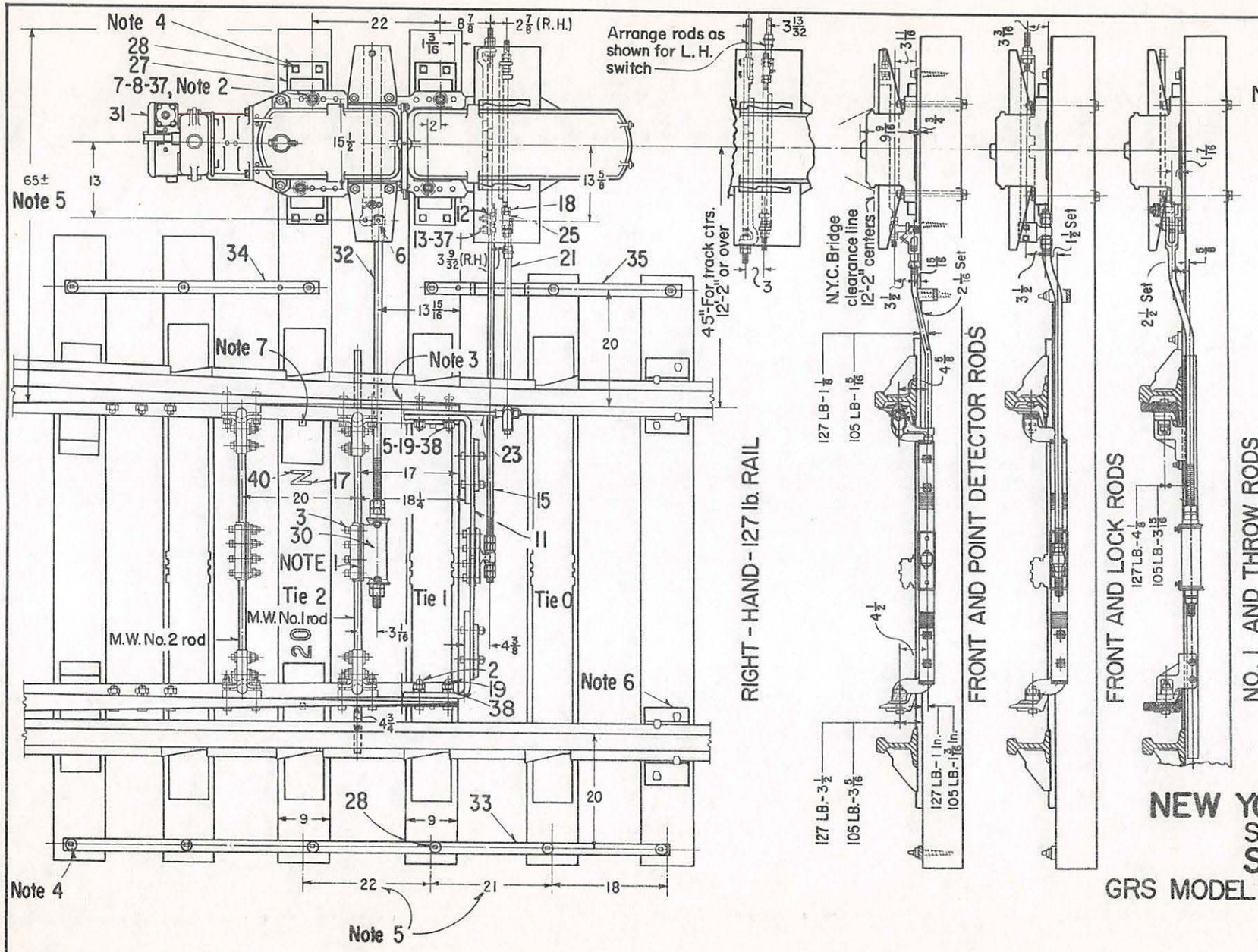
ORD. SECT.



NOTES:

1. Remove one splice plate from No. 1 switch rod and install switch adjustment bracket, Item 30.
2. Item 7 to be ASA regular double end stud bolt with square nuts and spring washers.
3. To provide clearance for front rod or point lug, switch bolt located 9-1/2 inches from switch point may be removed.
4. Holes for Drive Spikes, Item 28, to be one-half inch in diameter and five inches deep.
5. M. of W. to provide ties of length required, spaced as indicated. Creosote after framing.
6. M. of W. Dept. to provide double shoulder tie plates on five ties starting with second tie ahead of switch points.
7. M. of W. Dept. to provide suitable holes in gage plates, tie plates and ties for emergency spiking of switch. Four holes required.
8. Protective treatment-Item 32, Instruction 350.

0 12 24 36
All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
GRS MODEL 5A, 5C OR 5G SWITCH MACHINE
127-105 LB. RAIL

S-3000

Printed in U.S.A.

ISSUED 3-15-60

SHEET 1 Cont'd. on Sh. 2

NO	ITEM	REF.	REQ	USE	NO	ITEM	REF.	REQ.	USE	NO	ITEM	REF.	REQ	USE
1	Bolt, 3/4 X 3-3/4, Special Hd., Hex. Nut.	RSC-G35C	2	Fr. Rod-105 Lb.	25	Pt.-Detector Ball Stud Lug, Compl.	3006-9	1	Conn. at Sw. Mach.	49				
2	" 1 X 4-1/4 " " " "	RSC-G35C		Fr. Rod-127 Lb.	26					50				
3	" 3/4 X 3	3001-18	4	Item 30-No. 1 Rod.	27	Saddle plate, Compl.	3004-1	2	Switch Machine	51				
4	Bolt, 3/4 X 4-1/2, Special Hd., Hex. Nut	RSC-G35C	2	Fr. Rod-105 Lb.	28	Spike, Drive-6 long *	21-C-361	20		52				
5	" 1 X 5, " " " "	RSC-G35C		Fr. Rod-127 Lb.	29					53				
6	" Compl.	3007-1	1	Throw Rod	30	Switch Adjustment Bracket G. R. S.	46948-12 Gr. 1	1	Note 1	54				
7	Bolt, Stud, 3/4-10 X 12, Compl. with nuts.	Note 2	4	Switch Machine	31	Switch Machine		1	As required	55				
8	Bolt Grip Raco	589-1	4	Item 7	32	Throw Rod, Compl.	3002-11	1		56				
9	Bushing - For 3/4 Bolt GRS	6714-309	(2)	With Item 1 only.	33	Tie Strap - long	3014-1	1		57				
10	" " " " GRS	8104-2	(2)	With Item 4 only.	34	" " -short	3014-3	1		58				
11	Front Rod, Compl.	3001-50	1		35	" " -short; set	3014-5	1		59				
12	Lug, Lock Rod	3003-18	1		36					60				
13	Lug Bolt, Hex. Nut 3/4-10 X 2-1/2 GRS	0423	2	Lock Rod Lug.	37	Washer, Steel Spr. 3/4 In. ASA Med.	Coml.	As	Items 1, 4, 7, 13	61				
14					38	" " " 1 In. " "	"	Req.	Item 2 & 5	62				
15	Lock Rod	3003-21	1	127, 105 Lb. Rail	39					63				
16					40	Wood Screws, 2 In. No. 10 Flat Head	Coml.	8	Item 17	64				
17	Numerals - Letter "N" (Specify number)	2280		Sw. No. & Position.	41					65				
18	Nut-ASA-UNC-2B Heavy hex. jam 3/4-10	Coml.	4	Item 25	42					66				
19	Pins, Cotter 1/4 X 1-3/4	"	4	Items 2 & 5	43					67				
20	" " 1/4 X 1-1/4	"		Items 1 & 4	44					68				
21	Pt.-Detector Rod, Compl.	3005-1	1		45					69				
22					46					70				
23	Point Lug, Compl.	3006-21	1	127-105 Lb. Rail	47					71				
24					48					72				

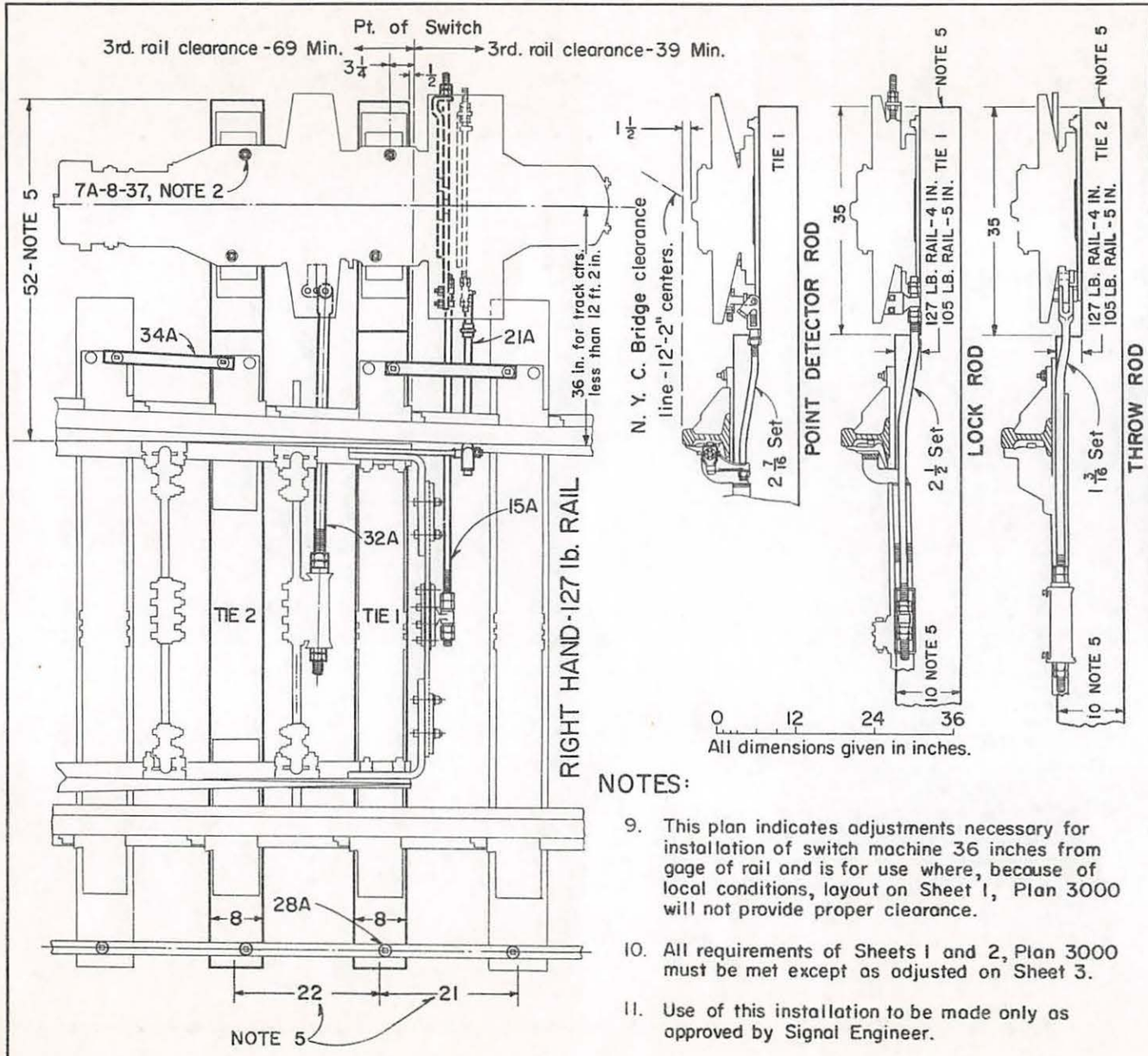
* Pittsburg Screw & Bolt Corp. or equal.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
GRS MODEL 5A, 5C OR 5G SWITCH MACHINE
127-105 LB. RAIL

S-3000

Printed in U.S.A.

ISSUED 3-15-60



NOTES:

9. This plan indicates adjustments necessary for installation of switch machine 36 inches from gage of rail and is for use where, because of local conditions, layout on Sheet 1, Plan 3000 will not provide proper clearance.

10. All requirements of Sheets 1 and 2, Plan 3000 must be met except as adjusted on Sheet 3.

11. Use of this installation to be made only as approved by Signal Engineer.

REQUIRED ADJUSTMENT OF MATERIAL LIST-SHEET 2

USE NO.	OMIT NO.	ITEM	REF.	REQ.	USE
7A	7	Bolt, Stud 3/4-10 X 11, Compl. with nuts	Note 2-Sh. 1	4	Sw. Machine-127 Lb. rail
7B	7	" " 3/4-10 X 10, " " "	"		" " 105 Lb. rail
15A	15	Lock Rod	3003-22	1	127 Lb. rail
15B	15	" "	3003-23		105 Lb. rail
21A	21	Point Detector Rod, Compl.	3005-2	1	
28A	28	Spike, Drive 6 long, 5 thd. *	21-C-361	14	
32A	32	Throw Rod, Compl.	3002-8	1	127 Lb. rail
32B	32	" " "	3002-9		105 Lb. rail
34A	34	Tie Straps, Short		2	Make in field as required
—	35	Tie Straps, Short, Set		0	Use Item 34A

* Pittsburg Screw & Bolt Corp. or equal.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
GRS MODEL 5A, 5C OR 5G SWITCH MACHINE
127-105 LB. RAIL

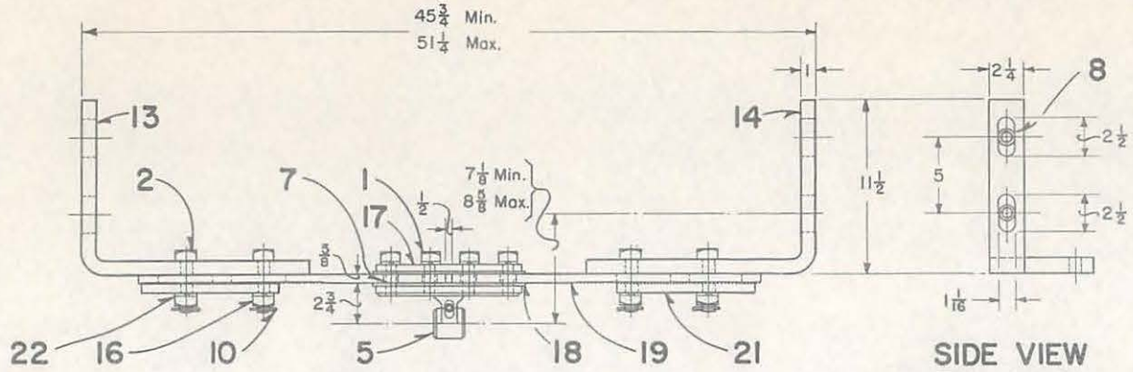
Approved C. J. Bottinelli
Chief Signal Engineer

S-3000

Printed in U. S. A.

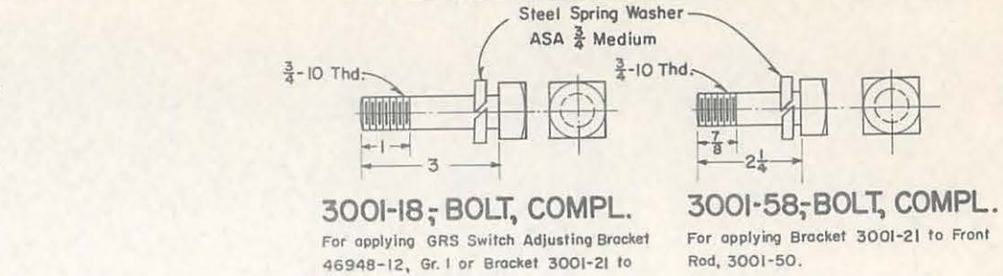
ISSUED 3-15-60

SHEET 3 Cont'd on Sh.

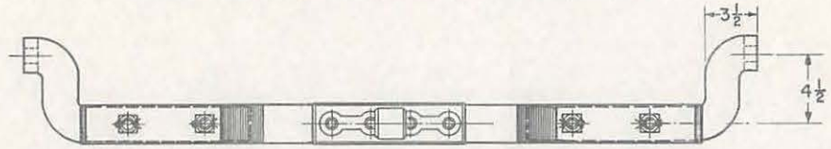


STANDARD ASSEMBLY SHOWN

Assembly To Be Made As Indicated On Switch Layout Plans.



SIDE VIEW
SWITCH LUG, R. H.



3001-50,- FRONT ROD, ADJUSTABLE

APPLIES TO 127 LB. RAIL. FOR 105 LB. RAIL SPECIFY BUSHINGS, ITEMS 8 & 9.

0 6 12 24 36

All dimensions given in inches.

NO.	ITEM	3001-50	3001-51	3001-53	REMARKS
1	Bolt, 3/4-10 X 2-1/4, Sq. Hd. 3001-58	4	4	4	
2	Bolt, 3/4-10 X 3-1/2, Sq. Hd.	4	2	2	
3					
4					
5	Bracket, Compl. 3001-21	1	1	1	
6					
7	Bushing, Insulation	4	4	4	
8	Bushing - For 3/4 Bolt, Front Rod only	2	2	2	105 Lb. Rail
9	Bushing - For 3/4 Bolt, Front Rod & Point Lug	2			105 Lb. Rail
10	Cotter Pin 3/16 X 1-1/4	4	2	2	
11					
12					
13	Lug, Switch L. H.	1	1		
14	Lug, Switch R. H.	1		1	
15					
16	Nut, 3/4-10 Thd., Sq. Hd.	4	2	2	
17	Plate, Connecting	1	1	1	
18	Plate, Insulation	2	2	2	
19	Plate, Center	2	1	1	
20	Rod, Front - Straight 3001-59		1	1	
21	Washer, Plate	2	1	1	
22	Washer, Lock - 3/4	4	2	2	

NOTES:

1 - Bolts, Nuts and Threads to be as specified on N.Y.C.S. Plan G35 unless otherwise indicated.

2 - Washers to be in accordance with current AREA specifications.

3 - Protective treatment,-Primer, Item 31, Instr. 350. or manufacturer's equivalent.

ASA Heavy, Unfinished, Sq. Hd. Bolts With Special Length Thread, C1020 Steel.

3001-18,- BOLT, COMPL.

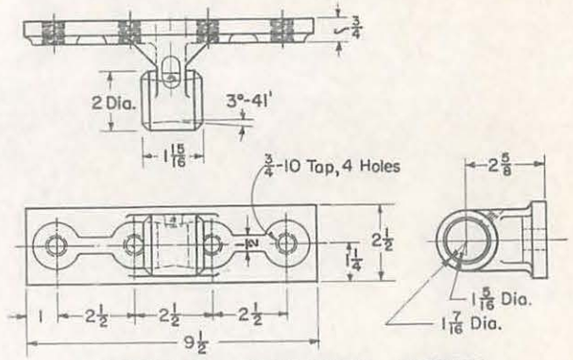
For applying GRS Switch Adjusting Bracket 46948-12, Gr. 1 or Bracket 3001-21 to M. of W. switch rods.

3001-58,- BOLT, COMPL.

For applying Bracket 3001-21 to Front Rod, 3001-50.

0 1 2 3 4 5 6

All dimensions given in inches.



3001-21,- BRACKET, COMPL.

WITH 1/4 IN., STRAIGHT, DRIVE OILER
MATERIAL- STEEL, ASTM-A27-46T, GRADE 65-30.

0 3 6 9 12

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
FRONT RODS
ADJUSTABLE

S-3001

ISSUED 9-8-59

SHEET 1 Cont'd on Sh 2

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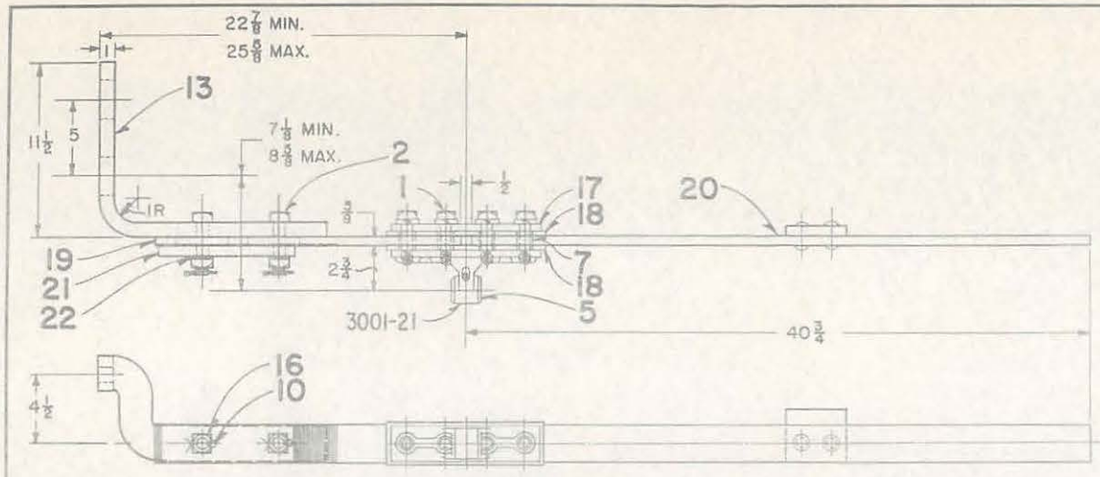
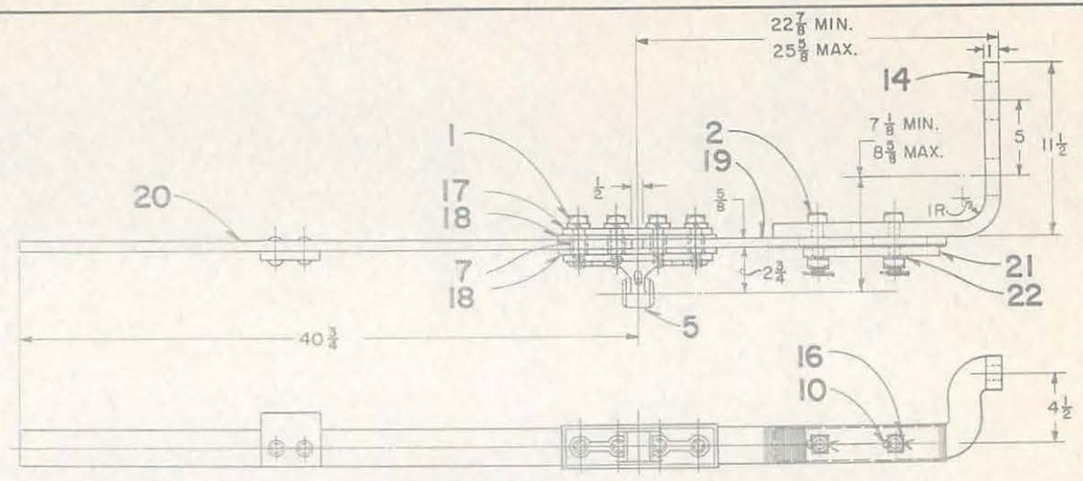


SCALE A

3001-51,-FRONT ROD, ADJUSTABLE-L.H. DERAIL

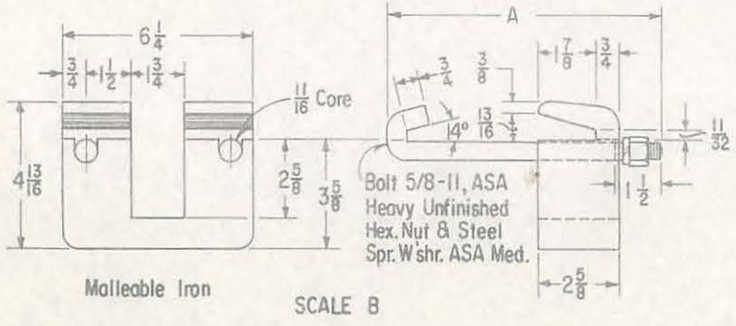
APPLIES TO 127 LB. RAIL. FOR 105 LB. RAIL SPECIFY BUSHINGS, ITEM 8.



SCALE A

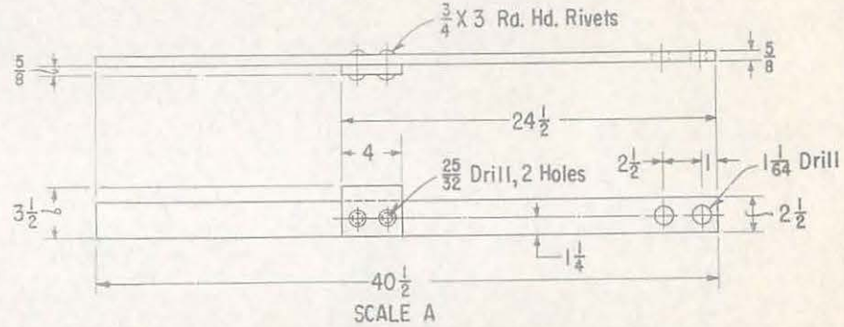
3001-53,-FRONT ROD, ADJUSTABLE-R.H. DERAIL

APPLIES TO 127 LB. RAIL. FOR 105 LB. RAIL SPECIFY. BUSHINGS, ITEM 8.



SCALE B

3001-35, GUIDE COMPL., 127 lb. rail A=9
3001-36, GUIDE COMPL., 105 lb. rail A=8



SCALE A

3001-59, FRONT ROD,-STRAIGHT END

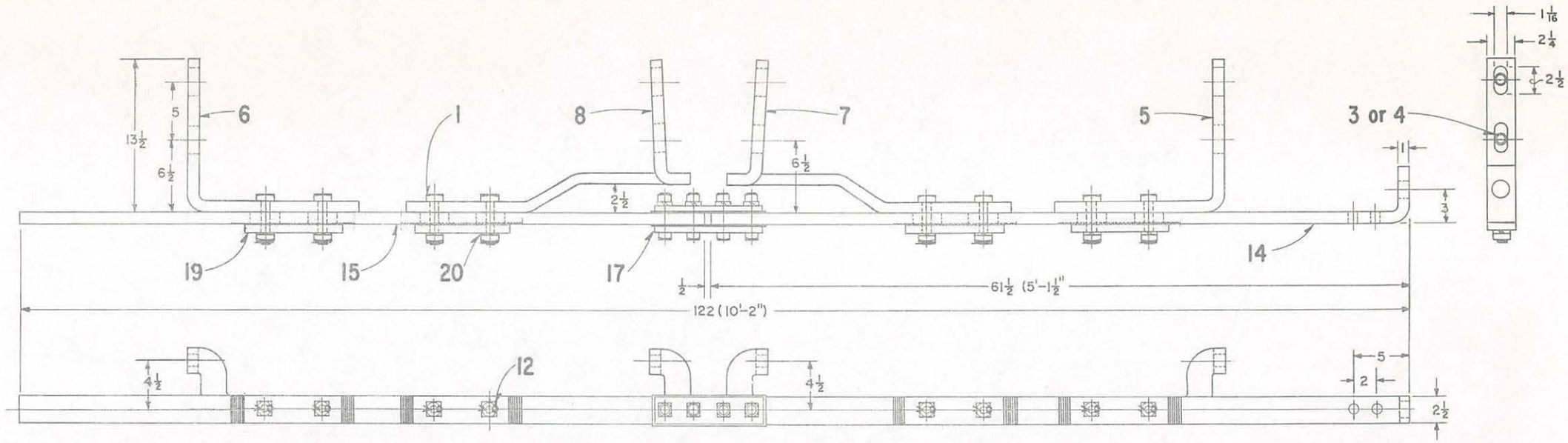
SEE SHEET 1 FOR MATERIAL LIST AND GENERAL NOTES.

0 6 12 24 SCALE A
0 6 12 SCALE B
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
FRONT RODS
FOR SWITCH POINT DERAILS

S-3001

Printed in U.S.A.
ISSUED 9-8-59



3001-60, FRONT ROD, COMPLETE

APPLIES TO 127 LB. RAIL. FOR 105 LB. RAIL SPECIFY BUSHING, ITEMS 3 OR 4. SEE NOTE 1.

0 6 12 18 24

All dimensions given in inches.

NO	ITEM		3001-60	REMARKS
1	Bolt - 3/4-10 X 3-3/4 With Square Nuts		8	
2				
3	Bushing, For 3/4 in. Bolt - Specify if required	GRS 6714-309	*	Note 1
4	Bushing, " " " " " "	GRS 8104-2	*	Note 1
5	Lug, R. H.		1	
6	Lug, L. H.		1	
7	Lug, R. H.		1	
8	Lug, L. H.		1	
9				
10				
11				
12	Pin, Cotter 3/16 X 1-1/4		8	
13				
14	Rod, Connecting, Bent		1	
15	Rod, "		1	
16				
17	Sw. Rod Insulation, Complete	AAR 10556	1	
18				
19	Washer Plate, Serrated		4	
20	Washer, 3/4" Lock		8	

NOTES:

1- For use with 105 lb. rail two bushings are required for each lug. Item 4 is required where a point detector lug is attached. Otherwise Item 3 is required.

2- Bolts, nuts and threads to meet specifications of N. Y. C. S. Plan G-35 unless otherwise indicated.

3- Material - C 1020 steel.

4- Protective treatment - Primer, Item 31, Instr. 350 or manufacturer's equivalent.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
FRONT RODS
DOUBLE SLIP SWITCH

Approved L. J. Bottinelli
Chief Signal Engineer

S-3001

ISSUED 9-8-59

SHEET 3 Cont'd. on Sh

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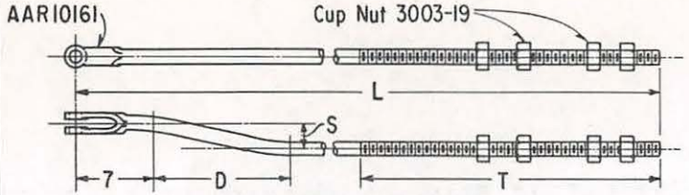
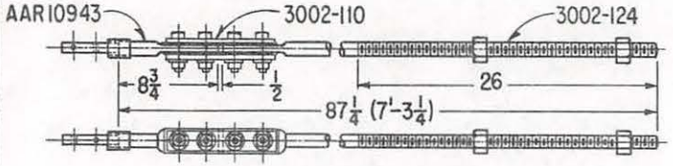
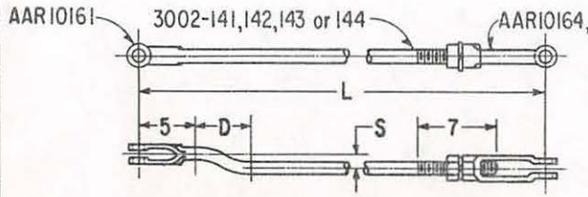


THROW RODS COMPLETE

NO.	L	S	D	T	HEX. NUTS	CUP NUTS
3002-8	59	1-3/16	6	26	2	0
3002-9	59	2-3/16	6	26	2	0
3002-10	68	3-1/4	10	12	2	0
3002-11	68	2-1/2	12	26	2	2
3002-12	68	2-1/2	12	26	2	0
3002-13	81	1-5/8	12	26	2	2
3002-14	54	2-13/16	6	22	2	0
3002-15	75	1-3/16	6	26	2	0
3002-16	75	2-3/16	6	26	2	0
3002-17	117	0	-	26	2	0
3002-18	110	3-3/4	12	26	2	0

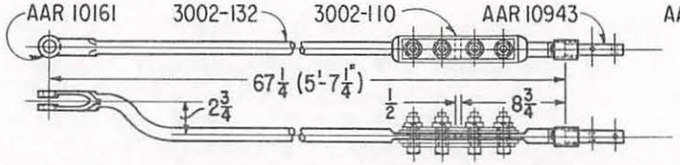


3002-21, THROW ROD COMPL.

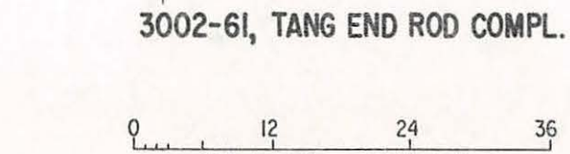


CONNECTING RODS, COMPL.

NO.	L	S	D	With Rod.
3002-31	33-3/4	0	-	3002-141
3002-32	35-1/4	0	-	3002-142
3002-33	25-1/2	0	-	3002-143
3002-34	30-1/2	1-1/8	5	3002-144



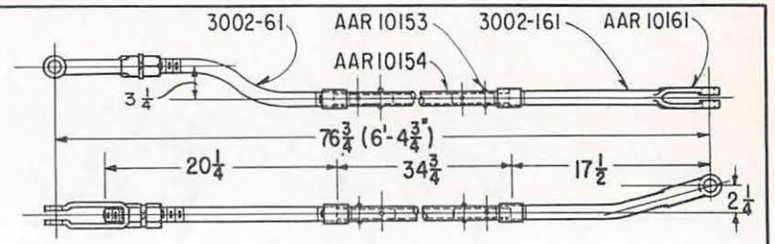
3002-51, CROSS CONNECTING ROD COMPL.



3002-61, TANG END ROD COMPL.

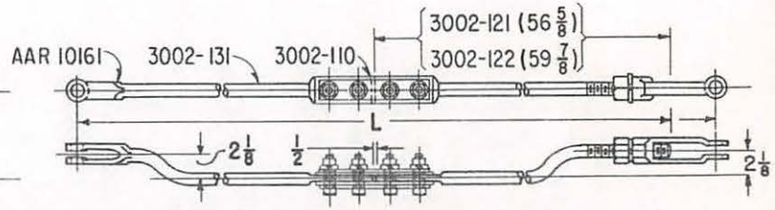
0 12 24 36

All dimensions given in inches.



CONNECTING ROD

3002-71, COMPL., With screw jaw AAR 10164
3002-72, ROD ONLY, Less screw jaw.



CROSS CONNECTING RODS

3002-81, COMPL., With screw jaw. With 3002-122 L=116
3002-82, ROD ONLY, Less screw jaw. With 3002-122 L=111-3/4
3002-83, COMPL., With screw jaw. With 3002-121 L=112-3/4
3002-84, ROD ONLY, Less screw jaw. With 3002-121 L=108-1/2

NOTES:

1- Rods to be of C1020 steel, 1-1/4 inches in diameter. Factory welds permitted but rods shall not be welded or reformed after manufacture. Portions which have been subjected to forging or welding operations to be normalized.
2- Nuts shall be of C1020 steel, ASA heavy hex. jam nuts unless otherwise indicated.
3- Threads shall be 1 1/4-7, external threads shall be ASA-UNC-2A with rounded root throughout. Internal threads shall be ASA-UNC-2B.
4- Screw Jaws are AAR 10164 and will be furnished complete with hex. nuts and ASA medium lock washers.
5- Protective treatment- Primer, Item 31, Instruction 350.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

RODS

FOR SWITCH LAYOUTS

S-3002

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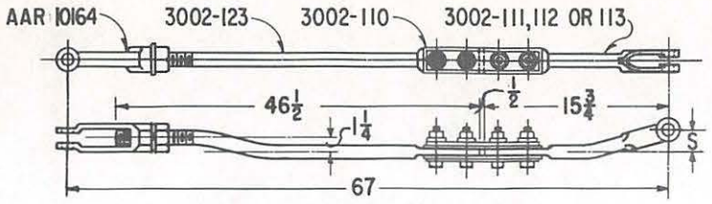
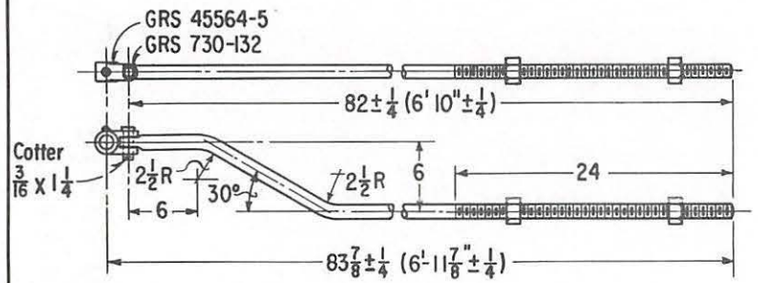
SHEET 1 Cont'd. on Sh. 2



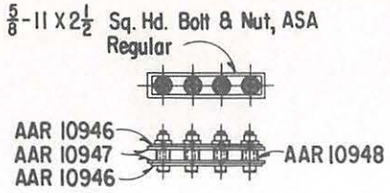
DERAIL CONNECTING RODS

3002-91, COMPL., With screw jaw. With 3002-111, S=1-7/8
3002-92, ROD ONLY, Less screw jaw. With 3002-111, S=1-7/8.
3002-93, COMPL., With screw jaw. With 3002-112, S= 1
3002-94, ROD ONLY, Less screw jaw. With 3002-112, S= 1
3002-95, COMPL., With screw jaw. With 3002-113, S=0
3002-96, ROD ONLY, Less screw jaw. With 3002-113, S=0

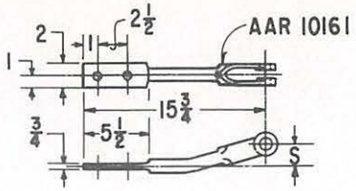


3002-101, THROW ROD COMPL., With Jaw and Pin
3002-102, THROW ROD ONLY, Less Jaw and Pin

See Notes on Sheet 1.

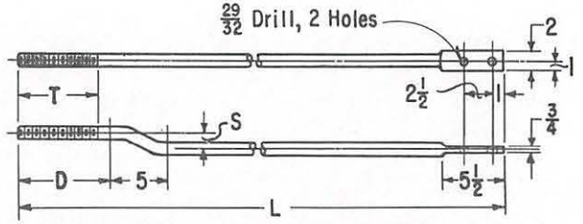


3002-110, SPLICE COMPL. INSULATED



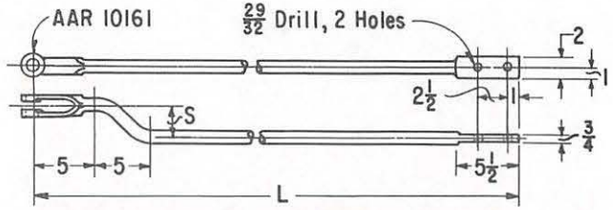
SOLID JAW, SPLICE END

3002-111, S=1-7/8
3002-112, S= 1
3002-113, S= 0



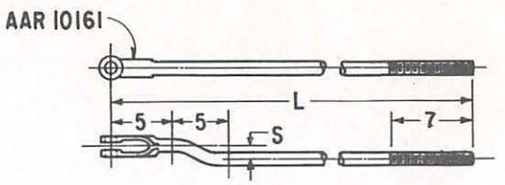
SPLICE END RODS, THREADED

3002-121,	L=56-5/8	S=2-1/8	T=7	D=8
3002-122,	L=59-7/8	S=2-1/8	T=7	D=8
3002-123,	L=46-1/2	S= 1-1/4	T=7	D=8
3002-124,	L=78	S= 0	T=26	D=0



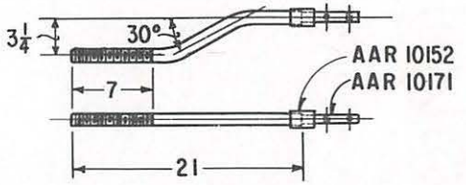
SOLID JAW ROD, SPLICE END

3002-131, L=51-3/8 S=2-1/8
3002-132, L=58 S=2-3/4

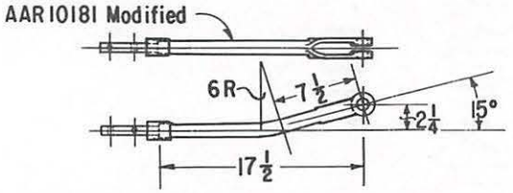


SOLID JAW RODS, THREADED

3002-141, L=29-1/2 S=0
3002-142, L=31 S=0
3002-143, L=21-1/4 S=0
3002-144, L=26-1/4 S=1-1/8



3002-151, TANG END ROD, THREADED



3002-161, SOLID JAW ROD, TANG END

0 12 24 36
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
RODS
FOR SWITCH LAYOUTS

Approved H. A. Scott
Chief Signal Engineer

S-3002

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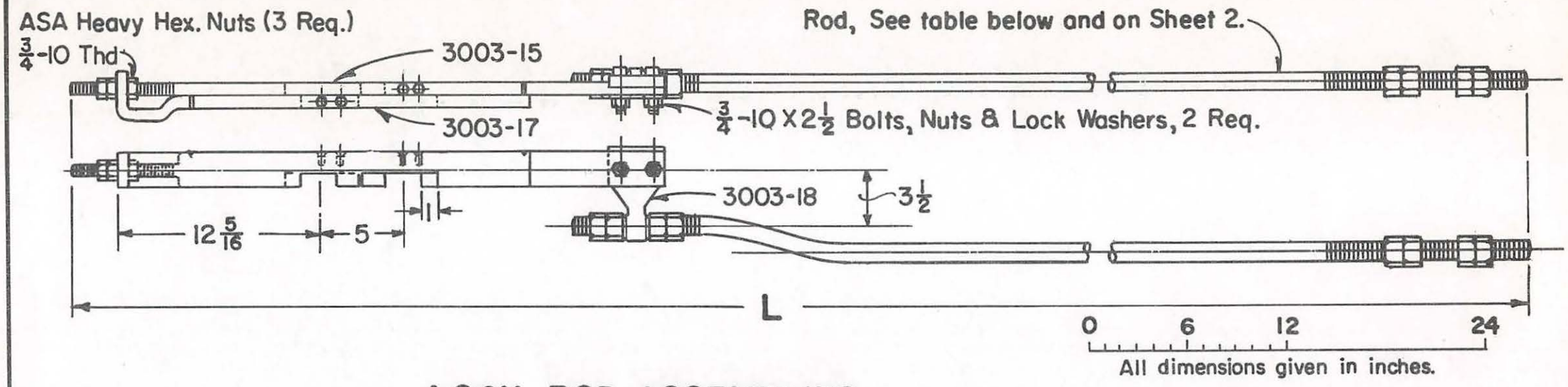
ISSUED 12-23-57

SHEET 2 Cont'd on Sh.....



LOCK ROD ASSEMBLIES

ORDER	ROD ONLY WITH NUTS	LENGTH (NOMINAL)	WEIGHT OF RAIL	DISTANCE TO GAGE
3003-2	3003-21	8'-0 3/4"	127 - 105	45
3003-4	3003-22	7'-3 3/4"	127	36
3003-6	3003-23	7'-3 3/4"	105	36
3003-102	3003-121	4'-7"	127	45
3003-104	3003-122	4'-7"	105	45
3003-106	3003-123	8'-0 3/4"	127-105	45
3003-108	3003-124	8'-7 3/4"	127	36(Slip Rail)
3003-110	3003-125	8'-7 3/4"	105	36(Slip Rail)

NOTES:

1 - Assembly shown for 5 in. throw. May be adjusted to from 3-1/2 to 6 in. throw.

2.- All nuts to be C1020 steel, shall be hot forged, cold trimmed, normalized, chamfered and faced.

3.- External threads shall be ASA-UNC 2A with rounded root throughout. Internal threads shall be ASA-UNC-2B.

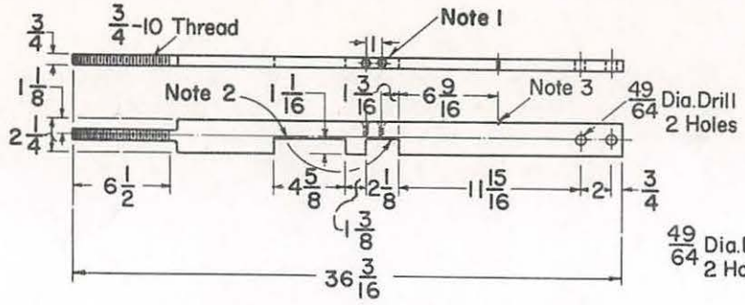
4.- Protective treatment, Primer, Item 31, Instruction 350.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
LOCK ROD
GRS MODEL 5A, 5C OR 5G SWITCH MACHINE ASSEMBLY

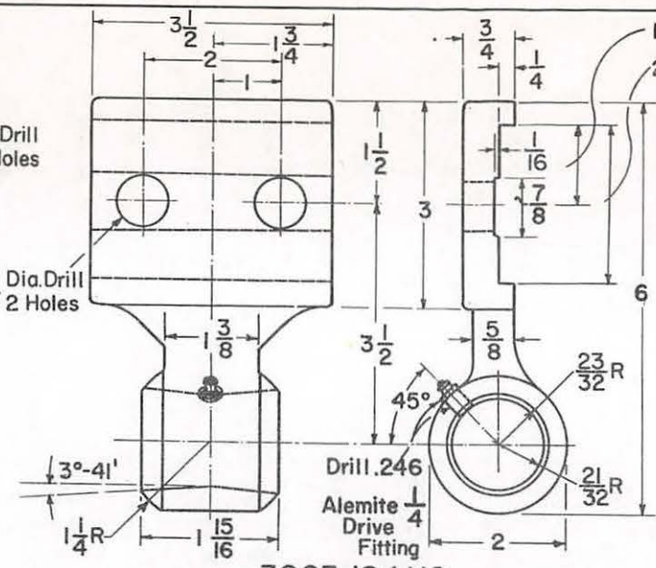
S-3003

Printed in U.S.A.

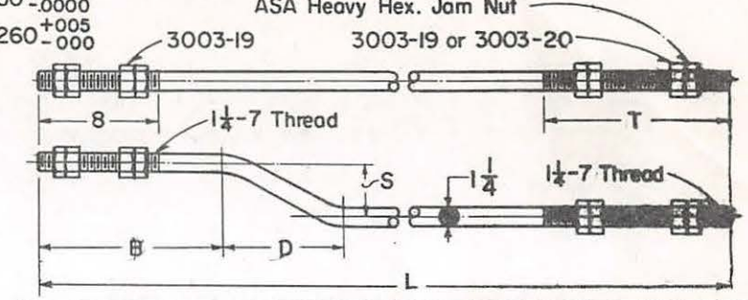
ISSUED 5-26-60
SHEET 1 Cont'd on Sh. 2



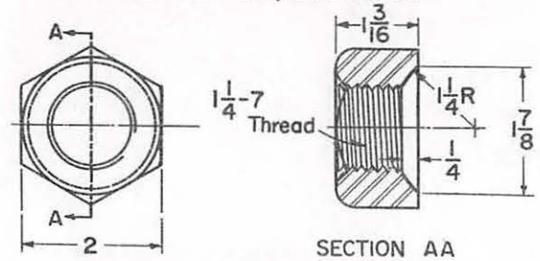
3003-15 LOCK PLATE
C1020 Steel forged



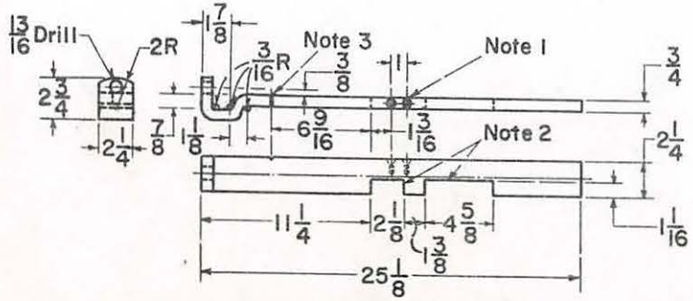
3003-18 LUG
Steel ASTM-A27-46T, Grade 65-30



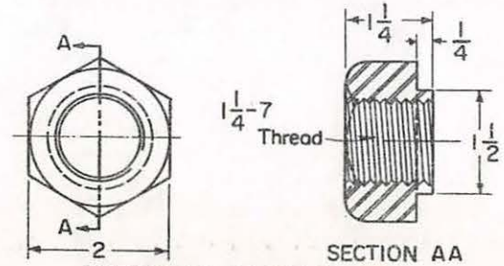
ROD ONLY (C1020 STEEL)						ROD ONLY-WITH NUTS				
NO.	L	S	B	D	T	NO.	ROD	JAM NUT	3003-19	3003-20
3003-11	67	1-1/2	12	8	12	3003-21	3003-11	4	4	—
3003-12	58	2-1/2	12	8	12	3003-22	3003-12	4	4	—
3003-13	58	3-1/2	12	8	12	3003-23	3003-13	4	4	—
3003-111	24-3/4	1	9-3/8	6	8	3003-121	3003-111	4	2	2
3003-112	24-3/4	1-3/16	9-3/8	6	8	3003-122	3003-112	4	2	2
3003-113	67	2-7/8	12	8	12	3003-123	3003-113	4	4	0
3003-114	74	3-1/2	12	8	12	3003-124	3003-114	4	4	0
3003-115	74	4-1/4	12	8	12	3003-125	3003-115	4	4	0



3003-19 CUP NUT
C1020 STEEL



3003-17 LOCK PLATE
C1020 Steel forged



3003-20 SLEEVE NUT
C1020 STEEL

NOTES:

1.- TAP 5/16-18 X 5/8 THREAD. COUNTERSINK 82° TO 3/8 DIAMETER. CENTERLINE OF HOLES MUST BE PARALLEL WITH SIDE OF PLATE.
2.- LOCKING NOTCHES MUST BE ACCURATE TO DIMENSIONS, FREE FROM BURRS AND HAVE STRAIGHT EDGES.
3 - LOCATING NOTCHES 1/32 DEEP, 1/32 WIDE.
4.- ALL NUTS TO BE C1020 STEEL, SHALL BE HOT FORGED, COLD TRIMMED, NORMALIZED CHAMFERED AND FACED.
5.- PROTECTIVE TREATMENT,-PRIMER, ITEM 31, INSTRUCTION 350.
6.- EXTERNAL THREADS SHALL BE ASA-UNC-2A WITH ROUNDED ROOT THROUGHOUT. INTERNAL THREADS SHALL BE ASA-UNC-2B.

0 1 2 3 4 5 6 0 6 12 18 24

ALL DIMENSIONS GIVEN IN INCHES

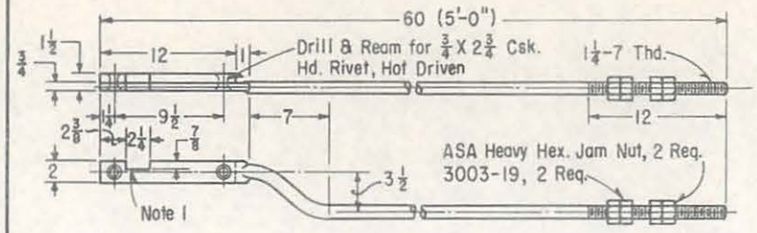
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
LOCK RODS
GRS MODEL 5A, 5C OR 5G SWITCH MACHINE DETAILS

S-3003

Printed in U.S.A.

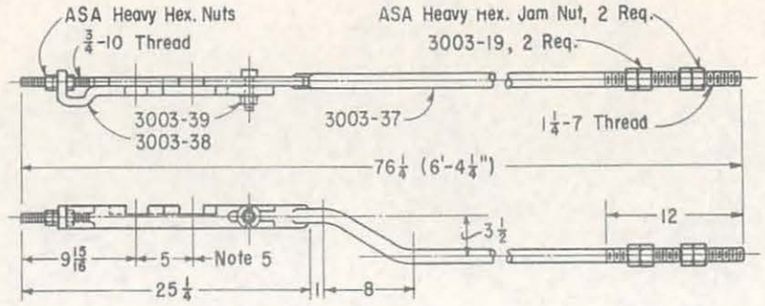
ISSUED 5-26-60

SHEET 2 Cont'd. on Sh. 3

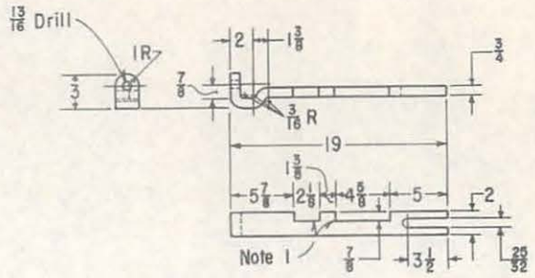


3003-31, LOCK ROD COMPLETE

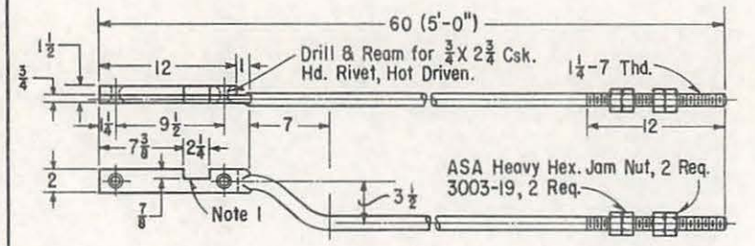
USE AT OPEN SWITCH POINT



3003-35, LOCK ROD COMPLETE

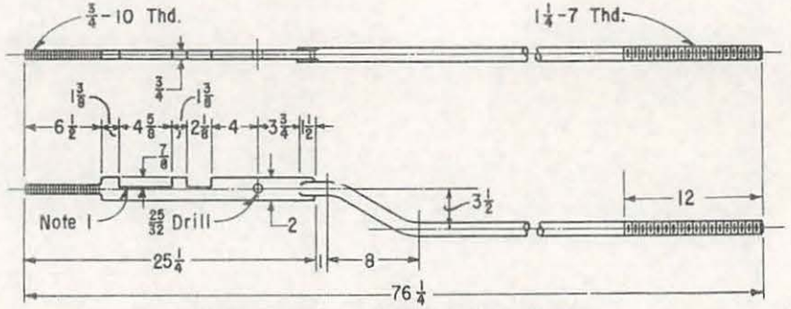


3003-38, LOCK PLATE

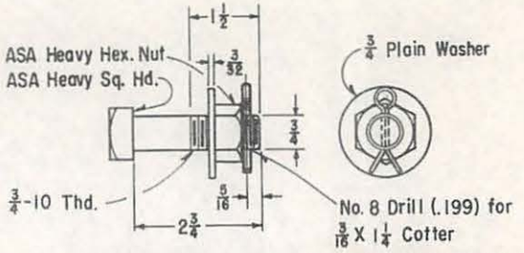


3003-33, LOCK ROD COMPLETE

USE AT CLOSED SWITCH POINT



3003-37, LOCK ROD ONLY



3003-39, BOLT COMPLETE

NOTES:

1 - Locking notches must be accurate to dimensions, free from burrs and have straight edges.

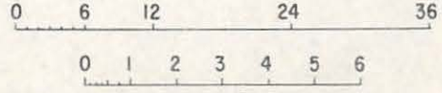
2 - All nuts to be of C-1020 steel, shall be hot forged, cold trimmed, normalized, chamfered and faced.

3 - All rods to be of C-1020 steel, 1-1/4 inches in diameter. Factory weld permitted; portions which have been subjected to forging or welding operations to be normalized. Rods must not be welded or reformed after manufacture.

4 - External threads shall be ASA-UNC-2A with rounded root throughout. Internal threads shall be ASA-UNC-2B.

5 - Assembly shown for 5 inch throw and may be adjusted from 3-1/2 to 6 inch throw.

6 - Protective treatment - Primer, Item 31, Instruction 350.



All dimensions given in inches.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

LOCK RODS

MECHANICAL SWITCH LAYOUTS

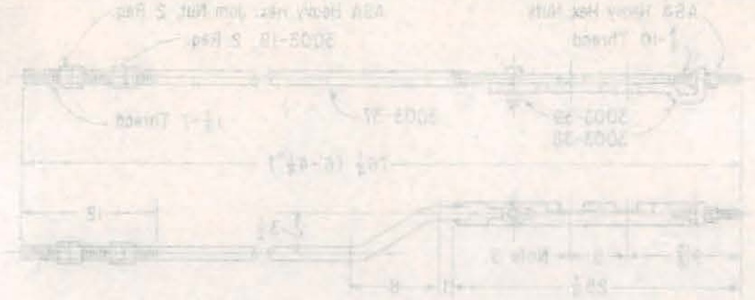
S-3003

Printed in U.S.A.

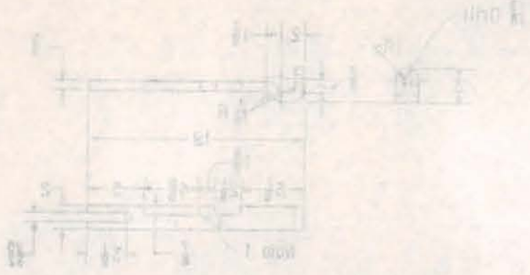
ISSUED 9-8-59

SHEET 3 Cont'd. on Sh. 4

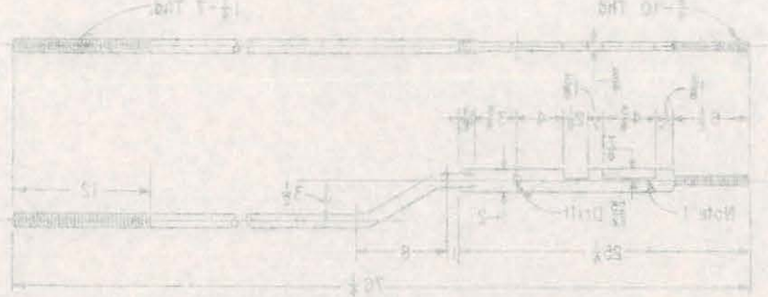
3003-33, LOCK ROD COMPLETE
USE AT CLOSED SWITCH POINT



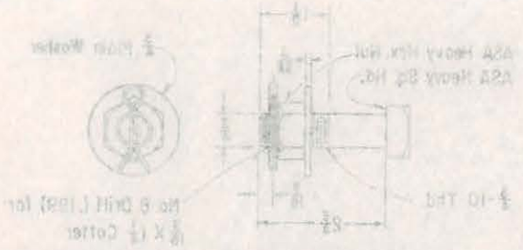
3003-35, LOCK ROD COMPLETE



3003-39, LOCK PLATE



3003-37, LOCK ROD ONLY



3003-39, BOLT COMPLETE

NOTES:

1 - Locking notches must be accurate to dimensions, free from burrs and have straight edges.
2 - All rods to be of C-1020 steel, which be hot forged, cold trimmed, normalized, cleaned and faced
3 - All rods to be of C-1020 steel, 1-1/4 inches in diameter. Factory weld permitted; portions which have been subjected to forging or welding operations to be normalized. Rods must not be welded or reformed after manufacture.
4 - External threads shall be ASA-UNC-2A with rounded root throughout. Internal threads shall be ASA-UNC-2B.
5 - Assembly shown for 6 inch throw and may be adjusted from 1-1/2 to 6 inch throw.
6 - Protective treatment - Primer, item 37, Instruction 350.

0 6 12 24 36
0 1 2 3 4 5 6
All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
LOCK RODS
MECHANICAL SWITCH LAYOUTS

S-3003

ISSUED 3-8-59

SHEET 3 Cont'd. on Sh. 4

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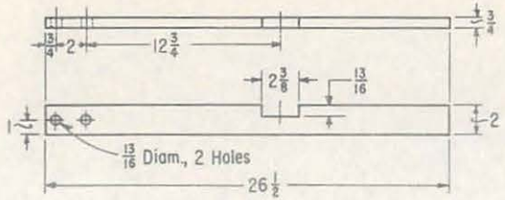
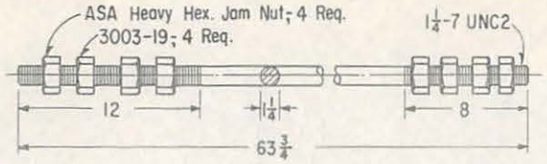
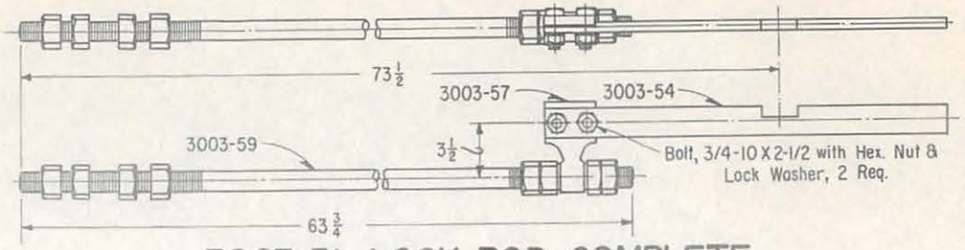


3003-54,- THROUGH PLATE



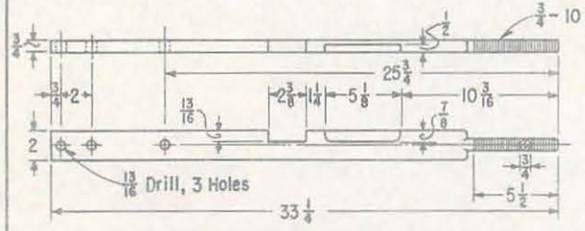
3003-58,- ROD, ONLY

3003-59,- ROD, COMPL. WITH NUTS

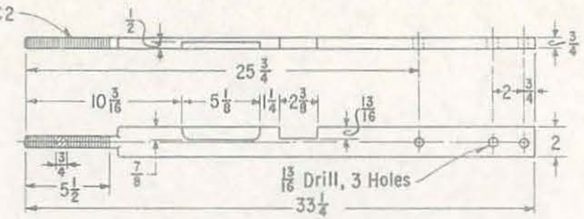


3003-51,- LOCK ROD, COMPLETE

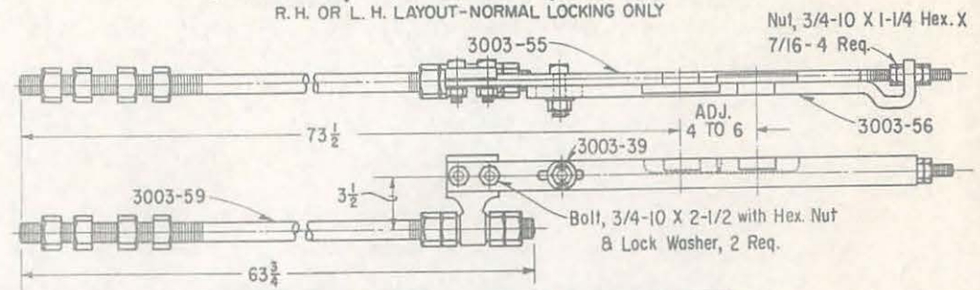
R. H. OR L. H. LAYOUT- NORMAL LOCKING ONLY



3003-55,- THROUGH PLATE

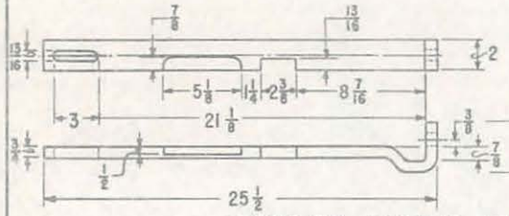


3003-60,- THROUGH PLATE

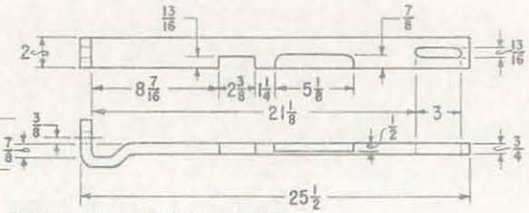


3003-52,- LOCK ROD, COMPLETE

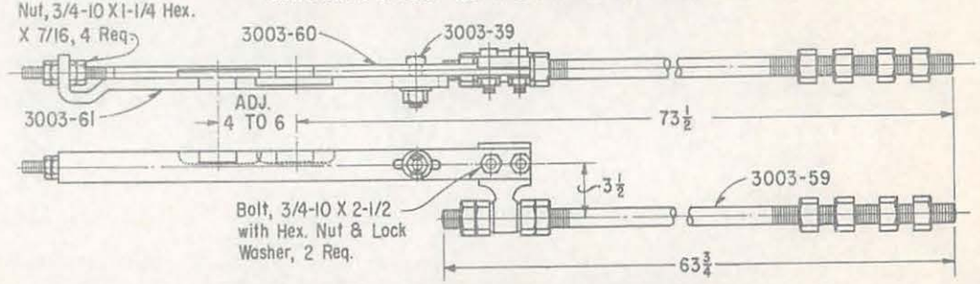
R.H. SWITCH LAYOUT- NORMAL & REVERSE LOCKING



3003-56,- LOCK PLATE

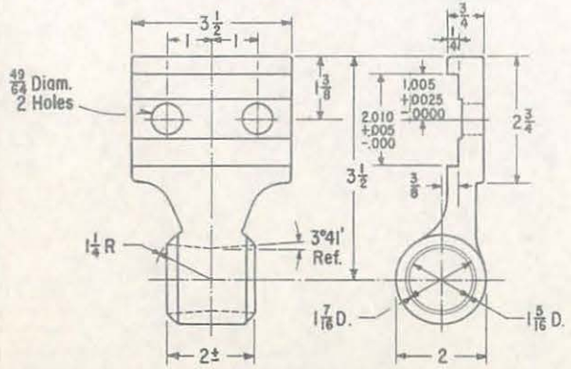


3003-61,- LOCK PLATE



3003-53,- LOCK ROD, COMPLETE

L.H. SWITCH LAYOUT- NORMAL & REVERSE LOCKING



3003-57,- LUG

MATERIAL- CAST STEEL ALLOY

NOTES:

1.- Material- C. D. Steel AISI-1335 unless otherwise noted.

2.- Rods must not be welded or reformed after manufacture.

3.- Rods will have one coat of primer when supplied by manufacturer. Rods reissued by Signal Dept. shop to have one coat of primer, Item 31, Instruction 350.

(3003-57) All dimensions given in inches. (All other figures)

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

LOCK RODS

GRS MODEL 9 SWITCH MACH.

Approved L. S. Battinelli
Chief Signal Engineer

S-3003

ISSUED 9-8-59

SHEET 4 Cont'd. on Sh

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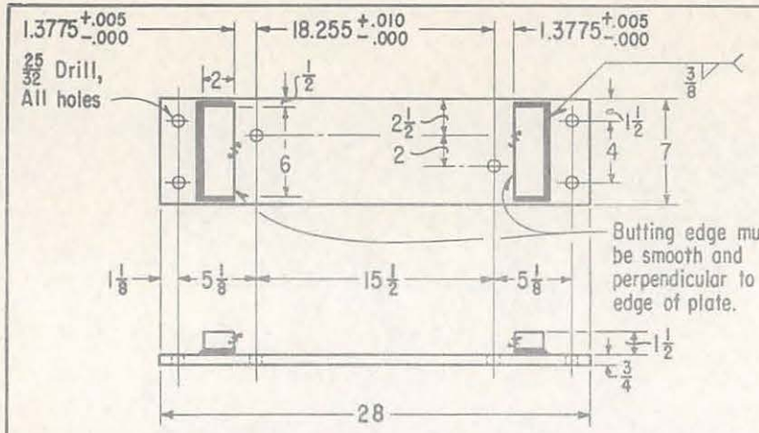
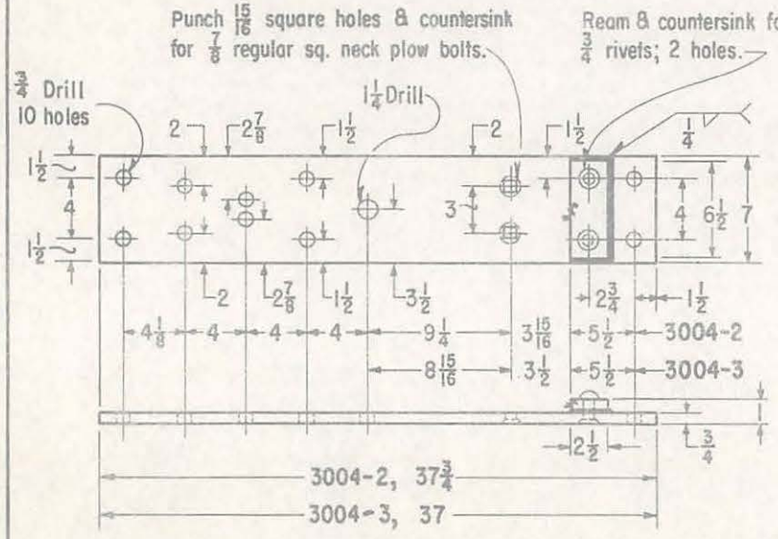
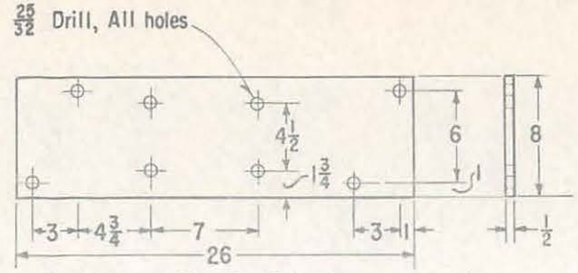


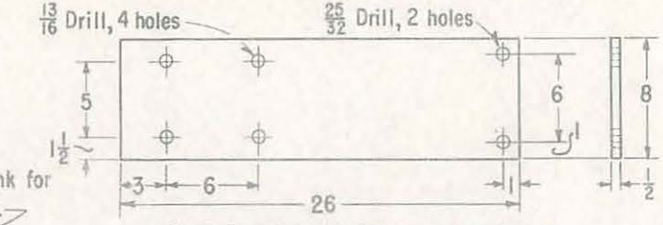
3004-1, SADDLE PLATE COMPL., G.R.S. Model 5 Sw. Mach.



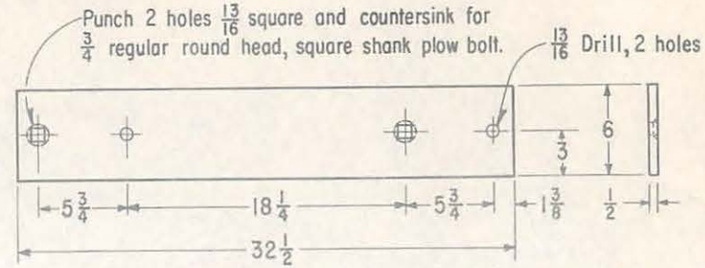
3004-2, TIE PLATE COMPL. HBP Derail, 127 lb. rail.
3004-3, TIE PLATE COMPL. HBP Derail, 105 lb. rail.



3004-4, BASE PLATE, Plunger Lock.



3004-5, BASE PLATE, Crank Stand.



3004-8, BASE PLATE, Model 10 Tandem Lock.

NOTES:

1 - Rail Braces used with 3004-2 and 3004-3 are to be adjustable and removable and will be furnished by M. of W. Dept.
2 - Material - C1020 steel.
3 - Protective treatment - Primer, Item 31, Instruction 350.

0 12 24
All dimensions given in inches.

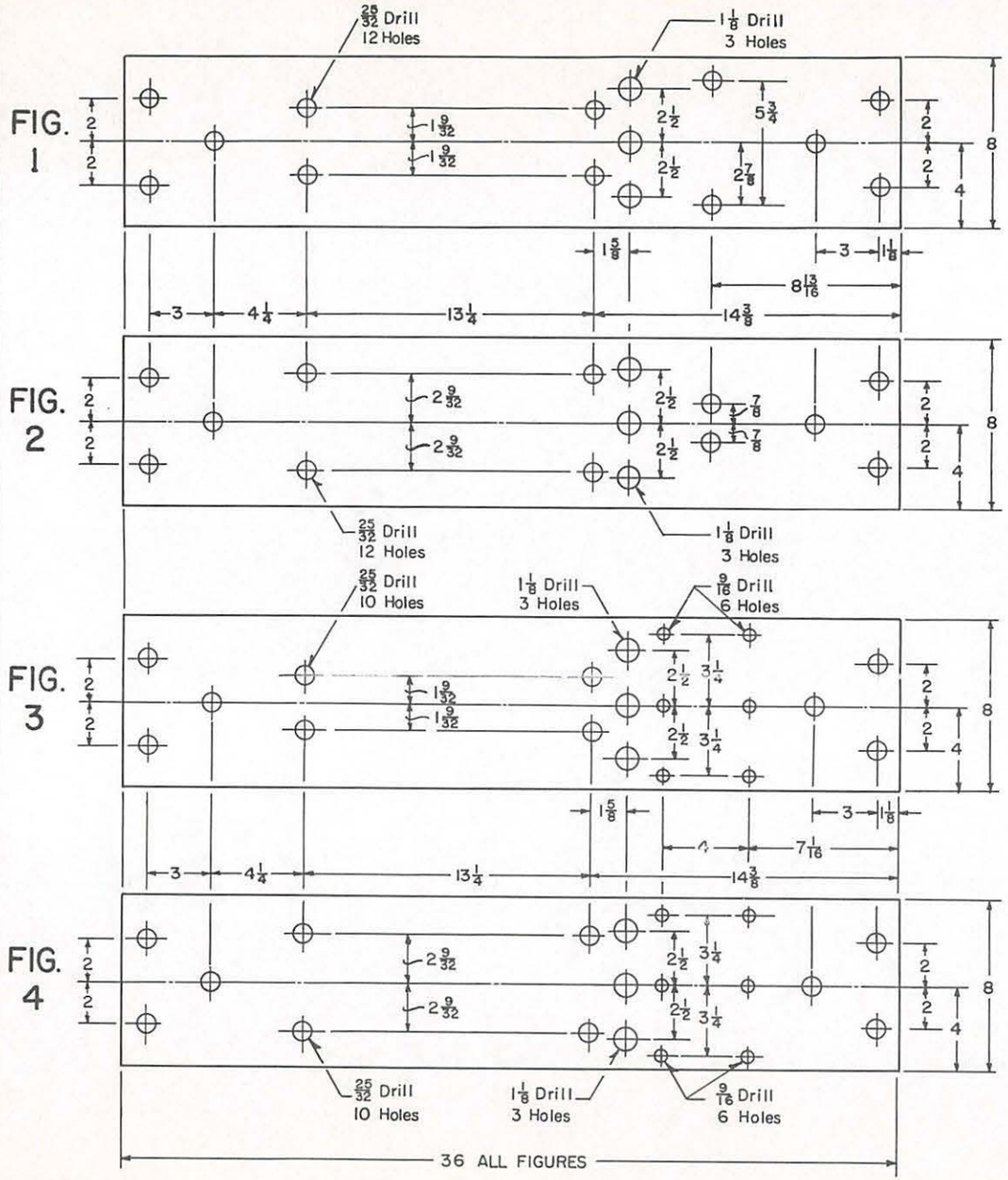
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
BASE PLATES
FOR SWITCH LAYOUTS

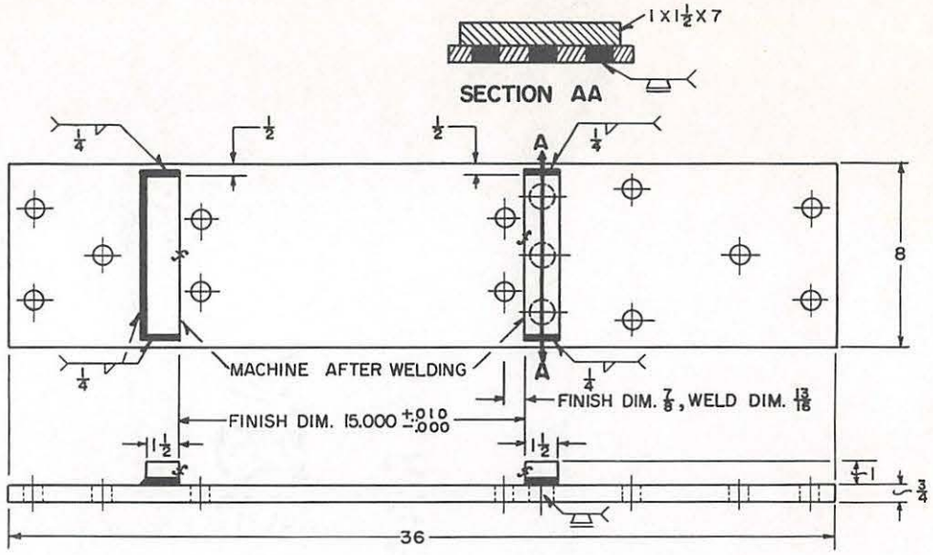
S-3004

Printed in U.S.A.

ISSUED 9-8-59

SHEET 1 Cont'd. on Sh. 2





3004-11, SADDLE PLATE, COMPL.	With drilling	Fig. 1	for	Tie 2 with	lock (Shown).
3004-12, SADDLE PLATE, COMPL.	" "	Fig. 2	"	Tie 1 "	tandem lock.
3004-13, SADDLE PLATE, COMPL.	" "	Fig. 3	"	Tie 2 "	latch stand.
3004-14, SADDLE PLATE, COMPL.	" "	Fig. 4	"	Tie 1 "	latch stand.

NOTES: 1. Material- C1020 steel.

2. Protective treatment- Primer, Item 31, Instruction 350.

0 6 12 24

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT.
BASE PLATES
FOR GRS MODEL 9 SWITCH MACHINE

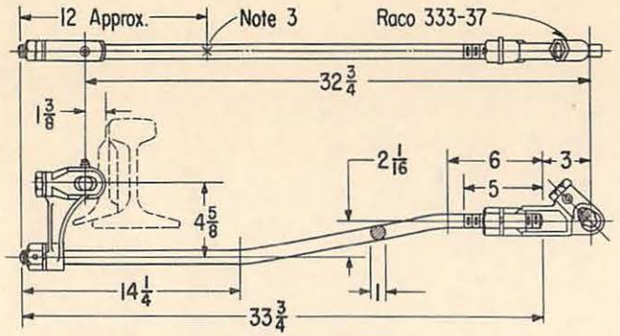
Approved... H. A. Scott
Chief Signal Engineer

S-3004

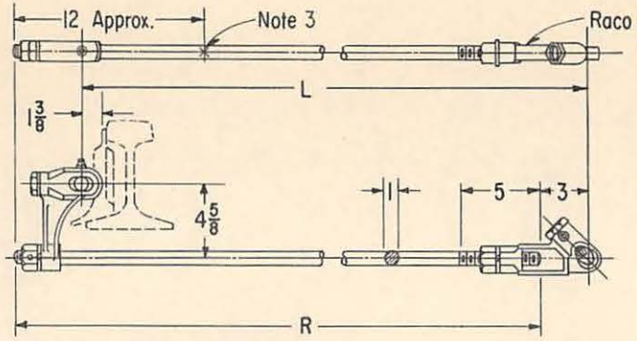
ISSUED..12-23-57.....

SHEET...2.....Cont'd on Sh.....

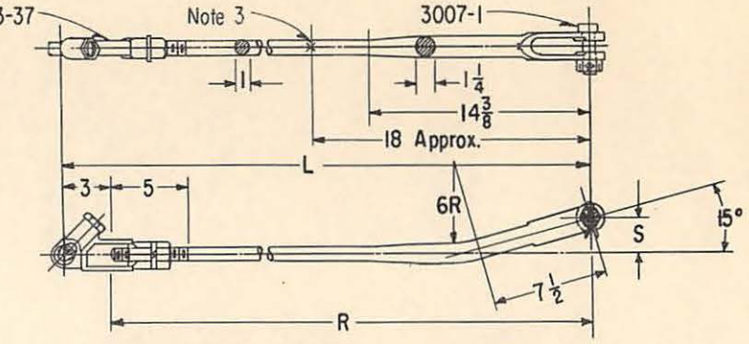
Printed in U.S.A.



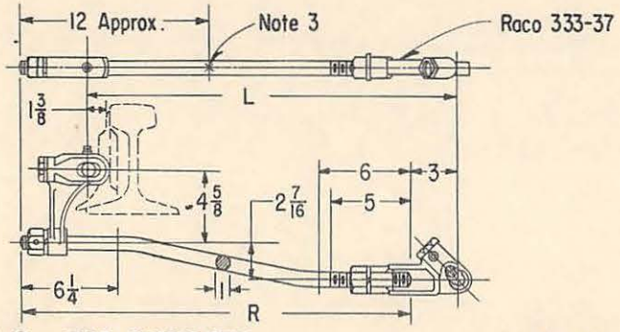
3005-1, ROD COMPLETE
3005-11, ROD & POINT SOCKET ASSEMBLY



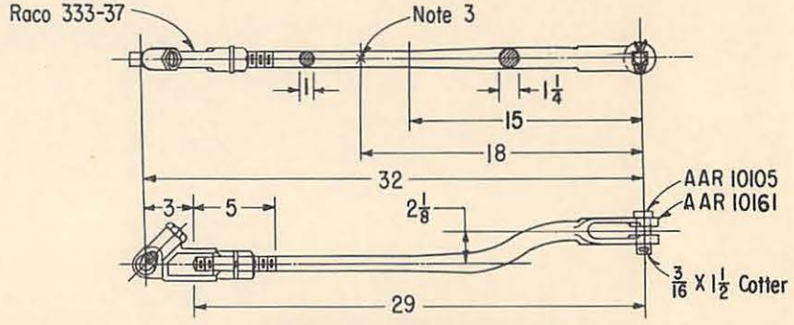
3005-3,	ROD COMPLETE	L=33-7/8
3005-13,	ROD & POINT SOCKET ASSEMBLY	R=34-7/8
3005-4,	ROD COMPLETE	L=46-3/8
3005-14,	ROD & POINT SOCKET ASSEMBLY	R=47-3/8



3005-6,	ROD COMPLETE	L=62-1/8	
3005-16,	ROD ONLY	R=59-1/8	S=2-1/4
3005-7,	ROD COMPLETE	L=84	
3005-17,	ROD ONLY	R=81	S=0



3005-2,	ROD COMPLETE	L=23-3/4
3005-12,	ROD & POINT SOCKET ASSEMBLY	R=24-3/4
3005-9,	ROD COMPLETE	L=39-1/4
3005-19,	ROD & POINT SOCKET ASSEMBLY	R=40-1/4



3005-8, ROD COMPLETE
3005-18, ROD ONLY

NOTES:
1 - Rods to be of 1335 steel. Factory welds permitted but rods shall not be welded or reformed after manufacture. Portions which have been subjected to forging or welding operations to be normalized.
2 - Threads shall be 1-8, external threads shall be ASA-UNC-2A with rounded root throughout. Internal threads shall be ASA-UNC-2B.
3 - Manufacturer's identification to be stamped on each rod at "X."
4 - For lengths not shown specify rod number and length required
5 - Protective treatment-Primer, Item 31, Instruction 350.

0 6 12 18 24
All dimensions given in inches.

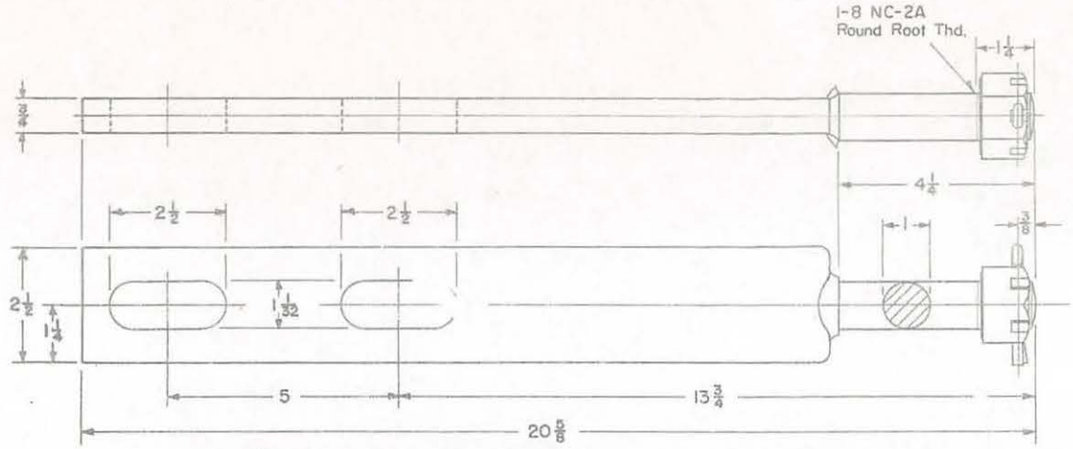
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
POINT DETECTOR RODS

Approved L. J. Bottinelli
Chief Signal Engineer

S-3005

Printed in U.S.A.

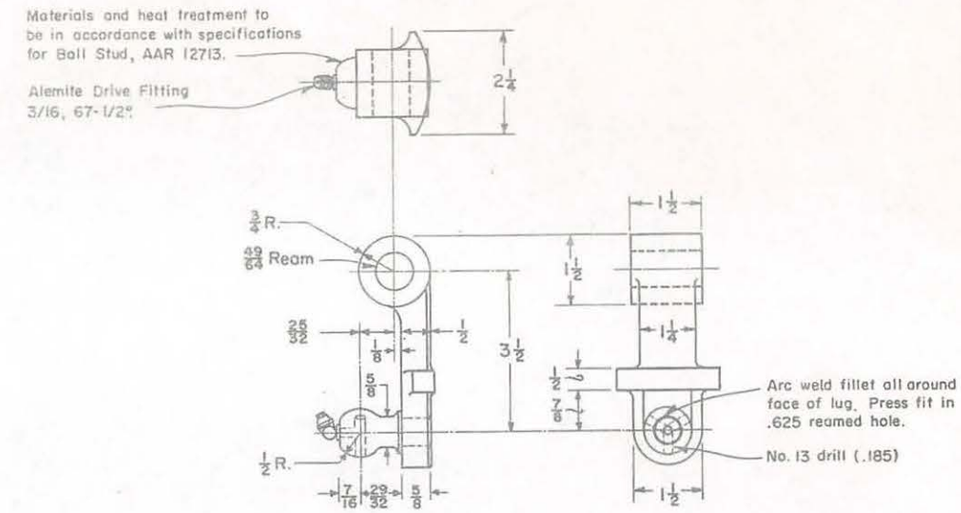
ISSUED 5-26-60
SHEET 1 Cont'd. on Sh.



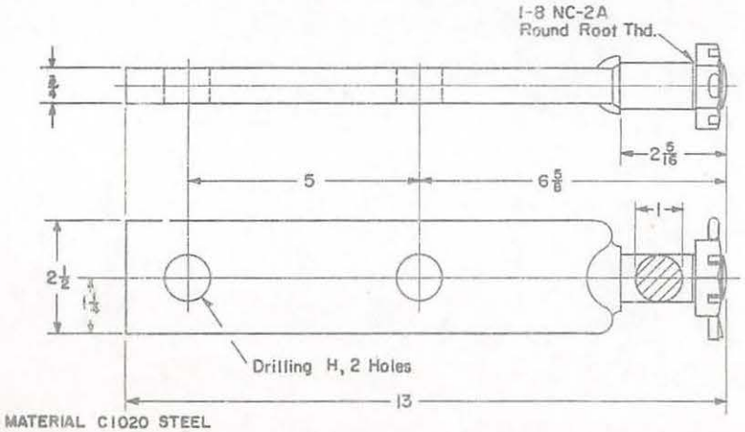
MATERIAL C-1020 STEEL

3006-21, POINT LUG, Compl. with Nut & Cotter
3006-31, POINT LUG, Only

BUSHINGS REQUIRED FOR 3/4 IN. BOLTS (105 LB. RAIL) SEE PLAN 3001, ITEMS 8 OR 9.



3006-9, BALL-STUD LUG, Compl.



MATERIAL C1020 STEEL

3006-23, POINT LUG, Compl. with Nut & Cotter.	H=1-1/16
3006-33, POINT LUG, Only	H=1-1/16
3006-24, POINT LUG, Compl. with Nut & Cotter.	H= 13/16
3006-34, POINT LUG, Only	H= 13/16

NOTE:

1.- Protective treatment - Primer, Item 31, Instruction 350 or manufacturer's equivalent.

0 1 2 3 4 5 6
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
LUGS
FOR POINT DETECTOR RODS

Approved L. S. Battinell
Chief Signal Engineer

S-3006

ISSUED 9-8-59

SHEET 1 Cont'd on Sh

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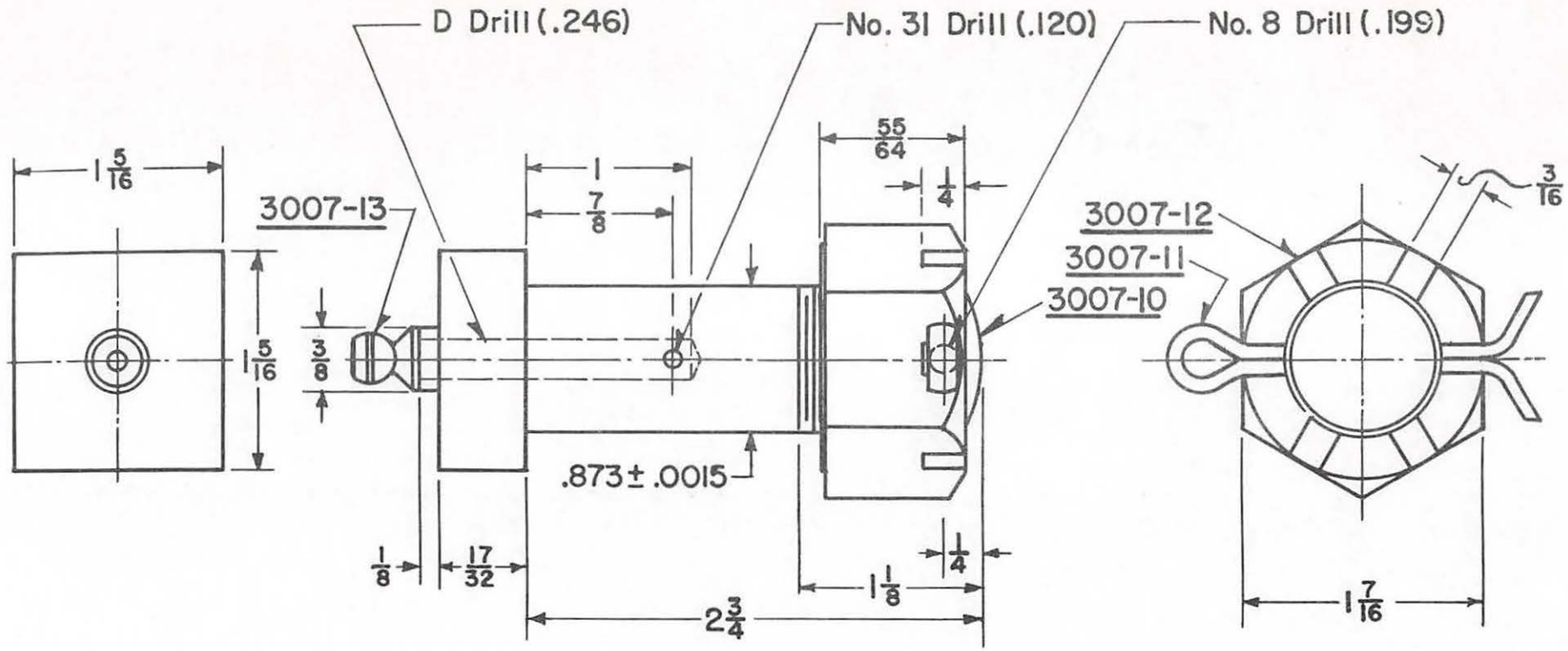


3007-1, BOLT COMPLETE

3007-10-BOLT ONLY, 7/8, Sq. Hd., CD Steel SAE 1117 or 1118
3007-11-COTTER, 3/16 X 2
3007-12-NUT, Heavy Hex., ASA., Semi-finished & cadmium plated.
3007-13-OILER, Alemite 1/4 inch drive straight fitting.

NOTES: 1.- Threads-External, 7/8-9 NC-2A; Internal 7/8-9 UNC-2B
2.-Protective treatment- No-Ox-Id, Item 62, Instruction 350.

0 1 2 3
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
BOLT
THROW ROD CONNECTION TO SWITCH MACH.

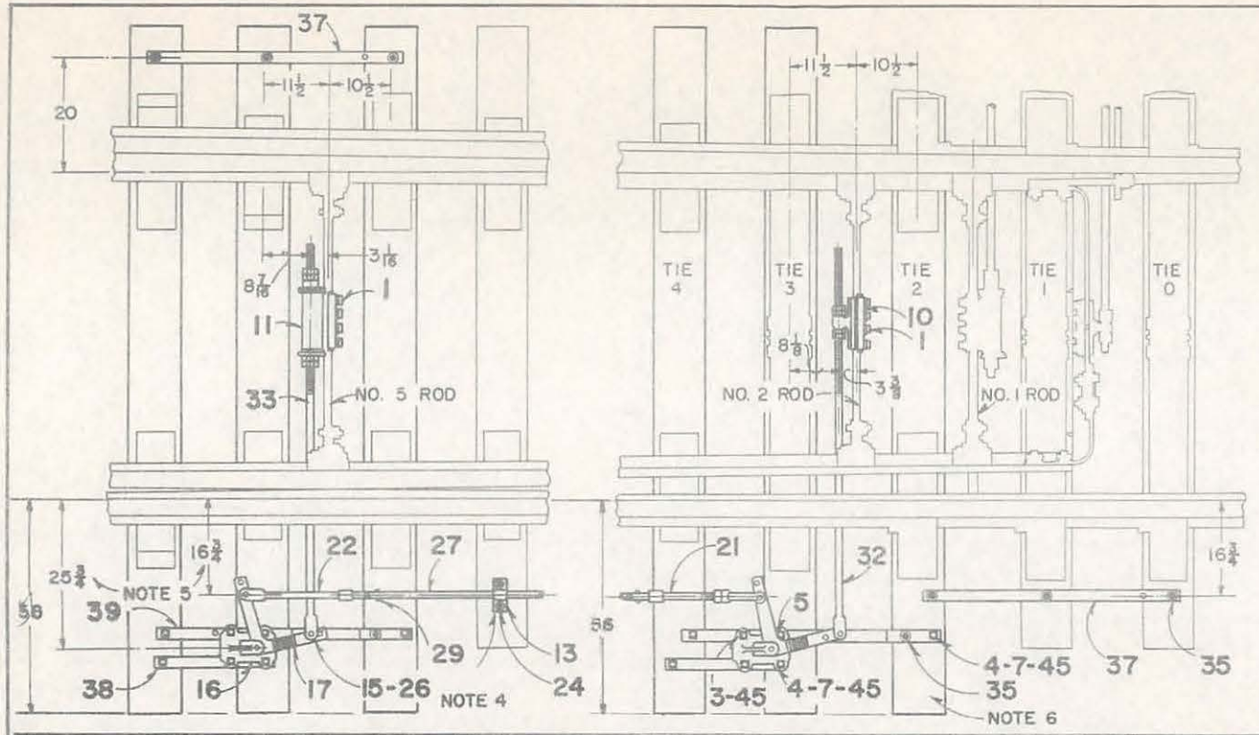
Approved L. S. Battinello
Chief Signal Engineer

S-3007

ISSUED 9-29-59

(Printed in U.S.A.)

SHEET 1 Cont'd on Sh.



NOTE:

1 - This plan to be used as directed by Signal Engineer and in conjunction with Plans 3000 or 3900. All requirements of Plan 3000 or 3900 must be met.

2 - Remove one splice plate on No. 2 and No. 5 rods; install bracket, Item 10 on No. 2 rod and bracket, Item 11 on No. 5 rod.

3 - Drilling for drive lags, Item 24, to be 3/8 in. diameter, 2 in. deep.

4 - Pipe carrier spacing and distance between first carrier and center line of crank must not exceed 60 inches.

5 Where adjacent to third rail, locate pipe line and crank stands 3 inches nearer to gage.

6 - For Tie No. 2, add 18 inches to length required on Plan 3000 or 3900

0 12 24 36 48 60

All dimensions given in inches.

NO.	ITEM	REF.	REQ.	USE
1	Bolt, 3/4 X3	3001-18	8	Bracket-No.2,5 Rod
2				
3	Bolt, 3/4 X2-1/2 Sq. Hd. & Nut.	ASA Regular	4	Crank Stands
4	Bolt,Stud, 3/4-10X11 Sq.Nuts-Spr.Wshr.	ASA Regular	8	" "
5	Bolt,Lag, 3/4 X 7, Cut Thd.	ASA	2	" "
6				
7	Bolt Grips	Roco 589-1	8	Stud Bolts
8				
9				
10	Bracket	3001-21	1	No. 2 rod
11	Bracket, Sw. Adjustment	GRS 46948-12Gr.1	1	No. 5 rod
12				
13	Carrier, Pipe-One way	AAR 10746	As req.	See Note 4
14				
15	Cotter, 3/16 X 1-1/2		4	Jaw Pins
16	Crank Stand-With center pin	AAR 10082	2	
17	Crank	3017-4	2	R. H. Turnout
18	Crank	3017-2		L. H. Turnout
19				
20				
21	Jaw, Screw-Tang End	AAR 10199	1	
22	Jaw, Solid - Tang End	AAR 10181	1	
23				

NO.	ITEM	REF.	REQ.	USE
24	Lag, Drive, Wshr Hd.1/2X3;2-1/2 Thd.	* 21-C-360	As req.	Pipe carrier
25				
26	Pin, Jaw	AAR 10105	4	Cranks
27	Pipe, 1 Inch, With plugs & couplings	AAR 10155	As req.	
28				
29	Rivets	AAR 10153	As req.	Pipe line
30				
31				
32	Rod, Throw, Complete	3002-12	1	At No. 2 rod.
33	Rod, Throw, Complete	3002-11	1	At No. 5 rod.
34				
35	Spikes, Drive, 6-1/2 in. long	* 21-C-361	8	Tie Straps
36				
37	Tie Straps, Short.	3014-3	2	
38	Tie Straps, Short	3014-4	2	Crank Stands
39	Tie Straps, Short, Set	3014-6	2	Crank Stands
40				
41				
42				
43				
44				
45	Washers, Steel Spr. ASA Med.	Coml.	12	Items 3 & 4

* Pittsburg Screw & Bolt Co. or equal.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

SWITCH LAYOUT

AUXILIARY THROW

Approved L. S. Battinelli
Chief Signal Engineer

S-3010

ISSUED 9-8-59

SHEET 1 Cont'd on Sh

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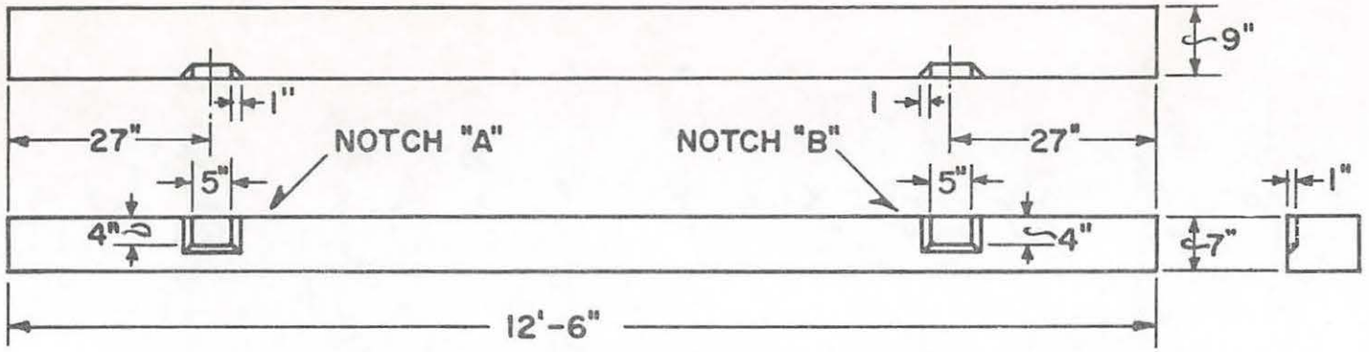
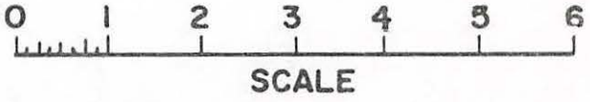


NOTE:

All ties to be creosoted after notching or framing.

3011-11,- TIE NO. 1, R.H. WITH NOTCH "A".
3011-12,- TIE NO. 1, L.H. WITH NOTCH "B".

FOR SWITCH LAYOUT 3100



NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT

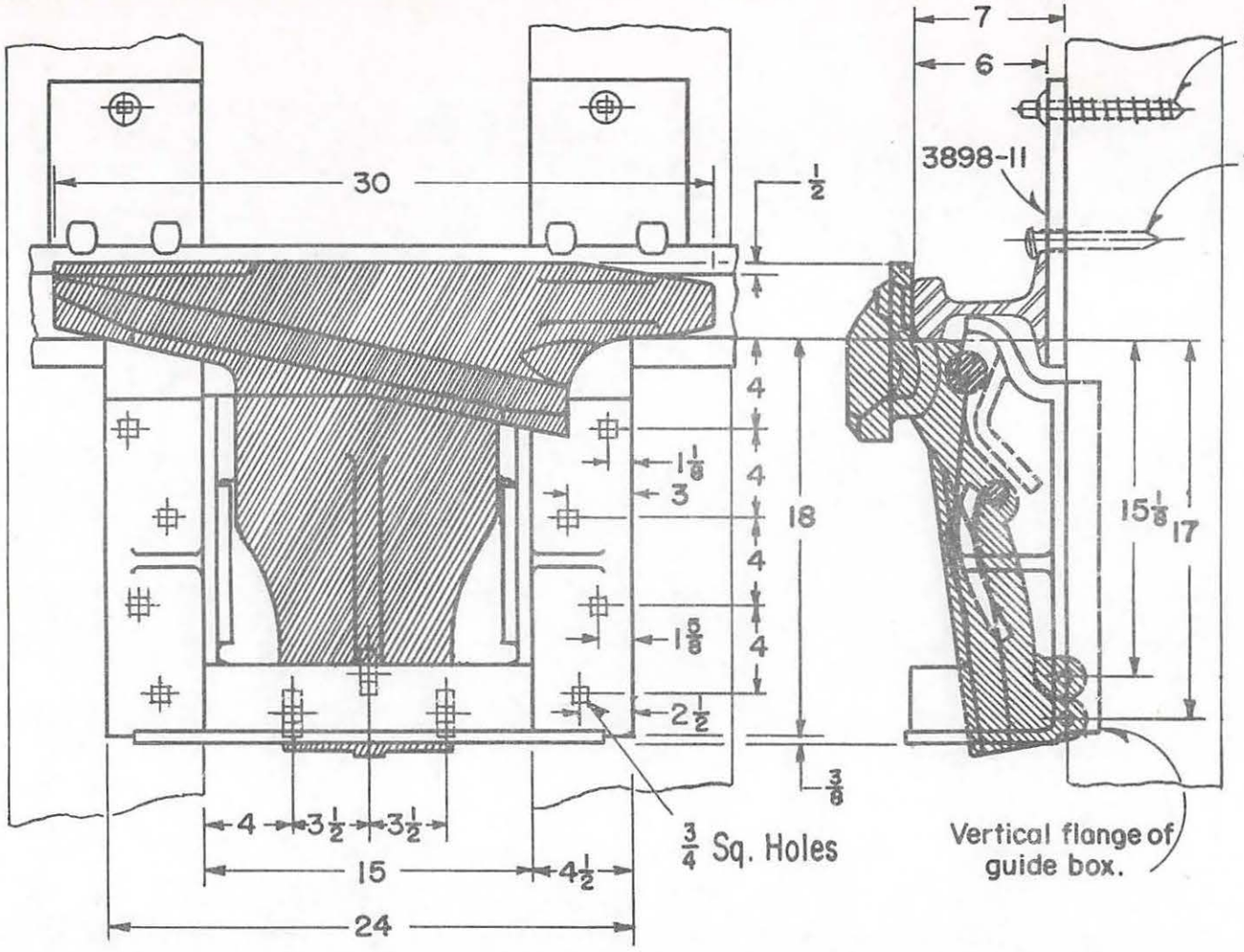
TIES
FOR SWITCH LAYOUTS

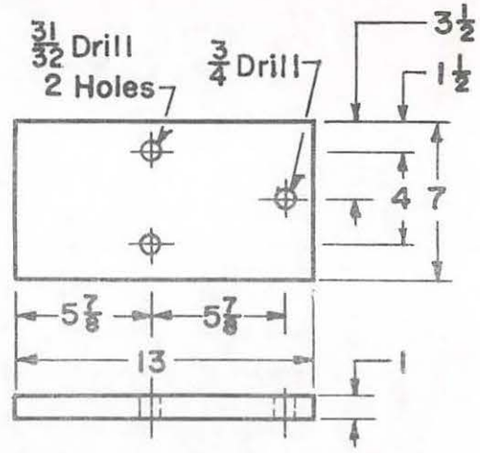
Approved L. S. Bartinelli
Chief Signal Engineer

S-3011

Printed in U.S.A.

ISSUED 9-8-59





3898-11, RAIL SHIM
C1020 Steel

NOTES

1 - Facing direction to be protected, a right hand derail goes on the right hand rail and derails to the right. Conversely with the left.
2 - Guide box must be square with rail and vertical flange must be firm against side of ties.
3 - Protective treatment-Primer, Item 31, Instruction 350.

0 6 12 24

All dimensions given in inches.

3012-1, DERAIL, HAYES-HBP 7, Specify R.H. or L.H., See Note 1.
Use for 127 Lb. rail
If necessary, use with Shim, 3898-11, for 105 lb. rail.

3012-2, DERAIL, HAYES-HBP 6, Specify R.H. or L.H., See Note 1.
Use for 105 Lb. rail

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
DERAIL
BLOCK TYPE

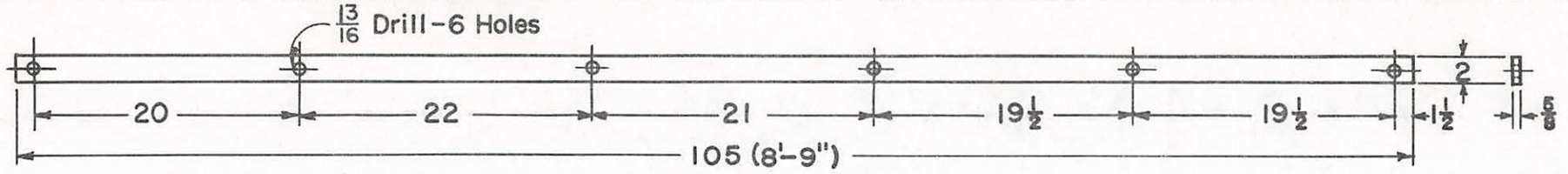
Approved C. J. Bothwell
Chief Signal Engineer

S-3012

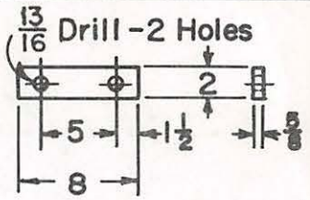
Printed in U. S. A.

ISSUED 9-8-59

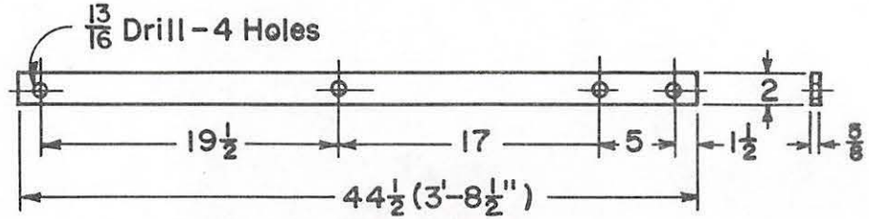
SHEET 1 Cont'd on Sh. .....



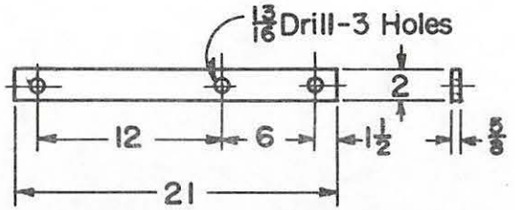
3014-1, TIE STRAP



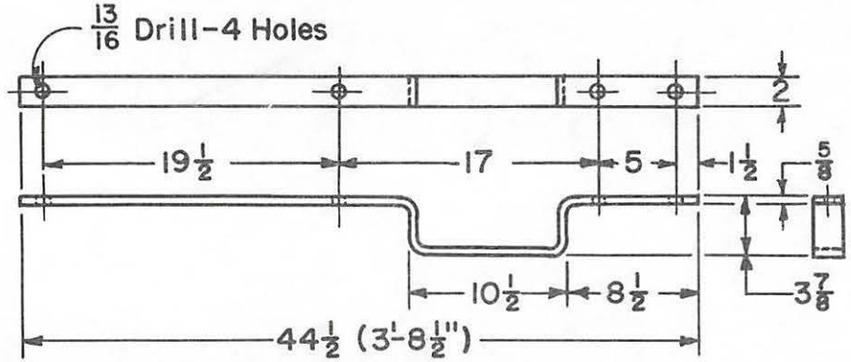
3014-2, STRAP WASHER



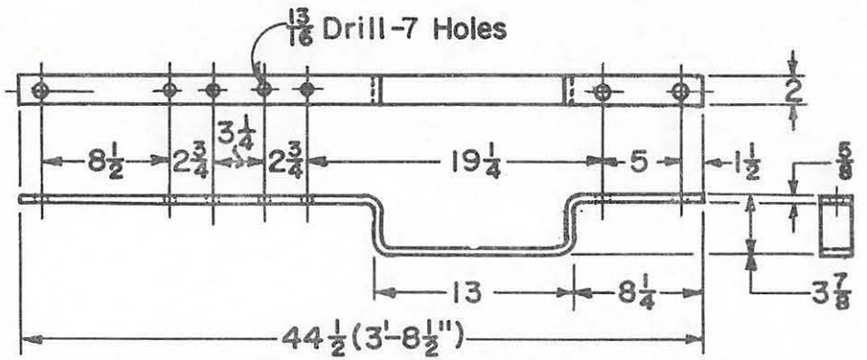
3014-3, TIE STRAP



3014-4, TIE STRAP



3014-5, TIE STRAP



3014-6, TIE STRAP

All dimensions given in inches.

NOTES:

1.- Material to be C-1020 steel.

2.-Protective treatment-Primer, Item 31, Instruction 350.

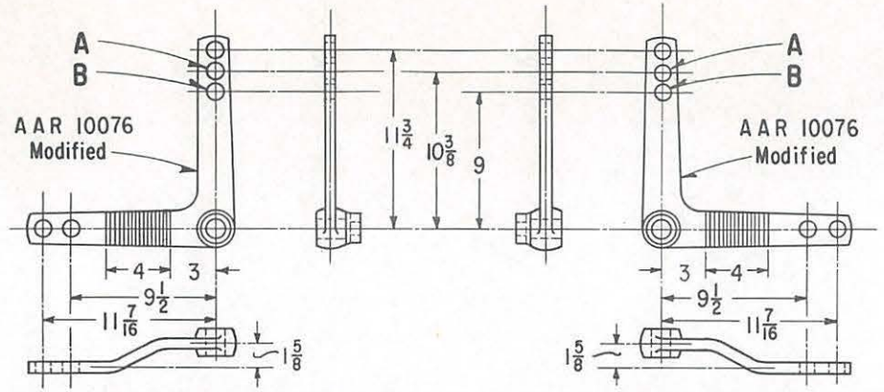
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TIE STRAPS

Approved L. S. Battinelli
Chief Signal Engineer

S-3014

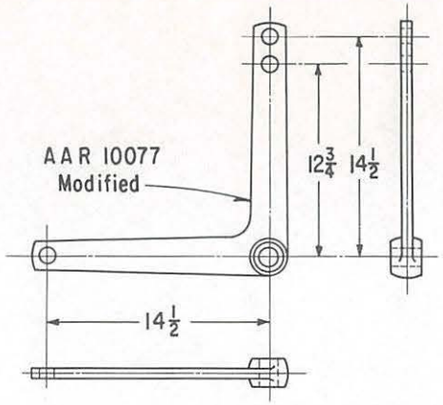
Printed in U. S. A.

ISSUED 9-8-59

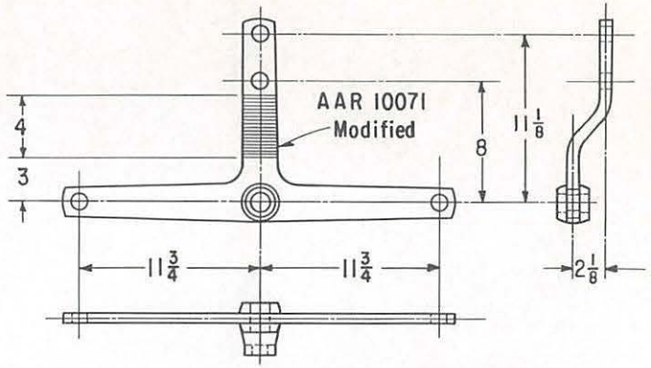


3017-1, CRANK, Without holes "A" & "B".
3017-2, CRANK, With holes "A" & "B"

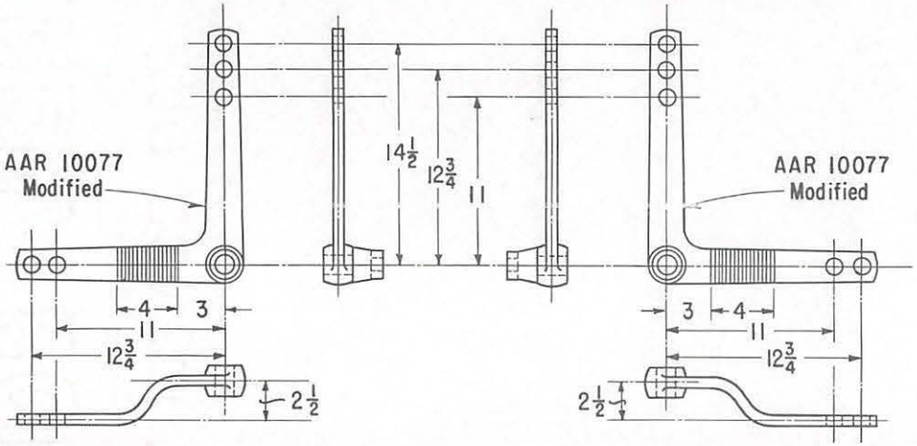
3017-3, CRANK, Without holes "A" & "B".
3017-4, CRANK, With holes "A" & "B".



3017-5, CRANK

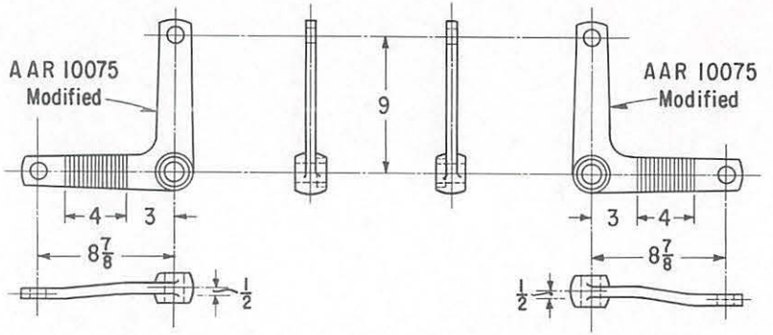


3017-6, CRANK, THREE ARM



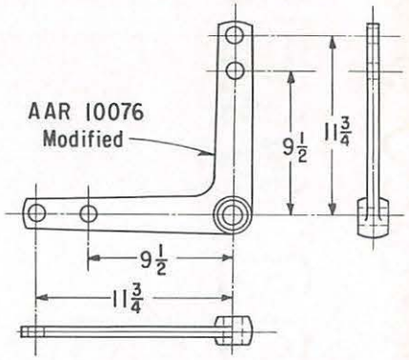
3017-7, CRANK

3017-8, CRANK



3017-9, CRANK

3017-10, CRANK



3017-11, CRANK

NOTES:

1 - All holes for jaw connections to be drilled and reamed for 7/8 pin.
2 - Protective treatment - Primer, Item 31, Instruction 350.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
CRANKS
FOR SWITCH LAYOUTS

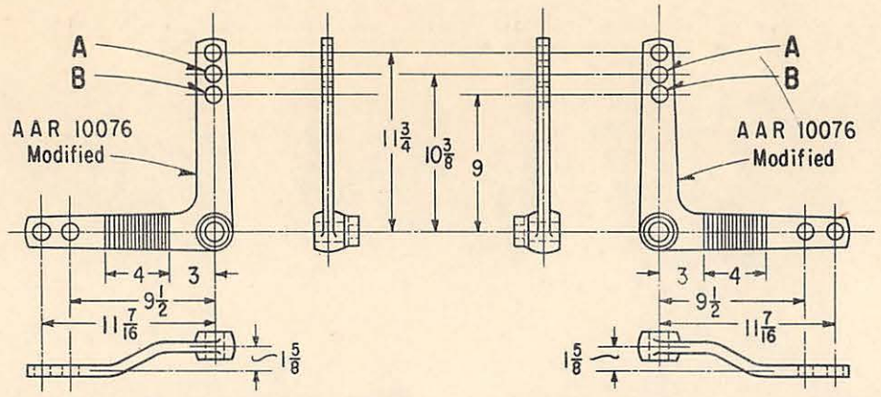
Approved H A Scott
Chief Signal Engineer

S-3017

ISSUED 12-23-57

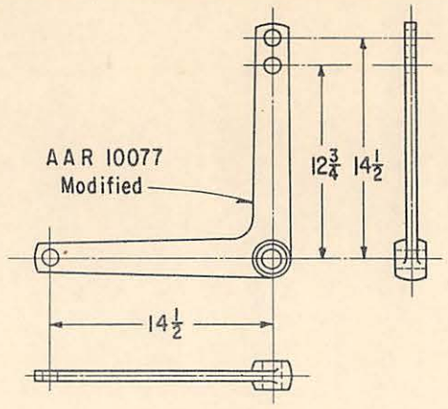
SHEET 1 Cont'd on Sh.....

Printed in U. S. A.

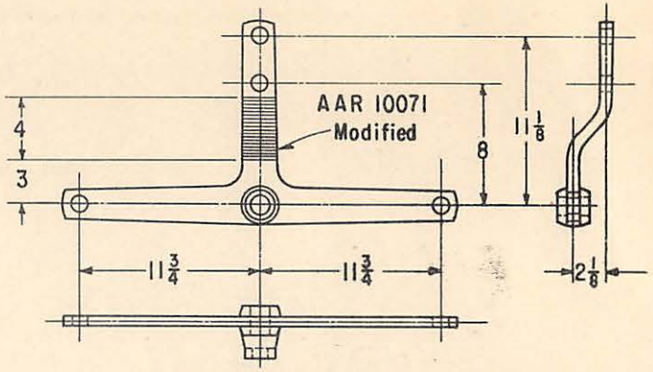


3017-1, CRANK, Without holes "A" & "B".
3017-2, CRANK, With holes "A" & "B"

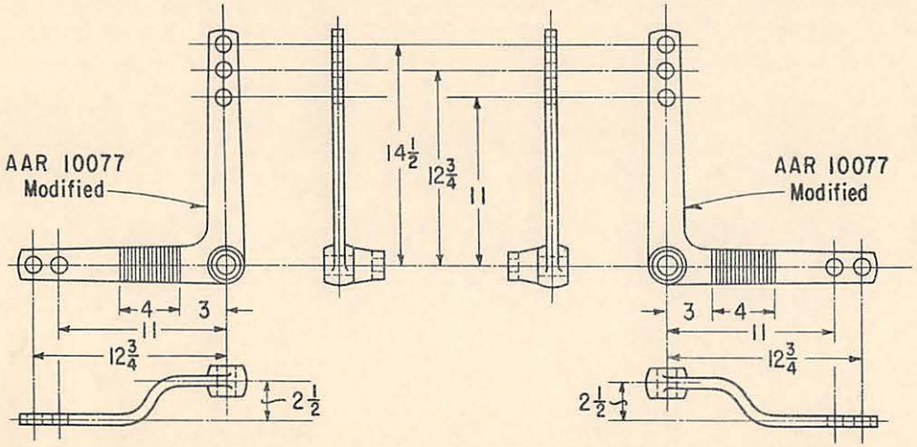
3017-3, CRANK, Without holes "A" & "B".
3017-4, CRANK, With holes "A" & "B".



3017-5, CRANK

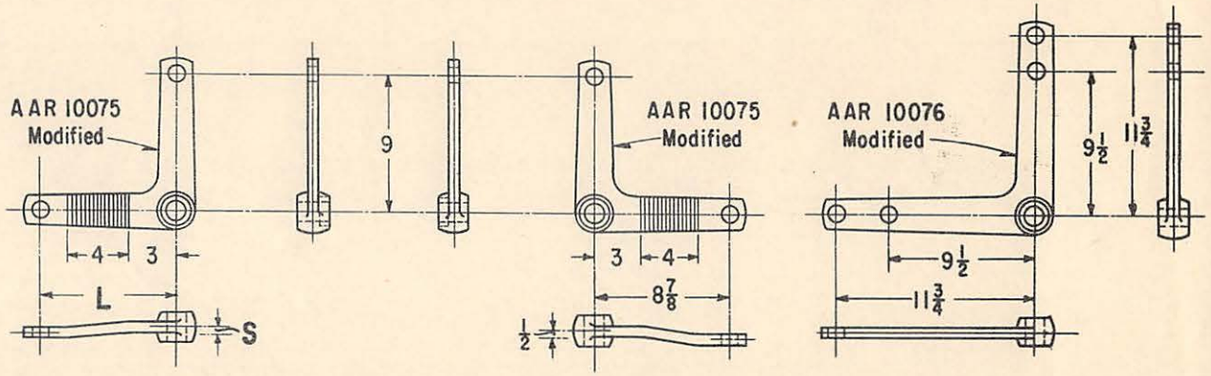


3017-6, CRANK, THREE ARM



3017-7, CRANK

3017-8, CRANK



3017-9, CRANK - L=8-7/8, S=1/2
3017-19, CRANK - L=8-3/8, S= 1

3017-10, CRANK

3017-11, CRANK

NOTES:

1 - All holes for jaw connections to be drilled and reamed for 7/8 pin.
2 - Protective treatment - Primer, Item 31, Instruction 350.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
CRANKS
FOR SWITCH LAYOUTS

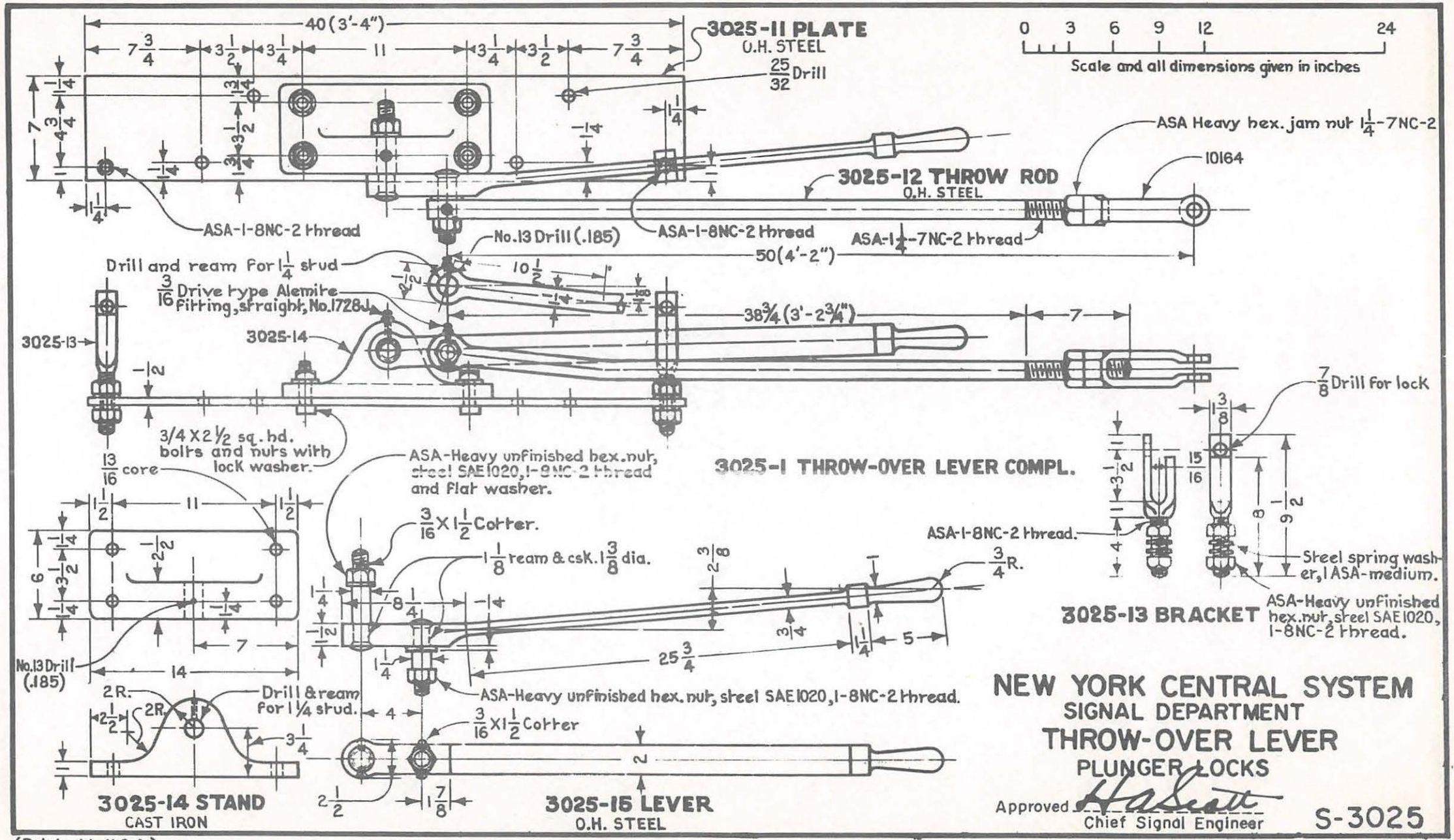
Approved L. F. Loree
Chief Signal Engineer

S-3017

ISSUED 5-26-60

SHEET 1 Cont'd on Sh.....

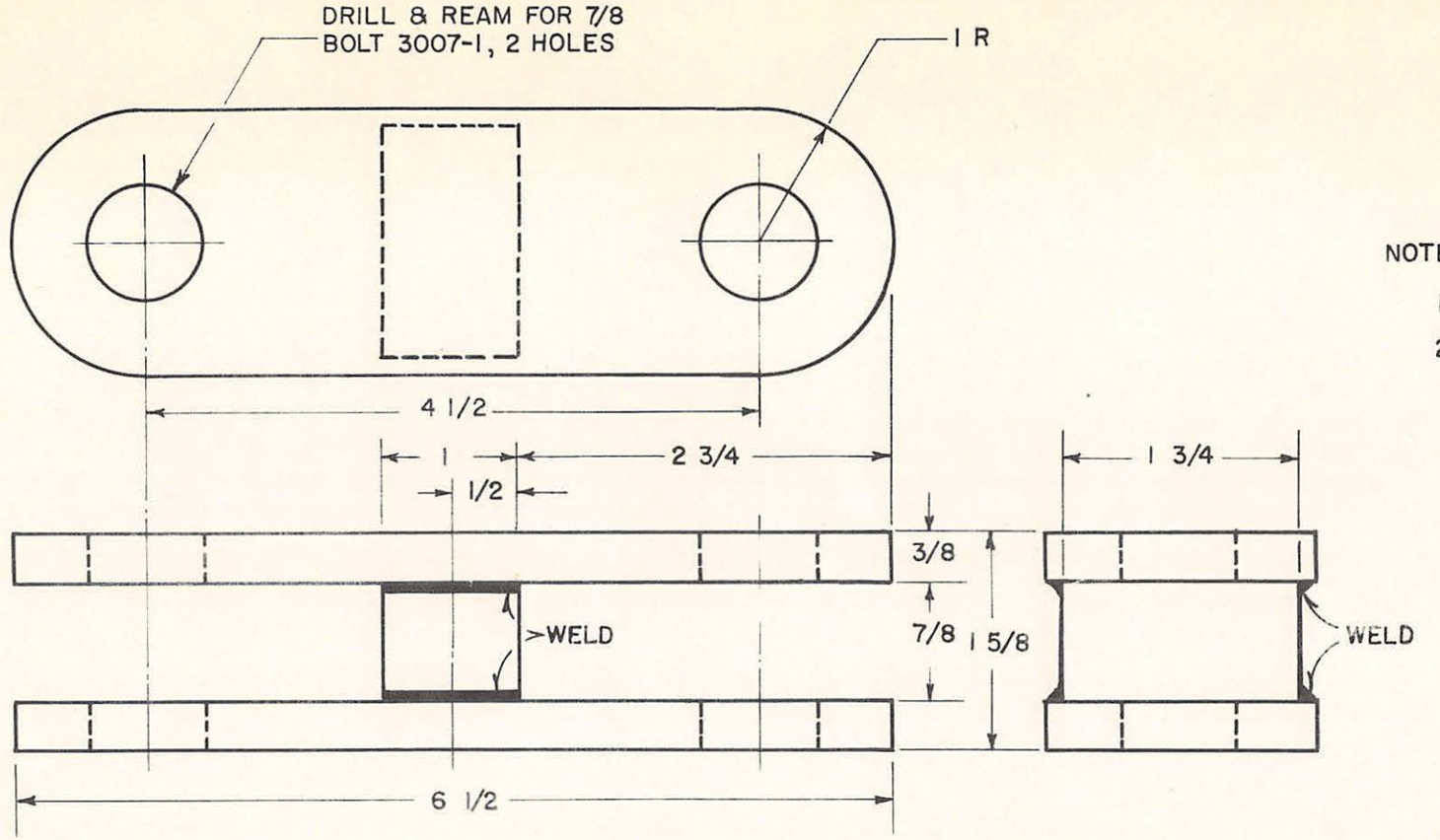
Printed in U.S.A.



(Printed in U.S.A.)

ISSUED 12-23-57

SHEET 1 Cont. on



3087-1, LINK

NOTES:

1. MATERIAL C1020 STEEL.
2. PROTECTIVE TREATMENT–
   PRIMER, ITEM 31, INSTRUCTION 350.

0 1 2 3

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

LINK

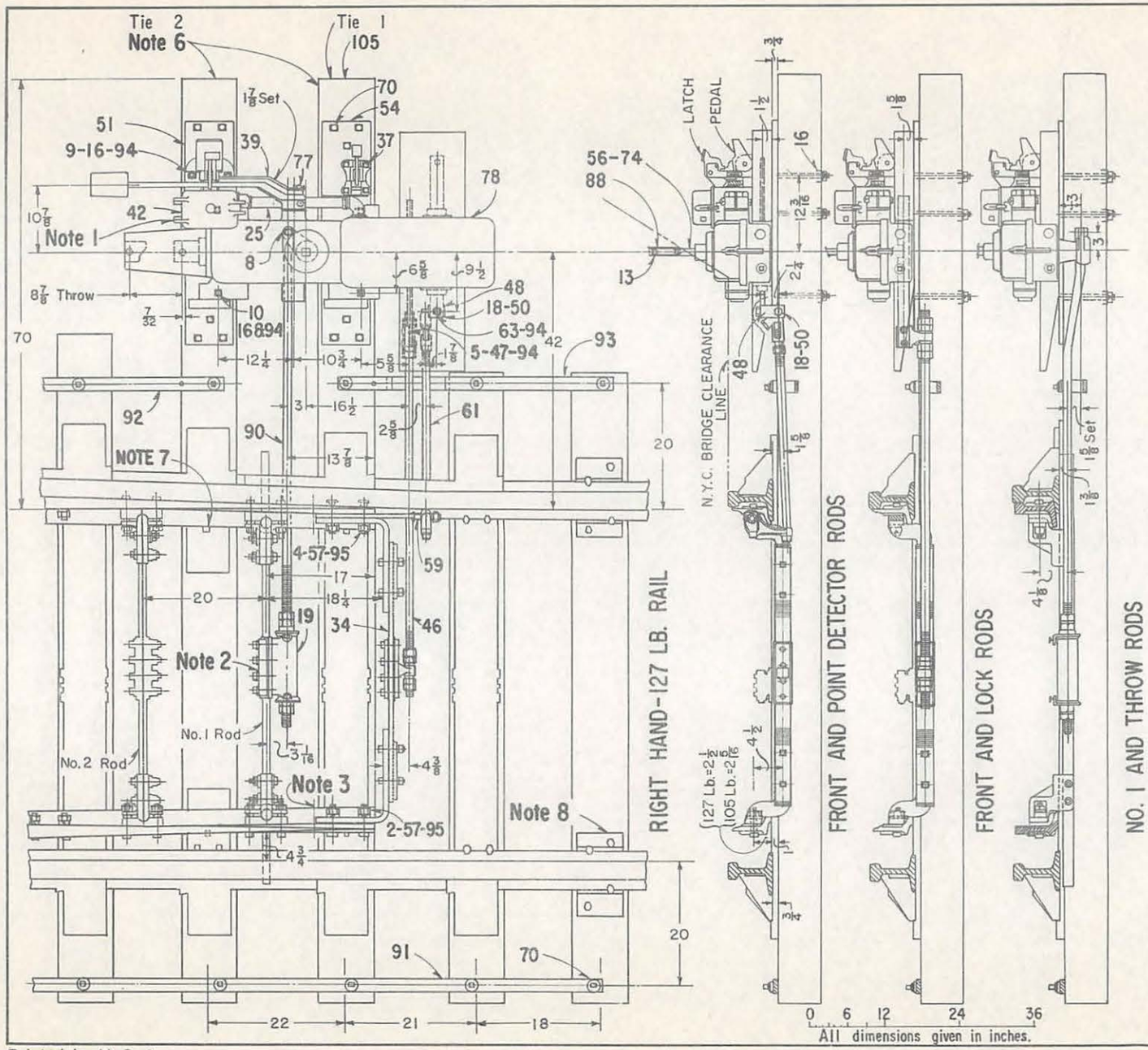
FOR SWITCH CONNECTED BLOCK DERAIL INTERLOCKED SWITCH

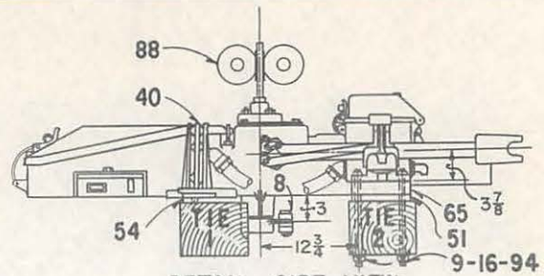
Approved ..... Chief Signal Engineer

S-3087

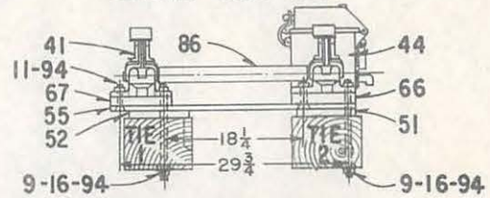
Printed in U.S.A.

ISSUED 7-1-54





DETAIL - SIDE VIEW



DETAIL - TANDEM LOCK

NOTES:

1 - Electric lock to be installed when specified by circuit plans.
2 - Remove one splice plate from No. 1 switch rod and install Switch Adjustment Bracket.
3 - To provide clearance for front rod or point lug, switch bolt 9-1/2 inches from switch point may be removed.
4 - Holes for Drive Spikes to be drilled in ties as follows:
   - 1/2 X 5 inches for 21-C-361
   - 3/8 X 3 inches for 21-C-360
5 - Switch target lamps, when required, to be installed as directed by Signal Engineers.
6 - M. of W. Dept. to provide Tie No. 1, Item 105 or 106 and Tie No. 2, minimum length as indicated.
7 - M. of W. Dept. to provide suitable holes in gage plates, tie plates and ties for emergency spiking of switch.
8 - M. of W. Dept. to provide double shoulder tie plates on five ties starting with second tie ahead of switch points.
9 - Protective treatment, Paint, Item 32, Instruction 350.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
MODEL 9 SWITCH MACHINE WITH MODEL 10 LOCK

S-3100

Printed in U. S. A.

ISSUED 9-8-59

SHEET 1 Cont'd. on Sh. 2

NUMBER	ITEM	REF.	REQUIRED FOR LAYOUT A	B	C	USE
1	Bolt, 3/4X3-3/4, Spcl. Hd., Hex. Nut.	RSC-G35C	2	2	2	Front Rod-105 lb.
2	" , 1X4-1/4 , " " " "	RSC-G35C				" " -127 lb.
3	" ,3/4X4-1/2 , " " " "	RSC-G35C	2	2	2	" " -105 lb.
4	" , 1X5 " " " "	RSC-G35C				" " -127 lb.
5	" ,3/4-10 X2-1/2 GRS	0423	2	2	2	Lock Rod Lug
6						
7						
8	Bolt, Compl	3007-1	1	1	1	Throw Rods
9	Bolt, Stud 3/4-10X13 with sq. nuts	ASA Reg.	2		2	Lock
10	" " 3/4-10X12 " " "	ASA Reg.	4	4	4	Switch Mach.
11	Bolt, Plow, Csk. Hd., Sq. Neck 3/4X3-1/4	Coml.			2	Base Plate
12						
13	Bolt, 3/8-16 NC-2X2, Hex. Hd. & Nut	ASA Reg.	2	2	2	Switch Target
14						
15						
16	Bolt Grip Raco	589-1	6	4	6	Stud Bolts
17						
18	Ball Stud, Eccentric G. R. S.	38948-5	1	1	1	Detector Lug
19	Bracket, Sw. Adjustment G. R. S.	46948-12 Gr. 1	1	1	1	Throw Rod
20	Bushing, For 3/4 Bolt G. R. S.	8104-2	(2)	(2)	(2)	With Item 3 Only
21	Bushing, For 3/4 Bolt G. R. S.	6714-309	(2)	(2)	(2)	With Item 1 Only
22						
23						
24						
25	Conduit Assembly	1173-3	1		1	Lock-Sw. Mach. Conn.
26						
27						
28						
29						
30						
31						
32						
33						
34	Front Rod, Compl.	3001-50	1	1	1	
35						
36						
37	Lag, Wstr. Hd., 1/2 X 4 2-1/2 Thd. *	21-C-360	4	8		Latch Stand
38						
39	Latch Rod, 15 in. long G. R. S.	46987-65	1		1	Lock
40	Latch Stand, Compl. # G. R. S.	52589-4 Gr. 1	1	2		Throw Lever
41	" " " # G. R. S.	52589-7 Gr. 1			1	" "
42	Lock, Model 10 G. R. S.	58800-4 Gr. 16	1			R. H. or L. H. Layout
43	" " " G. R. S.	17901 Gr. 18			1	R. H. Layout
44	" " " G. R. S.	17901 Gr. 5				L.H. "
45						
46	Lock Rod	3003-59	1	1	1	
47	Lug, Lock Rod	3003-18	1	1	1	
48	Lug, Detector Bar G. R. S.	30908-92	1	1	1	

NUMBER	ITEM	REF.	REQUIRED FOR LAYOUT A	B	C	USE
49						
50	Nut G.R.S.	646-9	1	1	1	Ball Pin
51	Plate, Saddle	3004-11	1		1	Tie 2
52	" "	3004-12			1	Tie 1
53	" "	3004-13		1		Tie 2
54	" "	3004-14	1	1		Tie 1
55	Plate, Base	3004-8			1	Lock & Latch St.
56	Pin, Roll 3/8 X 2-1/2 * G.R.S	17188-11	1	1	1	With target staff
57	Pin, Cotter 1/4 X 1-3/4	Coml.	4	4	4	Items 2 & 4
58	Pin, Cotter 1/4 X 1-1/4	Coml.				Items 1 & 3
59	Point Lug, Compl.	3006-21	1	1	1	
60						
61	Point Detector Rod, Compl.	3005-3	1	1	1	
62						
63	Screw, Cap 3/4-10X1-1/2 G.R.S.	6013-7	1	1	1	Detector Bar Lug
64						
65	Sub-base G.R.S.	59559-1	1			Lock
66	" " G.R.S.	59559-3			1	"
67	" " G.R.S.	59559-4			1	Latch Stand
68						
69						
70	Spikes, Drive, 6in., 5in. thd. *	21-C-361	24	24	24	Items 51-54 & 91-93
71						
72						
73						
74	Staff, Target # G.R.S.	57375-41	1	1	1	
75						
76						
77	Stud, Hex. Nut & Cotter # G.R.S.	K0205-4-Fig. 1	1		1	Latch Rod
78	Switch Machine, Model 9 G.R.S.	49600-501 Gr. 3	1			R. H. Closed Point
79	" " " " G.R.S.	49600-501 Gr. 4				L. H. Closed Point
80						
81	Switch Machine, Model 9 G.R.S.	49600-521 Gr. 3		1		R. H. Closed Point
82	" " " " G.R.S.	49600-521 Gr. 4				L. H. Closed Point
83						
84	Switch Machine, Model 9 G.R.S.	49600-602 Gr. 12			1	R. H. Closed Point
85	" " " " G.R.S.	49600-602 Gr. 13				L. H. Closed Point
86	Tube G.R.S.	29474-40			1	Latch Conn.
87						
88	Target Disc	2720-15	2	2	2	At Switch Mach.
89						
90	Throw Rod	3002-13	1	1	1	
91	Tie Straps, Long	3014-1	1	1	1	
92	" " , Short	3014-3	1	1	1	
93	" " , " , Set	3014-5	1	1	1	
94	Washer, Steel Spr. 3/4 ASA Med.	Coml.	As Req.	As Req.	As Req.	
95	" " " 1in. " "	"				

NUMBER	ITEM	REF.	REQUIRED FOR LAYOUT A	B	C	USE
	SUPPLEMENTARY - FURNISHED BY M. OF W. DEPARTMENT					
101						
102						
103						
104						
105	Tie No. 1 7X9X12'-6"	3011-11	1	1	1	R. H. Layout
106	Tie No. 1 7X9X12'-6"	3011-12				L. H. Layout
107						
108						
109						
110						

NOTES:

LAYOUT A-Independent switch machine with electric lock. Lock rod for normal locking only.

LAYOUT B-Dependent switch machine without electric lock. Lock rod for normal locking only.

LAYOUT C-Independent switch machine with normal and reverse electric lock. Lock rod for normal and reverse locking.

Model 9 switch machine circuit controllers to be supplied with two closed and two open contacts.

Model 10 lock to be supplied with emergency release and contacts as follows:
Two backs electrically operated.
One front and two backs mechanically operated.
12 Volt D.C. operating voltage.

Items indicated are included when ordering a switch machine (Items 78 thru 85) and are not to be specified except as replacement parts.

* Pittsburg Screw & Bolt Corp. or equal.

Exceptions to the above requirements must be authorized by Signal Engineer.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
MODEL 9 SWITCH MACHINE WITH MODEL 10 LOCK

Approved L. S. Bottinelli
Chief Signal Engineer

S-3100

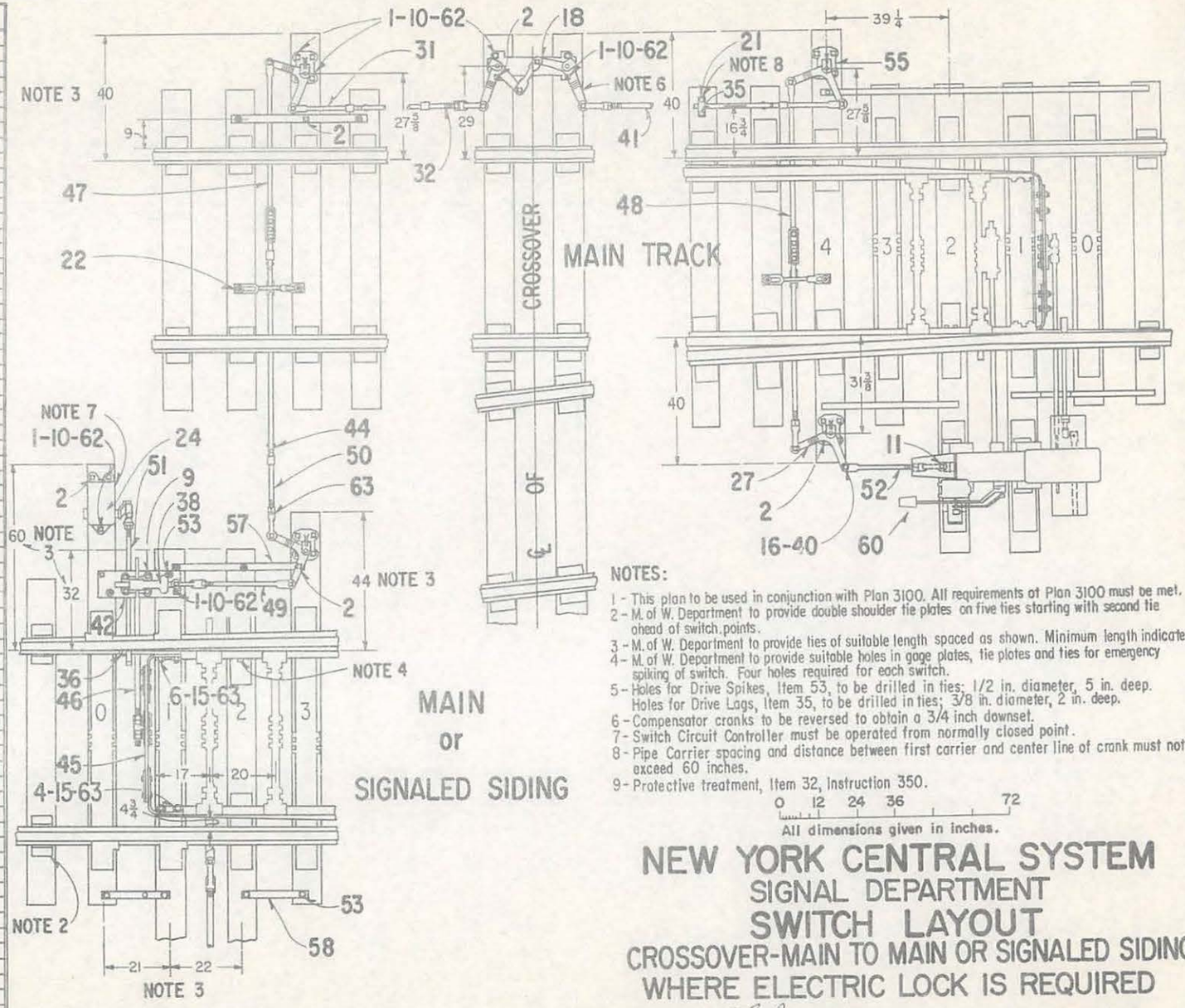
ISSUED 9-8-59

SHEET 2 Cont'd on Sh.

Printed in U. S. A.

NO.	ITEM		REFERENCE	REQ.	USE
1	Bolt, Stud 3/4-10 X 11		ASA Regular	14	Items 18,24,42 & 55
2	Bolt, Log 3/4 X 7		" "	14	Items 18,24,55 & 57
3	Bolt, Compl. 3/4 X 3-3/4, Spcl. Hd., Hex. Nut		RSC-G35C	2	105 lb. Rail
4	" " 1 X 4-1/4 " " " "		"		127 lb. Rail
5	" " 3/4 X 4-1/2 " " " "		"	2	105 lb. Rail
6	" " 1 X 5 " " " "		"		127 lb. Rail
7					
8					
9	Bolt 3/4-10 X 2-1/2 Sq. Hd. & Nut		ASA Regular	4	Item 42
10	Bolt Grip	Raco	589-1	14	Stud Bolts
11	Bolt, Compl.		3007-1	1	At Switch Machine
12	Bushing - For 3/4 in. Bolt	GRS	6714-309	(2)	With Item 3 only
13	" " " "	GRS	8104-2	(2)	" " 5 "
14	Cotter 1/4 X 1-3/4		Comℓ	4	Items 3 & 5
15	" 1/4 X 1-1/4		"		Items 4 & 6
16	" 3/16 X 1-1/2		"	11	Jaw Pins
17					
18	Compensator Assembly	AAR	10144	1	Pipe Line
19					
20					
21	Carrier, Pipe - One way	AAR	10746	As Req.	Pipe Line
22	" " - Transverse	Raco	411-1	2	Cross connections
23					
24	Circuit Controller	GRS	Model 8	1	
25					
26					
27	Crank		3017-3	4	L.H. Crossover
28	"		3017-1		R.H. Crossover
29					
30					
31	Jaw, Solid - With tang end	AAR	10181	2	Pipe Line
32	Jaw, Screw " " "	AAR	10199	2	" "
33					
34					
35	Lag, Washer Hd. - 1/2 X 3, Thd. 2-1/2	*	21-C-360	As Req.	Pipe Carriers
36	Lag, Point		3006-21	1	Sw. Point on Siding
37					
38	Plunger Lock, Compl.	AAR	14253	1	
39					
40	Pins, Jaw	AAR	10105	11	
41	Pipe, 1 in., With plugs and couplings	AAR	10155	As Req.	
42	Plate Base		3004-4	1	Plunger Lock
43					
44	Rivets 1/4 X 1-11/16	AAR	10153	As Req.	Pipe Conn.
45	Rod, Front - Compl.		3001-50	1	
46	Rod, Lock - Compl.		3003-33	1	Plunger Lock
47	Rod, Connecting - Compl.		3002-51	1	Cross Connections
48	" " "		3002-61	1	" "
49	" " "		3002-32	1	Pl. Lock Connection
50	Rod, Tank End		3002-61	1	Cross Connection
51	Rod, Point Detector, Compl.		3005-4	1	
52	Rod, Connecting, Compl.		3002-34	1	At Sw. Mach
53	Spike, Drive 6 in.	*	21-C-361	10	Tie Straps & Item 42
54					
55	Stand, Crank - With Center Pin	AAR	10082	4	Pipe Line
56					
57	Straps, Tie - Short		3014-3	2	
58	" "		3014-4	2	
59					
60	Switch Layout Specify Requirements		3100	1	Layout A
61					
62	Washer, Steel Spring 3/4 in. ASA Med.		Comℓ	As	Items 1, 3, 5, 9
63	" " " 1 in. " "		"	Req	Items 4, 6
64	" " " 1-1/4 in. " "		"	2	Screw Jaws
65					

* Pittsburg Screw & Bolt Corp. or equal.



NOTES:

1 - This plan to be used in conjunction with Plan 3100. All requirements of Plan 3100 must be met.
2 - M. of W. Department to provide double shoulder tie plates on five ties starting with second tie ahead of switch points.
3 - M. of W. Department to provide ties of suitable length spaced as shown. Minimum length indicated.
4 - M. of W. Department to provide suitable holes in gage plates, tie plates and ties for emergency spiking of switch. Four holes required for each switch.
5 - Holes for Drive Spikes, Item 53, to be drilled in ties; 1/2 in. diameter, 5 in. deep. Holes for Drive Lags, Item 35, to be drilled in ties; 3/8 in. diameter, 2 in. deep.
6 - Compensator cranks to be reversed to obtain a 3/4 inch downset.
7 - Switch Circuit Controller must be operated from normally closed point.
8 - Pipe Carrier spacing and distance between first carrier and center line of crank must not exceed 60 inches.
9 - Protective treatment, Item 32, Instruction 350.

0 12 24 36 72

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
CROSSOVER-MAIN TO MAIN OR SIGNALED SIDING WHERE ELECTRIC LOCK IS REQUIRED

Approved R. S. Bottinelli
Chief Signal Engineer

S-3110

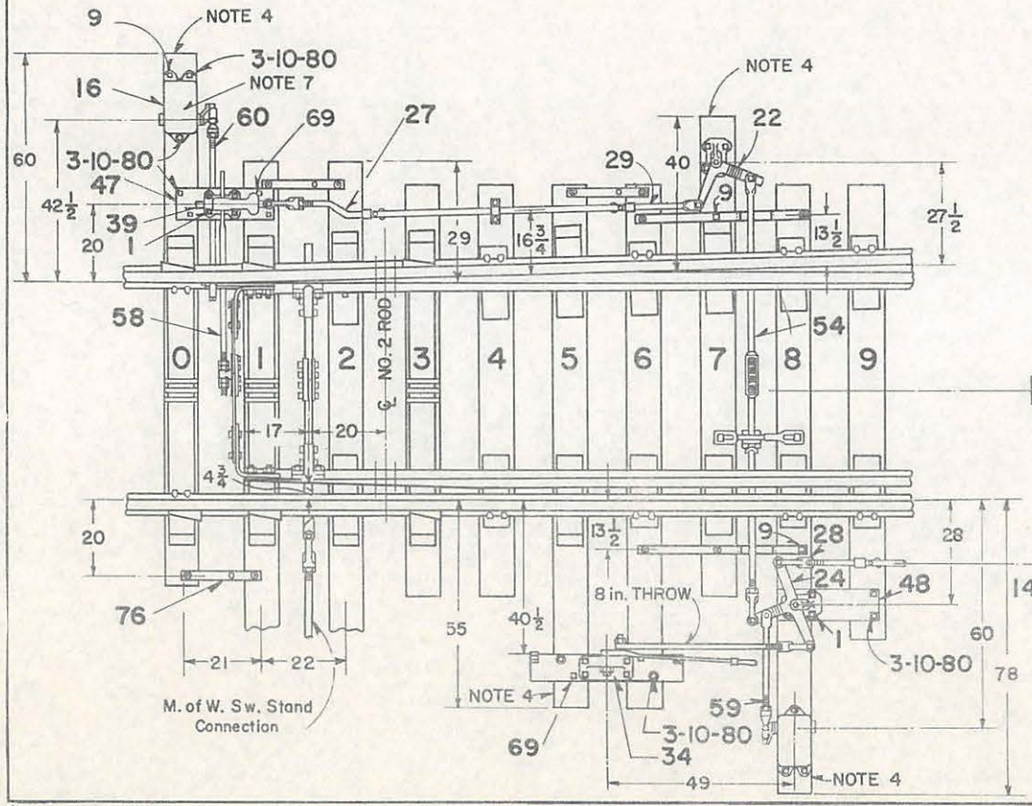
ISSUED 9-8-59

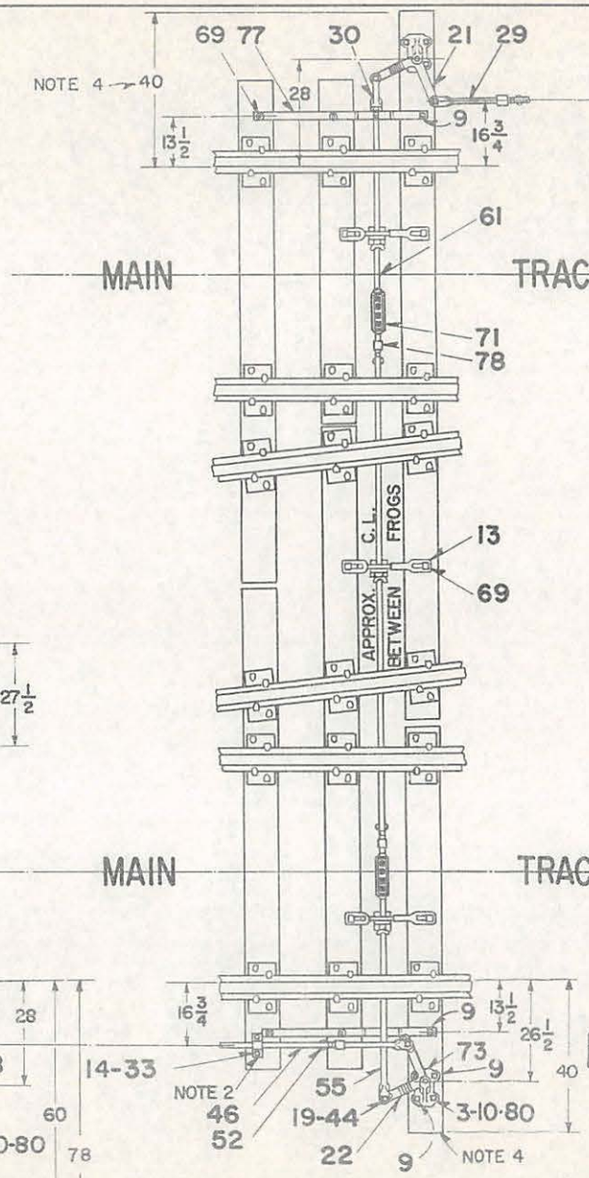
SHEET 1 Cont'd. on Sh.

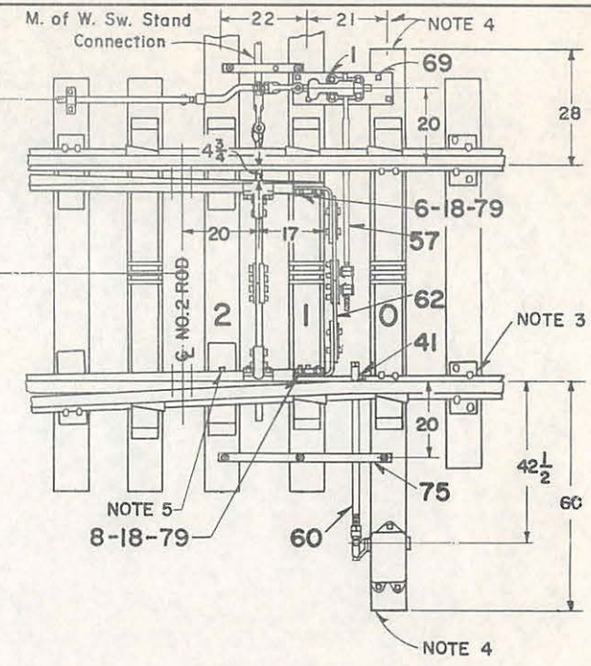
Printed in U.S.A.

NOTES:

1 – This plan, as shown, applies to No. 8 or No. 10 switch layouts.
2 – Pipe carrier spacing and distance between first carrier and center line of crank stand must not exceed 60 inches.
3 – M. of W. Dept. to provide double shoulder tie plates on five ties starting with second tie ahead of switch points.
4 – M. of W. Dept. to provide ties of length required, spaced as shown. Minimum length shown.
5 – M. of W. Dept. to provide suitable holes in gage plates, tie plates and ties for emergency spiking of switch. Four holes required for each switch.
6 – Holes for Drive Spikes, Item 69, to be drilled in ties; 1/2 in. diameter, 5 inches deep. Holes for Drive Lags, Item 33, to be drilled in ties; 3/8 in. diameter, 2 inches deep.
7 – Switch Circuit Controller must be operated from normally closed point.
8 – Protective treatment–Item 32, Instruction 350.







LEFT HAND LAYOUT, 127 Lb. Rail

0 12 24 36 72
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
CROSSOVER-MAIN TO MAIN
AUTOMATIC BLOCK SIGNAL TERRITORY
S-3120

Printed in U.S.A.
ISSUED 9-8-59
SHEET 1 Contd on Sh. 2

NO.	ITEM	REF.	REQ.	USE
1	Bolt, 3/4 X 2-1/2, Sq.Hd. & Nut	ASA Regular	10	Items 47-48
2				
3	Bolts, Stud 3/4-10X11 with Sq. Nuts	ASA Regular	20	Items 16-34-47 48-73
4				
5	Bolt, Compl. 3/4 X 3-3/4, Spl. Hd. Hex. Nut	RSC-G35C	4	105 lb. rail-Front Rod
6	" " 1 X 4-1/4 " " " "	RSC-G35C		127 lb. " " "
7	" " 3/4 X 4-1/2 " " " "	RSC-G35C	4	105 lb. " " "
8	" " 1 X 5 " " " "	RSC-G35C		127 lb. " " "
9	Bolt, Lag 3/4 X 7		12	Items 16-73-77
10	Bolt Grip Raco	589-1	20	Item 3
11	Bushing - For 3/4 in. bolt GRS	6714-309	(4)	With Item 5 only
12	" " " " " GRS	8104-2	(4)	With Item 7 only
13	Carrier, Pipe - Transverse Raco	411-1	4	Cross connections
14	" " - One Way AAR	10746	As req.	See Note 1.
15				
16	Circuit Controller, Compl. G.R.S.	Model 8	3	
17	Cotter 1/4 X 1-3/4	Coml.	8	Items 5 & 7
18	" 1/4 X 1-1/4	"		Items 6 & 8
19	" 3/16 X 1-1/2	"	12	Jaw Pins
20	Crank	3017-1	1	R. H. Layout
21	"	3017-3		L. H. "
22	"	3017-2	2	L. H. "
23	"	3017-4		R. H. "
24	" , Three Arm	3017-6	1	R. or L.H. Layout
25				
26				
27	Jaw, Screw - Tang End, Offset	3002-61	2	Pipe Line
28	" " " " AAR	10199	1	" "
29	" , Solid AAR	10181	3	" "
30	" , Screw AAR	10164	1	Cross Connection
31				
32				
33	Lag, Drive-Wshr. Hd., 1/2 X 3 - 2-1/2 Thd. *	21-C-360	As req.	Pipe Carrier
34	Lever, Throw Over	3025-1	1	
35				
36				
37				
38				
39	Lock, Plunger-Compl. AAR	14253	2	
40				

NO.	ITEM	REF.	REQ.	USE
41	Lug, Switch Point	3006-21	2	
42				
43				
44	Pins, Jaw AAR	10105	12	
45				
46	Pipe, 1 inch - With plugs, couplings. AAR	10155	As req.	
47	Plate, Base	3004-4	2	Item 39
48	" "	3004-5	1	Item 73
49				
50				
51				
52	Rivets 1/4 X 1-11/16 AAR	10153	As req.	Item 46
53				
54	Rod, Cross-connecting, Compl, Insulated	3002-81	1	
55	" , " " " "	3002-51	1	
56				
57	Rod , Lock, Compl.	3003-31	1	Open switch point.
58	" , " "	3003-33	1	Closed switch point.
59	" , Sw. C. C. Compl.	3005-8	1	
60	" , " " "	3005-4	2	Switch points
61	" , Threaded Half	3002-121	1	Cross connections
62	" , Front, Compl.	3001-50	2	
63				
64				
65				
66				
67				
68				
69	Spikes, Drive, 6 in. long, 5 in. thd. *	21-C-361	31	
70				
71	Splice, Insulated, Compl.	3002-110	1	Cross connection
72				
73	Stand, Crank, With center pin. AAR	10082	4	
74				
75	Strap, Tie - Short	3014-3	1	
76	" " - "	3014-4	4	
77	" , " - " , Set	3014-5	4	
78	Tang-End AAR	10943	1	Cross connection
79	Washers, Steel Spr. 1 In. ASA Med.	Coml.	As Req.	Items 6 & 8
80	" " " 3/4 In. ASA Med.	Coml.		Items 1, 3, 5 & 7

* Pittsburg Screw & Bolt Corp. or equal.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

SWITCH LAYOUT

CROSSOVER - MAIN TO MAIN

AUTOMATIC BLOCK SIGNAL TERRITORY

Approved L. J. Bottinelli
Chief Signal Engineer

S-3120

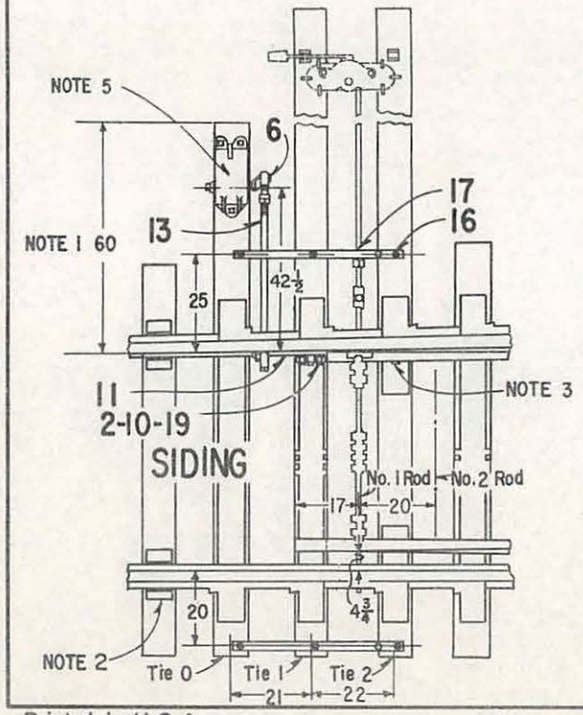
ISSUED 9-8-59

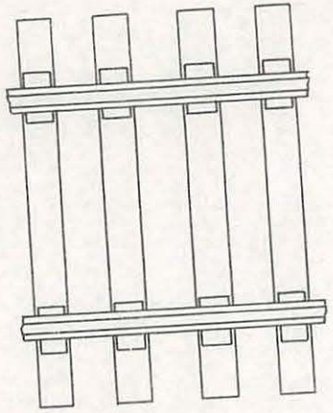
SHEET 2 Cont'd. on Sh.

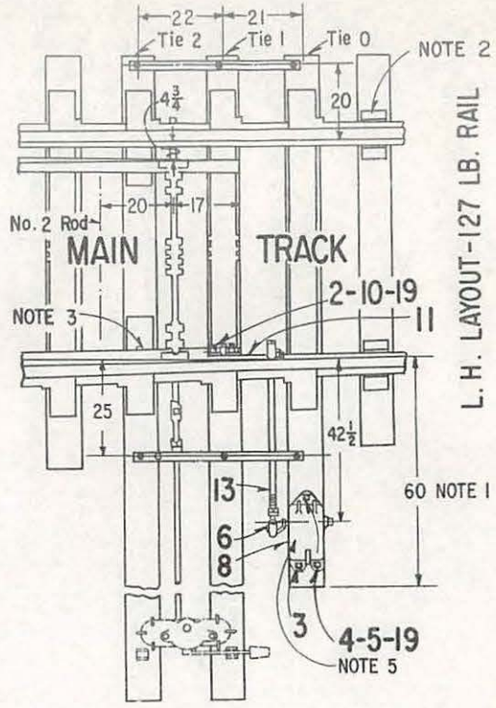
Printed in U. S. A.

NO.	ITEM	REFERENCE	REQ	USE
1	Bolt, Compl. 3/4 X 3, Spcl Hd. Hex. Nut	RSC-G35C	4	105 Lb. Rail
2	" " 1 X 3-1/4 Spcl Hd. Hex. Nut	RSC-G35C		127 Lb. Rail
3	Bolt, Lag 3/4 X 7 ASA Cut Thd.	Coml.	2	Sw. C. C.
4	Bolt Grip Raco	589-1	4	Stud Bolts
5	Bolt Stud, 3/4-10 X 11 With Sq. Nuts	ASA Regular	4	Sw. C. C.
6	Ball Stud, Compl. AAR	12711	2	Sw. C. C.
7	Bushing, 3/4 Long Modified GRS	6714-309	(4)	105 Lb. Rail
8	Circuit Controller, Compl. GRS	Model 8	2	5-3/8 Arm, 1 in. Offset
9	Cotter 1/4 X 1-1/4	Coml.	4	Item 1
10	" 1/4 X 1-3/4	"		Item 2
11	Lug, Point, Compl.	3006-21	2	
12				
13	Rod, Circuit Controller	3005-4	2	
14				
15				
16	Spike, Drive 6-1/2 In. *	21-C-361	12	Tie Straps
17	Straps, Tie	3014-3	4	
18				
19	Washers, Steel Spr. 3/4 in. ASA Medium	Coml.	As Req.	Items 1 & 5
20	" " " " "	"		Item 2

* Pittsburg Screw & Bolt Corp. or equal.







NOTES:

1.- M. of W. Department to provide ties of suitable length, spaced as shown. Minimum length indicated.

2.- M. of W. Department to provide double shoulder tie plates on five ties starting with second tie ahead of switch points.

3.- M. of W. Department to provide suitable holes in gage plates, tie plates and ties to provide for emergency spiking of switch. Four holes required for each switch.

4.- Holes for Drive Spikes, Item 16, to be drilled in ties, 1/2 in. diam., 5 in. deep.

5.- Switch circuit controller must be operated from normally closed point.

6.- Protective treatment - Item 32, Instruction 350.

0 12 24 36 72

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

SWITCH LAYOUT

CROSSOVER-MAIN TO NON-SIGNALED SIDING WHERE ELECTRIC LOCK IS NOT REQUIRED

Approved L. J. Battinelli
Chief Signal Engineer

S-3130

ISSUED 9-8-59

SHEET 1 Cont'd. on Sh.

Printed in U.S.A.

NOTES:

1.- This plan to be used in conjunction with Plan 3000.

2.- Installation of derail to meet requirements of Plan 81.

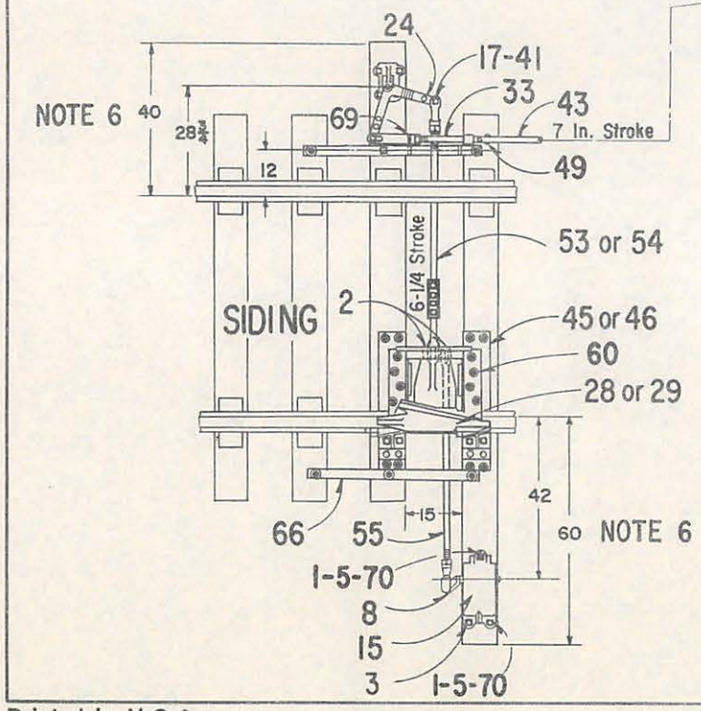
3.- Pipe carrier spacing and distance between first carrier and center line of crank must not exceed 60 inches.

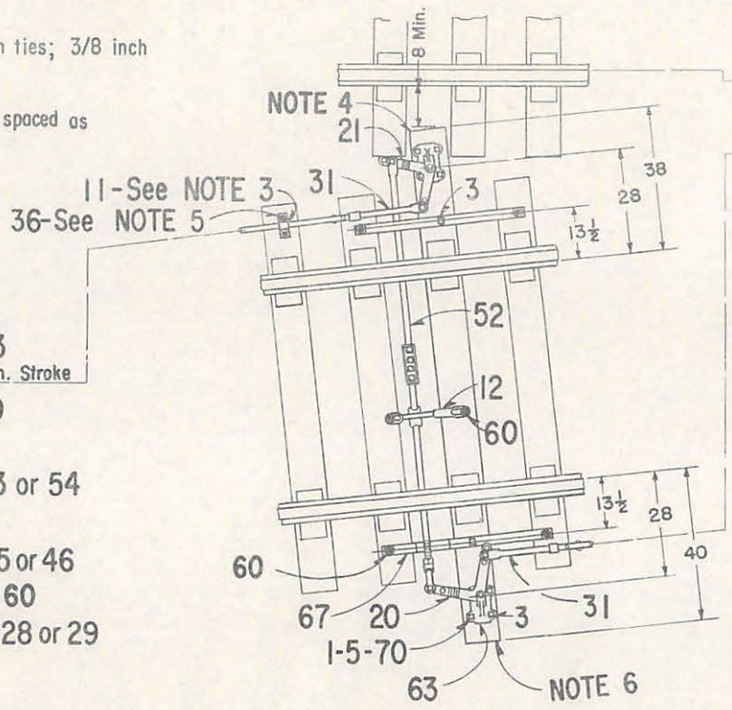
4.- Cross connection tie shall be located to provide clearance between crank and main track ties, and to provide proper pipe line compensation. End of cross connection tie must not be less than 8 inches from base of main rail.

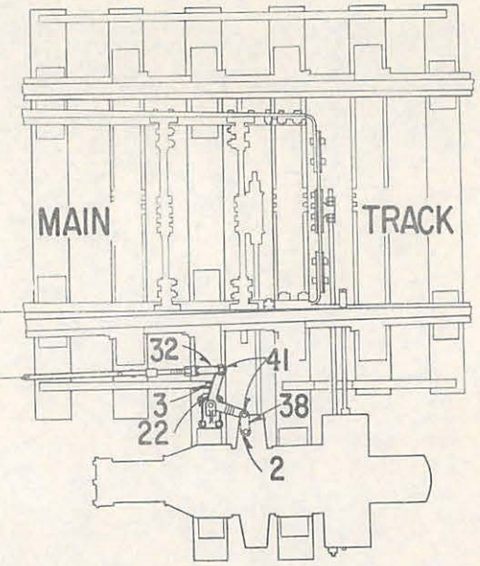
5.- Holes for Drive Lags, Item 36, to be drilled in ties; 3/8 inch diameter, 2 inches deep.

6- M. of W. Dept. to provide ties of length required, spaced as shown. Minimum length indicated.

7- Protective treatment- Item 32, Instruction 350.







0 12 24 36 72

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

SWITCH LAYOUT

TURNOUT WITH BLOCK TYPE DERAIL INTERLOCKED SWITCH

S-3140

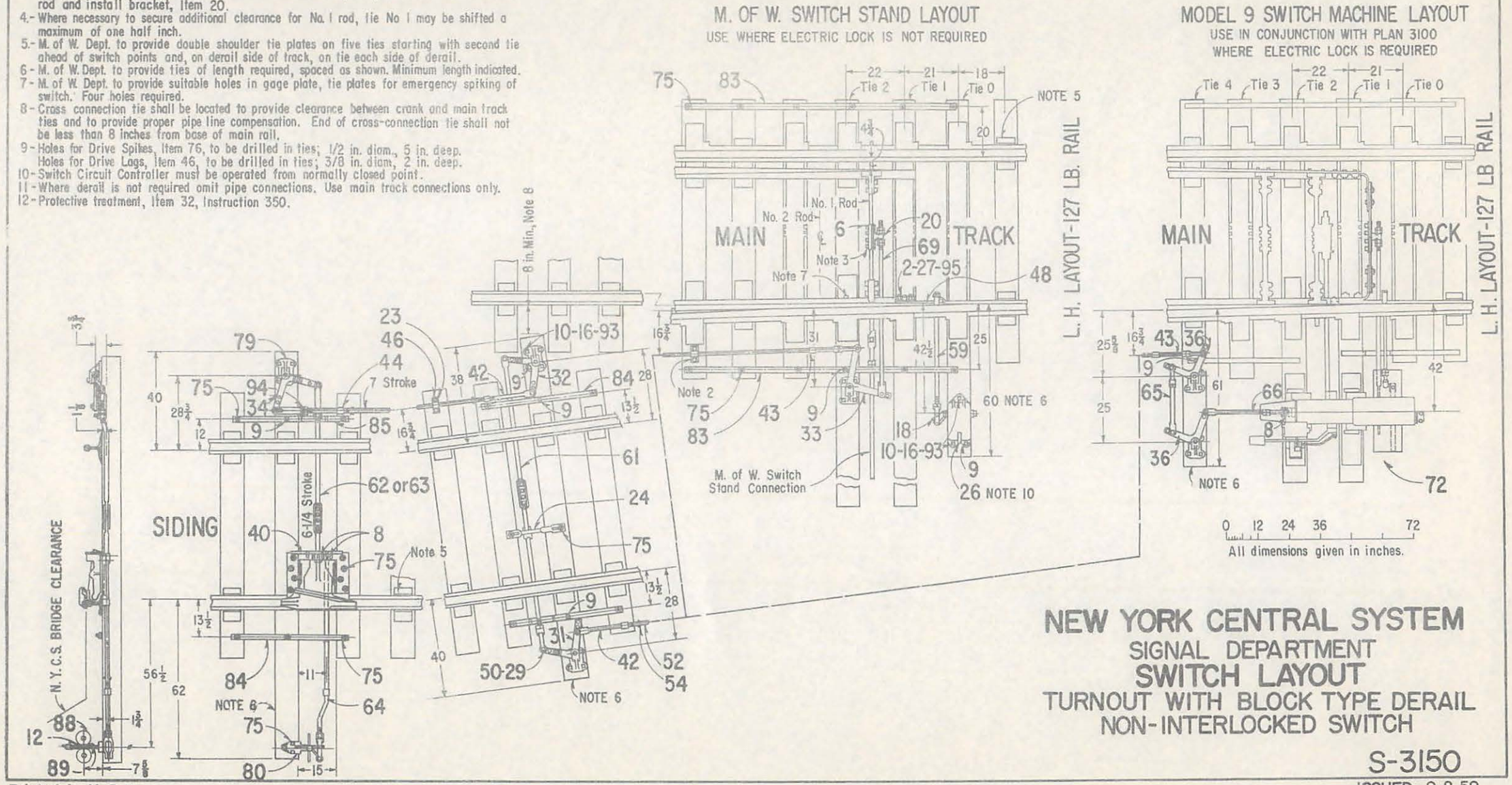
Printed in U.S.A.

ISSUED 9-8-59

SHEET 1 Cont'd on Sh. 2

NOTES:

1 - Installation of derail to meet requirements of Plan 81.
2 - Pipe carrier spacing and distance between first carrier and center line of crank stand must not exceed 60 inches.
3 - When used with M. of W. switch stand remove one splice plate from No. 1 switch rod and install bracket, Item 20.
4 - Where necessary to secure additional clearance for No. 1 rod, tie No 1 may be shifted a maximum of one half inch.
5 - M. of W. Dept. to provide double shoulder tie plates on five ties starting with second tie ahead of switch points and, on derail side of track, on tie each side of derail.
6 - M. of W. Dept. to provide ties of length required, spaced as shown. Minimum length indicated.
7 - M. of W. Dept. to provide suitable holes in gage plate, tie plates for emergency spiking of switch. Four holes required.
8 - Cross connection tie shall be located to provide clearance between crank and main track ties and to provide proper pipe line compensation. End of cross-connection tie shall not be less than 8 inches from base of main rail.
9 - Holes for Drive Spikes, Item 76, to be drilled in ties; 1/2 in. diam., 5 in. deep. Holes for Drive Lags, Item 46, to be drilled in ties; 3/8 in. diam., 2 in. deep.
10 - Switch Circuit Controller must be operated from normally closed point.
11 - Where derail is not required omit pipe connections. Use main track connections only.
12 - Protective treatment, Item 32, Instruction 350.



NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

SWITCH LAYOUT

TURNOUT WITH BLOCK TYPE DERAIL NON-INTERLOCKED SWITCH

S-3150

Printed in U. S. A.

ISSUED 9-8-59

SHEET 1 Cont'd on Sh. 2

NO	ITEM	REF.	REQUIRED M. of W. SWITCH STAND	REQUIRED MOD. 9 SWITCH MACH.	USE
1	Bolt, Compl. 3/4 X 3 Spl. Hd. Hex. Nut	RSC-G35C	2		Pt. Lug - 105 lb. Rail
2	" " 1 X 3-1/4 " " " "	RSC-G35C			" " 127 lb. Rail
3					
4					
5					
6	Bolt, Compl.	3001-18	4		Sw. Adj. Bracket
7					
8	Bolt, Compl.	3007-1	2	2	Sw. Mach.
9	Bolt, Lag 3/4X7 ASA cut thread	Coml.	12	14	Cr. Stands - Tie Straps
10	Bolt, Stud 3/4-10 X 11 with sq. nuts.	ASA Reg.	10	10	Cr. Stands - Sw. C. C.
11					
12	Bolt, 3/8-16 NC-2X2, Hex. Hd. & Nut	ASA Reg.	2	2	Derail Target
13					
14					
15					
16	Bolt Grip Raco	589-1	10	10	Stud Bolts
17					
18	Ball Stud, Compl. A. A. R.	12711	1		Sw. C. C.
19					
20	Bracket	3001-21	1		Throw Rod
21	Bushing, 3/4 Long (Modified) G R S	6714-309	(2)		Item 1
22					
23	Carrier, Pipe - One Way A. A. R.	10746	As req.	As req.	See Note 2.
24	Carrier, Pipe - Transverse Raco	411-1	1	1	Cross Connection
25					
26	Circuit Controller, Compl. G. R. S	Model 8	1		5-3/8 Arm, 1 in. offset
27	Cotter 1/4 X 1-3/4	Coml.	2		Item 2
28	" 1/4 X 1-1/4	"			Item 1
29	" 3/16 X 1-1/2	"	8	10	Jaw Pins
30					
31	Crank	3017-2	1	1	R. H. or L. H Layout
32	"	3017-4	1	1	" " " "
33	"	3017-5	1		" " " "
34	"	3017-7	1	1	L. H. Turnout
35	"	3017-8			R. H. "
36	"	3017-11		2	Tandem Cranks
37					
38					
39					
40	Derail, HBP 7 - Specify R. H. or L. H.	3012-1	1	1	127 lb. Rail
41	" HBP 6 - " " " "	3012-2			105 lb. "

NO	ITEM	REF.	REQUIRED M. of W. SWITCH STAND	REQUIRED MOD. 9 SWITCH MACH.	USE
42	Jaw, Solid-Tang End A. A. R	10181	2	2	Pipe Line
43	Jaw, Screw- " " "	10199	1	1	" "
44	Jaw, Gain Stroke, Compl. G. R. S.	39598	1	1	" "
45					
46	Lag, Drive, 1/2 X 3 Wshr. Hd. 2-1/2 Thd. *	21-C-360	As req.	As req.	Pipe Carriers
47					
48	Lug, Point	3006-21	1		
49					
50	Pins, Jaw A. A. R.	10105	8	11	
51					
52	Pipe, 1 in. - With plugs & couplings. A. A. R	10155	As req.	As req.	
53					
54	Rivets, 1/4 X 1-11/16 A. A. R.	10153	As req.	As req.	Pipe Line
55					
56					
57					
58					
59	Rod, Circuit Controller	3005-4	1		
60					
61	Rod, Connecting - Cross Conn., Compl.	3002-83	1	1	Center of Turnout.
62	" " - Derail, Compl.	3002-93	1	1	HBP 7 Derail
63	" " - " "	3002-95			HBP 6 "
64	" " - Der. Target, Compl.	3002-71	1	1	
65	" " , Compl.	3002-33		1	Tandem cranks
66	" " "	3002-34		1	Sw. Mach. conn.
67					
68					
69	Rod, Throw, Compl.	3002-10	1		At Switch Points
70					
71					
72	Switch Layout, Mod. 9 Switch Mach.	3100		1	Specify Requirements
73					
74					
75	Spike, Drive, 6-1/2 in. *	21-C-361	33	22	
76					
77					
78					
79	Stand, Crank, With center pin A. A. R.	10082	4	5	
80	" , Target A. A. R.	13997	1	1	
81					
82					

NO	ITEM	REF.	REQUIRED M. of W. SWITCH STAND	REQUIRED MOD. 9 SWITCH MACH.	USE
83	Strap, Tie, - Long	3014-1	2		
84	" " , - Short, Straight	3014-3	2	2	
85	" " , - " , Set	3014-5	2	2	
86					
87					
88	Target, Disc	2720-15	2	2	At Derail
89	" , Diagonal Banner	2720-14	1	1	" "
90					
91					
92					
93	Washer, Steel Spr. 3/4 in. ASA Med.	Coml.	As req.	As req.	Items 1-10
94	" " " 1-1/4 in. " "	"	1	1	Gain Stroke Jaw.
95	" " " 1 in. " "	"	As req.	As req.	Item 2.
96					
97					
98					
99					
100					

* Pittsburg Screw & Bolt Corp. or equal.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

SWITCH LAYOUT

TURNOUT WITH BLOCK TYPE DERAIL NON-INTERLOCKED SWITCH

Approved L. J. Battinelli
Chief Signal Engineer

S-3150

ISSUED 9-8-59

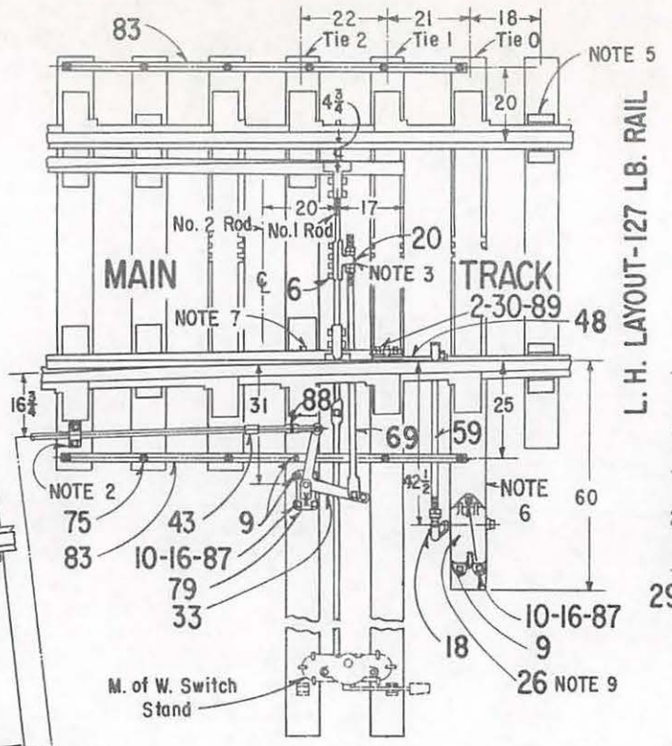
SHEET 2 Cont'd on Sh.....

Printed in U.S.A.

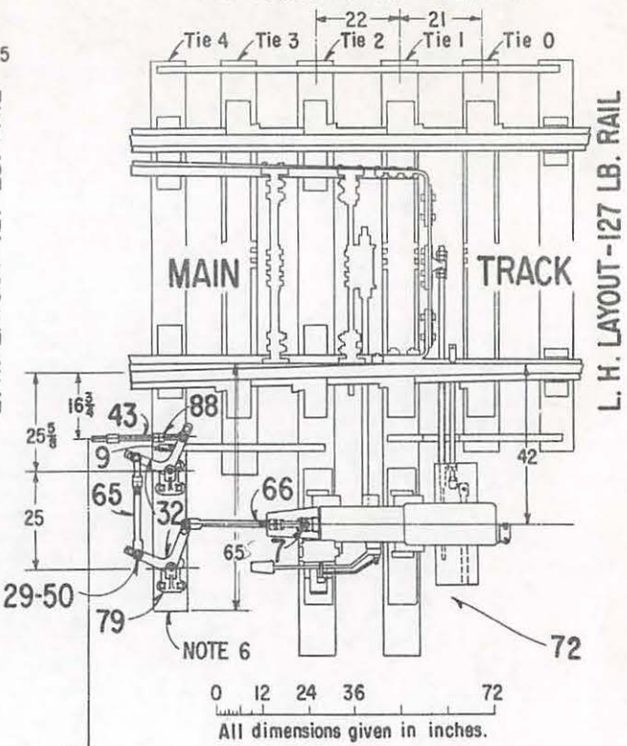
NOTES:

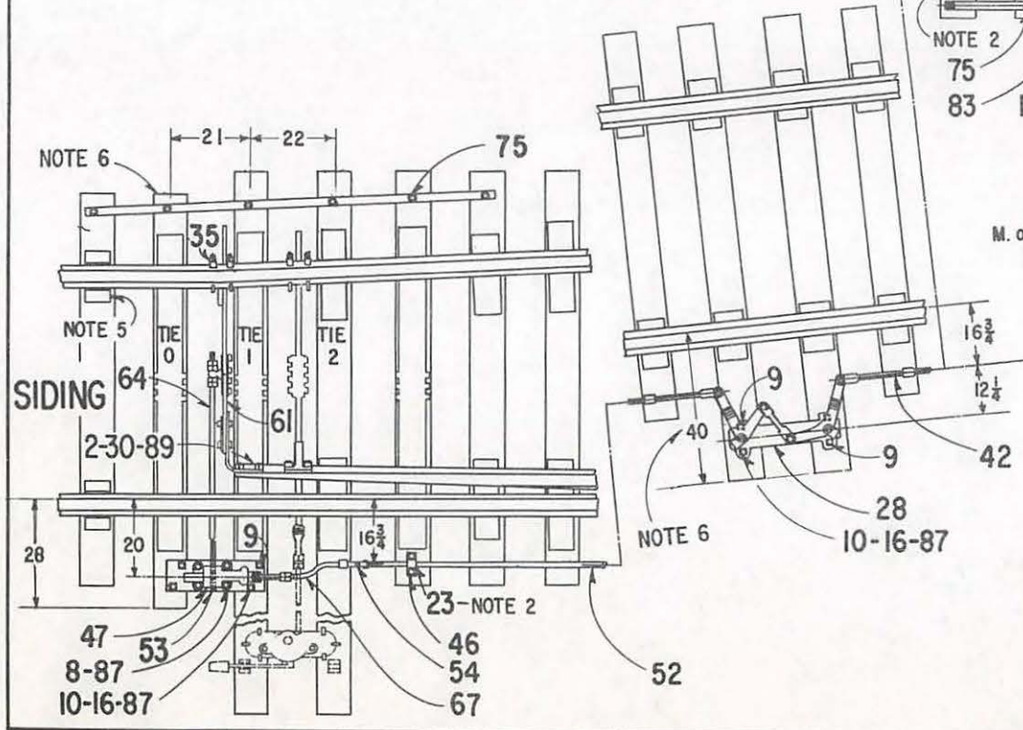
1- Installation of derail to meet requirements of Plan 81.
2- Pipe carrier spacing and distance between first carrier and center line of crank stand must not exceed 60 inches.
3- When used with M. of W. switch stand remove one splice plate from No. 1 switch rod and install bracket, Item 20.
4- Where necessary to secure additional clearance for No. 1 rod, tie No. 1 may be shifted a maximum of one half inch.
5- M. of W. Dept. to provide double shoulder tie plates on five ties, starting with second tie ahead of switch points at each end of turnout.
6- M. of W. Dept. to provide ties of length required, spaced as shown. Minimum length indicated.
7- M. of W. Dept. to provide suitable holes in gage plates, tie plates and ties to provide for emergency spiking of switch and derail. Six holes required.
8- Holes for Drive Spikes, Item 75, to be drilled in ties; 1/2 in. diam., 5 in. deep. Holes for Drive Lags, Item 46, to be drilled in ties; 3/8 in. diam., 2 in. deep.
9- Switch Circuit Controller must be operated from normally closed point.
10- Where derail is not required, omit pipe connections. Use main track connections only.
11- Protective treatment-Item 32, Instruction 350.

M. OF W. SWITCH STAND LAYOUT
USE WHERE ELECTRIC LOCK IS NOT REQUIRED



MODEL 9 SWITCH MACHINE LAYOUT
USE IN CONJUNCTION WITH PLAN 3100
WHERE ELECTRIC LOCK IS REQUIRED





NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
TURNOUT WITH SPLIT POINT DERAIL
NON-INTERLOCKED SWITCH

S-3160

Printed in U. S. A.

ISSUED 9-9-59
SHEET 1 Cont'd on Sh. 2

NO	ITEM	REF.	REQUIRED M. of W. SWITCH STAND	REQUIRED MOD. 9 SWITCH MACH.	USE
1	Bolt, Compl. 3/4 X 3-3/4, Spl. Hd. Hex. Nut	RSC-G35C	4	2	105 lb. Rail
2	" " 1 X 4-1/4 " " " "	RSC-G35C			127 lb. Rail
3					
4					
5					
6	Bolt, Compl.	3001-18	4		Sw. Adj. Bracket
7	Bolt, Compl.	3007-1		1	Sw. Mach. conn.
8	Bolt, 3/4 X 2-1/2, Sq. Hd. & Nut	ASA Reg.	4	4	Plunger Lock
9	Bolt, Lag 3/4 X 7 ASA cut thread	Coml.	8	12	
10	Bolt, Stud 3/4-10 X 11, with sq. nuts.	ASA Reg.	8	8	Items 26,28,53
11					
12					
13					
14					
15					
16	Bolt Grip Raco	589-1	8	8	Stud Bolts
17					
18	Ball Stud, Compl. A.A.R.	12711	1		Sw. C.C.
19					
20	Bracket	3001-21	1		Throw Rod
21	Bushing, 3/4 Long (Modified) G.R.S.	6714-309	(2)		105 Lb. Rail only.
22	Bushing G.R.S.	6714-309	(2)	(2)	105 Lb. Rail only.
23	Carrier, Pipe-One Way A.A.R.	10746	As req	As req	See Note 2.
24					
25					
26	Circuit Controller, Compl. G.R.S.	Model 8	1		5-3/8 Arm, 1 in. offset
27					
28	Compensator Assembly A.A.R.	10144	1	1	
29	Cotter 3/16 X 1-1/2	Coml.	7	10	Jaw Pins
30	" 1/4 X 1-3/4	"	4	2	Item 2
31	" 1/4 X 1-1/4	"			Item 1
32	Crank	3017-11		2	Tandem Cranks
33	"	3017-5	1		
34					
35	Guide, Front Rod	3001-35	1	1	Derail - 127 lb. Rail
36	" " "	3001-36			" 105 lb. Rail
37					
38					
39					
40					
41					

NO	ITEM	REF.	REQUIRED M. of W. SWITCH STAND	REQUIRED MOD. 9 SWITCH MACH.	USE
42	Jaw, Solid-Tang End A.A.R.	10181	2	2	Pipe Line
43	Jaw, Screw- " " A.A.R.	10199	1	1	" "
44					
45					
46	Lag, Drive, Wshr. Hd. 1/2X3-2-1/2 Thd. *	21-C-360	As req.	As req.	Pipe Carriers
47	Lock, Plunger-Compl. A.A.R.	14253	1	1	
48	Lug, Point	3006-21	1		127-105 lb. Rail
49					
50	Pins, Jaw A.A.R.	10105	7	10	
51					
52	Pipe, 1 in. With plugs & couplings. A.A.R.	10155	As req.	As req.	
53	Plate, Base-Plunger Lock	3004-4	1	1	
54	Rivets, 1/4 X 1-11/16 A.A.R.	10153	As req.	As req.	Pipe connections
55					
56					
57					
58					
59	Rod, Circuit Controller	3005-4	1		
60	Rod, Derail Front, Compl.	3001-51	1	1	L.H.
61	" " " "	3001-53			R.H.
62					
63					
64	Rod, Lock	3003-31	1	1	
65	Rod, Connecting, Compl.	3002-33		1	Tandem cranks
66	" " "	3002-34		1	Sw. Mach. conn.
67	Rod, Tang End	3002-61	1	1	
68					
69	Rod, Throw, Compl.	3002-10	1		At Switch Points
70					
71					
72	Switch Layout, Mod. 9 Switch Mach.	3100		1	Specify Requirements
73					
74					
75	Spike, Drive, 6-1/2 in. *	21-C-361	18	6	Tie Straps
76					
77					
78					
79	Stand, Crank, With center pin A.A.R	10082	1	2	
80					
81					
82					

NO	ITEM	REF.	REQUIRED M. of W. SWITCH STAND	REQUIRED MOD. 9 SWITCH MACH.	USE
83	Strap, Tie, - Long	3014-1	3	1	
84					
85					
86					
87	Washer, Steel Spr. 3/4 in. ASA Med.	Coml.	As req.	As req.	Items 1-8-10
88	" " " 1-1/4 in. " "	"	1	1	Screw Jaw
89	" " " 1 in. " "	"	As req.	As req.	Item 2
90					
91					
92					
93					
94					
95					
96					
97					
98					
99					
100					

* Pittsburg Screw & Bolt Corp. or equal.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

SWITCH LAYOUT

TURNOUT WITH SPLIT POINT DERAIL NON-INTERLOCKED SWITCH

Approved R. S. Bottinelli
Chief Signal Engineer

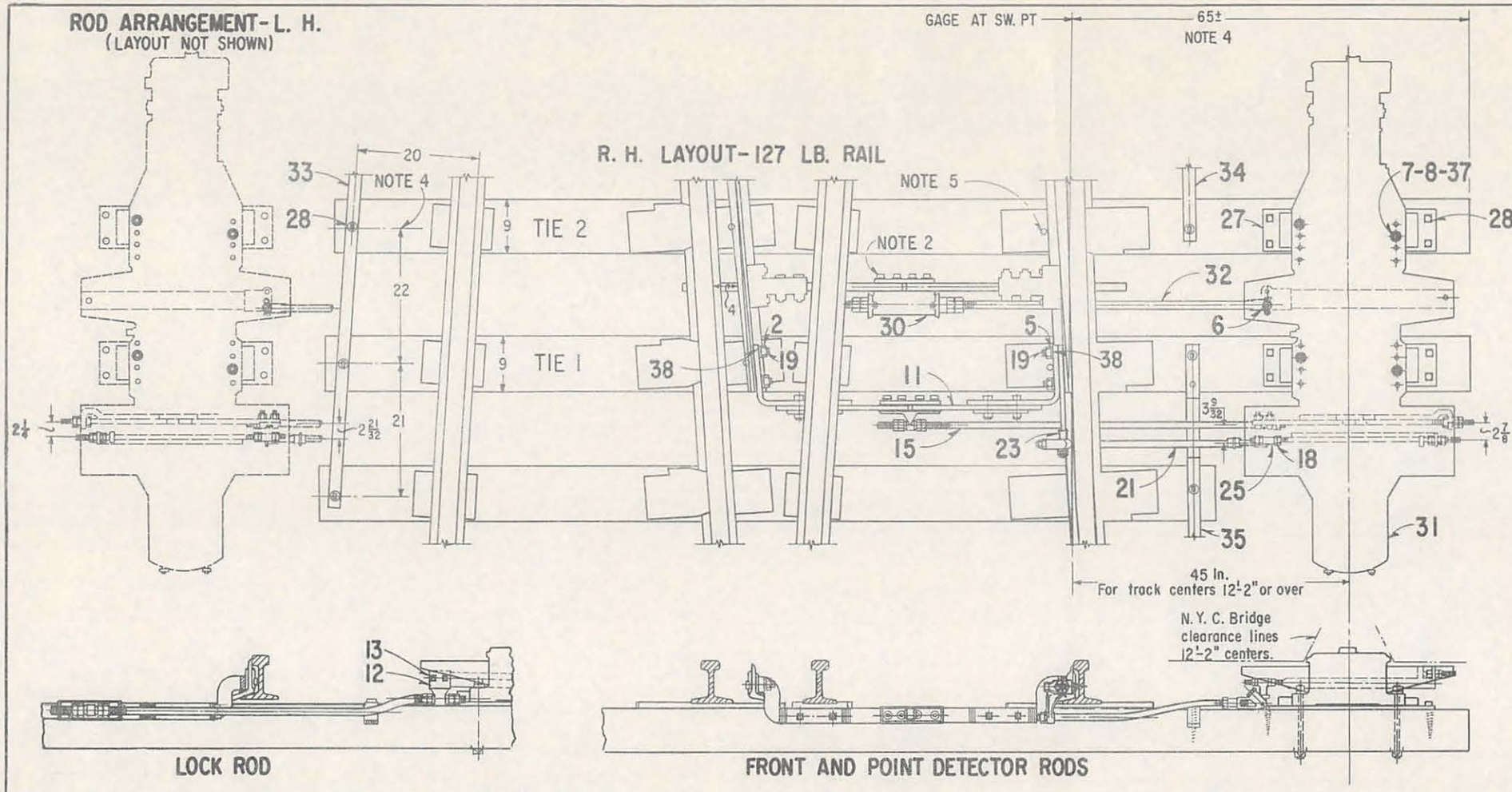
S-3160

ISSUED 9-9-59

SHEET 2 Cont'd on Sh.

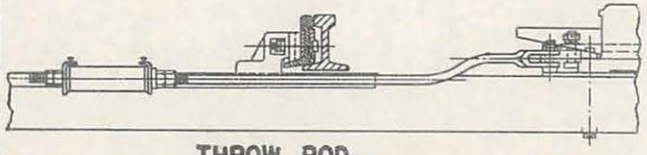
Printed in U. S. A.

ROD ARRANGEMENT - L. H.
(LAYOUT NOT SHOWN)



LOCK ROD

FRONT AND POINT DETECTOR RODS



THROW ROD

0 12 24 36
All dimensions given in inches.

NOTES:

1 - Material required is to be ordered from Plan 3000, Sheet 2.

2.- Remove one splice plate from No. 1 rod and install Switch Adjustment Bracket, Item 30.

3 - Holes for Drive Spikes, Item 28, to be one-half inch diameter and five inches deep.

4 - M. of W. to provide ties of length required, spaced as indicated.

5 - M. of W. Dept. to provide suitable holes in gage plates, tie plates and ties for emergency spiking of switch. Four holes required.

6 - Protective treatment, Item 32, Instruction 350.

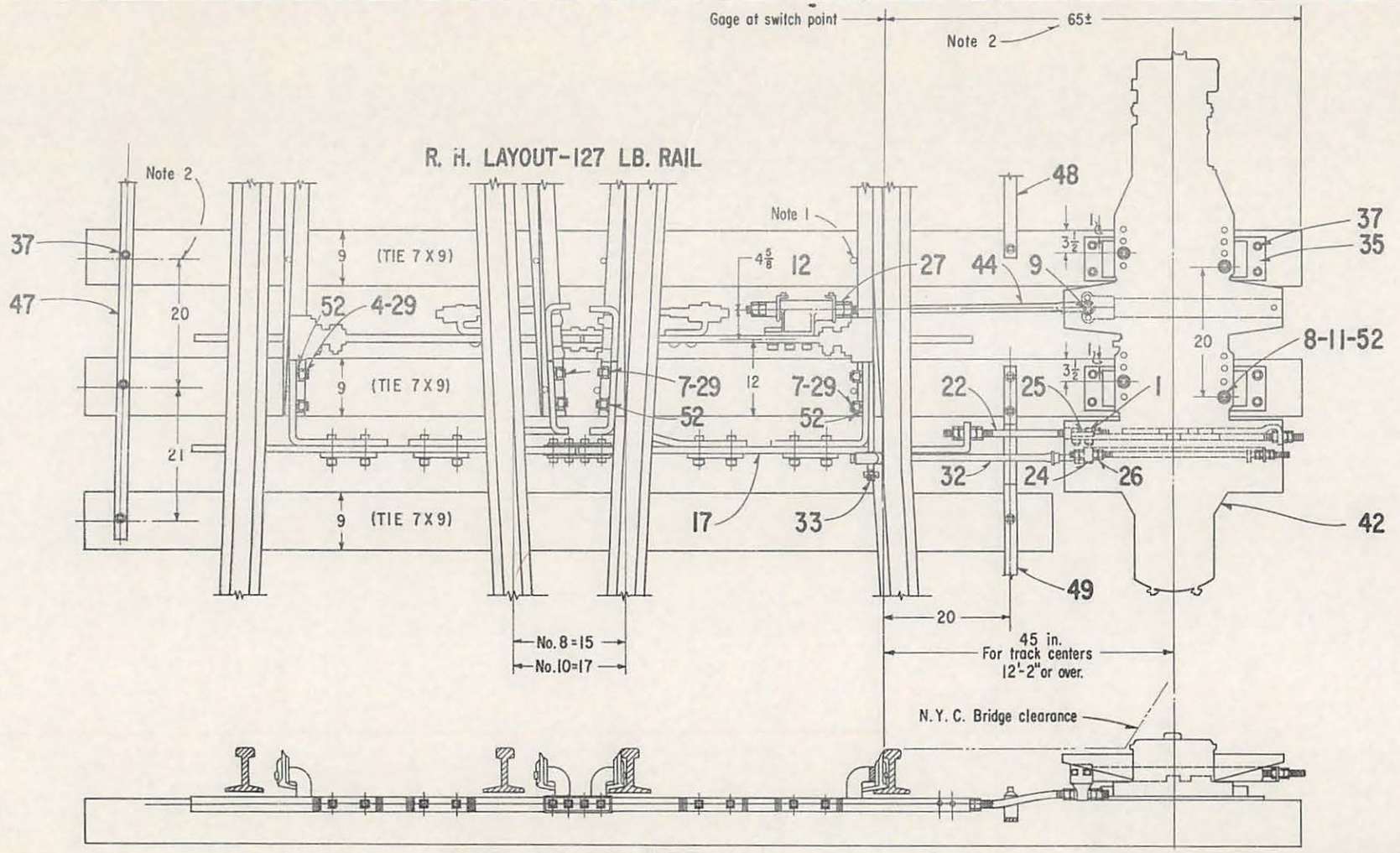
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SINGLE-SLIP SWITCH LAYOUT
G.R.S. MODEL 5A & 5C SWITCH MACHINES
127 - 105 LB. RAIL

Approved C. J. Boarnelli
Chief Signal Engineer

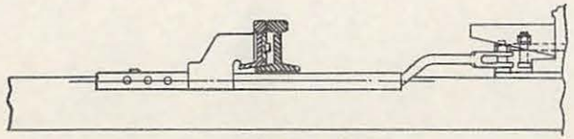
S-3170

Printed in U. S. A.

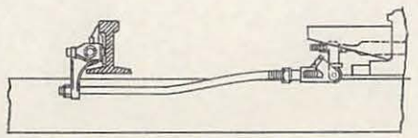
ISSUED 9-8-59
SHEET 1 Cont'd. on Sh



FRONT AND LOCK RODS



THROW ROD



POINT DETECTOR ROD

NOTES:

1.- M. of W. Department to provide suitable holes in gage plates and ties for emergency spiking of switch. Eight holes required.

2.- M. of W. to provide ties of length required, spaced as indicated.

3.- Holes for drive spikes to be one-half inch in diameter and five inches deep.

4.- Protective treatment, Item 32, Instruction 350.

0 12 24 36
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
DOUBLE-SLIP SWITCH LAYOUT
G. R. S. MODEL 5A & 5C SWITCH MACHINES
127-105 LB. RAIL

S-3180

Printed in U. S. A.

ISSUED 9-8-59

SHEET 1 Cont'd. on Sh. 2

NO.	ITEM	REF.	REQ.	USE	NO.	ITEM	REF.	REQ.	USE
1	Bolt, Hex. Nut $\frac{3}{4}$-10 X $1\frac{1}{2}$	Coml.	2	Lock Rod Lug	31				
2					32	Point Detector Rod	3005-1	1	
3	Bolt $\frac{3}{4}$ X $3\frac{3}{4}$, Special Hd., Hex. Nut	RSC-G35C	2	105 Lb. Straight Pt.	33	Point Lug Compl.	3006-21	1	127-105 Lb. Rail
4	" 1 X $4\frac{1}{4}$, " " " "	RSC-G35C		127 Lb. " "	34				
5					35	Saddle Plate, Compl.	3004-1	2	At Switch Mach.
6	Bolt $\frac{3}{4}$ X $4\frac{1}{2}$, Special Hd., Hex. Nut	RSC-G35C	6	105 Lb. Curved Pt.	36				
7	" 1 X 5 " " " "	RSC-G35C		127 Lb. " "	37	Spike, Drive-6 in. long. *	21-C-361	20	
8	" -Stud $\frac{3}{4}$-10 X 12, Sq. Nuts	ASA, Reg.	4	Switch Mach.	38				
9	"	3007-1	1	Throw Rod	39				
10					40				
11	Bolt Grip Raco	589-1	4	Item 8.	41				
12	Bracket, Switch Adjustment GRS	46948-13Gr.2	1	Throw Rod	42	Switch Machine		1	Specify requirements
13	Bushing - For $\frac{3}{4}$ bolts GRS	6714-309	(2)	Item 3 only.	43				
14	" " " " GRS	8104-2	(6)	Item 6 only.	44	Throw Rod, Complete	3002-14	1	
15					45				
16					46				
17	Front Rod, Complete	3001-60	1		47	Tie Strap - Long	3014-1	1	
18					48	" " -Short	3014-3	1	
19					49	" " -Short, Set	3014-5	1	
20					50				
21					51				
22	Lock Rod	3003-121	1	127 Lb. Rail	52	Washer, Steel Spring $\frac{3}{4}$ SAE Med.	Coml.	As Req.	Items 3,6 & 8
23	" "	3003-122		105 Lb. Rail	53	Washer, Steel Spring 1 in. SAE Med.	"	8	Items 4 & 7
24	Lug, Pt. Detector, Ball Stud	3006-9	1	Conn. at Sw. Mach.	54				
25	Lug, Lock Rod	3003-18	1		55				
26	Nut, $\frac{3}{4}$-10 Heavy Hex. Jam, ASA-UNC-2B	Coml.	4	Item 24 at Sw. Mach.	56				
27	Nut, Sleeve, $1\frac{1}{4}$-7 GRS	44921-2Gr.1	2	Item 12	57				
28					58				
29	Pins, Cotter $\frac{1}{4}$ X $1\frac{3}{4}$	Coml.	8	Items 4 & 7	59				
30	" " $\frac{1}{4}$ X $1\frac{1}{4}$	Coml.		Items 3 & 6	60				

* Pittsburg Screw & Bolt Corp. or equal.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
DOUBLE-SLIP SWITCH LAYOUT
G. R. S. MODEL 5A & 5C SWITCH MACHINES
127-105 LB. RAIL

Approved C. S. Bottinelli
Chief Signal Engineer

S-3180

ISSUED 9-8-59

SHEET 2 Cont'd. on Sh

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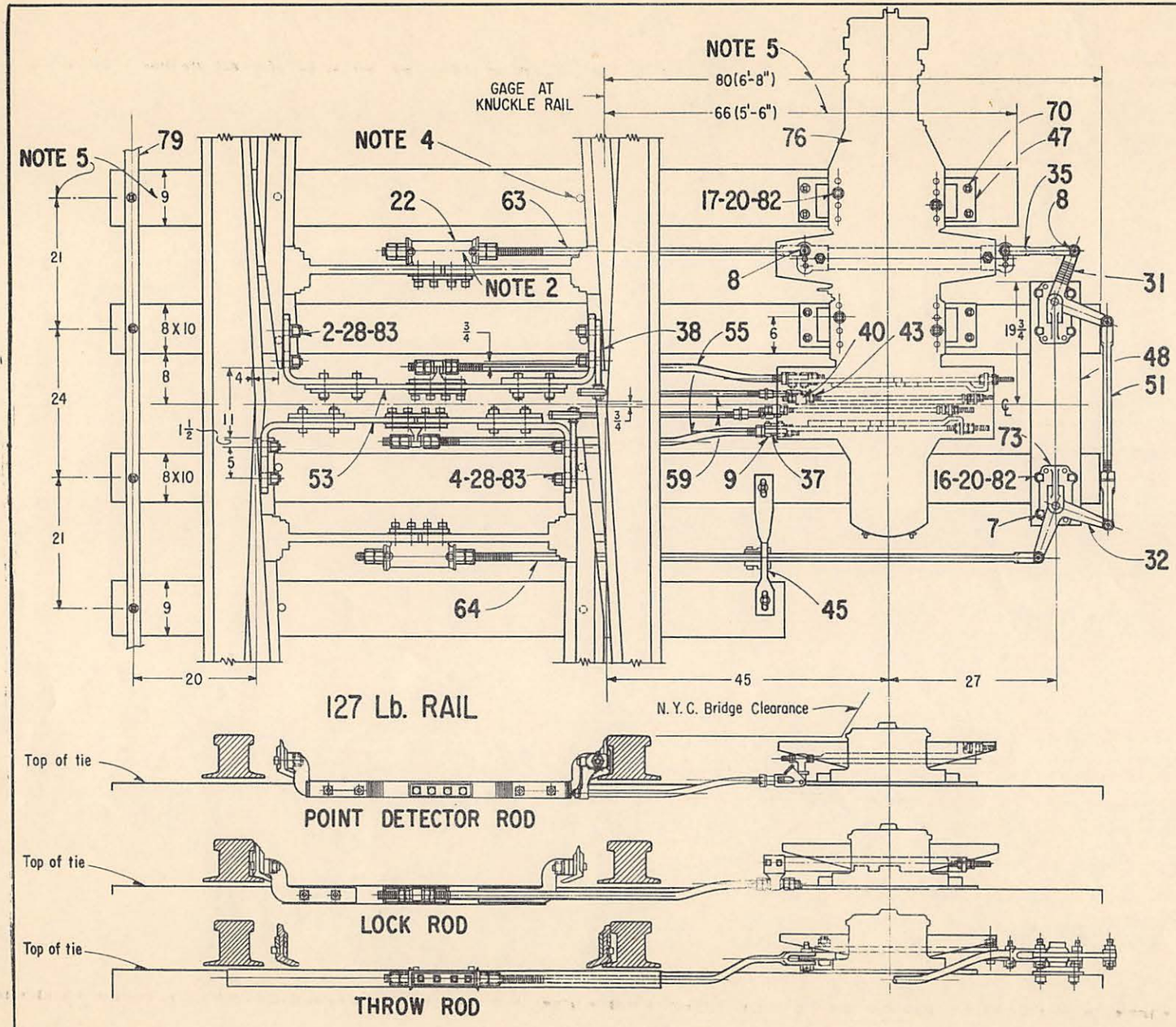


NOTES:

1. - Where slip rail is located between switch machine and knuckle rail, use Layout B.
2. - Remove one splice plate from M. of W. rod and install Switch Adjustment Brackets.
3. - Holes for Drive Spikes to be one-half inch diameter and five inches deep.
4. - M. of W. Dept. to provide suitable holes in gage plates, tie plates and ties for emergency spiking of switch. Eight holes required.
5. - M. of W. Dept. to provide ties of length required, spaced as indicated.
6. - Protective treatment-Item 32, Instruction 350.

0 12 24 36

All dimensions given in inches.

LAYOUT A

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

MOVABLE POINT FROG LAYOUT

G. R. S. MODEL 5A & 5C SWITCH MACHINES

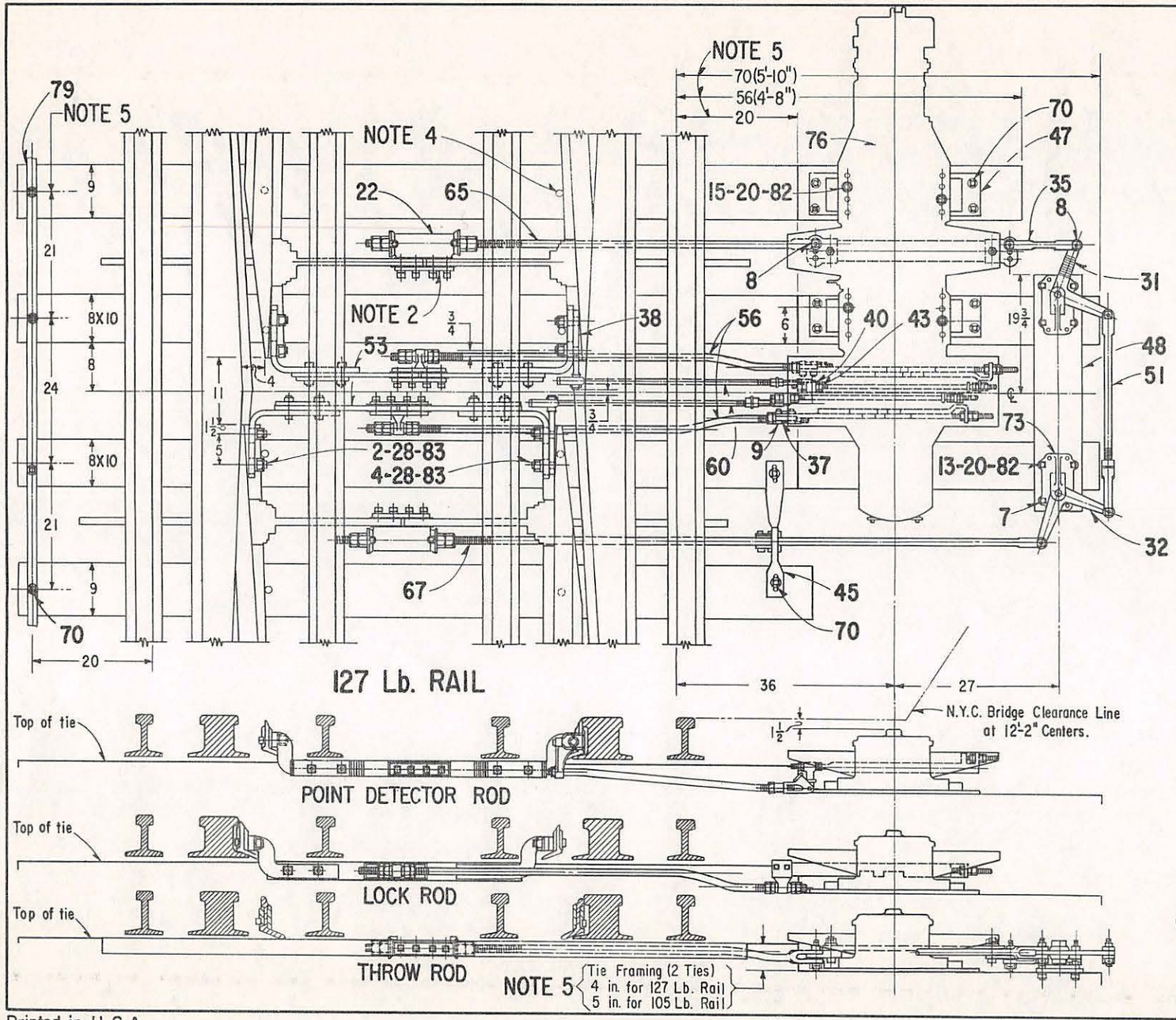
127-105 LB. RAIL

S-3190

Printed in U. S. A.

ISSUED 5-26-60

SHEET 1 Cont'd. on Sh



NOTES:

1 - This plan to be used where a slip rail is located between switch machine and knuckle rail. Where slip rail is not present use Layout A.

2 - Remove one splice plate from M. of W. rod and install Switch Adjustment Brackets.

3 - Holes for Drive Spikes to be one-half inch diameter and five inches deep.

4 - M. of W. Dept. to provide holes in gage plates, tie plates and ties to provide for emergency spiking of switch. Eight holes required.

5 - M. of W. Dept. to provide ties of suitable length spaced as indicated. Ties to be creosoted after framing.

6 - Protective treatment, Item 32, Instruction 350.

0 12 24 36

All dimensions given in inches.

LAYOUT B

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

MOVABLE POINT FROG LAYOUT

G. R. S. MODEL 5A & 5C SWITCH MACHINE

127-105 LB. RAIL

S-3190

Printed in U. S. A.

ISSUED 5-26-60

SHEET 2 Cont'd. on Sh. 3

NO.	ITEM	REF.	LAYOUT A	LAYOUT B	USE
1	Bolt, $\frac{3}{4}$ X $3\frac{3}{4}$, Special Head, Hex. Nut. RSC	G35C	4	4	105 Lb. Rail
2	Bolt, 1 X $4\frac{1}{4}$ " " " " "	"			127 Lb. Rail
3	Bolt, $\frac{3}{4}$ X $4\frac{1}{2}$ " " " " "	"	4	4	105 Lb. Rail
4	Bolt, 1 X 5 " " " " "	"			127 Lb. Rail
5					
6					
7	Bolt, $\frac{3}{4}$ X $2\frac{1}{2}$, Sq. Hd. & Nut	Coml.	4	4	Crank Stands
8	Bolt, Compl.	3007-1	6	6	Throw Rod Conn.
9	Bolt, Lug, $\frac{3}{4}$-10 X $2\frac{1}{2}$ Hex. Nut. GRS	0423	4	4	Lock Rod Lug
10					
11					
12	Bolt, Stud, $\frac{3}{4}$-10 X 9 Compl. w/Sq. Nuts	Coml.	-	4	Crank Std.-105 Lb. Rail
13	Bolt, Stud, $\frac{3}{4}$-10 X 10 " " "	"			" " -127 Lb. Rail
14	Bolt, Stud, $\frac{3}{4}$-10 X 11 " " "	"	-	4	Sw. Mach - 105 Lb. Rail
15	Bolt, Stud, $\frac{3}{4}$-10 X 12 " " "	"			" " -127 Lb. Rail
16	Bolt, Stud, $\frac{3}{4}$-10 X 14 " " "	"	4	-	Crank Stands
17	Bolt, Stud, $\frac{3}{4}$-10 X 15 " " "	"	4	-	Sw. Machines
18					
19					
20	Bolt Grip Raco	589-1	8	8	Stud Bolts
21					
22	Bracket, Switch Adjustment GRS	46948-12Gr.1	2	2	
23	Bushing, For $\frac{3}{4}$ Bolt GRS	6714-309	(4)	(4)	With Item 1 only
24	Bushing, " " " GRS	8104-2	(4)	(4)	" " 3 "
25					
26					
27	Cotter Pins $\frac{1}{4}$ X $1\frac{1}{4}$	Coml.	8	8	$\frac{3}{4}$ In. Switch Bolts
28	Cotter Pins $\frac{1}{4}$ X $1\frac{3}{4}$	"			1 In. " "
29					
30					

NO.	ITEM	REF.	LAYOUT A	LAYOUT B	USE
31	Crank	3017-19	1	1	
32	Crank AAR	10075	1	1	
33					
34					
35	Link AAR	10173	1	1	
36					
37	Lug, Lock Rod	3003-18	2	2	
38	Lug, Point-Compl.	3006-23	2	2	127 Lb. Rail
39	Lug, Point-Compl.	3006-24			105 Lb. Rail
40	Lug, Pt. Detector Ball Stud, Compl.	3006-9	2	2	Conn. at Sw. Mach.
41					
42					
43	Nut, Heavy Hex. Jam. $\frac{3}{4}$-10, UNC-2B	ASA Req.	8	8	Pt. Det. Ball Stud Lug.
44					
45	Pipe Carrier, Transverse Raco	411-1	1	1	
46					
47	Plate, Saddle, Compl.	3004-1	2	2	Sw. Mach.
48	Plate, Base	3004-6	1	1	Crank Stand
49					
50					
51	Rod, Connecting	3002-31	1	1	
52					
53	Rod, Front, Compl.	3001-50	2	2	
54					
55	Rod, Lock	3003-123	2		
56	Rod, Lock	3003-124		2	127 Lb. Rail
57	Rod, Lock	3003-125			105 Lb. Rail
58					
59	Rod, Point Detector, Compl.	3005-1	2		
60	Rod, " " "	3005-9		2	

NO	ITEM	REF.	LAYOUT A	LAYOUT B	USE
61					
62					
63	Rod, Throw	3002-11	1		
64	Rod, Throw	3002-18	1		
65	Rod, Throw	3002-15	-	1	127 Lb. Rail
66	Rod, Throw	3002-16			105 Lb. Rail
67	Rod, Throw	3002-17		1	127 & 105 Lb. Rail
68					
69					
70	Spike, Drive, 6 In. Long *	21-C-361	16	16	Items 45, 47, 79
71					
72					
73	Stand, Crank, With Center Pin AAR	10082	2	2	
74					
75					
76	Switch Machine GRS		As Req.	As Req.	Throw bar to have two couplings, 51153-1.
77					
78					
79	Tie Straps, Long	3014-1	1	1	
80					
81					
82	Washer, Steel Spring, $\frac{3}{4}$ In. ASA Med.	Coml.	As Req.	As Req.	
83	Washer, " " 1 In. " "	"	"	"	

* Pittsburg Screw & Bolt Corp. or equal.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
MOVABLE POINT FROG LAYOUT
G. R. S. MODEL 5A & 5C SWITCH MACHINES
127-105 LB. RAIL

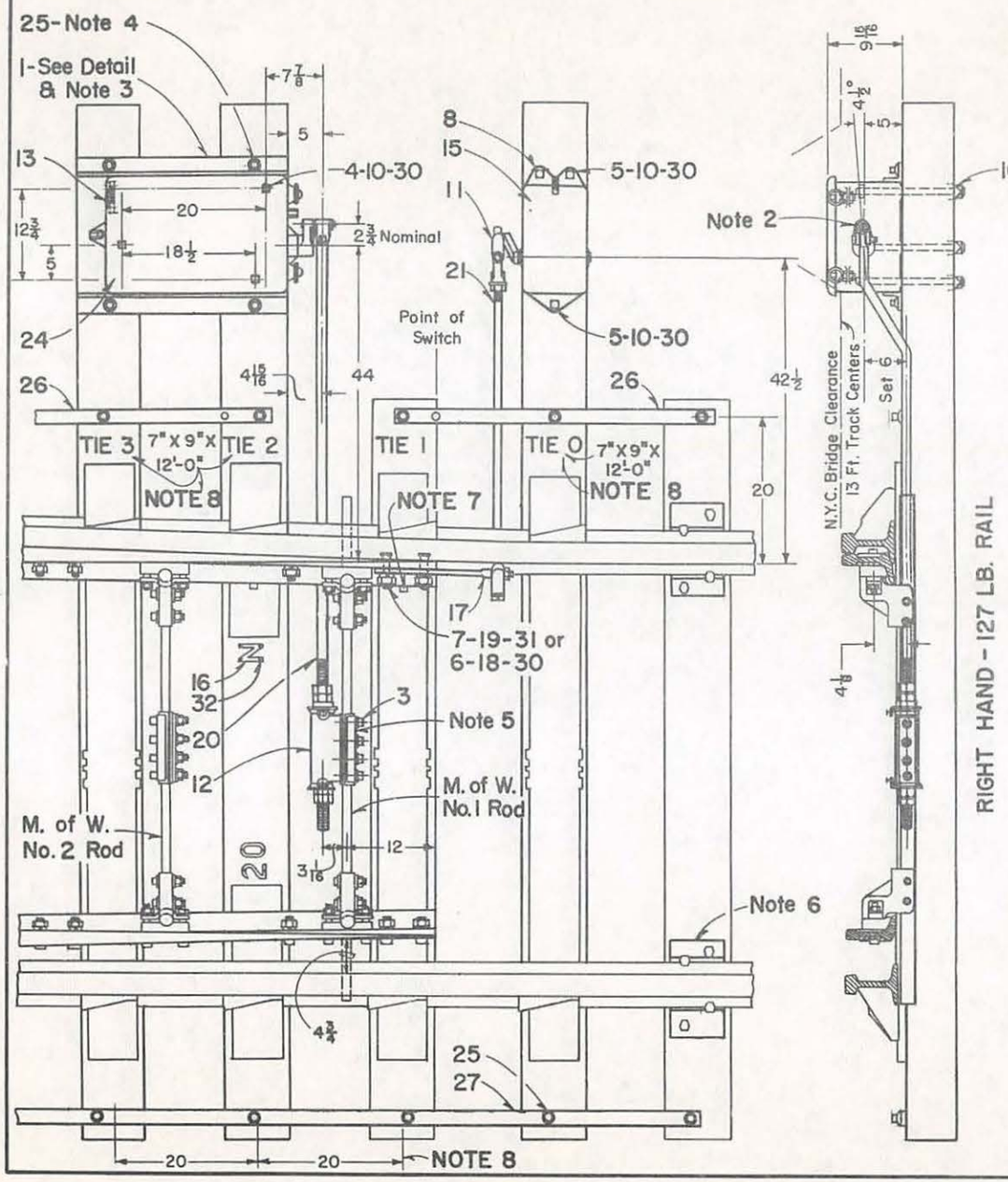
Approved L. S. Bottinelli
Chief Signal Engineer

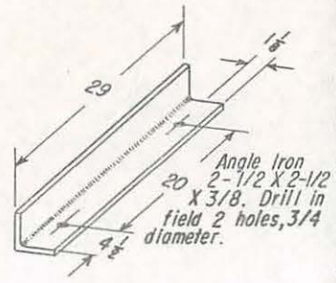
S-3190

Printed in U.S.A.

ISSUED 5-26-60

SHEET 3 Cont'd. on Sh____





DETAIL

NOTES:

1 – This layout to be installed only as authorized by Signal Engineer.

2 – When crank is attached to shaft of switch machine, the keyway must be used which positions the end of crank above the center line of the shaft when switch points are closed on machine side of track.

3 – Place angle iron in position after switch machine is installed. Scribe holes in ties and center punch for drilling 1/8 inch nearer to switch machine to obtain force fit against side of machine.

4 – Holes for Drive Spikes, Item 25 to be drilled in tie 1/2 inch diam., 5 inches deep.

5 – Remove one splice plate from No. 1 rod and install switch adjustment bracket.

6 – M. of W. Dept. to provide double shoulder tie plates on five ties starting with second tie ahead of switch points.

7 – M. of W. Dept. to provide suitable holes in gage plates, tie plates and ties for emergency spiking of switch.

8 – M. of W. Dept. to provide ties of length required, spaced as shown. Min. length indicated.

9 – Protective treatment–Item 32, Instruction 350.

NO.	ITEM	REF.	REQ.	USE
1	Angle - 2-1/2 X 2-1/2 X 3/8 X 29		2	See Detail
2				
3	Bolt 3/4 X 3	3001-18	4	If req. (M. of W. to supply)
4	Bolt, Stud 3/4-10 X 15, Sq. Nuts, Spr. Wshr.	ASA Regular	3	Switch Machine
5	" " 3/4-10 X 11 " "	" "	2	Sw. Circuit Controller
6	Bolt, 3/4 X 3, Spcl. Hd., Hex. Nut.	RSC-G35C	2	Pt. Lug-105 Lb. Rail
7	" 1 X 3-1/4 " " " "	"		" " 127 Lb. "
8	Bolt, Lag 3/4 X 7 ASA Cut Thd.	Coml.	1	Sw. Circuit Controller
9				
10	Bolt Grip Raco	589-1	5	Stud Bolts
11	Ball Stud, Compl. AAR	12711	1	Sw. Circuit Controller
12	Bracket, Switch Adjustment GRS	46948-12Gcl	1	
13	Bushing, Reducing 1-1/2 to 1-1/4 GRS	41892-13	1	Sw. Machine Conn.
14	" 3/4 Long Modified GRS	6714-309	(2)	Pt. Lug on 105 lb. Rail
15	Circuit Controller, Compl. GRS	Model 8	1	5-3/8 Arm 1 in. offset
16	Letter "N" & Numerals As Required	2280	2	Switch No. & Position
17	Point Lug, Complete	3006-21	1	
18	Pin, Cotter 1/4 X 1-1/4	Coml.	2	Item 6
19	Pin, Cotter 1/4 X 1-3/4	"		Item 7
20	Rod, Throw	3002-101	1	
21	Rod, Switch Circuit Controller	3005-4	1	
22				
23				
24	Sw. Machine GRS	Model 13	1	
25	Spikes, Drive 6-1/2 inch *	21-C-361	14	
26	Straps, Tie	3014-3	2	
27	" "	3014-1	1	
28				
29				
30	Washer, Steel Spr. 3/4 in. ASA Medium	Com'l	As	Items 4, 5, 6
31	" " " 1 in. " "	Com'l	Req.	Item 7
32	Wood Screws - 2 In. No. 10 Flat Hd.	Com'l	8	Item 16
33				
34				
35				

* Pittsburg Screw & Bolt Co. or equal.

0 6 12 24 36 48

All dimensions given in inches.

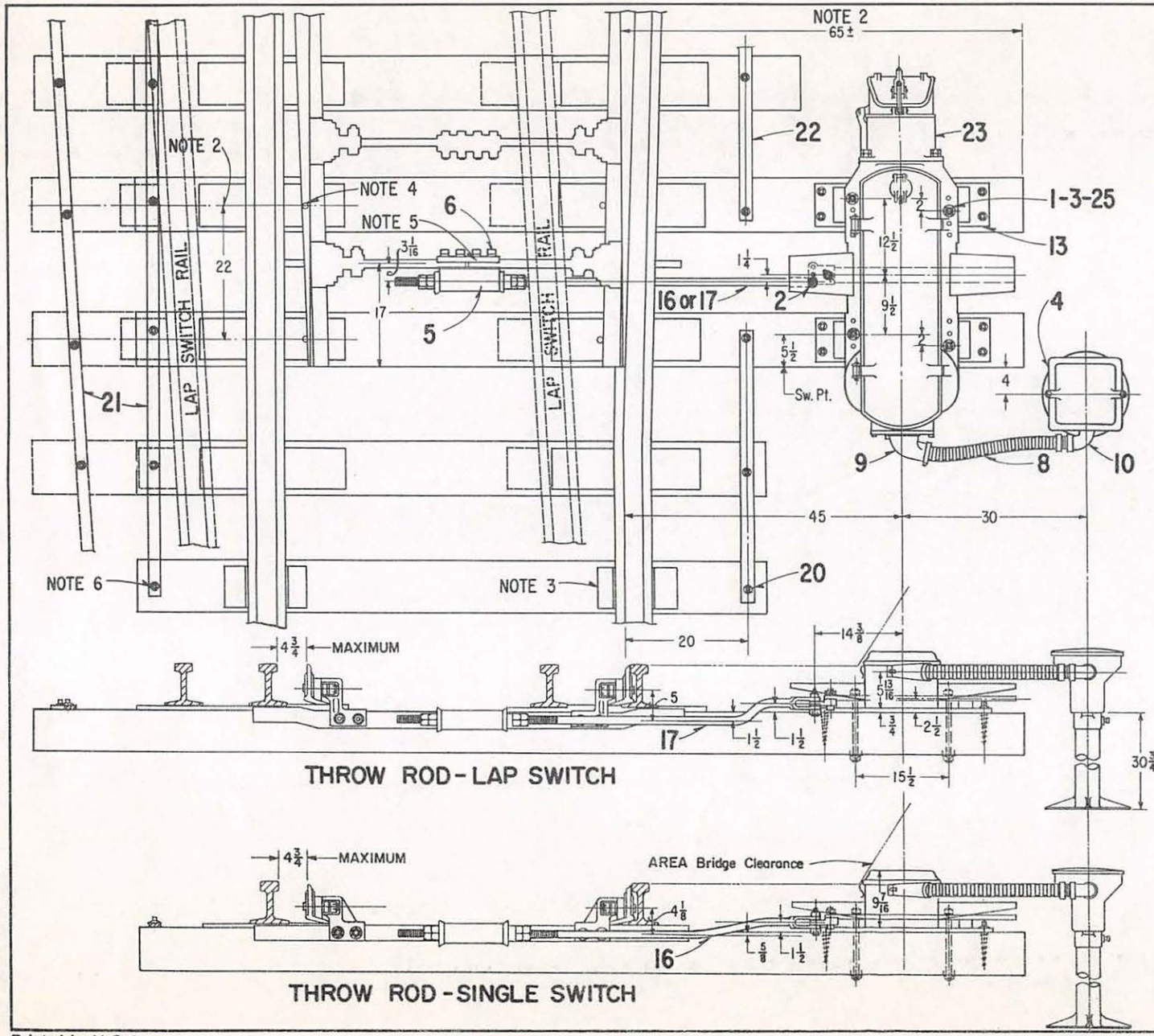
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
MODEL 13 SWITCH MACHINE

Approved L. B. Battinelli
Chief Signal Engineer

S-3200

ISSUED 9-8-59

SHEET 1 Cont'd. on Sh



NO.	ITEM		REFERENCE	REQ.	USE
1	Bolt, Stud 3/4-10 X 12 Compl. with Square Nuts		Coml.	4	Switch Machine
2	Bolt		3007-1	1	Throw Rod
3	Bolt Grip	Raco	589-1	4	Stud Bolts
4	Box, Terminal	GRS	52918-9	1	
5	Bracket, Switch Adjustment	GRS	46948-12 Gr. 1	1	
6	Bolts		3001-18	4	
7					
8	Conduit 2 In. Flex.	GRS	Pl. J-3517 Fig. 5	1	
9	Coupling	GRS	45688-6 Gr. 1	1	Switch Machine
10	Coupling	GRS	45688-104 Gr. 1	1	Terminal Box
11					
12					
13	Plate, Saddle Complete		3004-1	2	Switch Machine
14					
15					
16	Rod, Throw		3002-11	1	Single Switch
17	Rod, Throw		3002-7		Lap Switch
18					
19					
20	Spike, Drive 6 In. long	*	21-C-361	20	Saddle Pl. & Tie Strap
21	Strap, Tie		3014-1	1	
22	Strap, Tie		3014-3	2	
23	Switch Machine	GRS	52500-4 Gr. 2	1	Specify Requirements
24					
25	Washers, Steel Spring 3/4 In. ASA Medium		Coml.	4	Stud Bolts

* Pittsburg Screw & Bolt Corp. or equal.

0 6 12 24 36
All dimensions given in inches.

NOTES:

1 - This layout is for use as authorized by Signal Engineer on classification track switches. On receiving or departure yard switches, or where signal is required, use Layout B.

2 - M. of W. Dept. to provide ties of length required, spaced as indicated.

3 - M. of W. Dept. to provide double shoulder tie plates, where practicable, on five ties, starting with second tie ahead of switch points.

4 - M. of W. Dept. to provide suitable holes in switch plates and ties for emergency spiking of switch. Four holes required.

5 - Remove one splice plate from No. 1 switch rod and install switch adjustment bracket.

6 - Holes for drive spikes to be 1/2 inch diameter and 5 inches deep.

7 - Protective treatment - Item 32, Instruction 350.

LAYOUT A

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
GRS MODEL 6 SWITCH MACHINE

S-3210

ISSUED 3-15-60

SHEET 1 Cont'd on Sh 2

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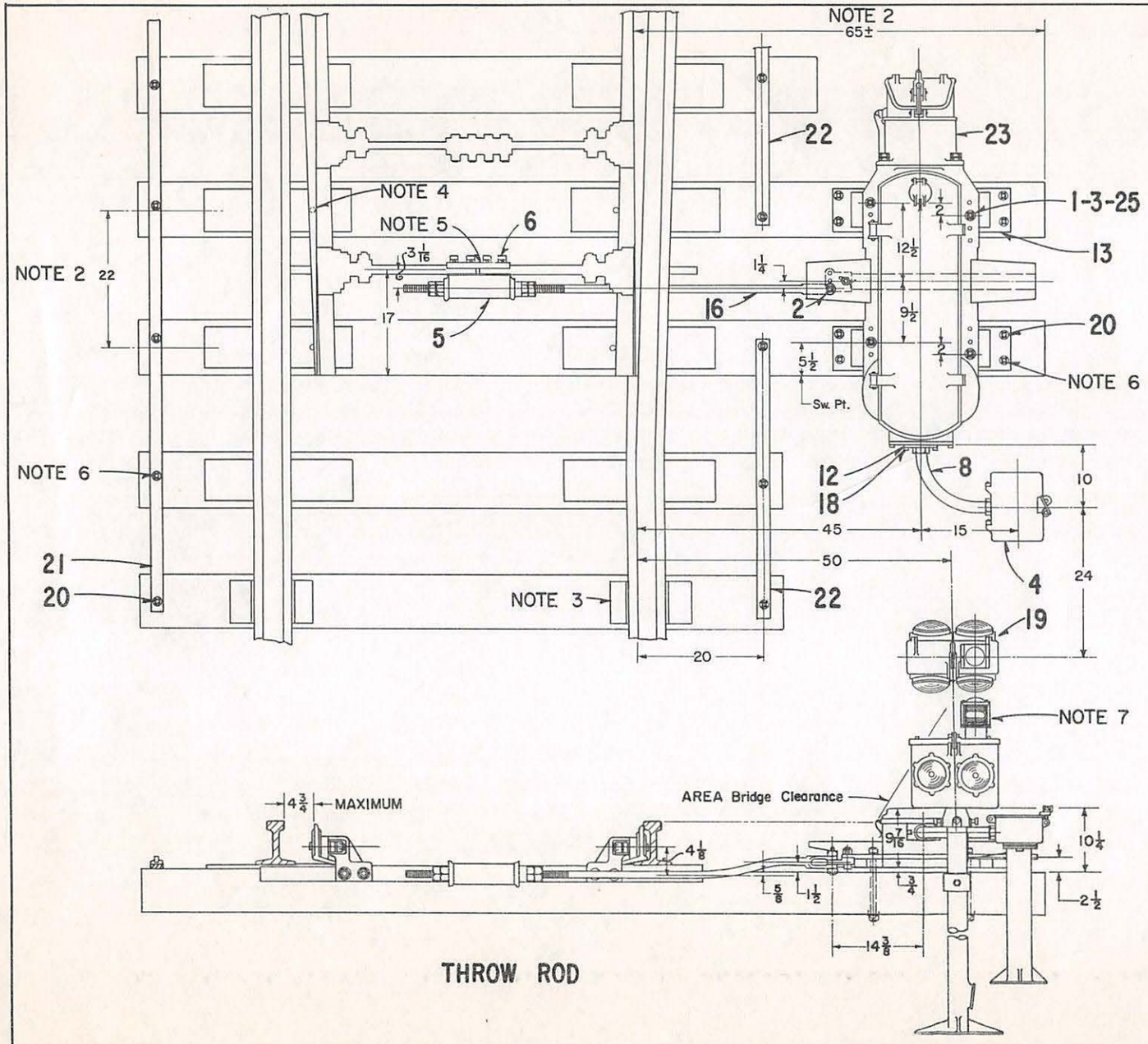


NO.	ITEM		REFERENCE	REQ.	USE
1	Bolt, Stud 3/4-10X12 Compl.with Square Nuts		Coml.	4	Switch Machine
2	Bolt		3007-1	1	Throw Rod
3	Bolt Grip	Raco	589-1	4	Stud Bolts
4	Box, Terminal	Raco	428-40	1	
5	Bracket, Switch Adjustment	GRS	46948-12 Gr. 1	1	
6	Bolt		3001-18	4	
7					
8	Conduit		1173-1	1	
9					
10					
11					
12	Plate,	GRS	52106-12	1	Switch Machine
13	Plate, Saddle Complete		3004-1	2	Switch Machine
14					
15					
16	Rod, Throw		3002-11	1	
17					
18	Screw, 3/8-16 X 1 Hex. Hd. & Lock Washer		Com'l	2	
19	Signal, Type P See Note 7	GRS	As Req.	1	
20	Spike, Drive 6 in. long	*	21-C-361	20	Saddle Pl. & Tie Straps
21	Strap, Tie		3014-1	1	
22	Strap, Tie		3014-3	2	
23	Switch Machine	GRS	52500-4 Gr. 2	1	Specify Requirements
24					
25	Washers, Steel Spring 3/4 in. ASA Medium		Coml.	4	Stud Bolts

* Pittsburg Screw & Bolt Corp. or equal.

0 6 12 24 36
All dimensions given in inches.

NOTES:

1 - This layout is for use as authorized by Signal Engineer on receiving or departure yard switches with Type P signal. On classification yard switches use Layout A.

2 - M. of W. Dept. to provide ties of length required, spaced as indicated.

3 - M. of W. Dept. to provide double shoulder tie plates on five ties starting with second tie ahead of switch points.

4 - M. of W. Dept. to provide suitable holes in switch plates and ties to provide for emergency spiking of switch. Four holes required.

5 - Remove one splice plate from No. 1 switch rod and install switch adjustment bracket.

6 - Holes for drive spikes to be 1/2 inch diameter and 5 inches deep.

7 - Signal to be equipped with Transport Products Corp. special lamp 31223X with red fresnel lens.

8 - Protective treatment - Item 32, Instruction 350.

LAYOUT B

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

SWITCH LAYOUT

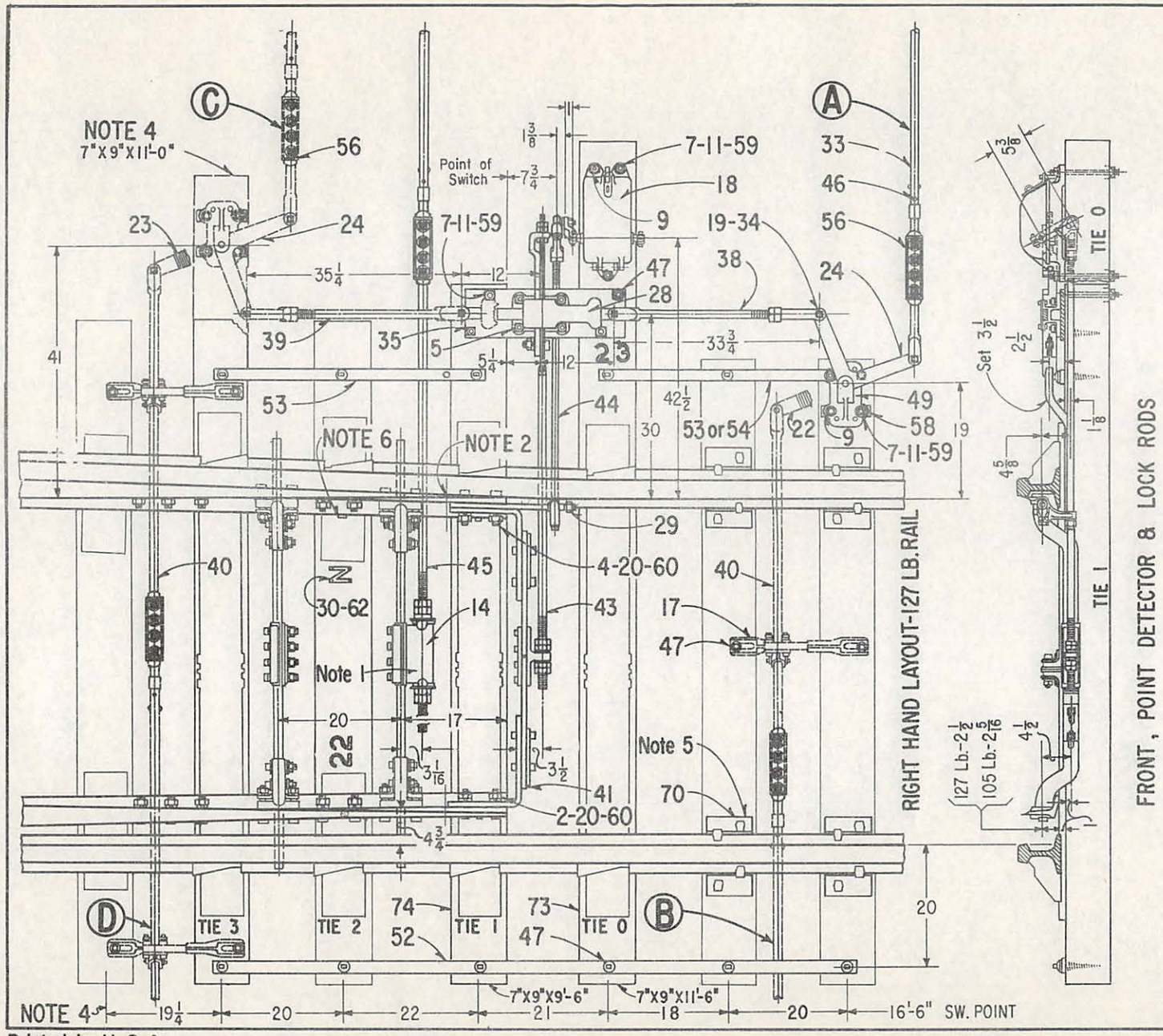
GRS MODEL 6 SWITCH MACHINE

Approved L. J. Bottinger
Chief Signal Engineer

S-3210

ISSUED 3-15-60

Printed in U. S. A.



NOTES:

1- Remove one splice plate from No. 1 switch rod and install switch adjustment bracket, Item 14.

2- To provide clearance for front rod or point lug, switch bolt located 9-1/2 inches from switch point may be removed.

3- Holes for Drive Spikes, Item 47, to be one half inch in diameter and five inches deep.

4- M. of W. Dept. to provide ties of length required, spaced as indicated.

5- M. of W. Dept. to provide double shoulder tie plates on five ties starting with second tie ahead of switch points.

6- M. of W. Dept. to provide suitable holes in gage plates, tie plates and ties for emergency spiking of switch, (4 required).

7- Protective treatment, Item 32, Instruction 350.

0 12 24 36

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

SWITCH LAYOUT

MECHANICAL- FACING POINT LOCK

S-3900

Printed in U. S. A.

ISSUED 9-8-59

SHEET 1 Cont'd. on Sh. 2

NO.	ITEM		REF.	REQUIRED FOR LAYOUT A	B	C	D	USE
1	Bolt 3/4 X 3-3/4, Spcl. Hd., Hex. Nut		RSC-G35C	2	2	2	2	Fr. Rod 105 Lb.
2	" 1 X 4-1/4 " " " "		RSC-G35C					" " 127 Lb.
3	" 3/4 X 4-1/2 " " " "		RSC-G35C	2	2	2	2	" " 105 Lb.
4	" 1 X 5 " " " "		RSC-G35C					" " 127 Lb.
5	" 3/4 X 2-1/2, With Sq. Hd. & Nut		ASA Regular	4	4	4	4	Plunger Lock
6								
7	Bolt, Stud, 3/4-10 X 11, With Sq. Hd. & Nuts		ASA Regular	6	6	6	6	Cr.Std.-C.C.-Pl.Lock
8								
9	Bolt, Lag, 3/4 X 7, Cut Thread		ASA	3	3	3	3	Cr. Stand, C. C.
10								
11	Bolt Grip	Raco	589-1	6	6	6	6	Stud Bolts
12								
13								
14	Bracket, Sw. Adjustment	G R S	46948-12Gr.1	1	1	1	1	
15	Bushing, For 3/4 Bolt	G R S	8104-2	(2)	(2)	(2)	(2)	With Item 3 only.
16	Bushing, For 3/4 Bolt	G R S	6714-309	(2)	(2)	(2)	(2)	With Item 1 only.
17	Carrier, Transverse Pipe	Raco	411-1		1		2	
18	Circuit Controller, 5-3/8 Arm, Offset 1 in.	G R S	Model 8	1	1	1	1	
19	Cotter 3/16 X 1-1/2		Coml.	3	3	4	4	Jaw Pins
20	" 1/4 X 1-3/4		"	4	4	4	4	Items 2 & 4
21	" 1/4 X 1-1/4		"					Items 1 & 3
22	Crank		3017-1		1		1	R. H. Layout
23	"		3017-3					L. H. Layout
24	"	AAR	10076	1		1		
25								
26								
27								
28	Lock, Plunger, Compl.	AAR	14253	1	1	1	1	
29	Lug, Point		3006-21	1	1	1	1	
30	Numerals-Letter "N"		2280	As Req	As Req	As Req	As Req	Sw. & Lock No.
31								
32								
33	Pipe, 1 Inch, With Plugs & Couplings	AAR	10154	As Req	As Req	As Req	As Req	
34	Pin, Jaw	AAR	10105	3	3	3	3	
35	Plate, Base		3004-4	1	1	1	1	Plunger Lock
36								
37								
38	Rod, Connecting		3002-31	1	1			Plunger Lock Conn.
39	" "		3002-32			1	1	" " "
40	Rod, Cross Connecting, Compl.		3002-51		1		1	
41	Rod, Front, Compl.		3001-50	1	1	1	1	
42								

NO.	ITEM		REF.	REQUIRED FOR LAYOUT A	B	C	D	USE
43	Rod, Lock, Complete		3003-35	1	1	1	1	
44	Rod, Point Detector, Compl.		3005-4	1	1	1	1	
45	Rod, Throw, Compl.		3002-21	1	1	1	1	
46	Rivets 1/4 X 1-11/16, Rd. Hd.	AAR	10153	As Req.	As Req.	As Req.	As Req.	Pipe Line
47	Spike, Drive, 6" Long	*	21-C-361	13	15	13	17	Items 17,35,52,53,54
48								Tie Straps
49	Stand, Crank, With Center Pin	AAR	10082	1	1	1	1	
50								
51								
52	Strap, Tie		3014-1	1	1	1	1	
53	" "		3014-3	2	1	2	2	
54	" "		3014-5		1			
55								
56	Tang End-Solid Jaw	AAR	109411	1		1		
57								
58	Washer, Strap		3014-2	1	1	2	2	Crank Stand
59	Washer, Steel Spring 3/4 ASA Medium		Coml.	As Req.	As Req.	As Req.	As Req.	Items 1,3,5 & 7
60	" " " 1 " "							Items 2 & 4
61								
62	Wood Screws, 2 in., No. 10 Flat Hd.		Coml.	8	8	8	8	Numerals-Letters.
63								
64								
65								
66								
67								
68								
69								
70								
71								
72								
73								
74								
75								

* Pittsburg Screw & Bolt Corp. or equal.

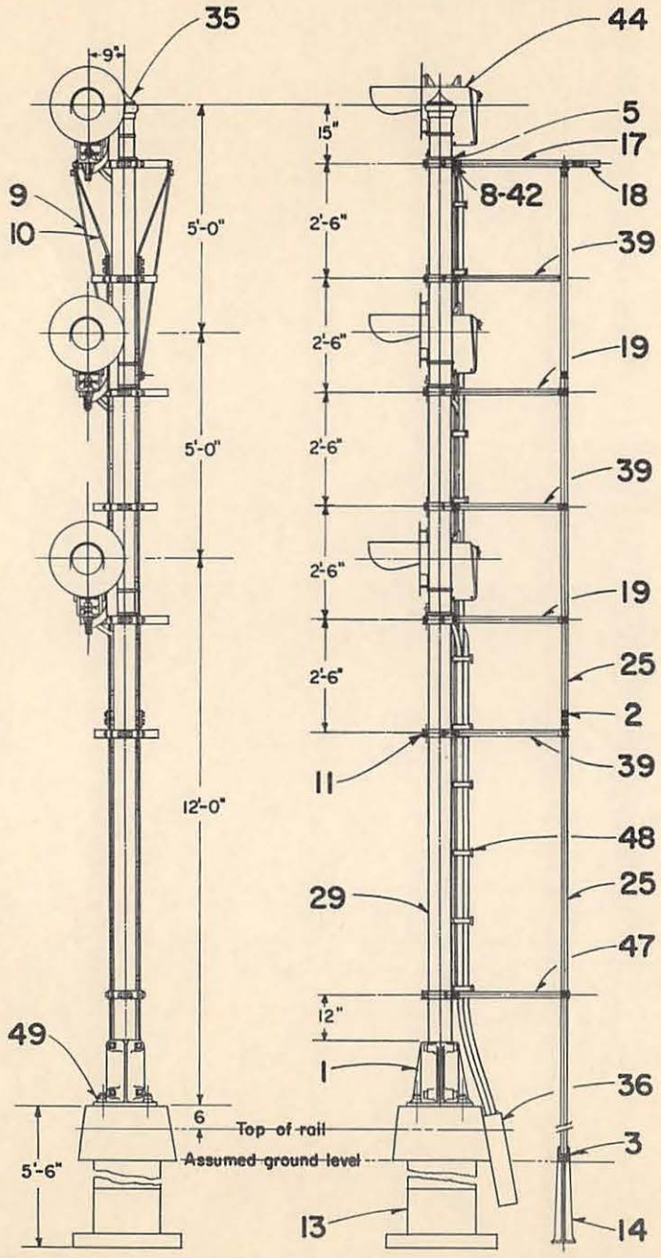
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
MECHANICAL- FACING POINT LOCK

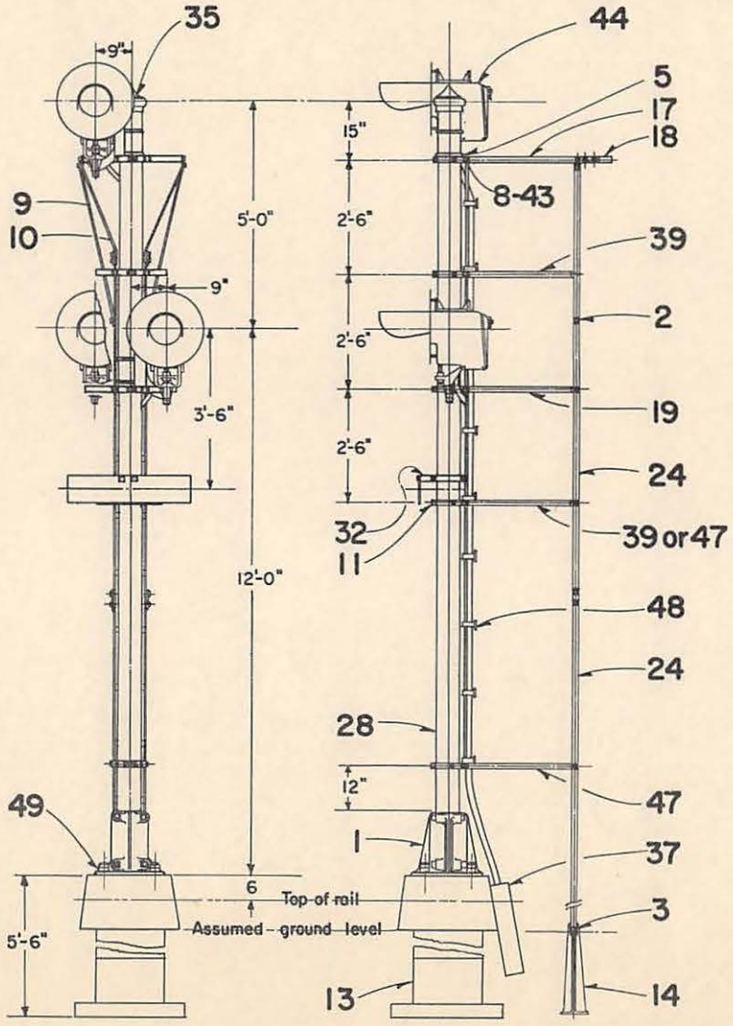
Approved R. S. Rottinell
Chief Signal Engineer

S-3900

ISSUED 9-8-59
SHEET 2 Cont'd. on Sh.

Printed in U. S. A.





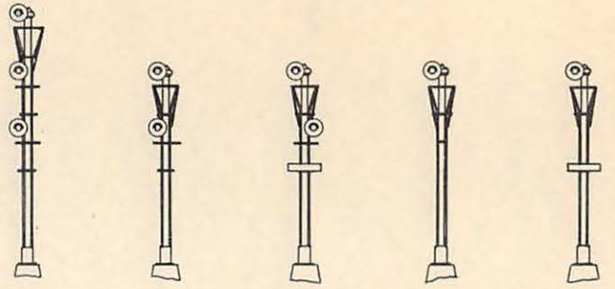


FIG. 1 FIG. 2 FIG. 3 FIG. 4 FIG. 5

TYPICAL ASSEMBLIES

NOTES:

1.- Dimensions shown are typical for all assemblies.

2.- See standard plan for clearance requirements when locating signals.

3.- Cut ladder to length required in field and drill 9/16 in. diameter hole for ladder foundation.

4.- Bolts, Nuts and Threads shall be in accordance with AAR Sig. Section Manual, Part 17.

5.- Protective treatment -
Seal soil pipe with Cold Application Compound, Item 3, Instruction 405.
Hoods and backgrounds of signals to have two coats of Flat Black, Item 46, Instruction 350.
All other exposed metal to have two coats of Aluminum Paint, Instruction 350.

0 1 2 3 4 5 6
Scale in Feet

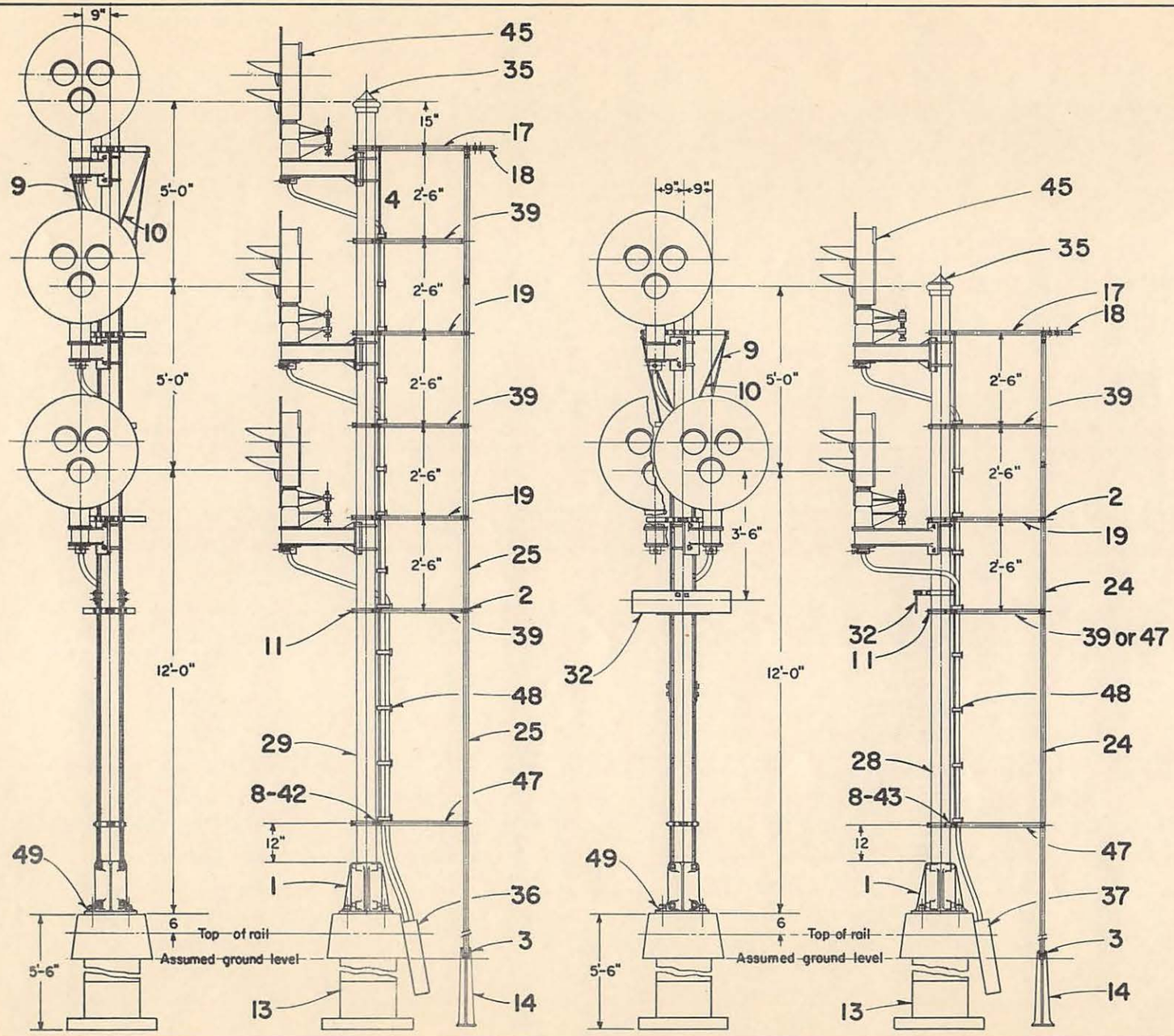
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SIGNAL MOUNTING
GROUND MAST SIGNALS
SEARCHLIGHT TYPE

S-4550

Printed in U.S.A.

ISSUED 4-10-59

SHEET 1 Cont'd on Sh 2



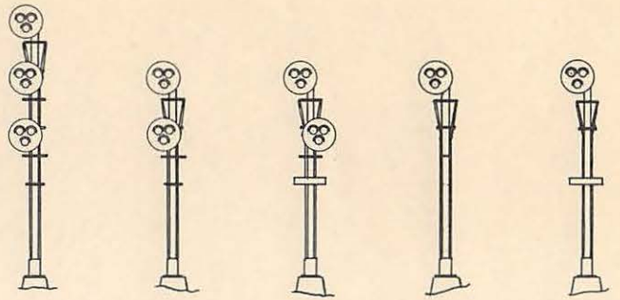


FIG. 10 FIG. 11 FIG. 12 FIG. 13 FIG. 14

TYPICAL ASSEMBLIES

NOTES:

1.- Dimensions shown are typical for all assemblies.

2.- See standard plan for clearance requirements when locating signals.

3.- Cut ladder to length required in field and drill 9/16 in. diameter hole for ladder foundation.

4.- Bolts, Nuts and Threads shall be in accordance with AAR Sig. Section Manual, Part 17.

5.- Protective treatment-
Seal soil pipe with Cold Application Compound, Item 3, Instruction 405.
Hoods and backgrounds of signals to have two coats of Flat Black, Item 46, Instruction 350.
All other exposed metal to have two coats of Aluminum Paint, Instruction 350.

0 1 2 3 4 5 6
Scale in Feet

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SIGNAL MOUNTING
GROUND MAST SIGNALS
DOUBLET TYPE

S-4550

Printed in U. S. A.

ISSUED 4-10-59

SHEET 2 Cont'd on Sh. 3

NO	ITEM		REF.	MATERIAL REQUIRED							REMARKS
				FIG. 1	FIG. 2 or 3	FIG. 4 or 5		FIG. 10	FIG. 11 or 12	FIG. 13 or 14	
1	Base	AAR	14471	1	1	1		1	1	1	
2	* Bolts, 1/2-13X1		Com'l.	32	24	20		32	24	20	Ladder assembly
3	* Bolts, 1/2-13X1-1/4		Com'l.	2	2	2		2	2	2	Ladder foundation
4	Bolts, U	GRS	29953	-	-	-		6	4	2	
5	Bolts, U	GRS	16209-4 Gr. 1	6	4	2		-	-	-	
6											
7											
8	Bracket		4551-3	7	5	4		7	5	4	
9	* Brace, Handrail Extension	GRS	319-219	2	2	2		2	2	2	
10	* Brace, Ladder Extension	GRS	319-226	2	2	2		2	2	2	
11	* Clamps, Complete	GRS	317-41	7	5	4		7	5	4	
12											
13	Foundation	Permacrete or equal	S-2	1	1	1		1	1	1	
14	Foundation, Ladder	AAR	10521	1	1	1		1	1	1	
15											
16											
17	* Handrail, Top Front	GRS	314-142	2	2	2		2	2	2	
18	* Handrail, Top Rear	GRS	314-143	1	1	1		1	1	1	
19	* Handrail, Standard	GRS	314-144	4	2	-		4	2	-	
20											
21											
22											
23											
24	* Ladder Section	GRS	312-125 Gr. 4	-	2	2		-	2	2	
25	* Ladder Section	"	312-125 Gr. 5	2	-	-		2	-	-	
26											
27											
28	Mast, Standard 5 in. W. I. Pipe. Length 17'± 1"		Coml.	-	1	1		-	1	1	
29	Mast, Standard 5 in. W. I. Pipe Length 22'± 2"		Coml.	1	-	-		1	-	-	
30											
31											
32	Number Plate,		2245-2	-	As Req.	As Req.		-	As Req.	As Req.	Specify Signal Number.
33											
34											
35	Pinnacle	AAR	1245-1	1	1	1		1	1	1	
36	Pipe, Soil		2440-4	1	-	-		1	-	-	
37	Pipe, Soil		2440-3	-	1	1		-	1	1	
38											
39	* Platform	GRS	313-97	3	2	1		3	2	1	
40											
41											
42	Rod, 1/2 In. Iron		4551-1	1	-	-		1	-	-	
43	Rod, 1/2 In. Iron		4551-2	-	1	1		-	1	1	
44	Signals, Searchlight Type, Compl. with mtg. bracket.	GRS	Type SA or SC	3	2	1		-	-	-	Order by GRS drawing number as required.
45	Signals, Doublet Type " " " "	GRS	Type G	-	-	-		3	2	1	Order by GRS drawing number as required.
46											
47	* Stay, Ladder	GRS	315-120	2	2	4		2	2	4	
48	Straps, Cabling	Raco	611	As Req.	As Req.	As Req.		As Req.	As Req.	As Req.	
49	Washer	GRS	47497	4	4	4		4	4	4	
50											

* Ladder assemblies may be ordered by specifying Ladder Complete, 4550 Fig.___ (Specify figure number which applies.) Items indicated by asterisk will be furnished.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SIGNAL MOUNTING
GROUND MAST SIGNALS

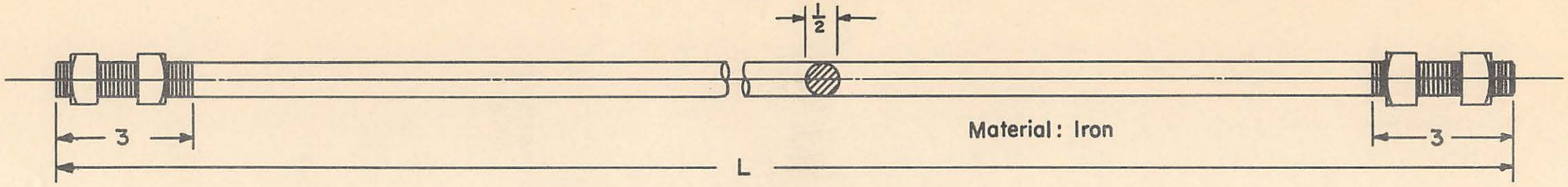
Approved L. J. Battinelli
Chief Signal Engineer

S-4550

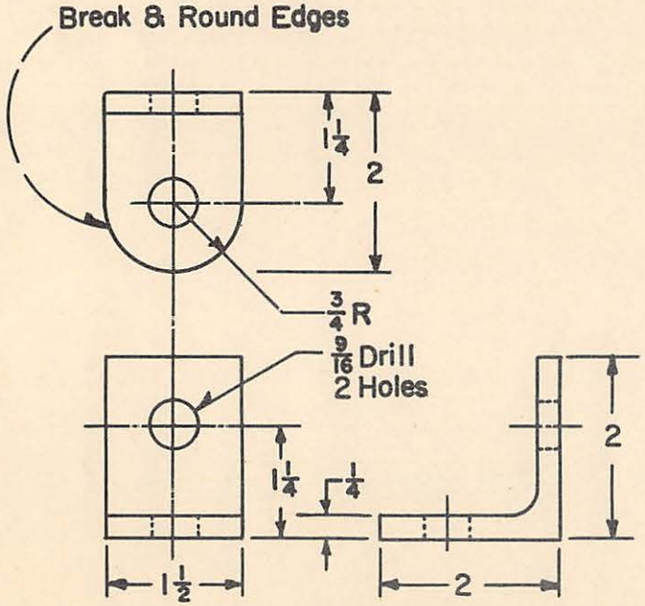
ISSUED 4-10-59

SHEET 3 Cont'd on Sh_____

Printed in U.S.A.



4551-1 ROD, L = 18'-8"
4551-2 ROD, L = 13'-8"



4551-3 BRACKET
MATERIAL: STRUCTURAL STEEL ANGLE

0 1 2 3
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
CABLE SUPPORT.
GROUND MAST SIGNALS

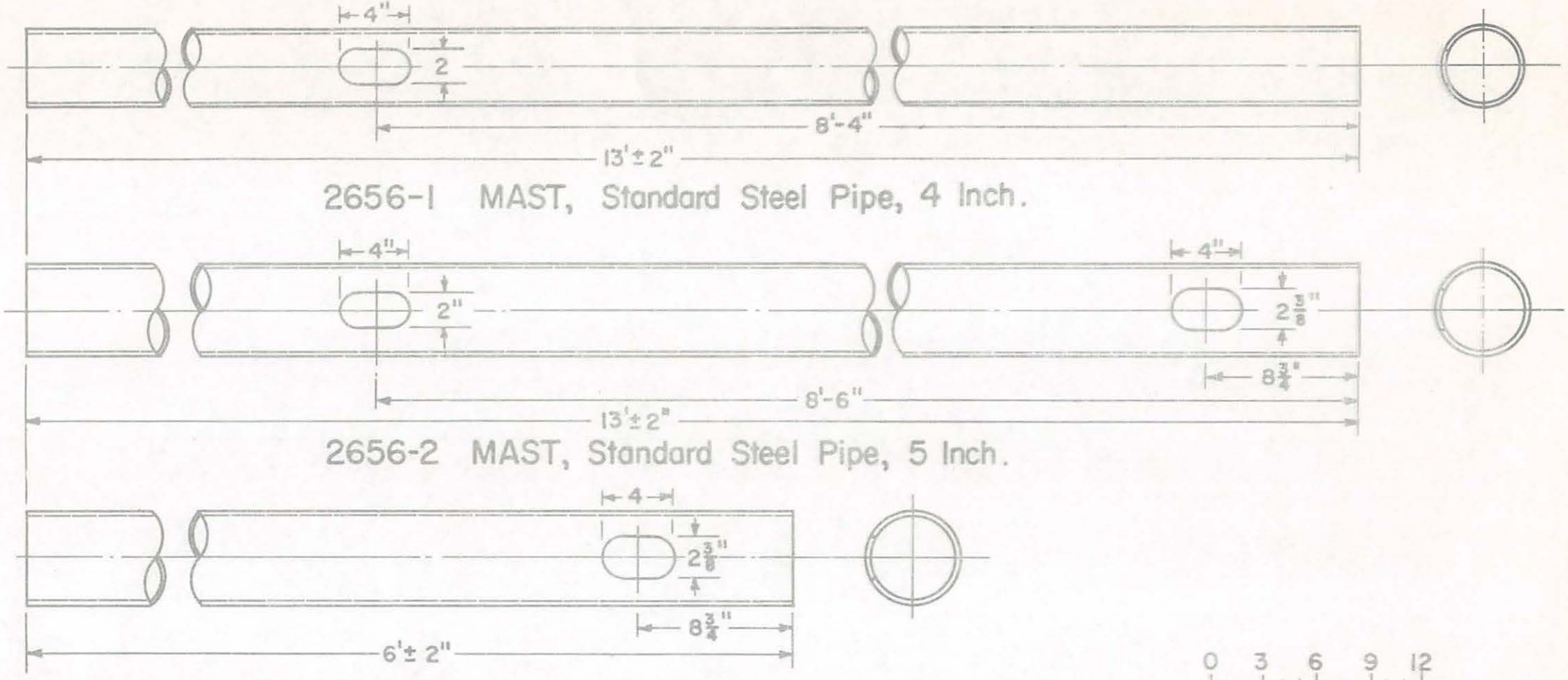
Approved L. S. Bottinelli
Chief Signal Engineer

S-4551

Printed in U.S.A.

ISSUED 4-10-59

SHEET 1 Cont'd on Sh



2656-1 MAST, Standard Steel Pipe, 4 Inch.

2656-2 MAST, Standard Steel Pipe, 5 Inch.

2656-3 MAST, Standard Steel Pipe, 5 Inch.

0 3 6 9 12
Scale in inches

NOTE:
Protective treatment-Primer, Item 31, Instruction 350.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
MASTS
HIGHWAY CROSSING SIGNAL

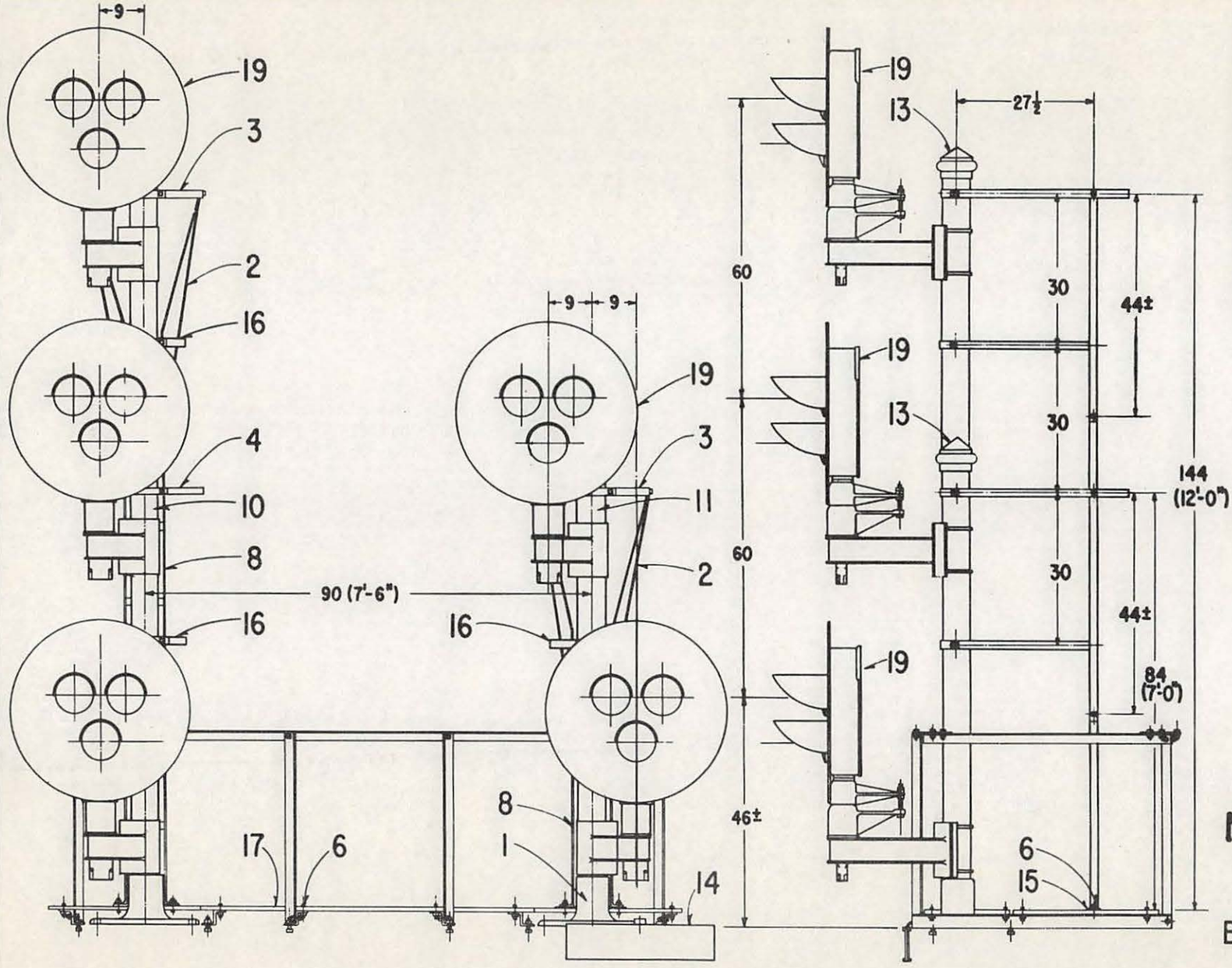
Approved L. B. Pottinelli
Chief Signal Engineer

S-2656

Printed in U.S.A.

ISSUED 8-29-59

SHEET 1 Con'td on Sh---



	MATERIAL REQUIREMENTS-SPECIFY QUANTITY REQUIRED		
1	Base	GRS 31603-1	
2	Braces	AAR 13629, Modified.	(Without hand.)
3	Handrail, Top	AAR 13631, Modified.	Dimensions as indicated.
4	"	AAR 13636, "	" " "
5			
6	J-Bolts	4565-12	
7			
8	Ladder	AAR 13628 Modified.	Dimensions as indicated.
9			
10	Mast- 3 Arm	5 in. W. I. Pipe	L = 12'-6" ± 1"
11	" - 2 Arm	" " "	L = 7'-6" ± 1"
12	- Dummy		L = 7'-6" ± 1" (Not shown)
13	Pinnacle	AAR 12451	
14	Plate, Number	2245	Specify Requirements
15	Plate, Ladder Footing	4565-10	
16	Platform, Compl.	AAR 16197	
17	" "	4565-1	
18			
19	Signals, Type G	See current GRS catalogue	
20			

NOTES:

Protective treatment, Instruction 350.
All parts to have one coat of Primer, Item 31.
Signal hoods and face of background to have one additional coat of Black Enamel, Item 46 (Non-reflecting).
All other surfaces to have two additional coats of Aluminum Paint, Item 53.

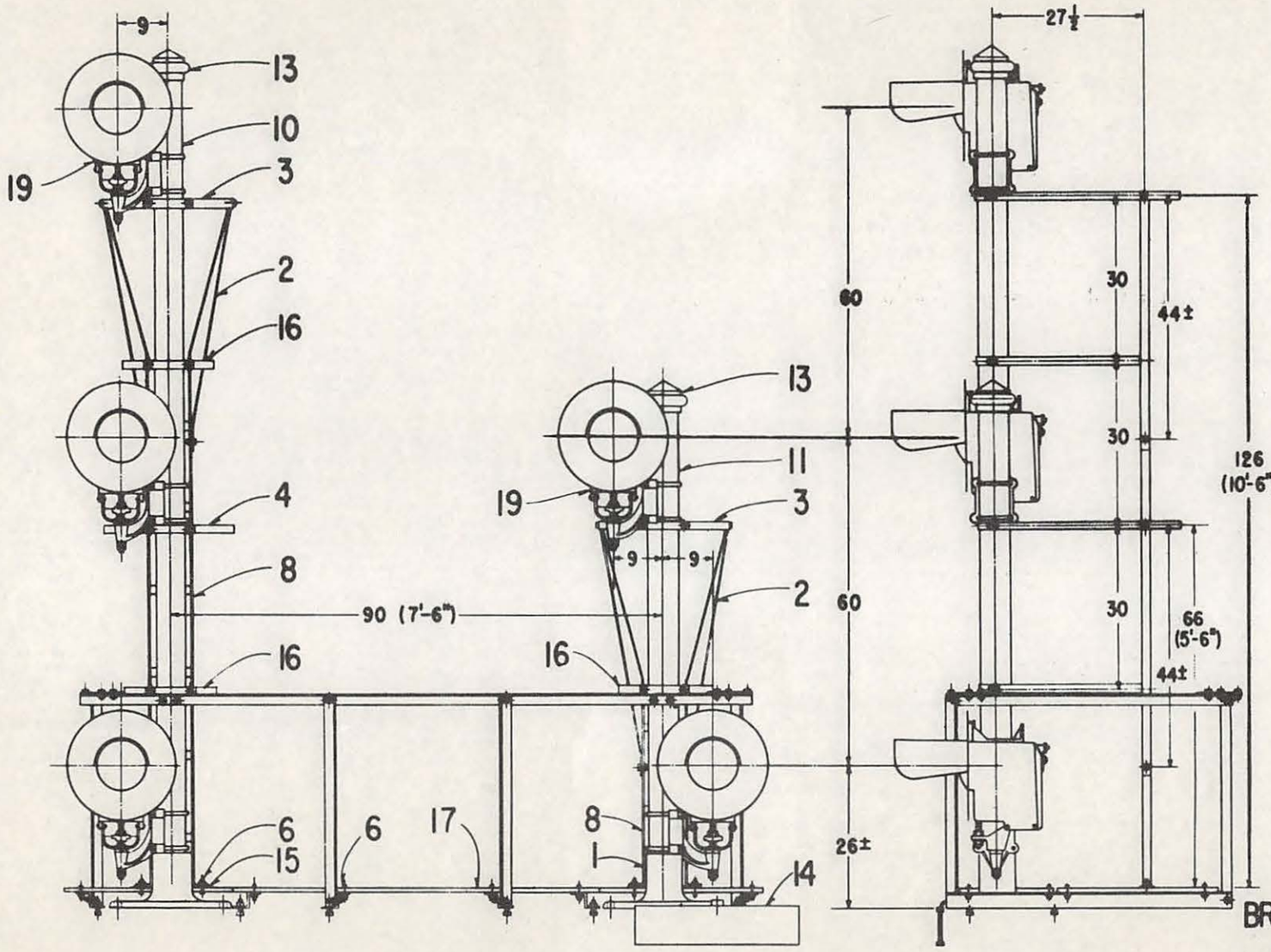
0 12 24 36 48
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SIGNAL MOUNTING
BRACKET MAST WITH TYPE G SIGNALS

S-4560

Printed in U. S. A.

ISSUED 2-17-59
SHEET 1 Cont'd. on Sh. 2



MATERIAL REQUIREMENTS - SPECIFY QUANTITY REQUIRED		
1	Base GRS 31603-1	
2	Brace AAR 13629 Modified.	(Without bend)
3	Handrail AAR 13631 "	Dimensions as indicated.
4	" AAR 13636 "	" " "
5		
6	J-Bolts 4565-12	
7		
8	Ladder AAR 13628 Modified.	Dimensions as indicated.
9		
10	Mast - 3 Arm 5 in. W.I. Pipe	L = 12'-6" ± 1"
11	" - 2 Arm " " "	L = 7'-6" ± 1"
12	" - Dummy	L = 7'-6" ± 1" (Not shown)
13	Pinnacle AAR 12451	
14	Plate, Number 2245	Specify Requirements
15	Plate, Ladder Footing 4565-10	
16	Platform, Compl. AAR 16197	
17	" " 4565-1	
18		
19	Signals, Type SA or SC	See current GRS catalogue.
20		

NOTES:

Protective treatment, Instruction 350.
All parts to have one coat of Primer, Item 31.
Signal hood and face of background to have one additional coat of Black Enamel, Item 46. (Non-reflecting).
All other surfaces to have two additional coats of Aluminum Paint Item 53.

0 12 24 36 48
All dimensions given in inches.

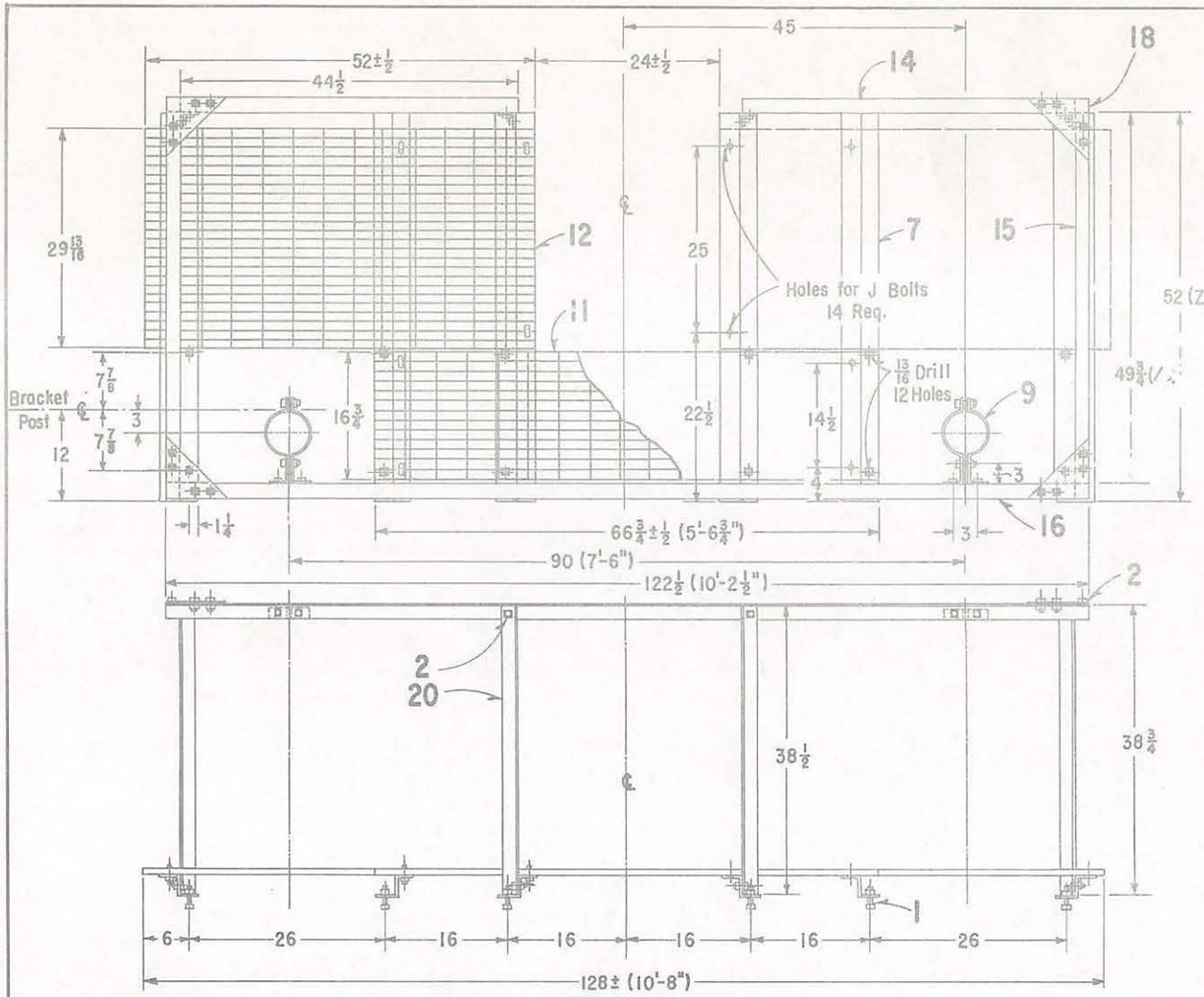
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SIGNAL MOUNTING
BRACKET MAST WITH SEARCHLIGHT TYPE SIGNALS

Approved L. E. Bottinelli
Chief Signal Engineer

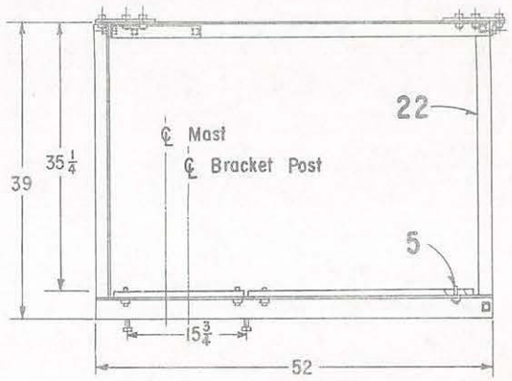
S-4560

Printed in U. S. A.

ISSUED 2-17-59
SHEET 2 Cont'd. on Sh.



NO.	ITEM	REQ.	USE
1	Bolts 3/4-10 X 2 Sq. Hd. & Nut.	12	Zs to Bracket Post
2	" 1/2-13 X 1-1/2 Sq. Hd. & Nut.	30	
3			
4			
5	Bolts, J 4565-12	14	Fastening for Grating
6			
7	Beam, Support 3 X 2-3/4 X 1/4 X 52 Zs	6	
8			
9	Clamp 4565-11	2	Handrail at Sig. Mast
10			
11	Grating, Irving 16-3/4 X 66-3/4 ± 1/2 Irving Type AA, Bars 3/4 X 1/8	1	Front
12	" " 29-13/16 X 52 ± 1/2 " " " " " "	2	Rear
13			
14	Handrail 2 X 2 X 1/4 X 44-1/2 ∠	2	Rear
15	" 2 X 2 X 1/4 X 49-3/4 ∠	2	Sides
16	" 2 X 2 X 1/4 X 10-2-1/2 ∠	1	Front
17			
18	Plate, Corner 8 X 8 X 1/8 See Detail	4	
19			
20	Post 2 X 2 X 1/4 X 38-1/2 ∠	2	Front Center
21			
22	Post 2 X 2 X 1/4 X 38-3/4 ∠	4	Rear
23			
24			
25	Washer, Lock Med. .171 X .125 X 1/2	30	
26	" " " .234 X .188 X 3/4	12	



See DETAIL-TYPICAL DRILLING, Sh. 2

NOTES:

1 - Platform to be made at Signal Dept. shop, Elkhart, Ind.
2 - Bolts, Nuts & Threads - AAR specifications, Manual Part 17.
3 - Test assembly to be made at shop before shipment.
4 - Drill all holes 9/16 diam. unless otherwise noted.
5 - Break and round all sharp edges. Round ends of posts 1/4 in. where necessary to seat against handrails or beams.
6 - Protective treatment - Instruction 350:
Primer, Item 31 - One shop coat, all parts.
Aluminum, Item 53 - Two field coats at assembly.

4565-1 - PLATFORM, COMPLETE

0 6 12 24 36 48

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
PLATFORM
FOR BRACKET POST MOUNTING ASSEMBLY

S-4565

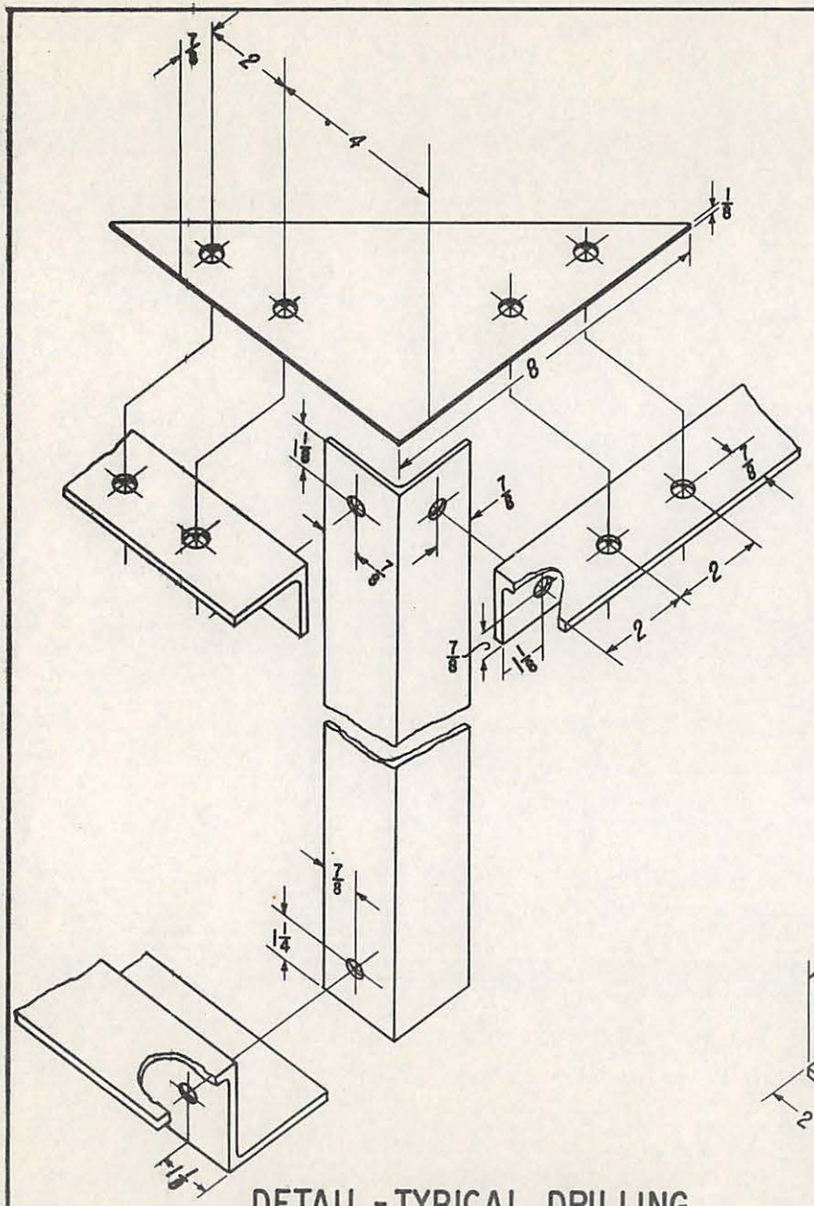
Printed in U. S. A.

ISSUED 9-29-59

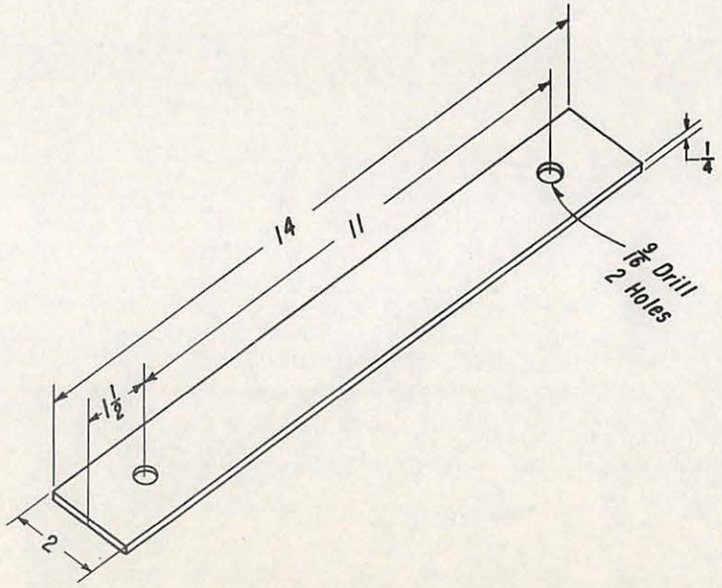
SHEET 1 Cont'd on Sh. 2

NOTES:

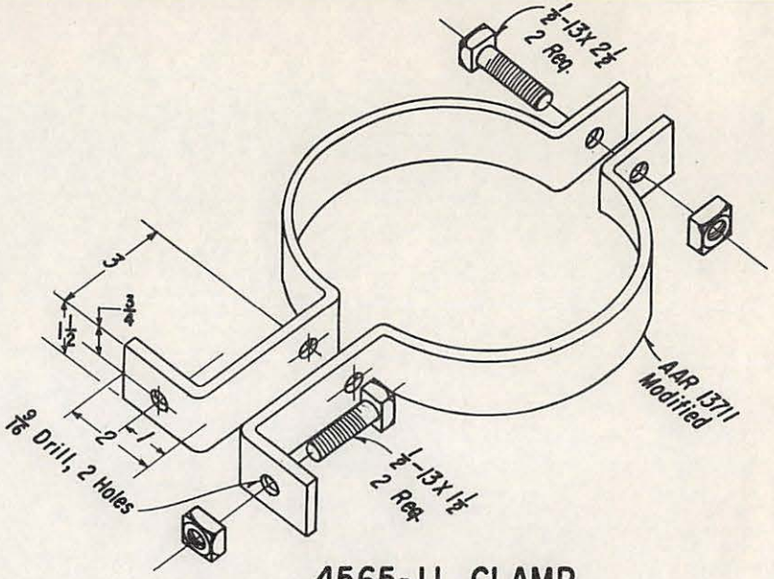
Bolts, Nuts and Threads shall be in accordance with AAR specifications Manual Part 17.
Protective treatment - Primer, Item 31, Instruction 350.



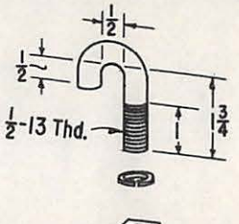
DETAIL - TYPICAL DRILLING
DIAMETER OF ALL HOLES 9/16 INCHES
STRUCTURAL STEEL ANGLES



4565-10 PLATE, LADDER FOOTING
STRUCTURAL STEEL PLATE



4565-11 CLAMP
COMPL. WITH 4 BOLTS & NUTS



4565-12 J-BOLT
COMPL. WITH NUT & LOCK WASHER

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
PLATFORM
FOR BRACKET POST MOUNTING
DETAILS

Approved L. J. Bottinelli
Chief Signal Engineer

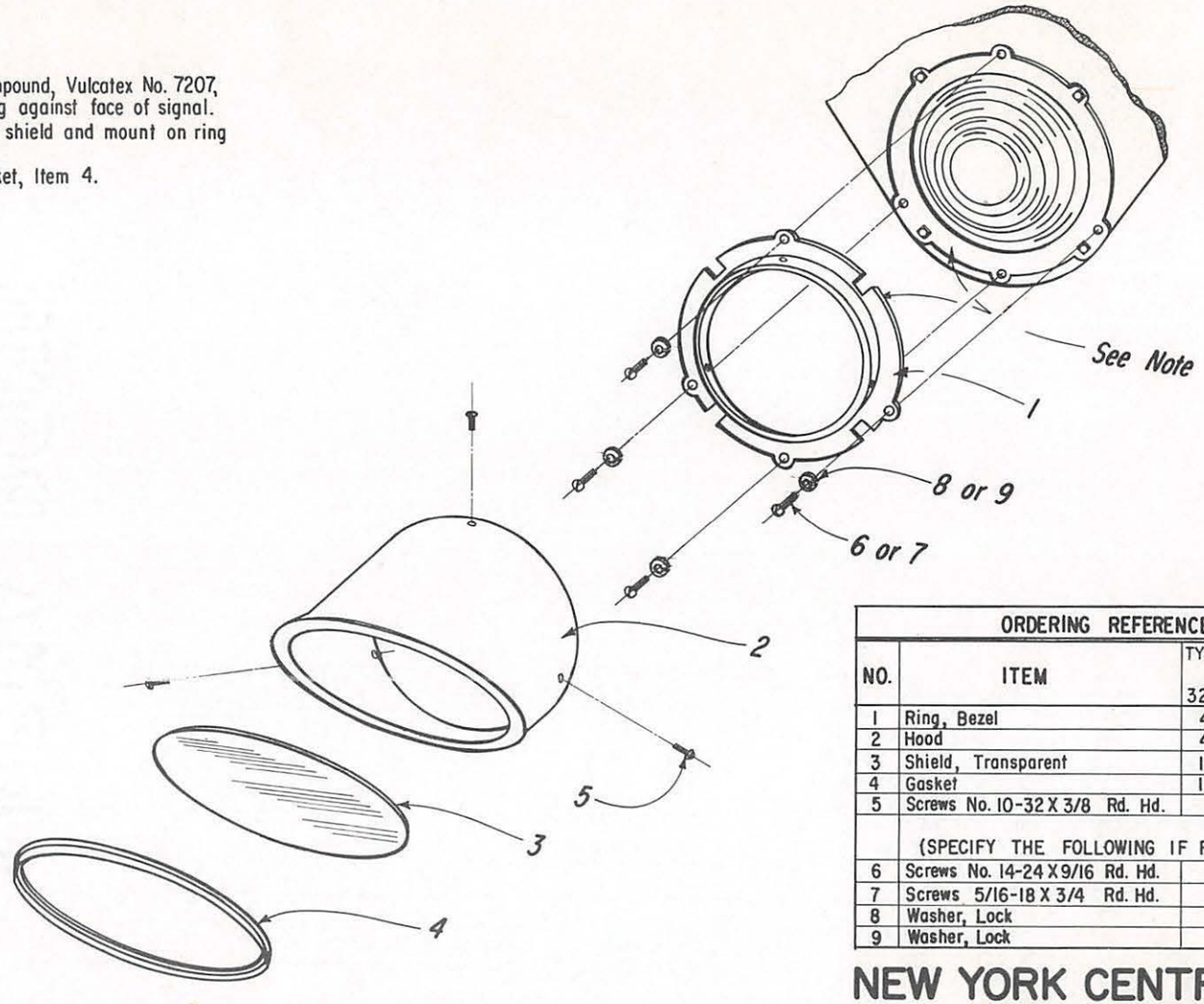
S-4565

Printed in U. S. A.

ISSUED 2-17-59
SHEET 2 Cont'd on Sh.

NOTE :

ASSEMBLY- Remove existing hood and ring. Apply sealing compound, Vulcatex No. 7207, to surface of Bezel Ring, Item 1, before mounting against face of signal. After securing ring on the signal, assemble snow shield and mount on ring using screws provided, Item 5.
Transparent shield is secured in place using gasket, Item 4.



ORDERING REFERENCES - G. R. S. CO.				
NO.	ITEM	TYPE D OR G SIGNAL 32626-5 Gr. 2	TYPE SA OR SC SIGNAL 32626-5 Gr. 1	REQ.
1	Ring, Bezel	43983-97	43983-96	1
2	Hood	49127-71	49127-71	1
3	Shield, Transparent	15659-3	15659-3	1
4	Gasket	13014-335	13014-335	1
5	Screws No. 10-32 X 3/8 Rd. Hd.	3044-5	3044-5	3
	(SPECIFY THE FOLLOWING IF REQUIRED)			
6	Screws No. 14-24 X 9/16 Rd. Hd.	0649		4
7	Screws 5/16-18 X 3/4 Rd. Hd.		33287-6	
8	Washer, Lock	0510		4
9	Washer, Lock		0623-1	

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SNOW SHIELD HOOD
FOR COLOR LIGHT SIGNALS

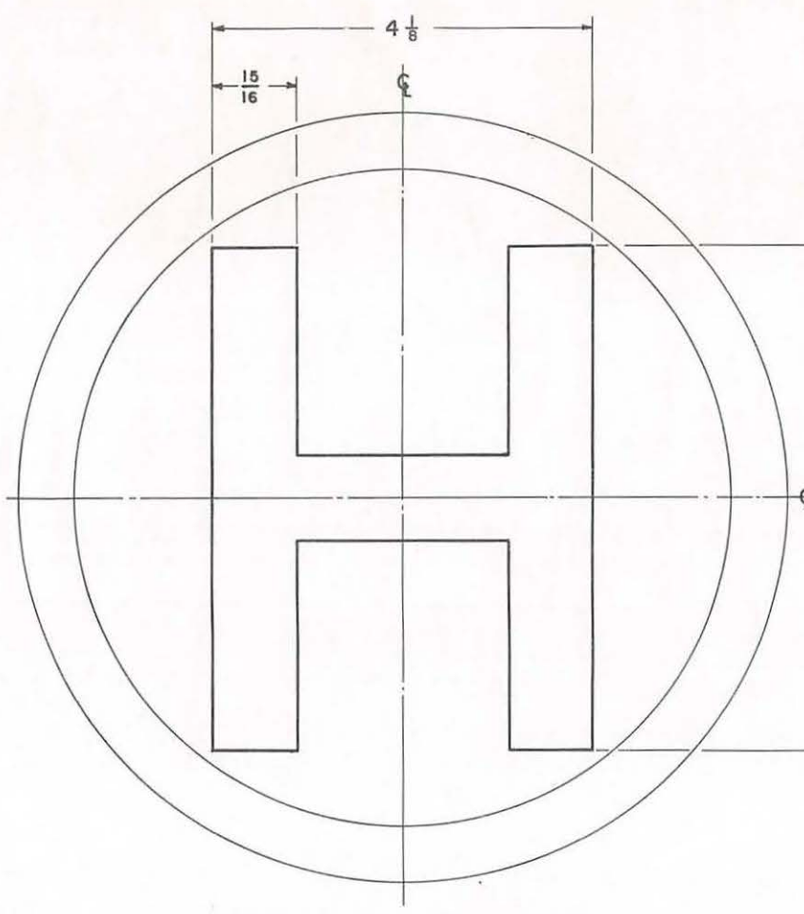
Approved H. Abcott
Chief Signal Engineer

S-4830

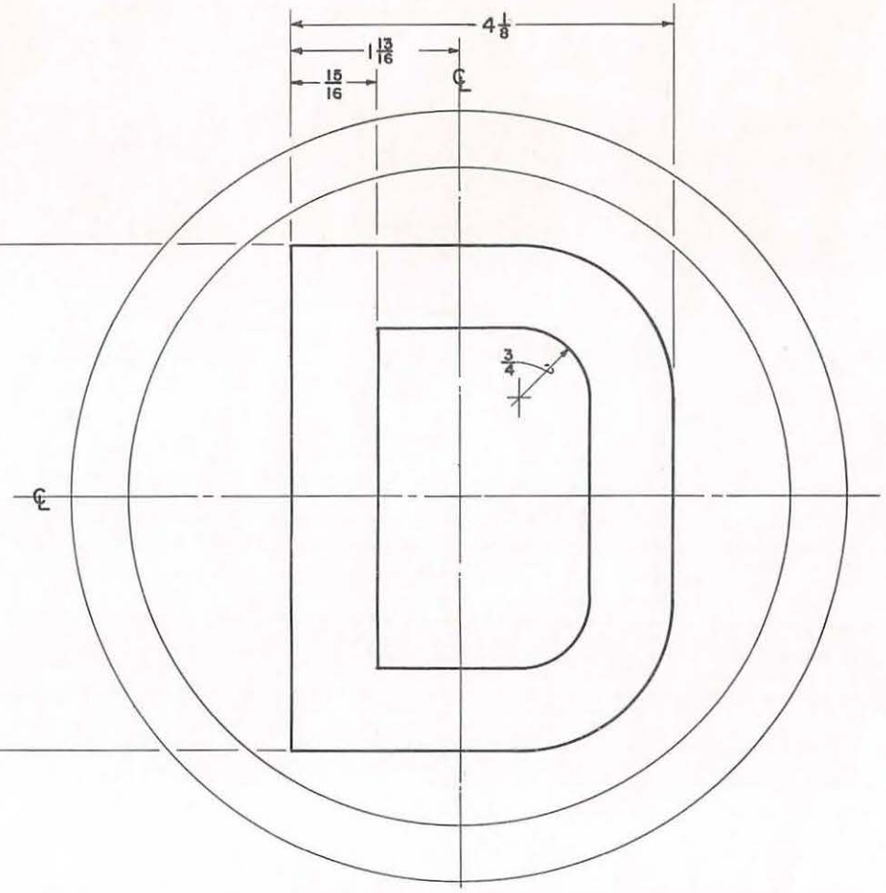
Printed in U. S. A.

ISSUED 12-23-57

SHEET 1 Cont'd. on Sh.



4831-1, LENS, SPECIAL
For Hot Box Detector Signal



4831-2, LENS, SPECIAL
For Dragging Equipment Detector Signal

Notes:

1. - Letters to be cut from non-reflecting black Scotchcal No. 605, (Minnesota Mining & Manufacturing Co.) or equal.
2. - Proportions of letters, as shown, to be in accord with N. Y. C. S. Plan J-2B.
3. - Letters to be mounted on standard, clear, 8-3/8 inch outer roundel for GRS Type D signal with lunar white inner lens.

0 1 2 3
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SPECIAL SIGNAL LENSES

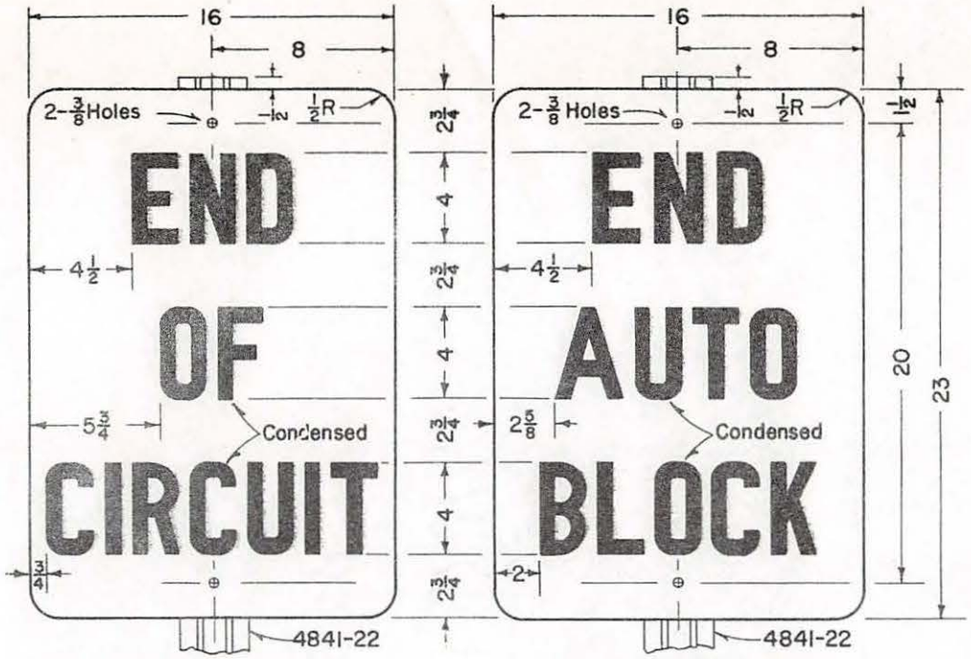
Approved L. S. Gottinelli
Chief Signal Engineer

S-4831

Printed in U.S.A.

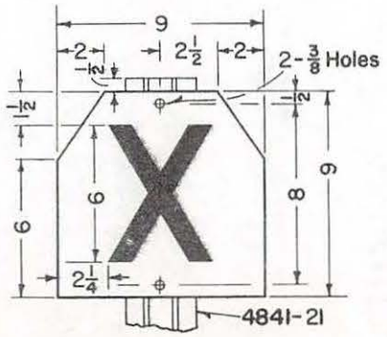
ISSUED 5-21-59

SHEET 1 Cont'd on Sh.



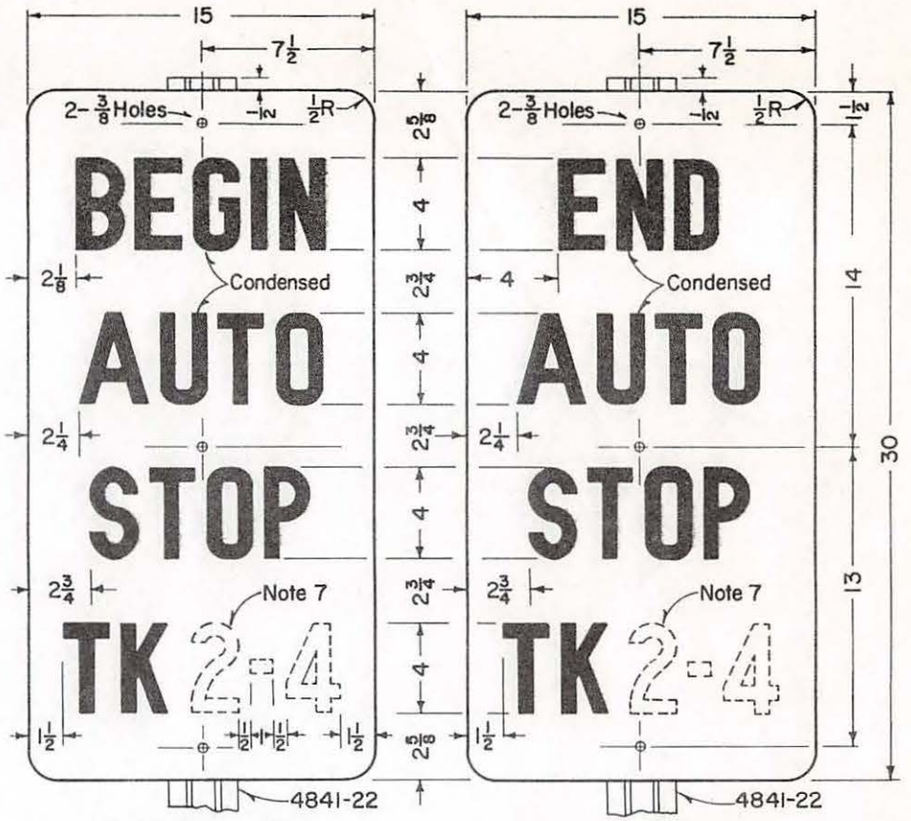
4841-1 SIGN ONLY
4841-11 SIGN COMPL. with Post
Note 8

4841-2 SIGN ONLY
4841-12 SIGN COMPL. with Post



4841-1A SIGN ONLY
4841-11A SIGN COMPL. with Post
Note 8

NOTES:
1. Spacing between letters shall be one half inch.
2. See Roadway Standard plan J-28 for proportion of letters and numerals.
3. Material for all sign plates shall be .081"-6061-T6 aluminum.
4. Face of sign plate shall be covered with No. 2270 wide angle Silver Flat-Top Scotchlite. (Minn., Mining & Mfg.)
5. Letters and numerals shall be No. 605 Black Scotchcal. (Minn., Mining & Mfg.)
6. Signs shall be at right angles to track.
7. Indicate numerals desired on signs 4841-3 & 4.
8. Sign 4841-1A to be used in place of 4841-1 between tracks where track centers are less than eighteen feet.
9. Necessary bolts, nuts and washers to be furnished with each sign.



4841-3 SIGN ONLY
4841-13 SIGN COMPL. with Post

4841-4 SIGN ONLY
4841-14 SIGN COMPL. with Post

0 3 6 9 12
All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SIGNS

S-4841

Printed in U.S.A.

ISSUED 12-2-57

SHEET 1 Cont'd on Sh 2

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT

SIGS

S-484-1

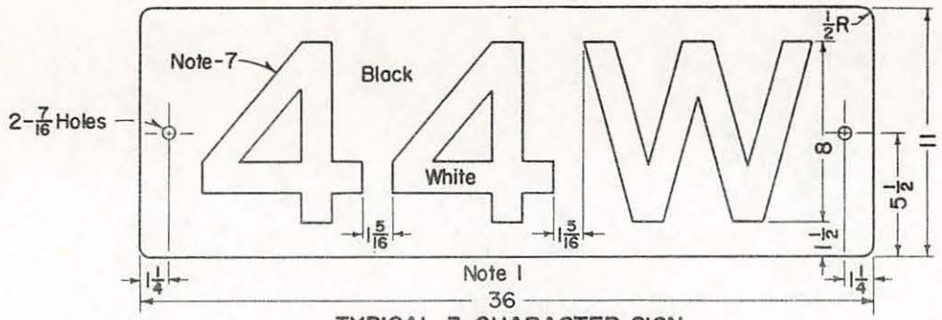
BEGIN AUTO BLOCK

END AUTO BLOCK

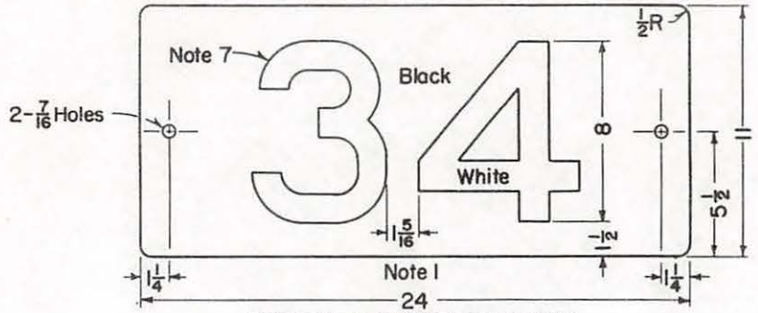
TK 2105

END AUTO BLOCK

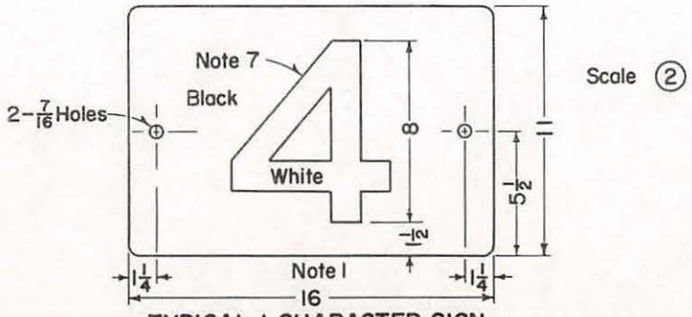
CIRCUIT TO



TYPICAL 3 CHARACTER SIGN
4841-33



TYPICAL 2 CHARACTER SIGN
4841-32

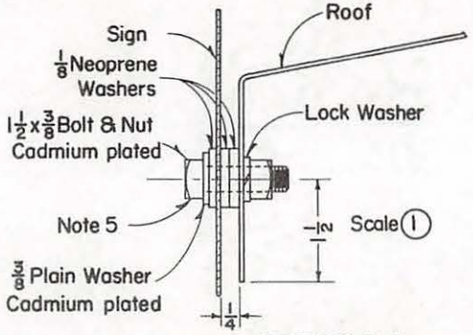


TYPICAL 1 CHARACTER SIGN
4841-31

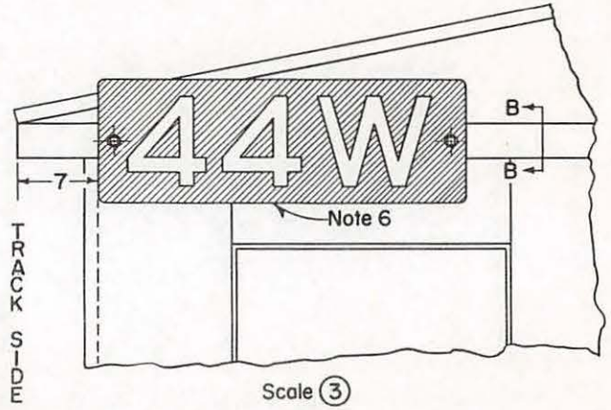
Scale (2)

NOTES:

1. Specify numerals and (or) letters required for each sign.
2. Material for all sign plates shall be .081"-6061-T6 aluminum.
3. Face of sign to be covered with Minn. Mining & Mfg. No. 605 Black Scotchcal.
4. Letters and numerals to be Minn. Mining & Mfg. No. 2270 wide angle Silver Flat-Top Scotchlite.
5. Necessary nuts, bolts and washers to be furnished with each sign.
6. Signs to be mounted on both ends of house.
7. See Roadway Standard plan J-2B for proportion of letters and numerals.



SECTION B-B



Scales and all dimensions given in inches

(1) 0 1 2 3 4

(2) 0 3 6 12

(3) 0 6 12 24

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

SIGNS

IDENTIFICATION

REMOTE CONTROL LOCATIONS

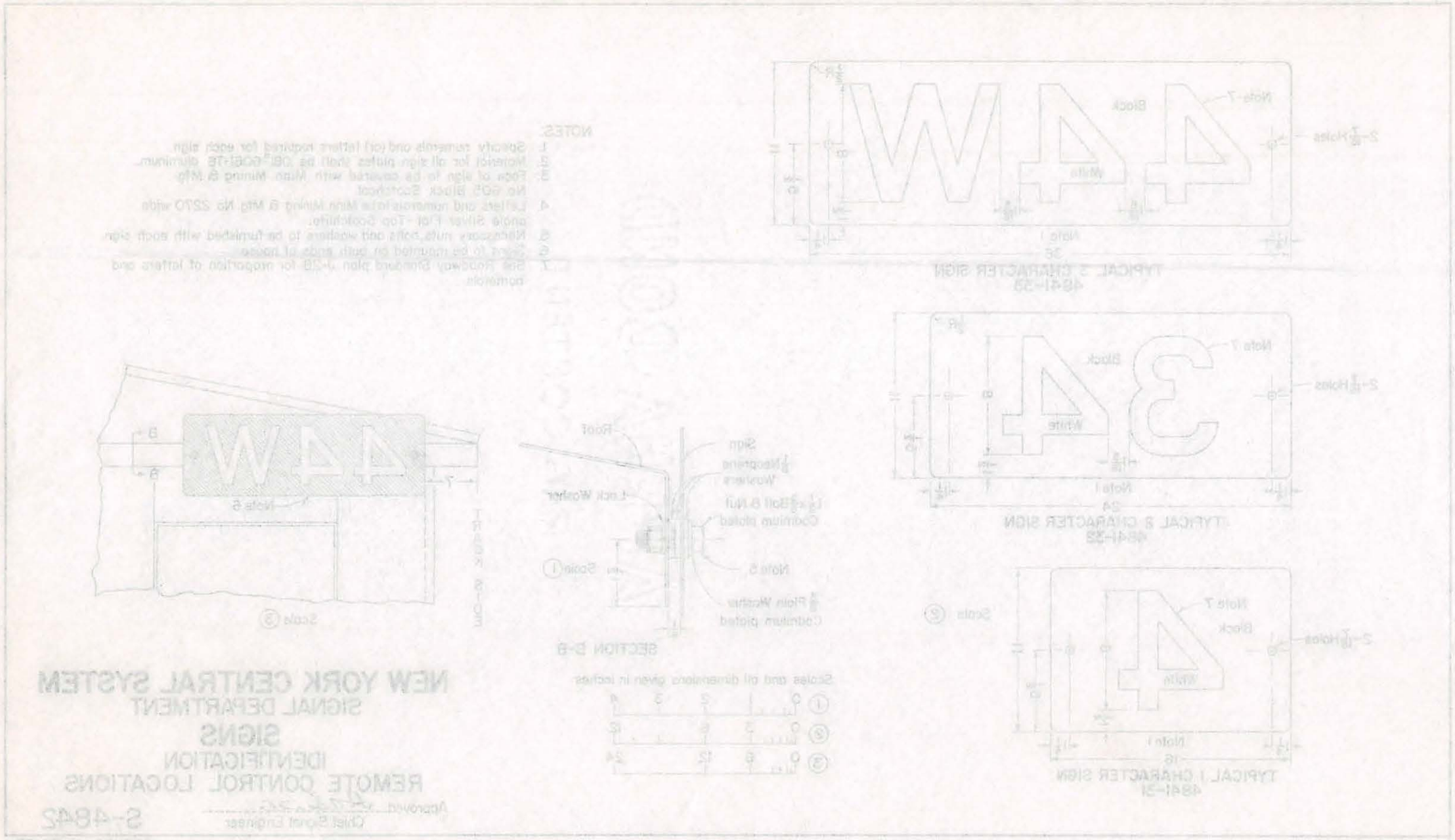
Approved Habach
Chief Signal Engineer

S-4842

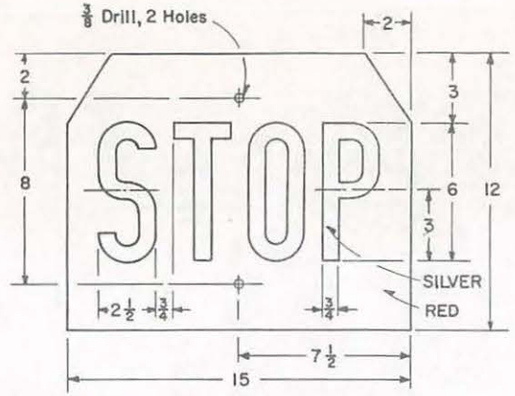
Printed in U.S.A.

ISSUED 11-29-57

SHEET 1 Cont'd on Sh



NOTES:
1. Specify numerals and (or) letters required for each sign.
2. Material for all sign plates shall be .081" 6061-T6 aluminum.
3. Face of sign to be covered with Minn. Mining & Mfg. No. 605 Black Scotchcal.
4. Letters and numerals to be Minn. Mining & Mfg. No. 2270 wide angle Silver Flat-Top Scotchlite.
5. Necessary nuts, bolts and washers to be furnished with each sign.
6. Signs to be mounted on both ends of house.
7. See Roadway Standard plan J-28 for proportion of letters and numerals.
Block
White
Note 7
Note 1
TYPICAL 3 CHARACTER SIGN
4841-33
TYPICAL 2 CHARACTER SIGN
4841-32
TYPICAL 1 CHARACTER SIGN
4841-31
Scale (2)
Scale (3)
Scale (1)
Scales and all dimensions given in inches
Roof
Sign
Lock Washer
Note 5
SECTION B-B
TRACK SIDE
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SIGNS
IDENTIFICATION
REMOTE CONTROL LOCATIONS
Approved
Chief Signal Engineer
S-4842
ISSUED 11-29-57
SHEET 1 Cont'd on Sht
Printed in U.S.A.

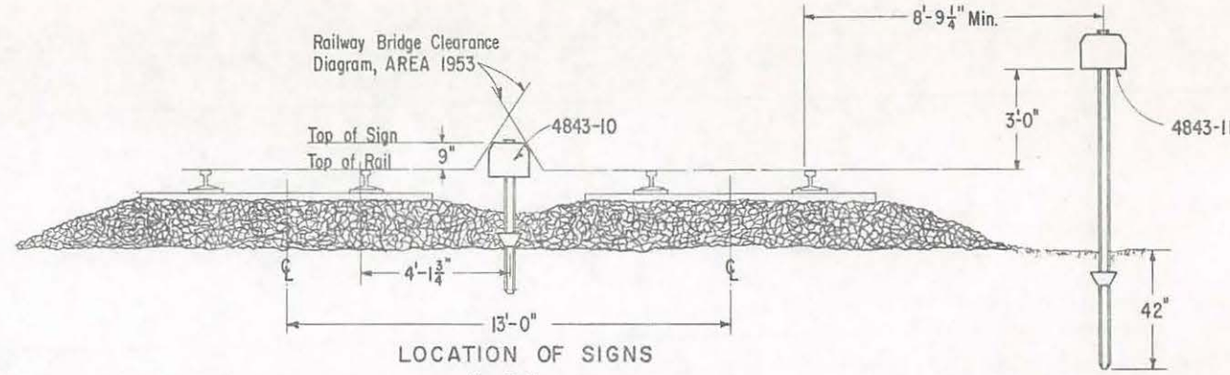


4843-1, STOP SIGN ONLY.
ALUMINUM 0.125-6061-T6

4843-10, STOP SIGN COMPLETE.
WITH POST 4841-21

4843-11, STOP SIGN COMPLETE.
WITH POST 4841-22

0 6 12
All dimensions given in inches.



LOCATION OF SIGNS
No Scale

NOTES:

1.- Face of sign shall be "Scotchlite" No. 712 Red Transparent Color screened on No. 2270 Silver Wide Angle, Flat Top "Scotchlite" Reflective Sheeting.
2.- Signs shall be at right angle to track.
3.- Bolts and Nuts to be cadmium plated and in accordance with AAR Spec., Manual Part 17.
Washers to be cadmium plated, SAE standard.
4.- Protective treatment, Instruction 350.
Bolt heads and washers appearing on face of sign, Primer, Item 31, Red Enamel, Item 42. Paint before assembly.
Other metal surfaces, except aluminum, Primer, Item 31, Paint, Item 53.

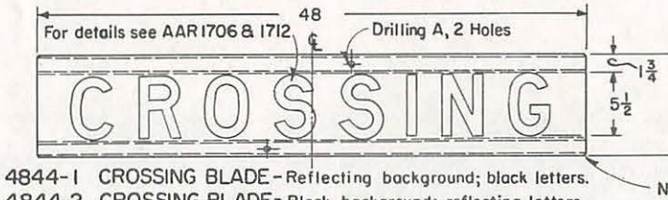
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SIGNS
STOP SIGN - PERMANENT

Approved L. J. Bottinelli
Chief Signal Engineer

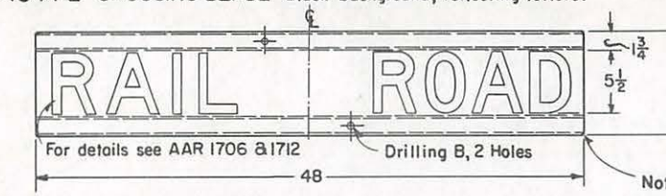
S-4843

Printed in U. S. A.

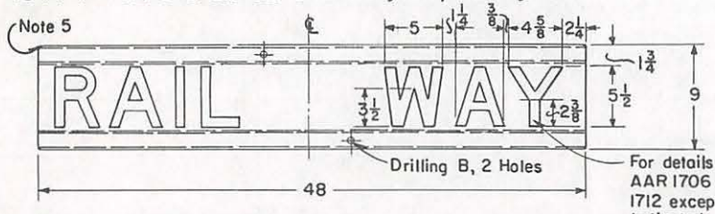
ISSUED 8-14-59
SHEET 1 Cont'd. on Sh



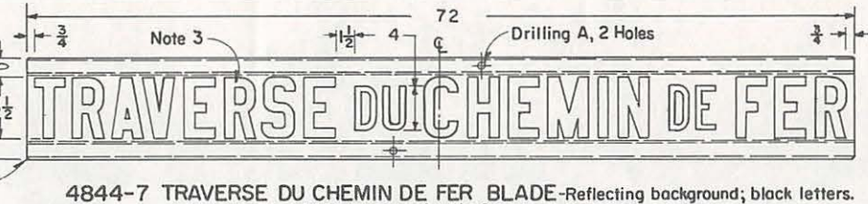
4844-1 CROSSING BLADE - Reflecting background; black letters.
4844-2 CROSSING BLADE - Black background; reflecting letters.



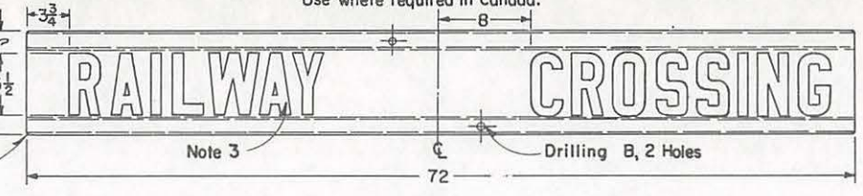
4844-3 RAILROAD BLADE - Reflecting background; black letters
4844-4 RAILROAD BLADE - Black background; reflecting letters.



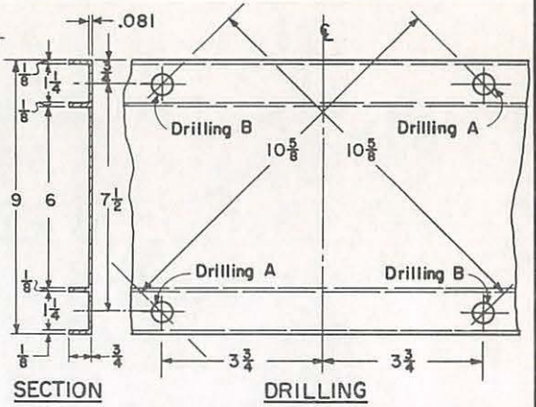
4844-5 RAILWAY BLADE — Reflecting background; black letters.
Use where required in Canada.



4844-7 TRAVERSE DU CHEMIN DE FER BLADE - Reflecting background; black letters.
Use where required in Canada.



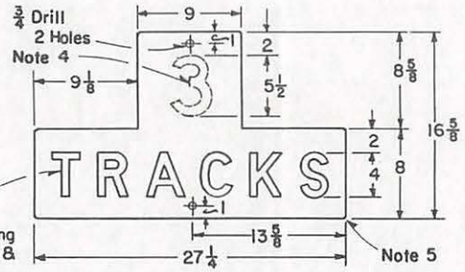
4844-9 RAILWAY CROSSING BLADE - Reflecting background; black letters.
Use where required in Canada.



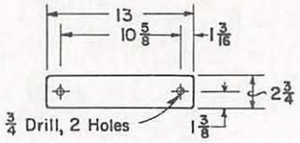
2 HOLES, 3/4 IN. DIA., IN EACH BLADE AS SHOWN

DETAILS (NO SCALE)

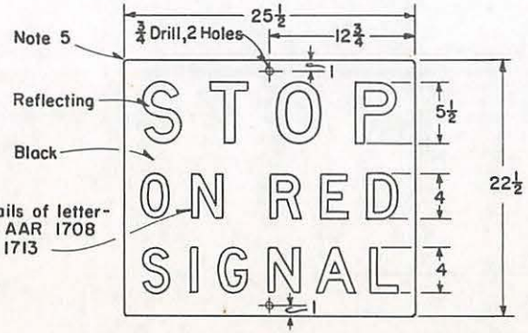
CROSSING BLADES
EXTRUDED ALUMINUM 6063-T6



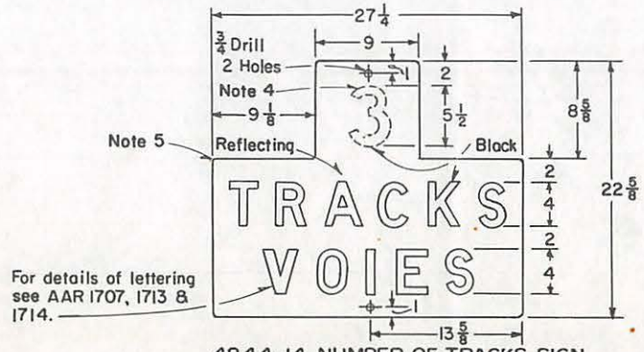
4844-10 NUMBER OF TRACKS SIGN - Reflecting letters, black background.
4844-11 NUMBER OF TRACKS SIGN - Reflecting background, black letters.
For "1 TRACK" sign the word "TRACK" shall be centered.



4844-13 BACKER PLATE
.081-6061 Aluminum sheet.



4844-12 STOP ON RED SIGNAL SIGN



4844-14 NUMBER OF TRACKS SIGN
Use where required in Canada, for more than one track only.

NOTES:

1 - Where Black is indicated use No. 605 Black Scotchcal (Minn. Mining & Mfg. Co.) or equal.

2 - Where Reflecting is indicated, use No. 2270 wide angle Silver Flat-Top Scotchlite (Minn. Mining & Mfg. Co.) or equal.

3 - Condensed lettering to conform to N.Y.C.S. Plan J-2B. Nominal spacing between letters, 3/4 inch.

4 - Specify numeral required.

5 - Break and round all corners.

6 - Sign material shall be .081-6061-T6 aluminum sheet except where indicated otherwise.

0 6 12 24 36

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SIGNS
HIGHWAY CROSSING PROTECTION

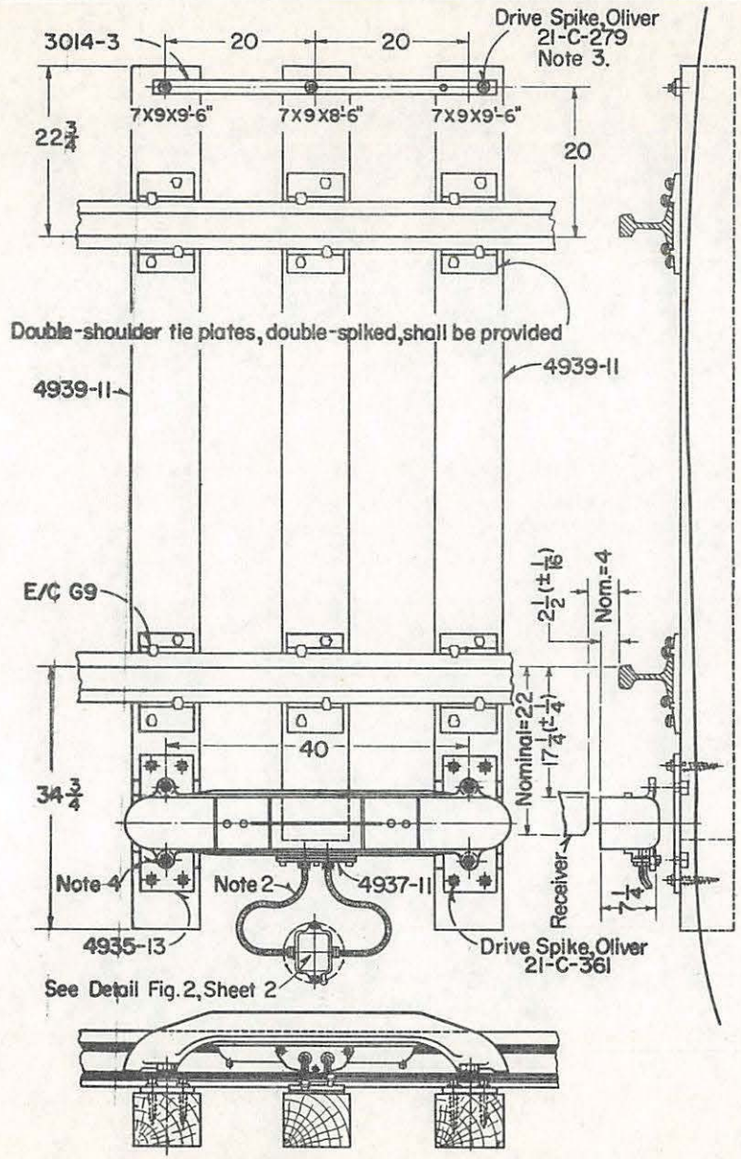
Approved L. S. Fortinelle
Chief Signal Engineer

S-4844

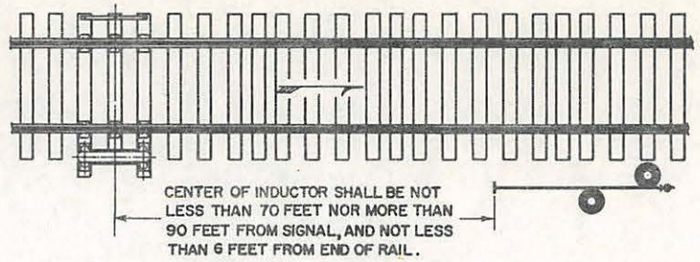
ISSUED 6-22-59

SHEET 1 Cont'd on Sh

Printed in U.S.A.



LAYOUT A
SEE NOTE 1.



RELATIVE LOCATION

NOTES:

1.-Layout "A" is for use in territory where electric equipment with third-rail shoes is not operated. Layout "B" is for use in territory where electric equipment with third-rail shoes is operated.

2.- Single conductor No. 8 A.W.G., 19 strand trench cable, A.A.R. Spec. 161-52. To be installed approximately horizontal between inductor and junction box.

3.- Bore hole in tie 5/8 diameter and 5 inches deep.

4. For inductor fastenings required, see Plan 4935.

5.-Protective treatment, except ties;-Pole faces: Paint, Item 36, Instruction 350. Other surfaces: Paint, Item 32, Instruction 350.

0 6 12 24 36
All dimensions given in inches.

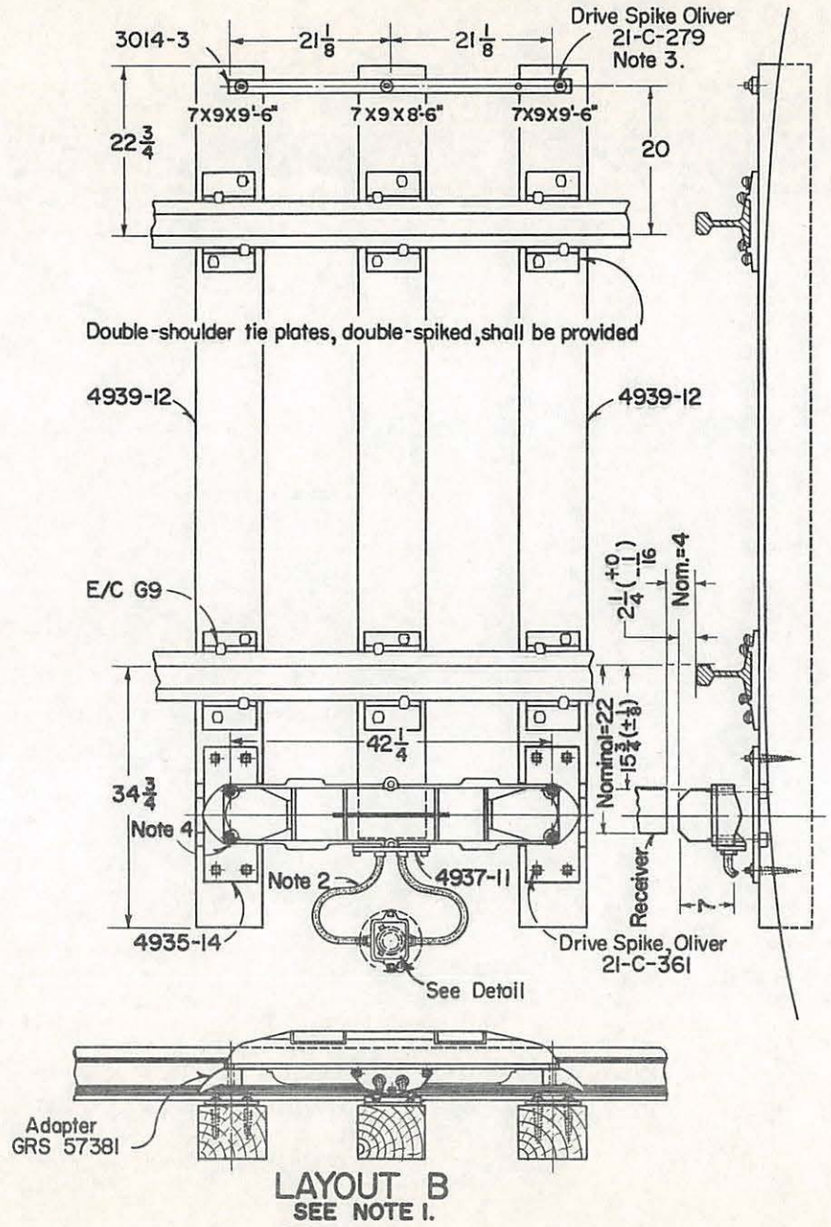
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
INDUCTOR LAYOUT
AUTOMATIC TRAIN STOP

S-4930

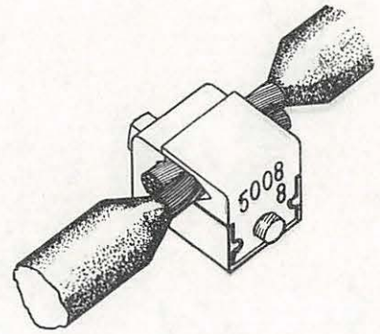
Printed in U.S.A.

ISSUED 10-15-58

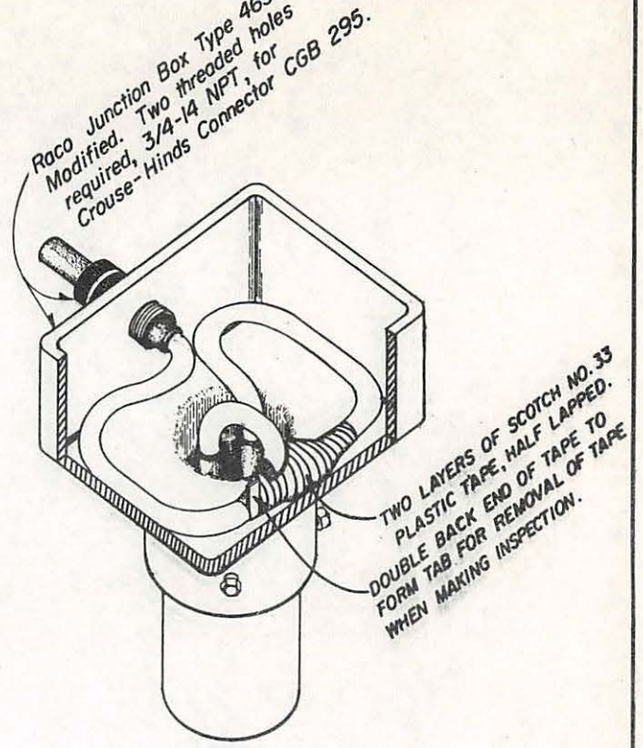
SHEET 1 Cont'd. on Sh. 2



LAYOUT B
SEE NOTE 1.



DETAIL - FIG. 1
WIRE SPLICE WITH FARGO TYPE CONNECTOR



DETAIL - FIG. 2
TYPICAL CONNECTION IN JUNCTION BOX

0 6 12 24 36
All dimensions given in inches.

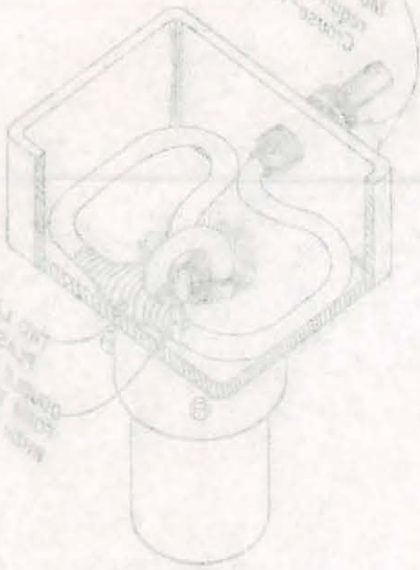
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
INDUCTOR LAYOUT
AUTOMATIC TRAIN STOP

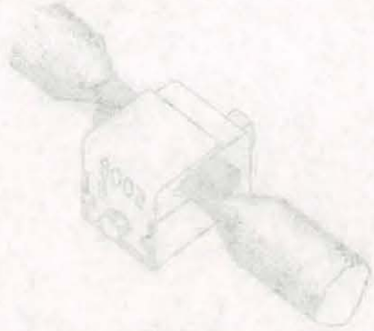
Approved Hallcott
Chief Signal Engineer

S-4930

Printed in U.S.A.

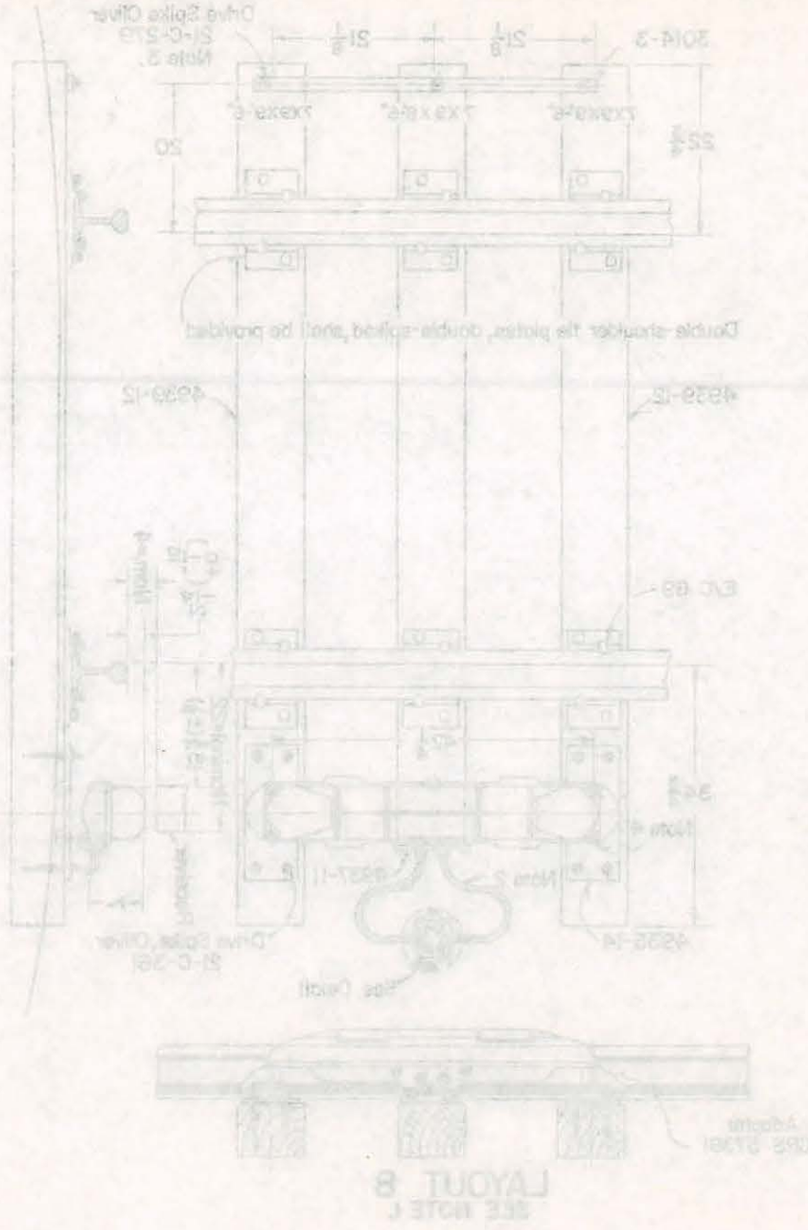
ISSUED 10-15-58
SHEET 2 Cont'd. on Sh.....





DETAIL - FIG. 1
WIRE SPLICE WITH FARGO
TYPE CONNECTOR

DETAIL - FIG. 2
TYPICAL CONNECTION
IN JUNCTION BOX



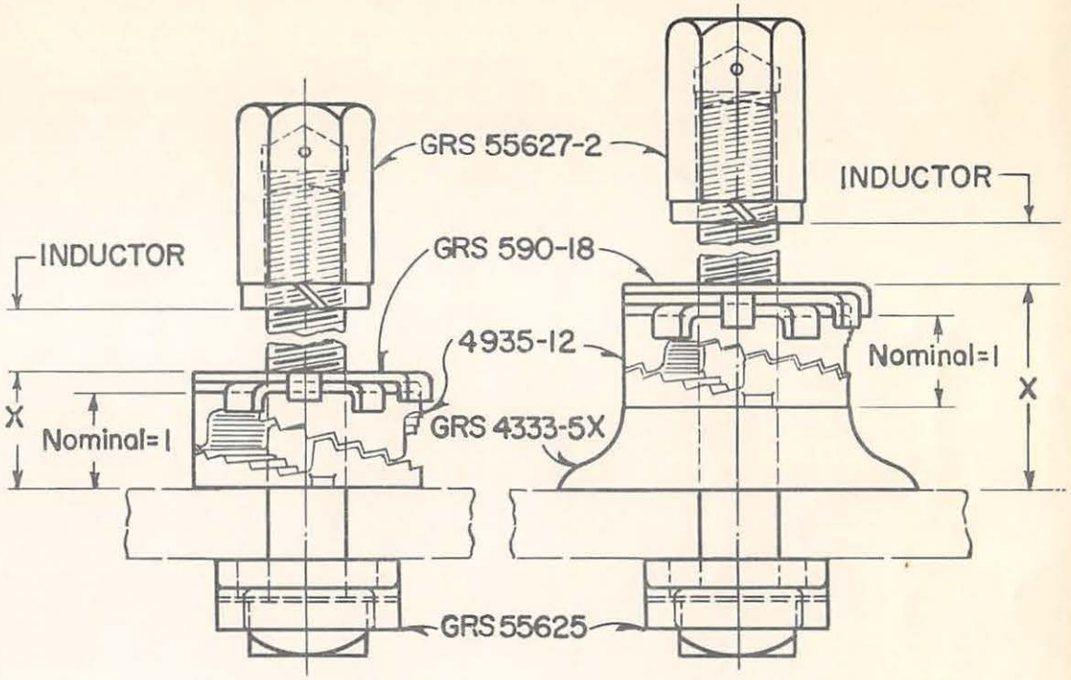
LAYOUT B
SEE NOTE 4

FOR TERRITORY OTHER THAN WHERE ELECTRIC EQUIPMENT WITH THIRD-RAIL SHOES IS MOVED OR OPERATED

WEIGHT OF RAIL	105	112	115	127	131
ORDER NO.	4935-1	4935-3	4935-9	4935-6	4935-10
HEIGHT OF RAIL	6	6-5/8	6-1/2	7	7-1/8
DIMENSION "X"	1-1/4	1-7/8	1-3/4	2-1/4	2-3/8
Bolt Length, See Note. (1 Req.)	4-1/2	5	5	5-1/2	5-1/2
Grease Nut, GRS. 55627-2	1	1	1	1	1
Spring Washer 1/4X1/4X7/8	1	1	1	1	1
U Washer, GRS 590-18	2	0	6	3	4
Adjuster, Compl. 4935-12	1	1	1	1	1
Washer, C.I. GRS 4333-5X	0	1	0	1	1
Washer, Anchor, GRS 55625	1	1	1	1	1

FOR TERRITORY WHERE ELECTRIC EQUIPMENT WITH THIRD-RAIL SHOES IS MOVED OR OPERATED

WEIGHT OF RAIL	105	112	115	127	131
ORDER NO.	4935-21	4935-23	4935-29	4935-26	4935-30
HEIGHT OF RAIL	6	6-5/8	6-1/2	7	7-1/8
DIMENSION "X"	1-1/4	1-7/8	1-3/4	2-1/4	2-3/8
Bolt Length, See Note. (1 Req.)	6-1/2	7	7	7-1/2	7-1/2
Grease Nut, GRS 55627-2	1	1	1	1	1
Spring Washer 1/4X1/4X7/8	1	1	1	1	1
U Washer, GRS 590-18	2	0	6	3	4
Adjuster, Compl. 4935-12	1	1	1	1	1
Washer, C.I., GRS 4333-5X	0	1	0	1	1
Washer, Anchor, GRS 55625	1	1	1	1	1



TYPICAL ASSEMBLIES

NOTE:

All bolts to be C-1020 steel, unfinished ASA Req. Sq. Hd. and 7/8-9 NC-2 thread.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

INDUCTOR FASTENINGS

AUTOMATIC TRAIN STOP

S-4935

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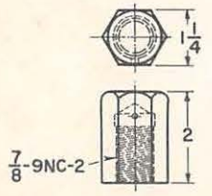
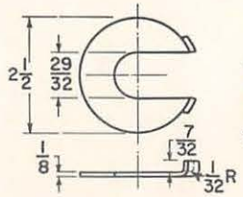
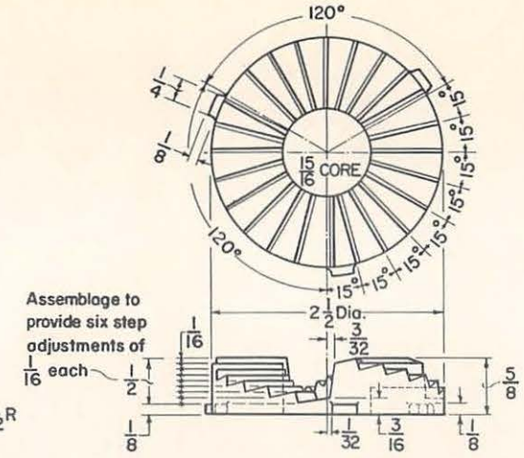


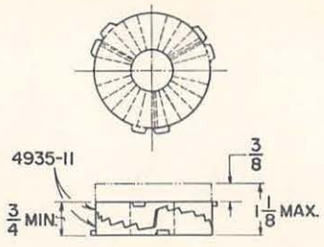
SPECIAL HEX. GREASE NUT
G.R.S. No. 55627-2 or equal
B-1112 C.D. Steel-Cadmium plated



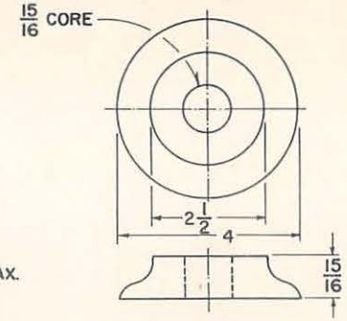
SPECIAL 'U' WASHER
G.R.S. No. 590-18 or equal
No. 11 U.S.S.G. sh. steel



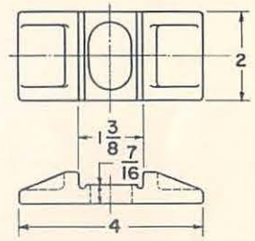
4935-11, HALF ADJUSTER
Malleable iron



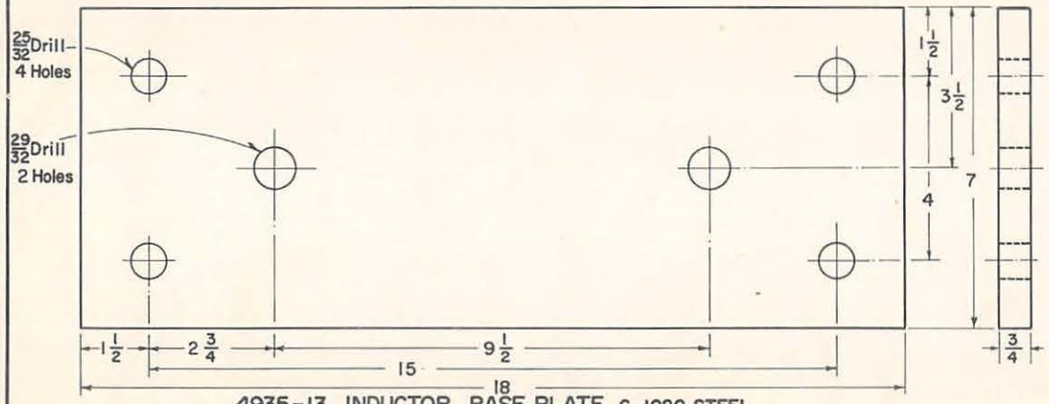
4935-12, ADJUSTER COMPL.



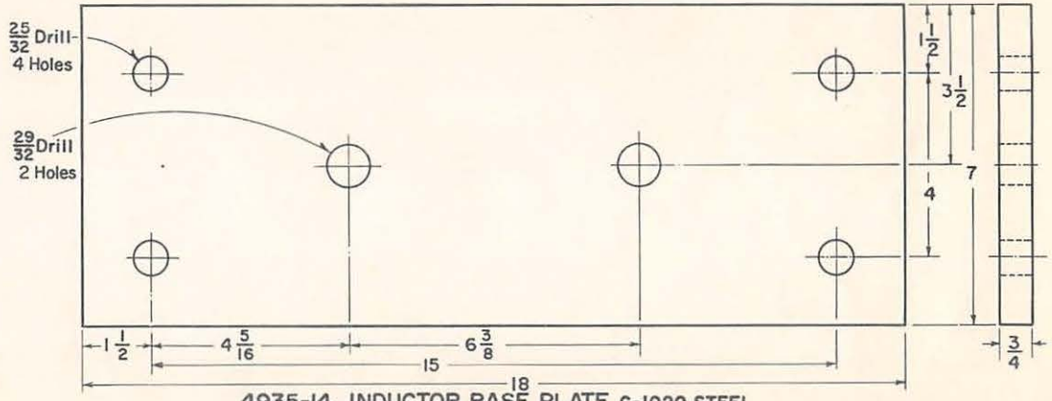
WASHER
G.R.S. No. 4333-5X or equal
Cast iron



ANCHOR WASHER
G.R.S. No. 55625 or equal
Cast steel

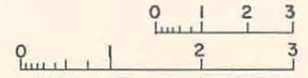


4935-13, INDUCTOR BASE PLATE, C-1020 STEEL
USE WITH INDUCTOR LAYOUT "A", PLAN 4930



4935-14, INDUCTOR BASE PLATE, C-1020 STEEL
USE WITH INDUCTOR LAYOUT "B", PLAN 4930

NOTE: Protective treatment-Primer, Item 31, Instruction 350.



All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
INDUCTOR FASTENINGS
AUTOMATIC TRAIN STOP

Approved _____ Chief Signal Engineer

S-4935

Printed in U.S.A.

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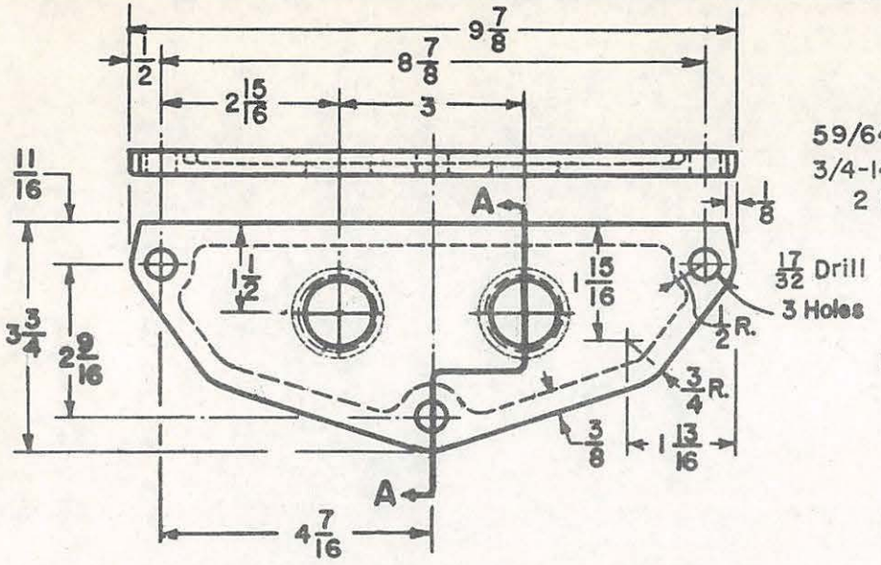
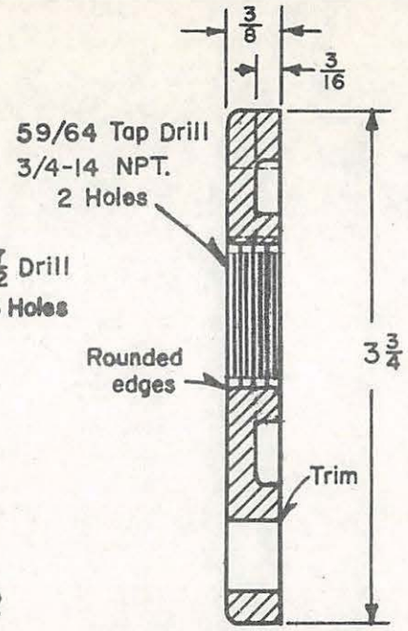
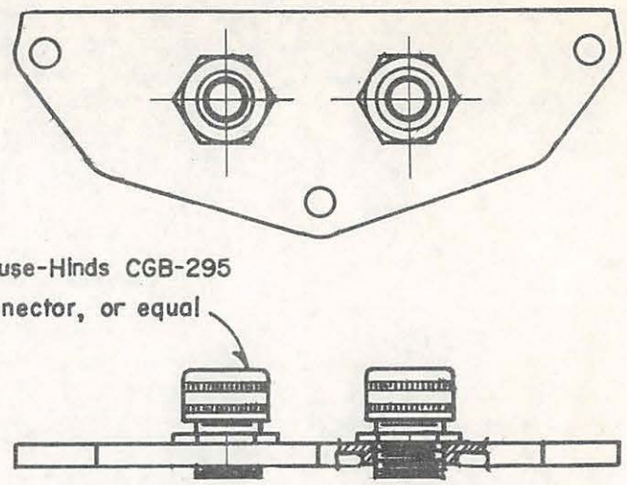


4937-I, INDUCTOR CABLE ENTRANCE COVER
G.R.S. No. 52032-29
Cast Brass



SECTION AA
Scale A



4937-II, INDUCTOR CABLE ENTRANCE COMPLETE

NOTE: Protective treatment, Paint, Item 32, Instruction 350.

0 1 2 3 4 5 6
All dimensions given in inches.

SCALE A
0 1 2 3
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
INDUCTOR CABLE ENTRANCE COVERS

Approved H.A. Scott
Chief Signal Engineer

S-4937

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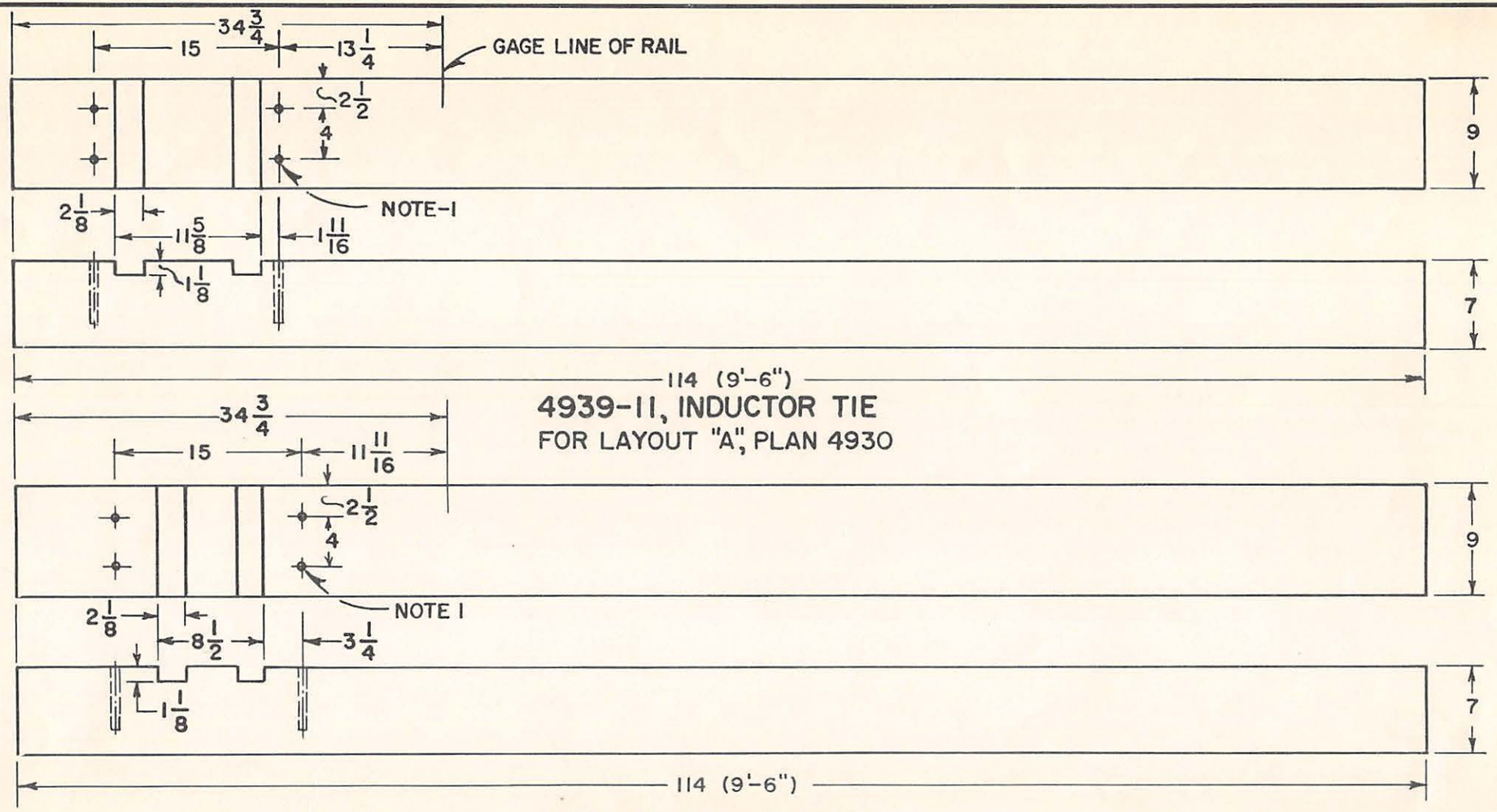

4939-11, INDUCTOR TIE
FOR LAYOUT "A", PLAN 4930

4939-12, INDUCTOR TIE
FOR LAYOUT "B", PLAN 4930

NOTES:

1 - BORE HOLE IN TIE ONE-HALF INCH IN DIAMETER AND FIVE INCHES DEEP.

2 - TIES TO BE OAK; CREOSOTE AFTER FRAMING.

0 6 12 24 36

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
INDUCTOR TIES
AUTOMATIC TRAIN STOP

Approved H.A. Scott
Chief Signal Engineer

S-4939

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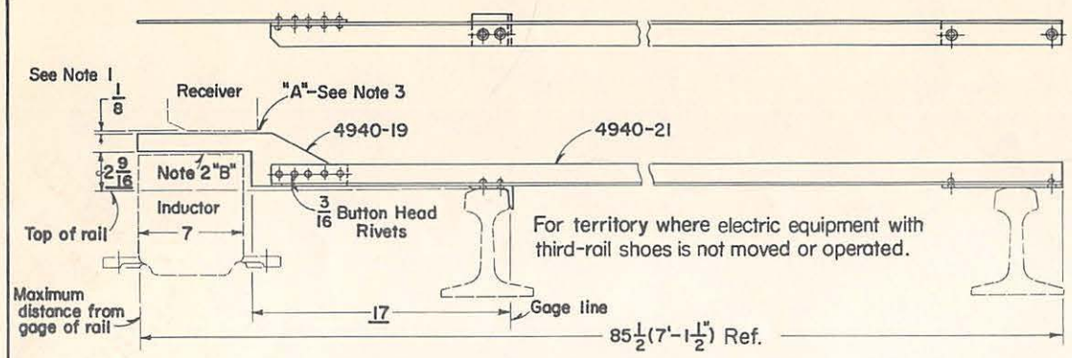
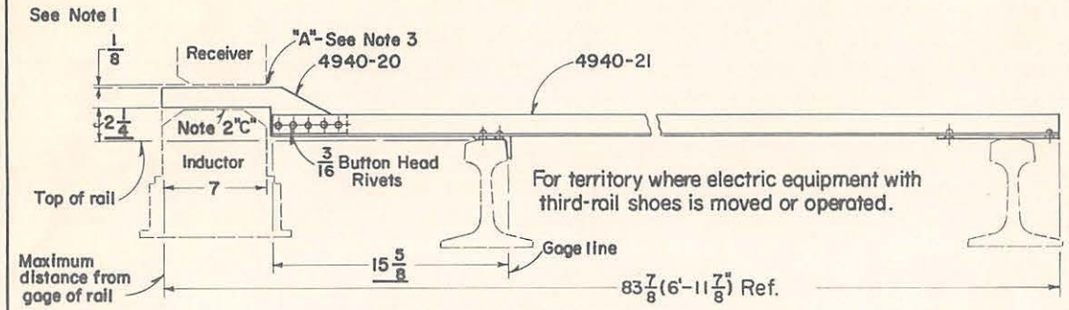
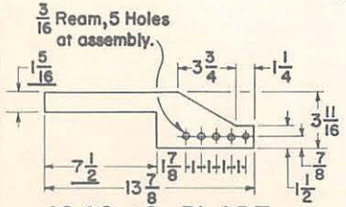


4940-3, GAGE COMPLETE

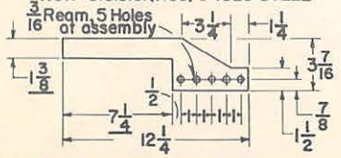


4940-4, GAGE COMPLETE



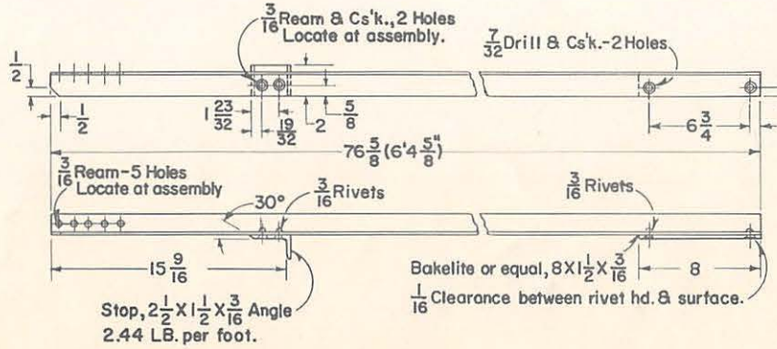
4940-19, BLADE

NO.7 U.S.S.G. (.188) C-1020 STEEL



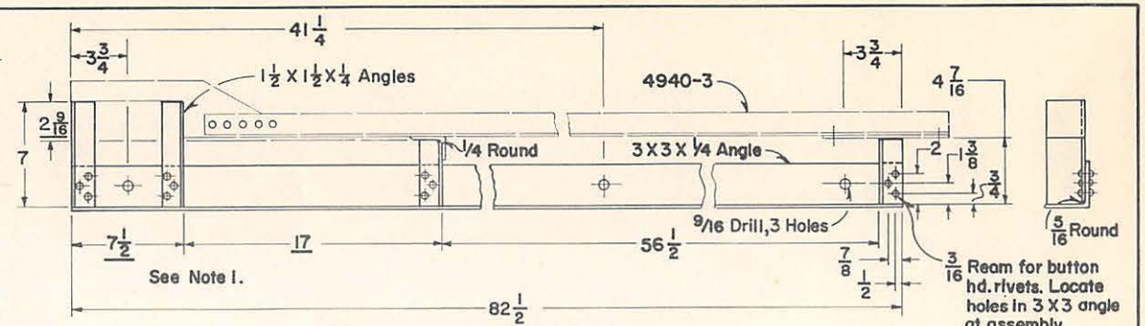
4940-20, BLADE

NO.7 U.S.S.G. (.188) C-1020 STEEL



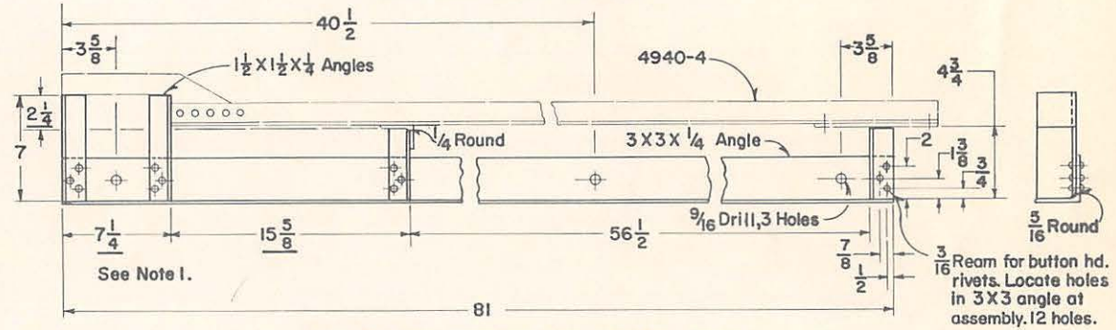
4940-21, SHAFT

1 1/2 X 1 1/2 X 3/16 ANGLE - 1.80 LB. PER FOOT.



4940-23, TEMPLET COMPLETE

USE WITH GAGE 4940-3

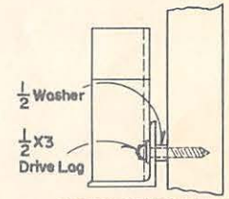


4940-24, TEMPLET COMPLETE

USE WITH GAGE 4940-4

NOTES:

1. Dimensions underscored must be within 1/64 inch tolerance.
2. Inductor must not be more than 1/8 inch below gage at "B" and not more than 1/16 inch below gage at "C".
3. Receiver on engine must not be allowed to come lower than gage at "A". Preferably it should be kept as near 1/8 inch above gage as the notches in the washboard adjustment will allow.
4. Templet must be mounted at headquarters of maintenance force on sections where inductors are in use.
5. Gage must be checked with templet for proper alignment and any irregularity corrected before check of inductors is made.
6. Protective treatment - Primer, Item 31; Paint, Item 32, Instruction 350.



METHOD OF MOUNTING TEMPLET ON WALL (NO SCALE)

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

INDUCTOR-RECEIVER GAGE

AUTOMATIC TRAIN STOP

Approved H A Scott
Chief Signal Engineer

S-4940

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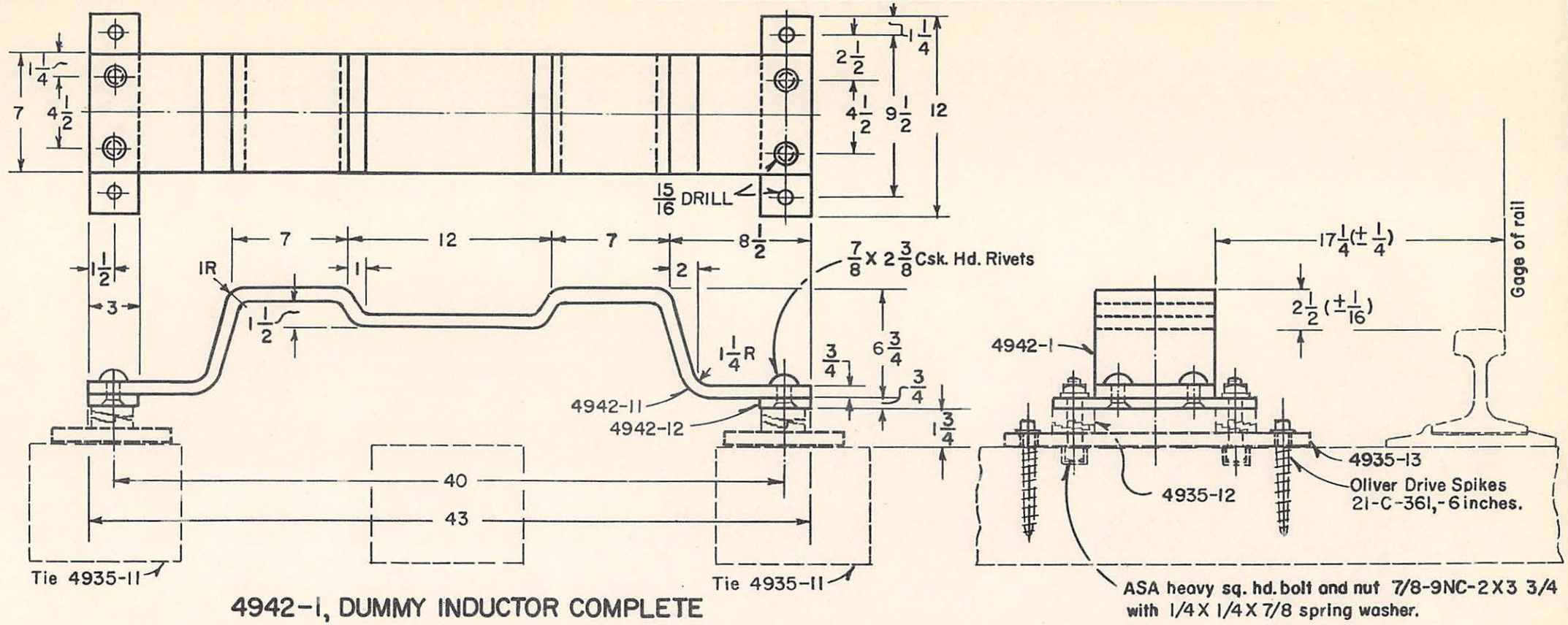

4942-1, DUMMY INDUCTOR COMPLETE

NOTES:

All material to be C-1020 steel.

Protective treatment - Primer, Item 31, Instruction 350.
Paint, " 32, " 350.

0 6 12 24

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

DUMMY INDUCTOR

FOR TEST TRACKS-AUTOMATIC TRAIN STOP

Approved _____
Chief Signal Engineer

S-4942

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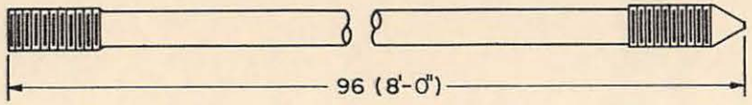
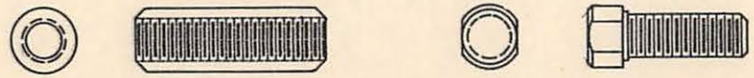
ISSUED 7-1-54

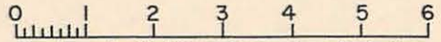


6315-14 SECTIONAL GROUND ROD



6315-15 COUPLING

6315-16 DRIVING STUD
STEEL



Scale and all dimensions given in inches.

NOTE: For installation and maintenance of lightning arrester grounds see Instruction 256

For method of making welded ground wire connections see Sheet 2.

ORDER NO.	ITEM	ORDERING REFERENCES		REMARKS
6315-1	WELDER	Erico Products Co.	SB-1367 Gr. 3. No. 6 Solid-5/8 Ground Rod	For 3 wire connection only.
6315-11	MOLD	" " " " " " " " " "	Mold only.	" " " " "
6315-12	CARTRIDGE	" " "	No. 25 Cartridges	" " " " "
6315-14	SEC. GROUND ROD	Hubbard-Copperweld	No. 29438	
6315-15	COUPLING	" "	No. 9534	
6315-16	DRIVING STUD	" "	No. 29534	
6315-20	"ONE SHOT" UNIT *	Erico Products Co.	No. S219E No. 6 Solid-5/8 Ground Rod	For 1 or 2 wire connections

* "One-Shot" Unit contains one disposable mold, one Cadweld cartridge No. 45, a metal disc, a wrap seal and two sleeves.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SECTIONAL GROUND ROD

S-6315

ISSUED 6-28-60

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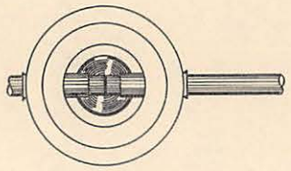
INSTRUCTIONS-1 OR 2 GROUND WIRES

1 - Wires must be bright, clean and dry; rods to be filed bright on top to insure proper weld.

2 - Twist wrap seal on rod and position wires in sleeves as indicated, Fig. A. If one wire only is to be connected insert ground wire through both sleevs.

3 - Place metal disc in mold to retain welding metal. Gently empty welding metal from cartridge into mold followed by starting powder normally caked in bottom of cartridge. Charge is then ready to fire.



TOP VIEW
(Powder & Disc Removed)

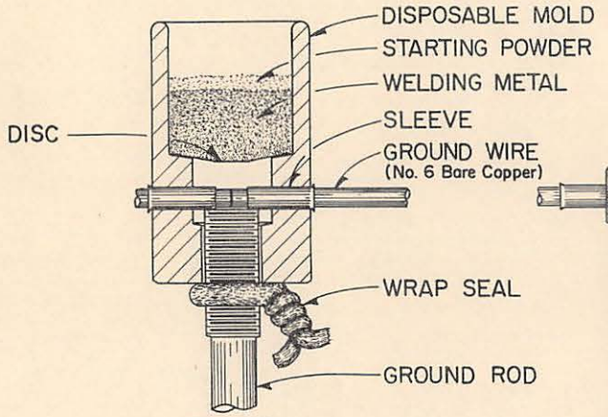
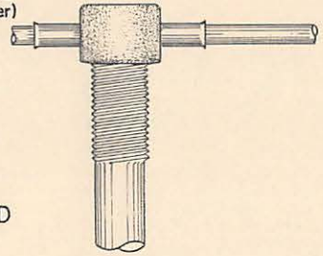


Fig. A
6315-20 "ONE-SHOT" UNIT
SECTION VIEW OF ASSEMBLY
READY FOR FIRING



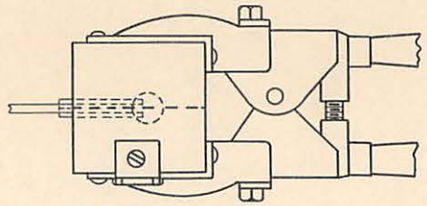
COMPLETED WELD

ONE OR TWO WIRE CONNECTIONS

INSTRUCTIONS-3 GROUND WIRES

1 - Wires must be bright, clean and dry; rods to be filed bright on top to insure proper weld.

2 - Position wires in mold (as shown Fig. B) with end of wires directly under center of tap hole. Cover tap hole with a steel disc. Use three cartridges, 6315-12, as follows:
Gently empty the welding metal only from two cartridges into the mold taking care not to disturb starting powder normally caked in the bottom of the cartridge. Empty entire contents of third cartridge into mold. Close cover and fire.



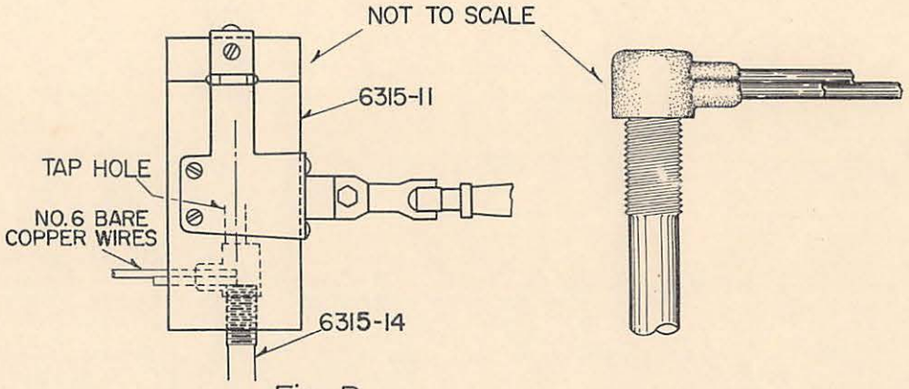


Fig. B
6315-1 WELDER COMPL.
6315-11 MOLD ONLY

COMPLETED WELD

THREE WIRE CONNECTIONS ONLY

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SECTIONAL GROUND ROD
WELDED GROUND WIRE CONNECTIONS

Approved L. S. Bottwell
Chief Signal Engineer

S-6315

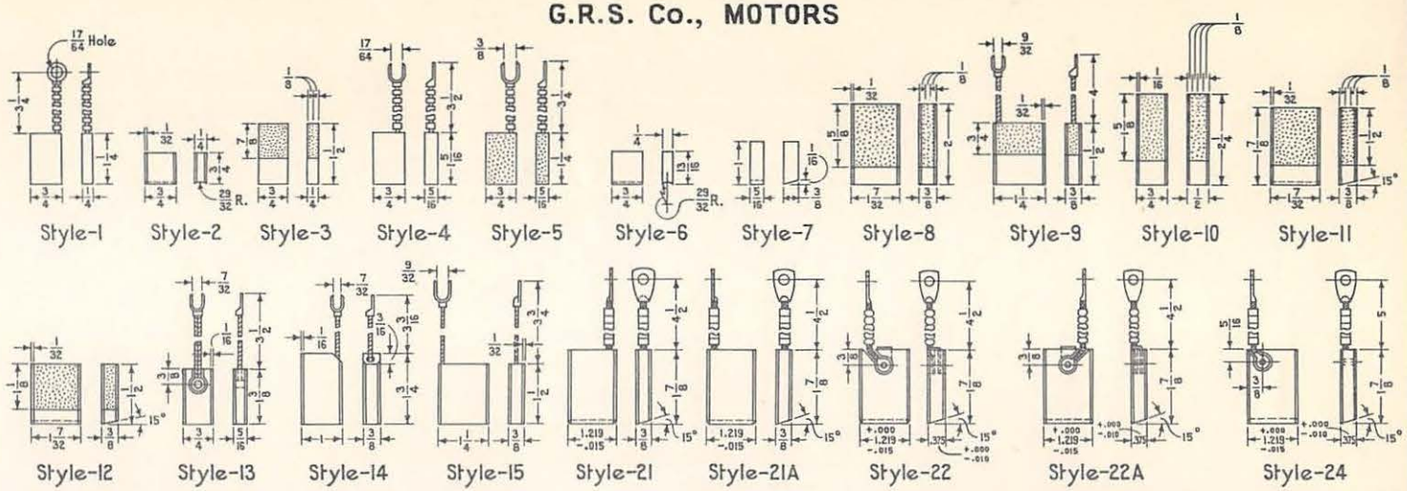
Printed in U.S.A.

ISSUED 6-28-60

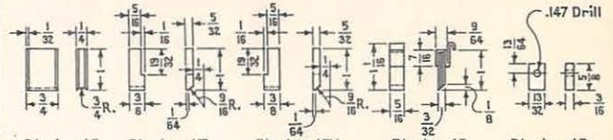
SHEET 2 Cont'd on Sh.....

	TYPE OF MOTOR	FOR	STYLE	ORDER NO.	NAME	GRADE
G.R.S. Co.	Model 2A-110V. D.C.	Signal	1	6580-1	N.C. Co.	NJ-25
	" " - " "	"	2	6580-2	" " "	DO
	" " - " "	Xing.Gate	6	6580-9	" " "	"
	" 5A-B-C and D-20V. D.C.	Switch	2	6580-3	" " "	NJ-25
	" " " - " " - " "	"	21	LH-6580-17	" " "	" - "
	" " " - " " - " "	"	21A	RH-6580-17		
	Type B car retarder-110-220V. D.C.	Skate	2	6580-4	" " "	549
	" " " " -110V. D.C.	"	25	6580-5	" " "	"
	Model 2A-110V. D.C.	Signal	3	6580-6	" " "	"
	" " - " "	"	25	6580-18	" " "	"
	Type 4-20V.D.C.(Federal)	"	4	6580-7	" " "	524
	" " -110V. D.C.(")	"	5	6580-8	" " "	"
	Special- " " dwarf-(Federal)	"	7	6580-10	" " "	"
	Model 2 and 5-110V. D.C.	Switch	8	6580-11	" " "	549
	Type 2-4 and 41-110V. D.C.(Federal)	"	9	6580-12	" " "	306
	" 4 and 41-110V. D.C. (Federal)	"	15	6580-20	" " "	AY
	Model 4-4A-B and C-110V. D.C.	"	10	6580-13	" " "	549
	" 5A-B-C and D-110V. D.C.	"	11	6580-14	" " "	"
	" " -220V. D.C.	"	12	6580-15	" " "	"
	" " -B-C-D,110V. D.C. SA Brake	"	21	LH-6580-20	" " "	NJ-25
	" " -"-"-", " " " "	"	21A	RH-6580-20		
	" " -C-D,110V. D.C. QA Brake	"	22	LH-6580-23	" " "	850
	" " " " " " " "	"	22A	RH-6580-23		
	" " and B,110V. D.C.	"	24	LH-6580-27	" " "	549
	" " " ", " "	"	24A	RH-6580-27		
	" 6, 110V. D.C.	"	24	LH-6580-29	" " "	"
	" ", " "	"	24A	RH-6580-29		
	Type B car retarder-230V. D.C.	Mechan'm.	13	6580-16	" " "	SA-35 or 259
					" " "	25903
					G.E. Co.	G
					" "	D-3 or 377
	Type B car retarder-230V. D.C. Compound wound	Mechan'm.	14	6580-19	Westinghouse	WL-21
	" " crossing gate L.V.D.C.	Xing. Gate	27	6580-28	N.C. Co.	DO
U.S.&S. Co.	Style B-10V. D.C.	Signal	16	6580-21	N.C. Co.	NJ-15
	" " and S-10V. D.C.	"	17	LH-6580-22	" " "	EL
	" " " "-" "	"	17A	RH-6580-22		
	" "-10V. D.C	"	18	6580-24	U.S.& S. Co.	Pc.74289
	" K- " " (Hall)	"	19	6580-25	N.C. Co.	NJ-25
	" L- " " (")	"	20	6580-26	" " "	" - "
	" T-2-10V. D.C.	"	23	6580-30	" " "	" - "
	" M and M-2-110V. D.C., or A.C.	Switch	26	6580-34	Stackpole	C-1
	" " " M-20-32V. D.C.	"	26A	6580-35	"	P-85
	Type No.3564 crossing gate mech.	Xing. Gate	32	6580-36	N.C. Co.	DO
MISCL.	Model 5D74AB8 (G.E. Dynamotor)	Power	28	6580-31	G.E. Co.	258 A.C.
	" 5H76AB1A (" ")	"	29	6580-32	" "	9613 D.C.
	" 5R21U Kohler Plant	"	30	6580-33	Kohler	D-742 D.C.
	" " " "	"	31	6580-34	"	156031 A.C.

G.R.S. Co., MOTORS



U.S.&S. Co., MOTORS



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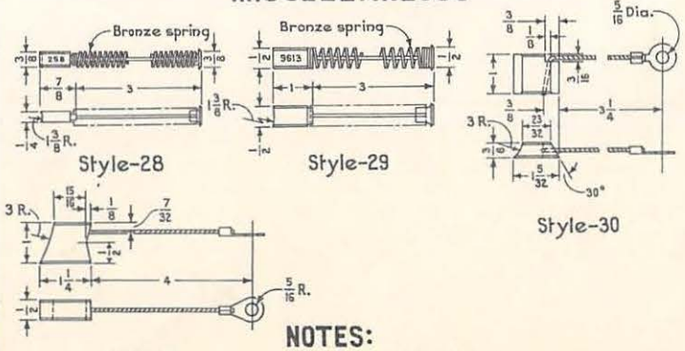

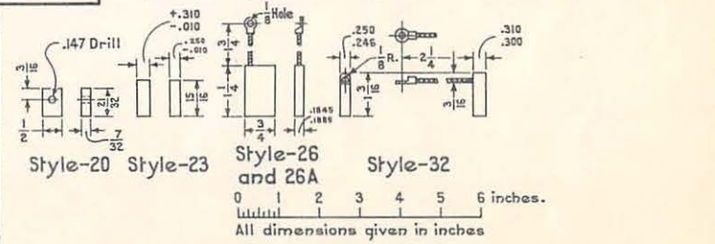

NOTES:

1. Other brush requirements shall be ordered to Manufacturer's Reference.

⊙ = Copper plated brushes.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

MOTOR BRUSHES

Approved H.A. Scott
Chief Signal Engineer

S-6580

Printed in U.S.A.

ISSUED 2-1-55

SHEET 1 ...Cont'd on Sh.....

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MAR 4 1975
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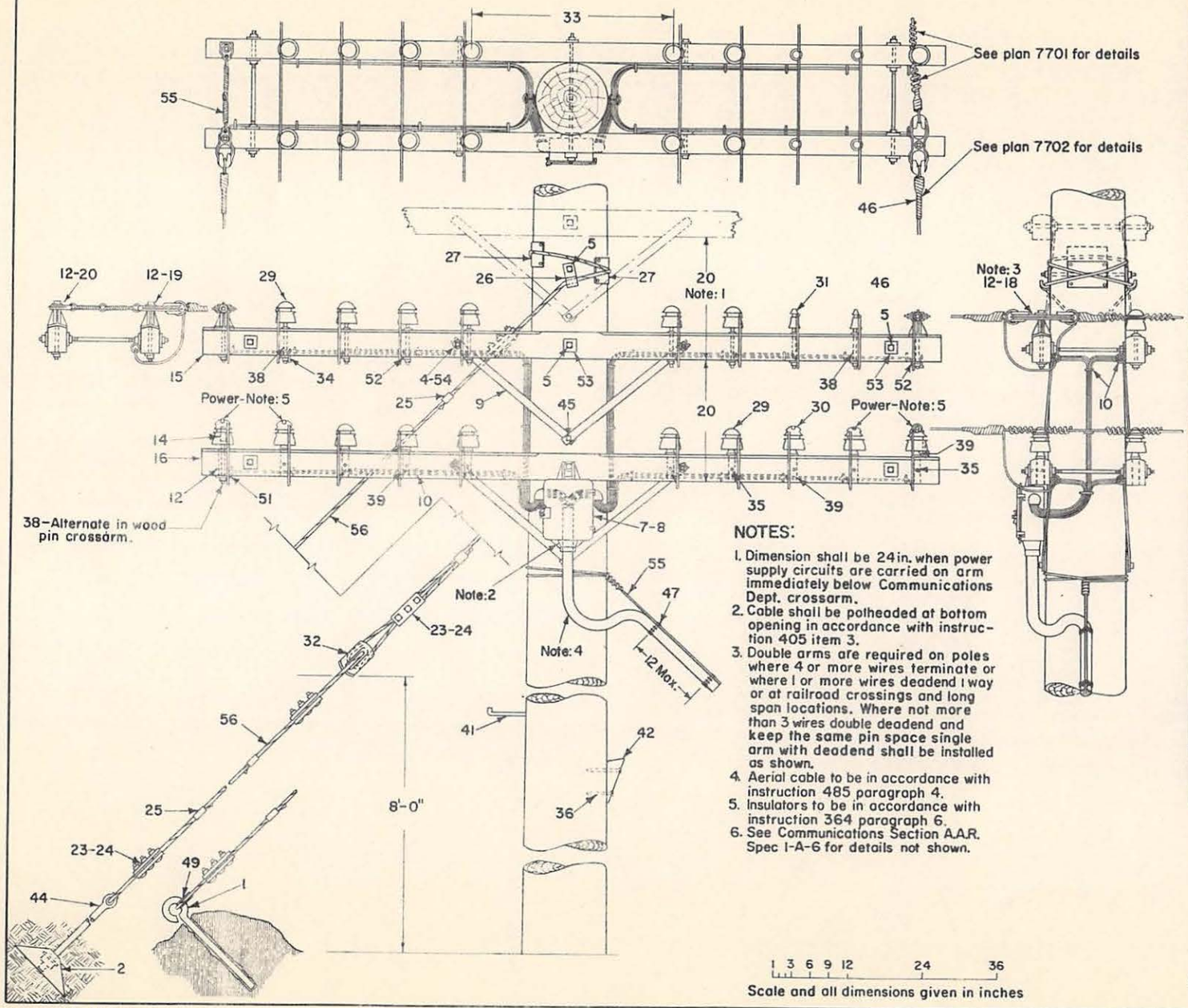
ORD. SECT.



NO	ITEM	REF.	SPEC.
1	Anchor, rock guy – with thimble eye	T-T 1742	I-A-20
2	Anchor, cone type 12 in. Chance or equal		
3			
4	Bolt, Machine 3/8 x 4 galvanized		
5	" , double-arming 5/8 x 14 to 24 (by 2 inch steps)	T-T 1745	I-A-20
6			
7	Box, pole (Raco 480-1 less terminals) Max. Cable Dia. 1 1/2		
8	(" 469-2 " ") " " " 2 1/2		
9	Brace, flat crossarm - 26 in.	T-T 1747	I-A-20
10	Bridle ring, enameled (Graybar Electric Co.) or porcelain		
11	insulated screw eyes.		
12	Bushing, wood (for steel pin and deadend in wood pin arm)	T-T 3181	I-A-94
13			
14	Cob (for steel pins)	T-T 1776	I-A-20
15	Crossarm, special 10 ft., for steel pins	T-T 2790	I-A-28
16	" " " ., for wood pins	T-T 2791	I-A-28
17			
18	Deadend, double Raco 239-13		
19	" and Anchor eye Raco 239-12		
20	" Anchor Raco 239-7		
21			
22			
23	Guy clamp, heavy 3 bolt (10M-16M strand)	T-T 2377	I-A-20
24	" " , 3 bolt (6M strand)	T-T 1753	I-A-20
25	" clip (of approved type)	T-T 2650	I-A-6
26	" hook (16M strand) where required	T-T 1756	I-A-20
27	" plates (10M-16M strand) where required	T-T 1772	I-A-20
28			
29	Insulator, glass-side groove Hemingray No. 42	T-T 1999	I-A-33
30	" , " - " -top groove Hemingray No. 43	T-T 2000	I-A-33
31	" , rubber (Continental Rubber Works R-4)		
32	" , strain (pole guy) Pierce No. 506		
33			
34	Nail, 4d galvanized (steel pins)	T-T 2640	I-A-6
35	" , 6d galvanized (wood pins)	T-T 2640	I-A-6
36	Nails, 30d and 50d galvanized (wood step)	T-T 2644	I-A-6
37			
38	Pin, crossarm- 1/2 in. steel	T-T 1759	I-A 20
39	" - wood	T-T 3041	I-A-84
40			
41	Pole step - spike head	T-T 1767	I-A-20
42	" " - wood	T-T 2003	I-A-35
43			
44	Rod, anchor (thimbleless) specify length and diameter	T-T 2788	I-A-20
45	Screw, fetter drive - 1/2 x 4 1/2	T-T 1766	I-A-20
46	Sleeve, line tapping (Nicotap) specify size	7702	
47	Strap, bead cabling (Raco 503) without hook - specify lgth.		
48			
49	Thimble, specify light or heavy	T-T 1773	I-A-20
50			
51	Washer, 1 3/4 outside diameter	T-T 2640	I-A-6
52	" , 1 1/4	T-T 1759	I-A-20
53	" , 2 1/4 square	T-T 1774	I-A-20
54	" , 3/8 std. plate galvanized		
55	Wire, solid No. 6 Copperweld or equal		
56	" , pole guy (specify strand)	T-T 2656	I-A-6
57			
58			

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

POLE LINE STRUCTURE

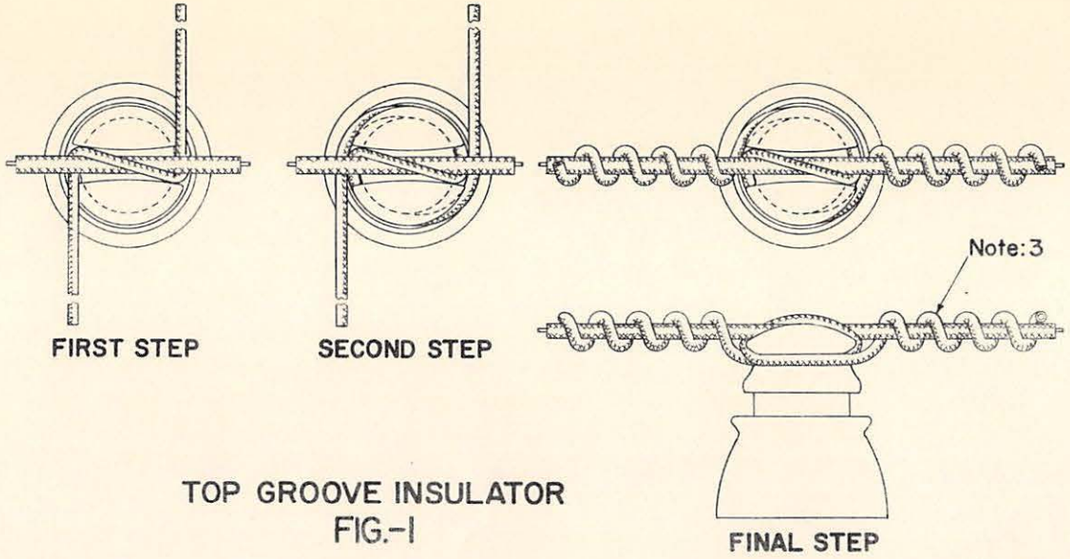
WIRE CONNECTIONS AND FIXTURES

Approved _____
Chief Signal Engineer

S-7700

ISSUED 7-1-54

Printed in U.S.A.



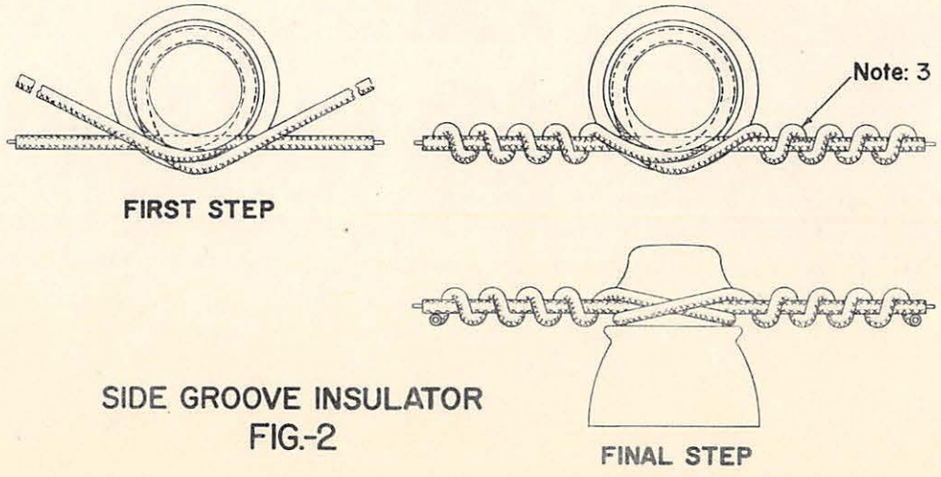
TOP GROOVE INSULATOR
FIG.-1

NOTES:

1 Where heavy side pull occurs place line wire in the side groove of the insulator opposite the pull and fasten as shown in FIG.2.

2 Where heavy down pull occurs, line wires shall be fastened as shown in FIG.1

3 Tie wires shall be No.10 D.B.W.P. annealed copper 26 inches long.



SIDE GROOVE INSULATOR
FIG.-2

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

POLE LINE STRUCTURE

DETAILS

LINE WIRE TIES

Approved J. A. Corcoran
Chief Signal Engineer

S-7701

ISSUED 7-1-54

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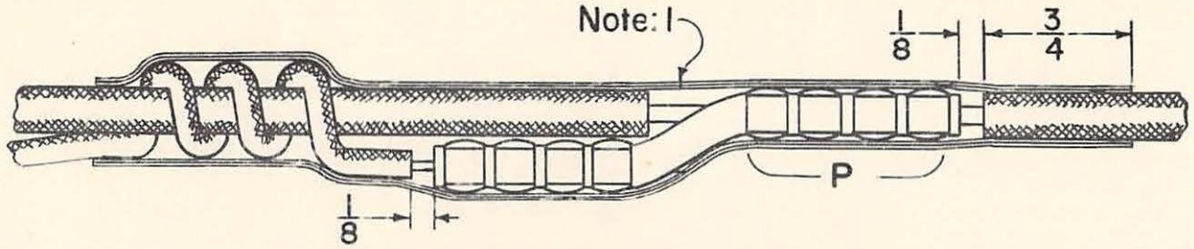
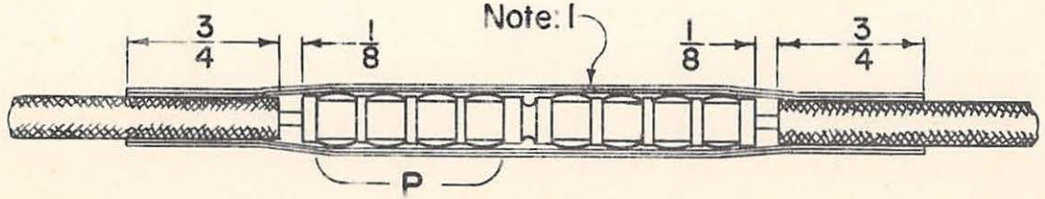


LINE CONNECTION
USED AT DEADEND OR FOR LINE TAP



SPLICE CONNECTION

SPLICING SLEEVES		
Wire Gage	Ordering Ref.	*P
NO.6	Nicopress 1-162J	5
NO.8	" 1-128J	4
NO.10	" 1-102J	3
LINE TAPPING SLEEVES		
NO.6 to 12	Nicotap T1-162x080J	4
NO.8 to 12	" T1-128x080J	4
NO.10 to 12	" T1-102x080D	4

*P-indicates number of presses 1/16 in. apart.

NOTE:

1. Two layers of friction tape half lapped and painted in accordance with Instruction 350 Item 38.
2. Line splicing and tapping sleeves to be applied with Nicopress tool No. 31-DJ.
3. No.6,8 and 12 wire referred to in the table is solid copper, No.10 is copperweld.
4. The last letter in the ordering reference number indicates the tool groove to be used.

All dimensions given in inches

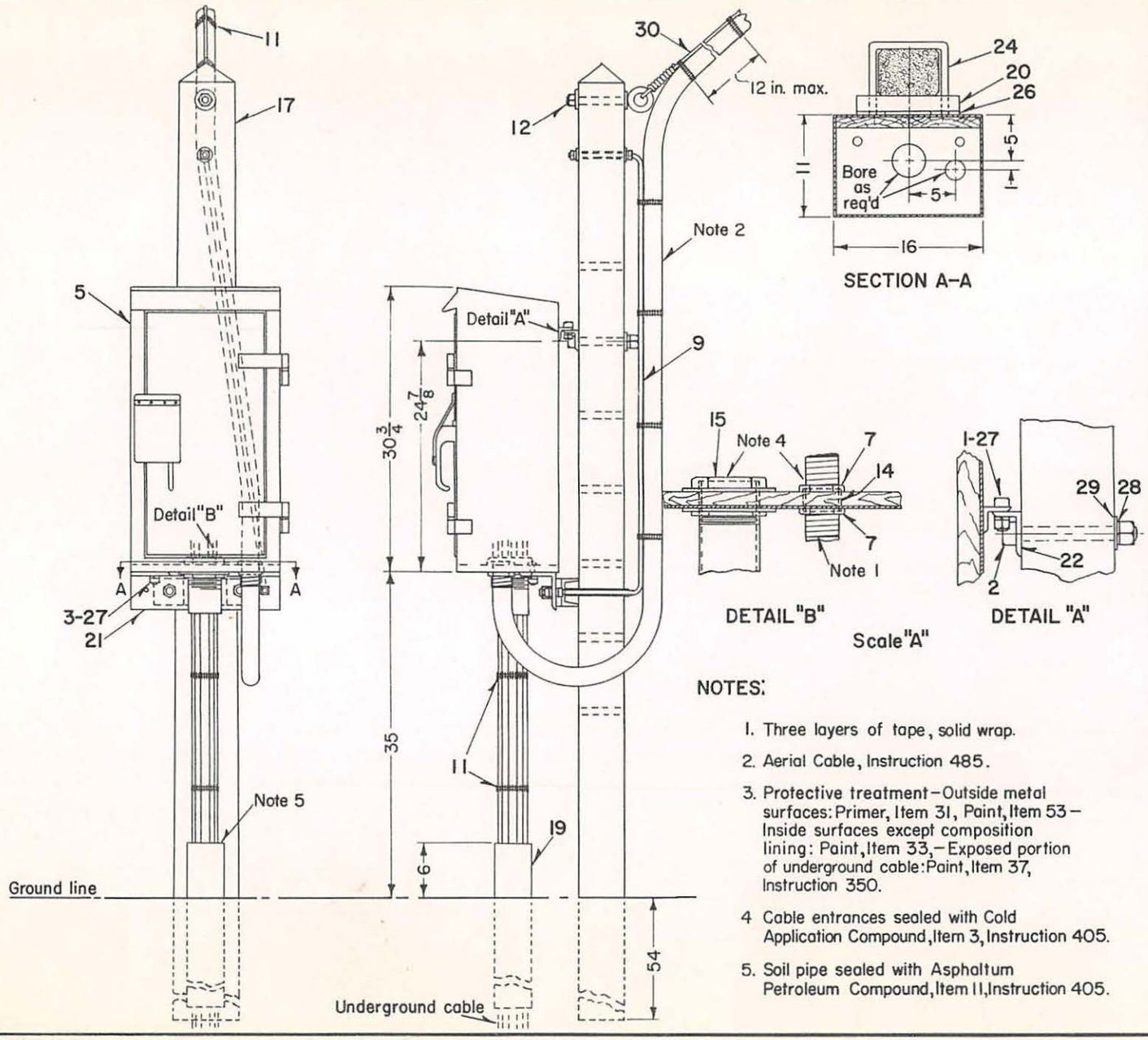
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
POLE LINE STRUCTURE
DETAILS
LINE WIRE JOINTS

Approved J. Pearson
Chief Signal Engineer

S-7702

Printed in U.S.A.

ISSUED 7-1-54



NOTES:

1. Three layers of tape, solid wrap.
2. Aerial Cable, Instruction 485.
3. Protective treatment – Outside metal surfaces: Primer, Item 31, Paint, Item 53 – Inside surfaces except composition lining: Paint, Item 33, – Exposed portion of underground cable: Paint, Item 37, Instruction 350.
4. Cable entrances sealed with Cold Application Compound, Item 3, Instruction 405.
5. Soil pipe sealed with Asphaltum Petroleum Compound, Item 11, Instruction 405.

NO	ITEM	REF.	REQ.	USE
1	Bolt 1/2 X 1 1/4 sq.hd & hex nut		2	Top support.
2	" 3/4 X 6 1/2 " " " " "		1	Top support
3	" 1/2 X 1 3/4 galv. carriage		2	Bottom support
4				
5	Box, complete	G.R.S 54311-47 GR.1	1	
6				
7	Bushing		2	Item no. 14
8				
9	Cable Support, Complete	8520-7	1	
10				
11	Cabling strap, beaded (lgth. as req.)	Raco No. 503 without hook		
12	Eye, bolt	AAR12813	1	Wire support
13				
14	Nipple (order as required)		1	Drop entrance
15	" (" " ")	8520-22,	1	U.C. "
16		23 or 24		
17	Post	AAR12812	1	
18				
19	Soil pipe (order as required)	2440	1	
20	Spacer	8520-1	1	Bottom support
21	Support, bottom	8520-5	1	
22	" , top	8520-3	1	
23				
24	U Bolt complete	8520-8	1	Bottom support
25				
26	Washer, square	8520-2	2	Bottom support
27	" 1/2 common spring		4	Items no.1 & no.3
28	" 3/4 " "		1	Item no.2
29	" 3/4 wrought iron		1	" " 2
30	Wire, solid no.6 Copperweld or equal			

Scale "A" 0 3 6 9 12
0 6 12 24
All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
STEEL CASE
TERMINAL BOX

Approved H A Scott
Chief Signal Engineer

S-8500

ISSUED 4-2-57
SHEET 1 Cont'd on Sh.

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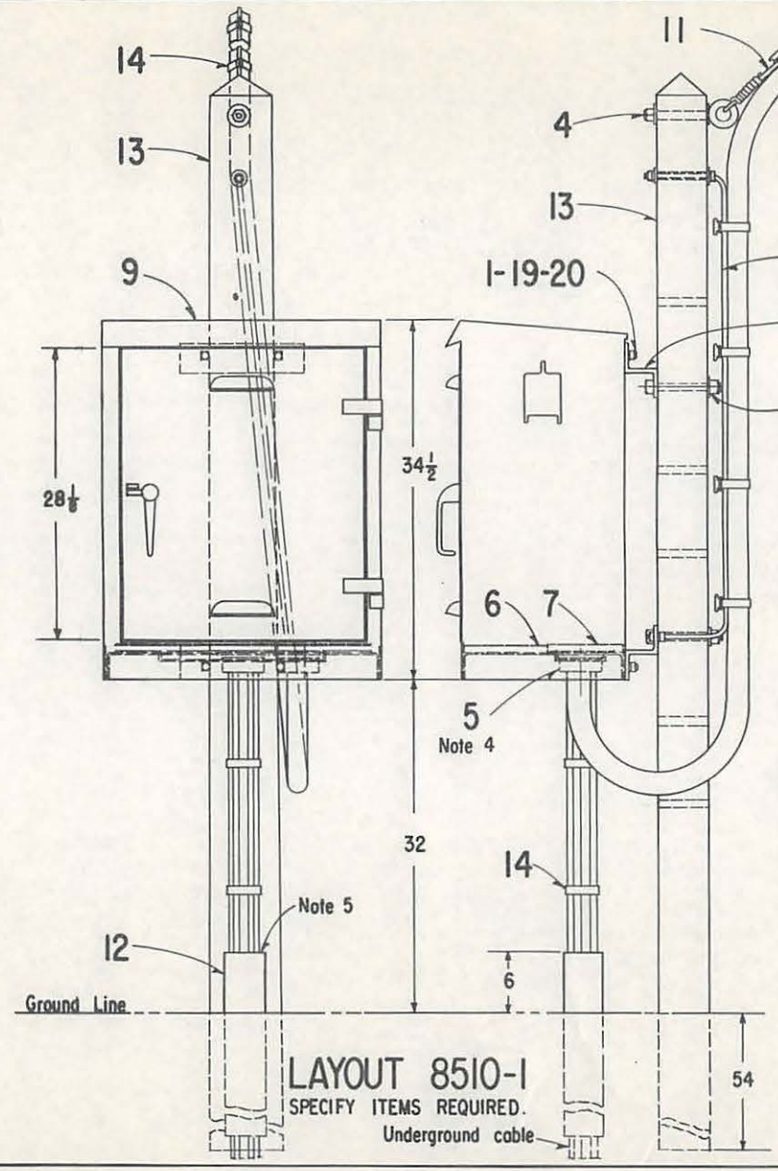
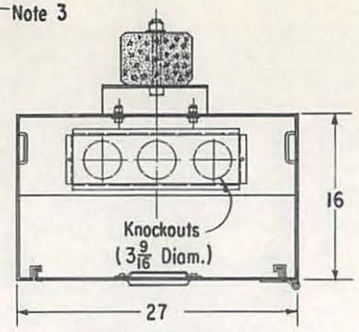


LAYOUT 8510-1
SPECIFY ITEMS REQUIRED.



Detail of Floor

NO	ITEM.	REF.	REQ	USE
1	Bolt 1/2-13 X 1-1/2 Sq. Hd. & Nut.	Coml.	4	Items 9 & 16
2	" 3/4-10 X 6-1/2 " " " Hex. Nut	"	2	Items 13 & 16
3				
4	Bolt, Eye AAR	12813	1	Item. 11
5	Bushing, Compl.	8520-23	As Req.	
6	Board, Floor 8-1/8 In. Wide GRS	32108-315	1	
7	" " 7-1/2 In. " GRS	32108-316	1	
8				
9	Case, Single Door GRS	A5-160	1	See Note 1.
10				
11	Messenger, Strand 3 No. 12 Copperweld	2.2 M	As Req.	
12	Pipe, Soil	2440	As Req.	Specify Size
13	Post, Concrete AAR	12812	1	
14	Straps, Cabling-Without hook Raco	611	As Req.	Specify Length.
15				
16	Support, Case	8520-31	2	
17	Support, Cable	8520-9	1	
18				
19	Washer, Galv. 1/2 In. SAE	Coml.	4	Item 1
20	" Lock 1/2 In. SAE Med.	"	4	Item 1
21	" Galv. 3/4 In. SAE	"	2	Item 2
22				
23				
24				
25				

NOTES:

1. For details of box fittings available see GRS Catalogue, Sec. 5.
2. Bolts, Nuts and Threads to be in accordance with AAR Spec., Manual Part 17; Washers AAR Spec., Manual Part 35.
3. Aerial Cable, Instruction 485.
4. Cable entrances sealed with Cold Application Compound, Item 3, Instruction 405.
5. Soil pipe sealed with Asphaltum Petroleum Compound, Item 11, Instruction 405.
6. Protective treatment-Outside metal surfaces, Primer, Item 31, Paint, Item 53; Inside surfaces, Paint, Item 37, Instr. 350.

0 6 12 24
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
STEEL CASE
SINGLE DOOR

Approved H.A. Scott
Chief Signal Engineer

S-8510

ISSUED JAN 16 58
SHEET 1 Cont'd on Sh.

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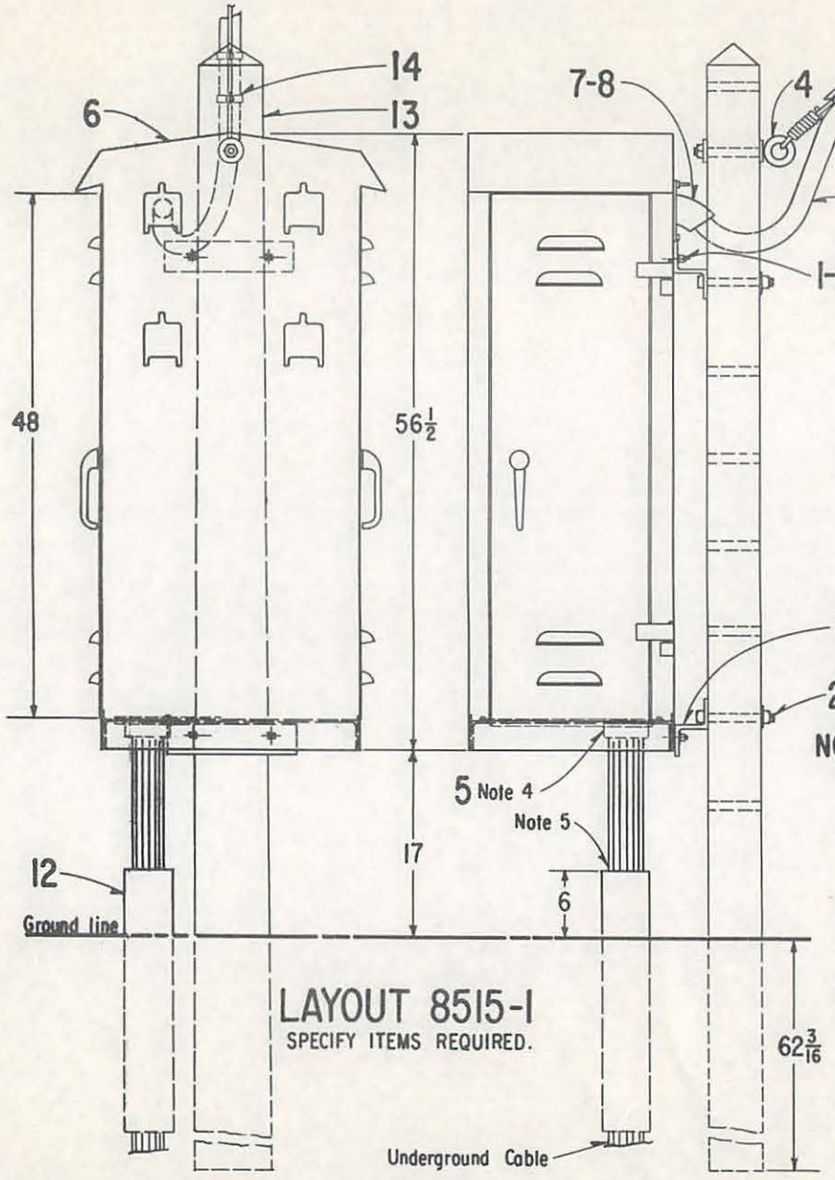

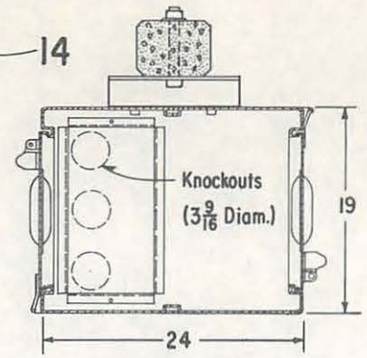

Detail of Floor

NO	ITEM	REF.	REQ.	USE
1	Bolt 1/2-13 X 1-1/2 Sq.Hd.& Nut.	Coml.	4	Items 6 & 16
2	" 3/4-10 X 6-1/2 " " " Hex. Nut.	"	2	Items 13 & 16
3				
4	Bolt, Eye AAR	12813	1	Item 10
5	Bushing, Compl.	8520-23	As Req.	
6	Case, Half Size GRS	A5-150	1	See Note 1.
7	Coupling, Compl. 2 X 2 GRS	P5-163	1	
8	" " 3-1/8 X 3-1/4 GRS	P5-164		
9				
10	Messenger, Strand 3 No. 12 Copperweld	2.2 M	As Req.	
11				
12	Pipe, Soil	2440	As Req.	Specify Size
13	Post, Concrete AAR	12812	1	
14	Straps, Cabling, Without Hook Raco	611	As Req.	Specify Length
15				
16	Support, Case	8520-32	2	
17				
18				
19	Washer, Galv. 1/2 in. SAE	Coml.	4	Item 1
20	" , Lock 1/2 in. SAE Med.	"	4	Item 1
21	" , Galv. 3/4 in. SAE	"	2	Item 2
22				
23				
24				
25				

LAYOUT 8515-1
SPECIFY ITEMS REQUIRED.

NOTES:

1. For details of box fittings available see GRS Catalogue, Sec. 5.
2. Bolts, Nuts and Threads to be in accordance with AAR Spec., Manual Part 17; Washers AAR Spec., Manual Part 35.
3. Aerial Cable, Instruction 485.
4. Cable entrances sealed with Cold Application Compound Item 3, Instruction 405.
5. Soil pipe sealed with Asphaltum Petroleum Compound, Item 11, Instruction 405.
6. Protective treatment-Outside metal surfaces, Primer, Item 31, Paint, Item 53; inside surfaces, Paint, Item 33; Exposed underground cable, Paint, Item 37, Instruction 350.

0 6 12 24
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
STEEL CASE
HALF SIZE

Approved H.A. Scott
Chief Signal Engineer

S-8515

ISSUED JUN 16 58

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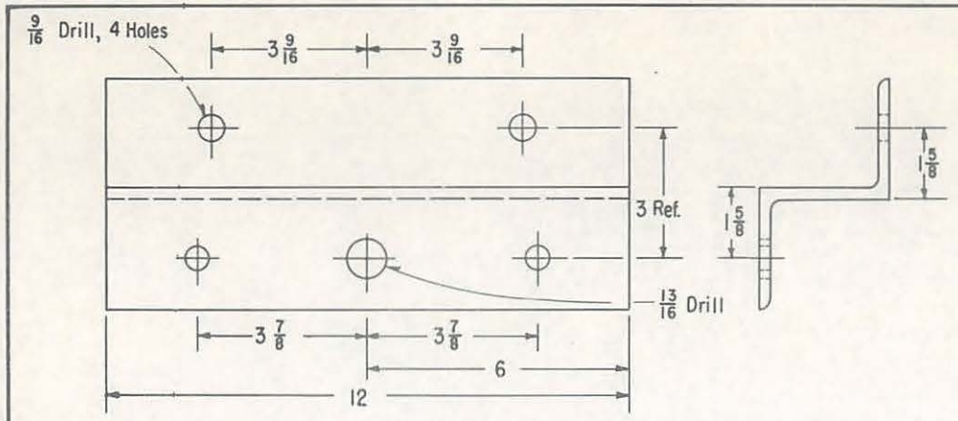
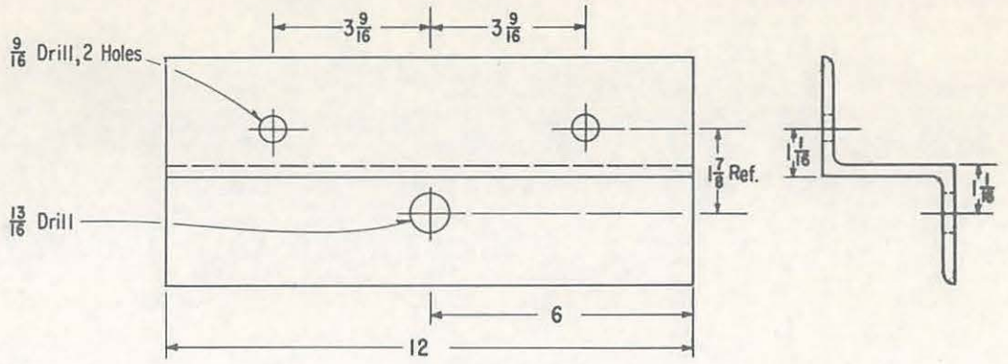


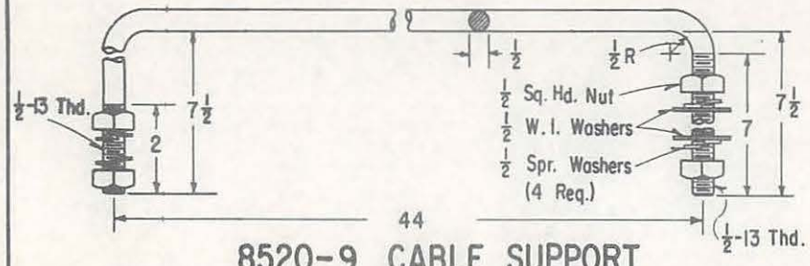
8520-31 CASE SUPPORT

3 X 2¾ - 6.7 Lb. STRUCTURAL STEEL Z



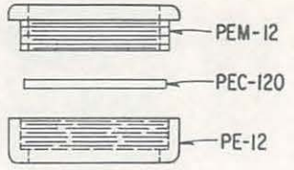
8520-32 CASE SUPPORT

3 X 2¾ - 6.7 Lb. STRUCTURAL STEEL Z



8520-9 CABLE SUPPORT

C 1020 STEEL



8520-23 BUSHING, COMPL.

ADALET CO. OR EQUAL

NOTES:

1. Nuts and Threads shall be in accordance with AAR Spec., Manual Part 17. Washers shall be in accordance with AAR Spec., Manual Part 35.
2. Protective treatment, Primer, Item 31, Instruction 350.

0 3 6 12

ALL DIMENSIONS GIVEN IN INCHES.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

STEEL CASE

DETAILS

Approved H.A. Scott
Chief Signal Engineer

S-8520

ISSUED JAN 16 '58

SHEET 1 Cont'd on Sh

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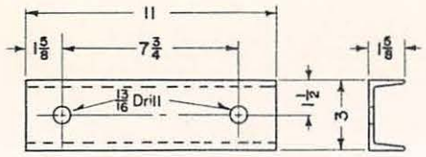
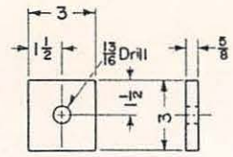
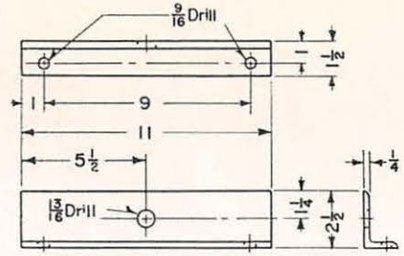


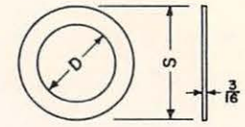
8520-1 SPACER
6 LB. CHANNEL



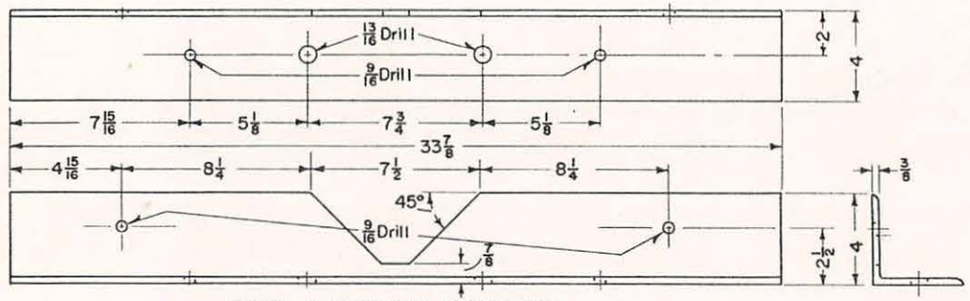
8520-2 WASHER
C 1020 STEEL



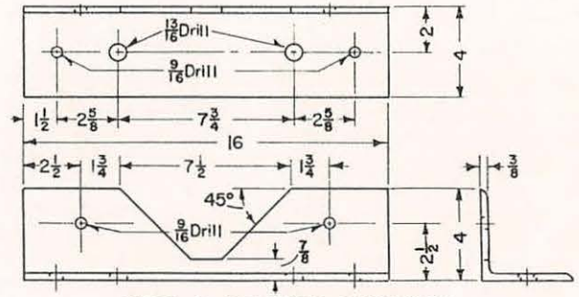
8520-3 TOP SUPPORT
3.19 LB. ANGLE



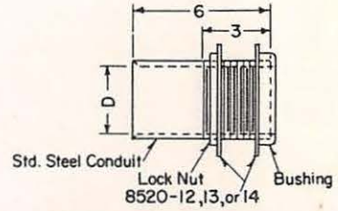
8520-12 WASHER - D=2 1/2, S=4
8520-13 WASHER - D=3 5/8, S=5
8520-14 WASHER - D=4 5/8, S=6
C 1020 STEEL



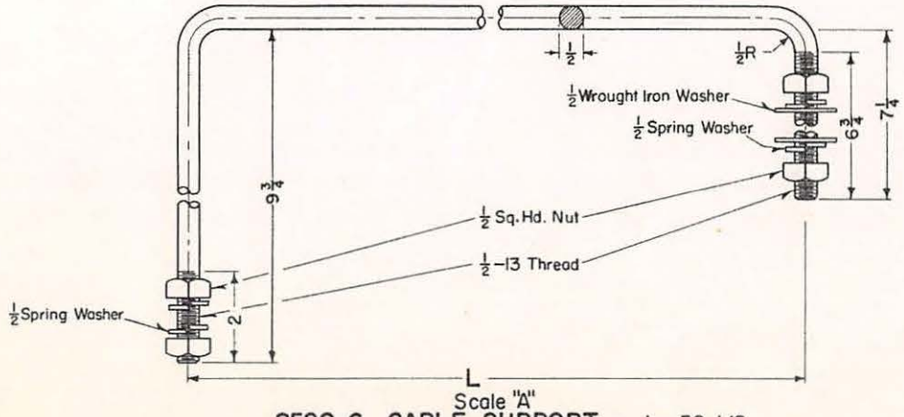
8520-4 BOTTOM SUPPORT
9.8 LB. ANGLE



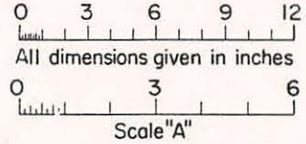
8520-5 BOTTOM SUPPORT
9.8 LB. ANGLE

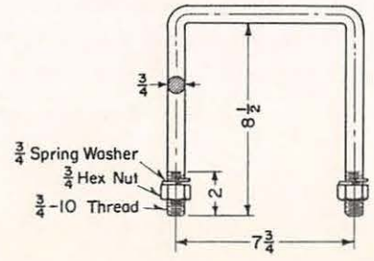


8520-22 NIPPLE - D=2
8520-23 NIPPLE - D=3
8520-24 NIPPLE - D=4



8520-6 CABLE SUPPORT - L=59 1/2
8520-7 CABLE SUPPORT - L=47 1/4
C 1020 STEEL





8520-8 U BOLT
C 1020 STEEL

NOTES:

1. External threads shall be ASA-UNC-2A with rounded root throughout.
2. Internal threads shall be ASA-UNC-2B.
3. Protective treatment - Primer, Item 31, Instruction 350.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
STEEL CASE
DETAILS

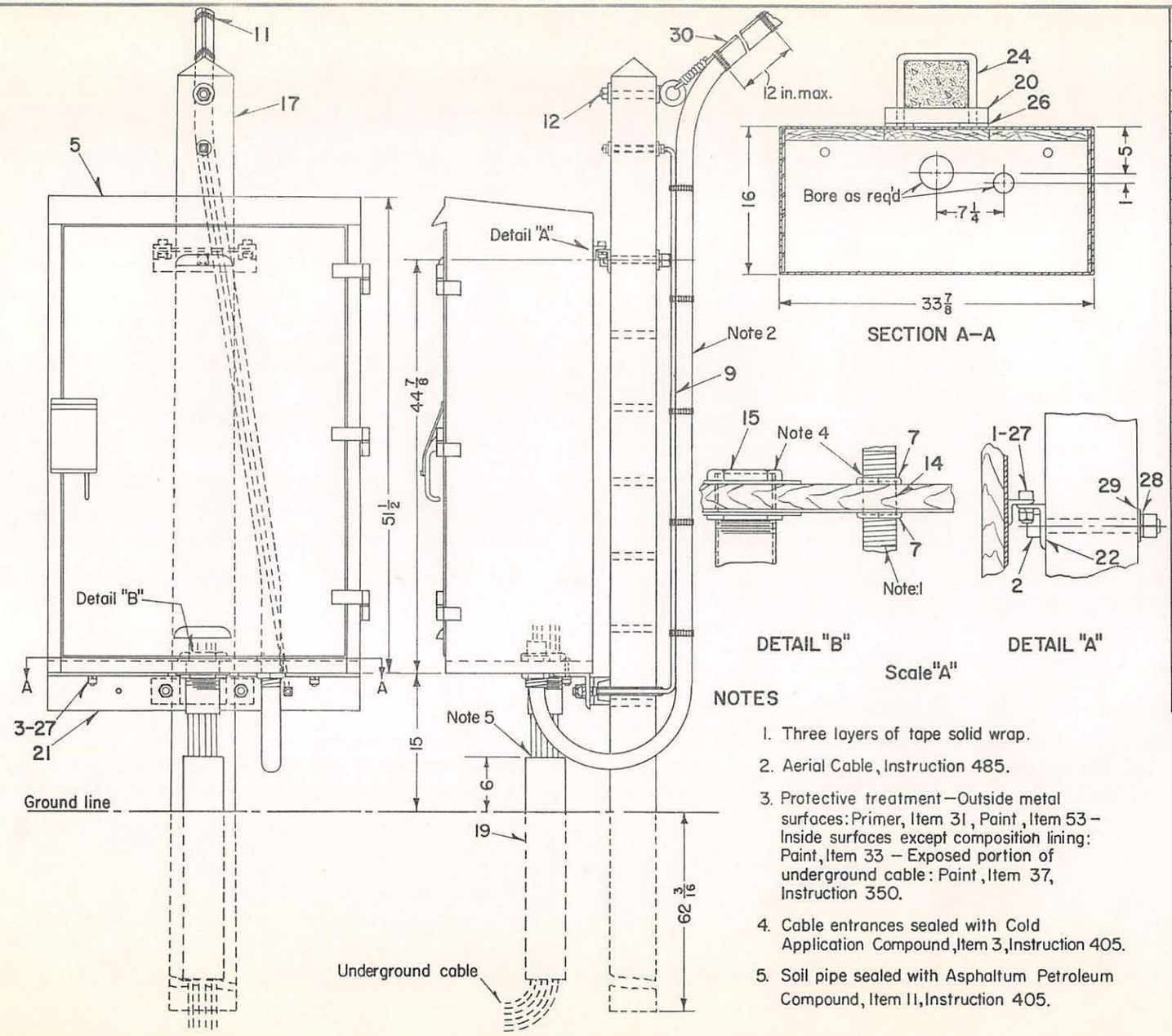
Approved H A Scott
Chief Signal Engineer

S-8520

Printed in U.S.A.

ISSUED 4-2-57

SHEET 1 Cont'd on Sh.



NOTES

1. Three layers of tape solid wrap.
2. Aerial Cable, Instruction 485.
3. Protective treatment—Outside metal surfaces: Primer, Item 31, Paint, Item 53 – Inside surfaces except composition lining: Paint, Item 33 – Exposed portion of underground cable: Paint, Item 37, Instruction 350.
4. Cable entrances sealed with Cold Application Compound, Item 3, Instruction 405.
5. Soil pipe sealed with Asphaltum Petroleum Compound, Item 11, Instruction 405.

NO.	ITEM	REF.	REQ.	USE
1	Bolt 1/2 X 1 1/4 sq.hd. & hex.nut		2	Top support
2	" 3/4 X 6 1/2 " " " "		1	Top support
3	" 1/2 X 1 3/4 galv. carriage		2	Bottom support
4				
5	Box, complete with ventilators	GRS 5431I-56 GR.1	1	
6				
7	Bushing		2	Item no. 14
8				
9	Cable Support, Complete	8520-6	1	
10				
11	Cabling strap, beaded (lgth. as req.)	Raco No. 503 without hook		
12	Eye, bolt	AAR 12813	1	Wire support
13				
14	Nipple (order as required)		1	Drop entrance
15	" (" " " ")	8520-22	1	U.C. "
16		23 or 24		
17	Post	AAR 12812	1	
18				
19	Soil Pipe (order as required)	2440		
20	Spacer	8520-1	1	Bottom support
21	Support, bottom	8520-4	1	
22	" , top	8520-3	1	
23				
24	U Bolt complete	8520-8	1	Bottom support
25				
26	Washer, square	8520-2	2	Bottom support
27	" 1/2 common spring		4	Items no. 1 & no. 3
28	" 3/4 " "		1	Item no. 2
29	" 3/4 wrought iron		1	" " 2
30	Wire, solid no. 6 Copperweld or equal			

Scale "A" 0 3 6 9 12
0 6 12 24
All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
STEEL CASE
4 WAY

Approved H. A. Scott
Chief Signal Engineer

S-8525

ISSUED 4-2-57
SHEET 1 Cont'd on Sh.

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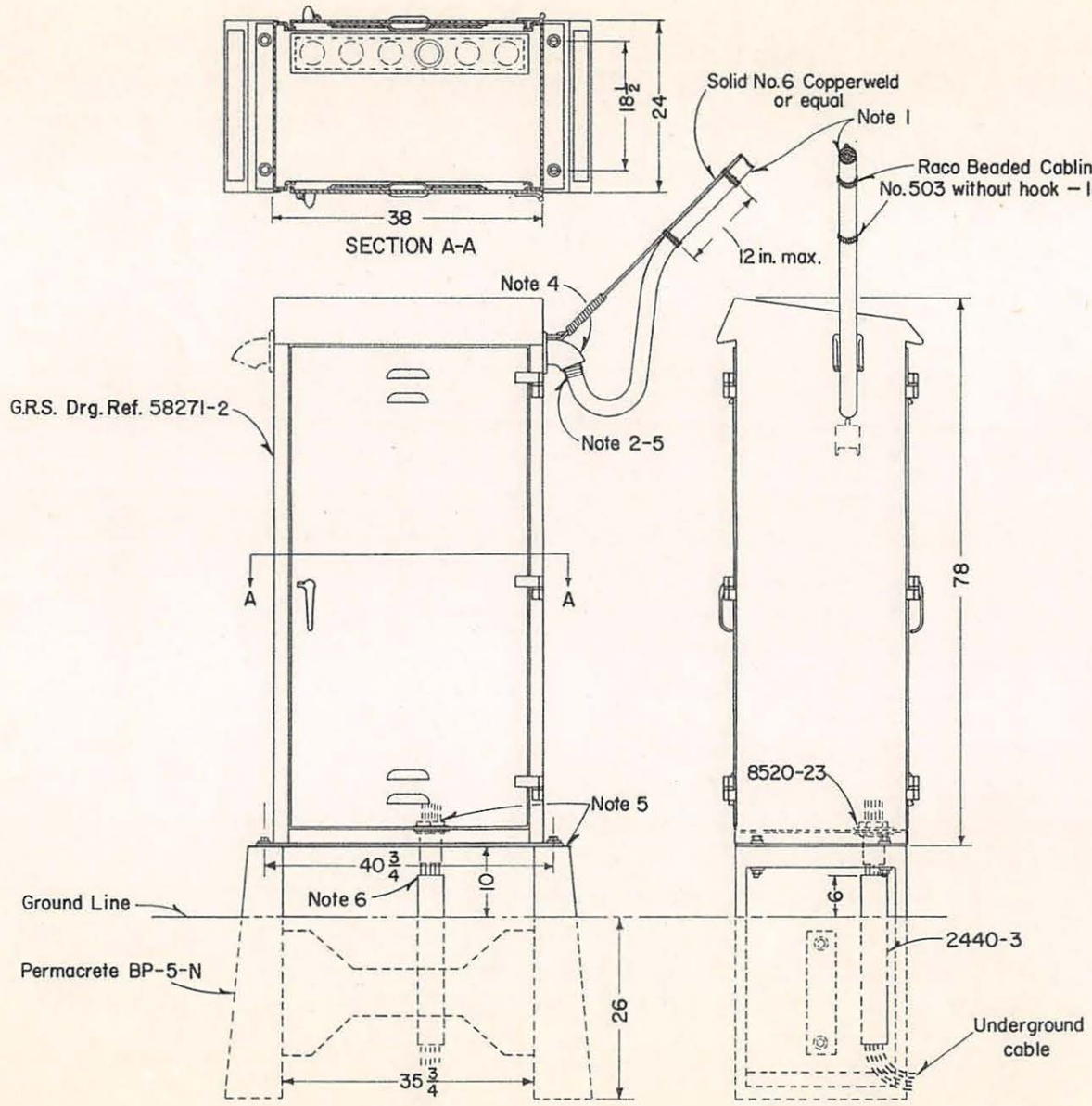
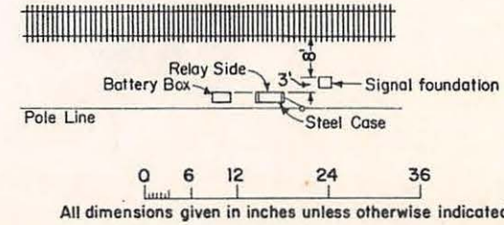


NOTES:

1. Aerial cable to be in accordance with Instruction 485 paragraph 4.
2. Signal wires through outlet to be wrapped with several layers of tape and painted per Instruction 350, Item 38.
3. Protective treatment – Outside surfaces: Primer, Item 31, Paint, Item 53 – Inside surfaces except composition lining: Paint, Item 33 – Foundation nuts and bolts: Grease, Item 62 Instruction 350.
4. One cable entrance coupling and ground post furnished with each case. Additional couplings must be ordered if required. Specify size: $3\frac{1}{4} \times 3\frac{1}{4}$ opening G.R.S. ref. 45689-150
   2×2 " " " 45689-91
5. Cable entrances sealed and foundation tops coated ($\frac{1}{8}$ inch layer) with Cold Application Compound, Item 3, Instruction 405.
6. Soil pipe sealed with Asphaltum Petroleum Compound, Item 11, Instruction 405.



All dimensions given in inches unless otherwise indicated

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

STEEL CASE

HIGH SINGLE

Approved H. A. Scott
Chief Signal Engineer

S-8550

ISSUED 4-2-57

SHEET 1 Cont'd on Sh.

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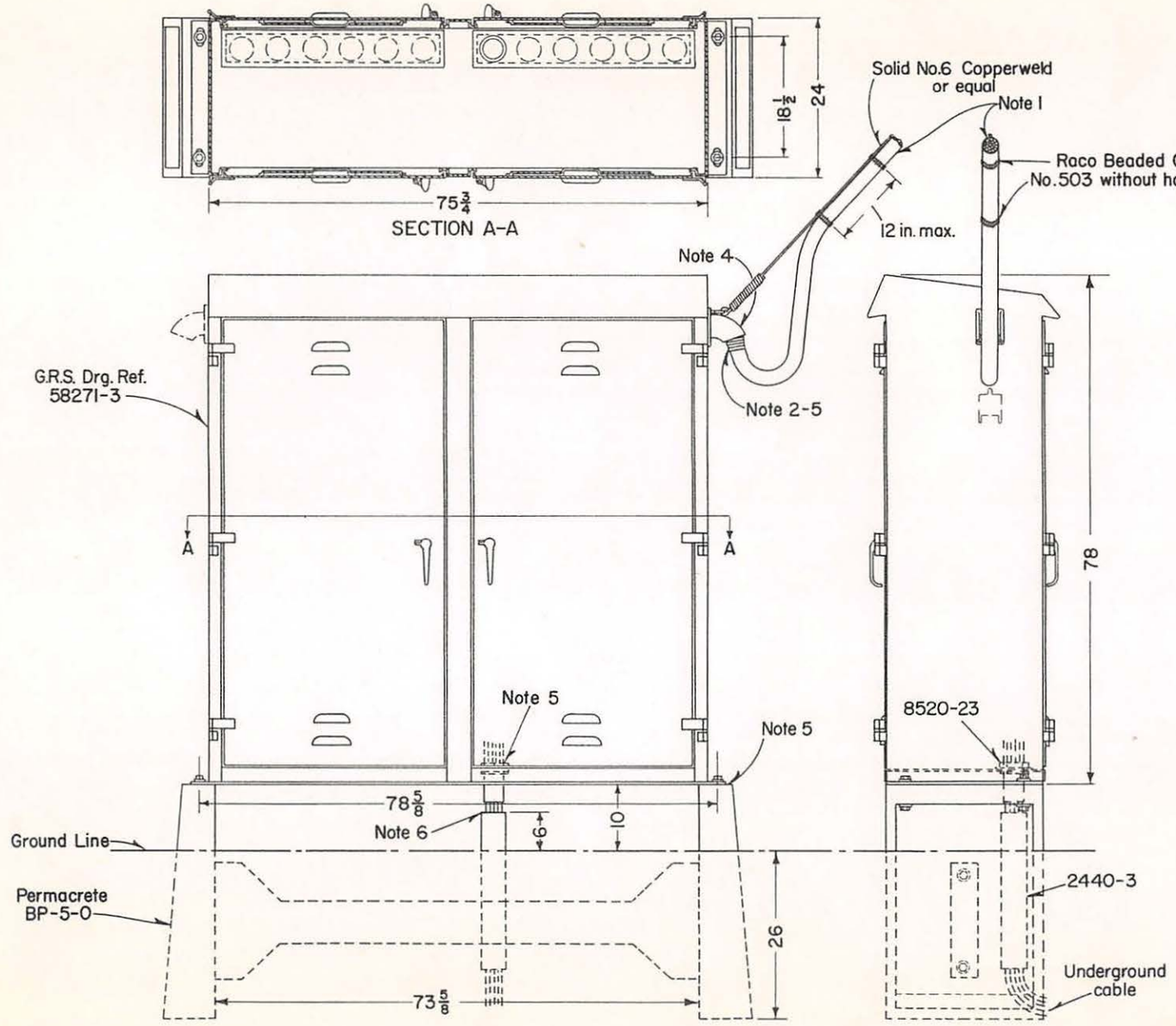
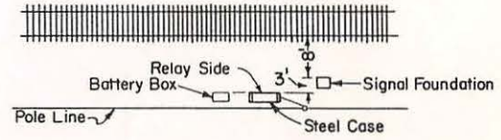


NOTES:

1. Aerial cable to be in accordance with Instruction 485 paragraph 4.
2. Signal wires through outlet to be wrapped with several layers of tape and painted per Instruction 350, Item 38.
3. Protective treatment – Outside surfaces: Primer, Item 31, Paint, Item 53 – Inside surfaces except composition lining: Paint, Item 33– Foundation nuts and bolts: Grease, Item 62, Instruction 350.
4. One cable entrance coupling and ground post furnished with each case. Additional couplings must be ordered if required. Specify size: $3\frac{1}{4} \times 3\frac{1}{4}$ opening G.R.S. ref. 45689-150
   2×2 " " " 45689-91
5. Cable entrances sealed and foundation tops coated ($\frac{1}{8}$ inch layer) with Cold Application Compound, Item 3, Instruction 405.
6. Soil pipe sealed with Asphaltum Petroleum Compound, Item 11, Instruction 405.



0 6 12 24 36

All dimensions given in inches unless otherwise indicated

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

STEEL CASE

HIGH DOUBLE

Approved H.A. Scott
Chief Signal Engineer

S-8575

ISSUED 4-2-57

SHEET 1 Cont'd on Sh.....

Printed in U.S.A.

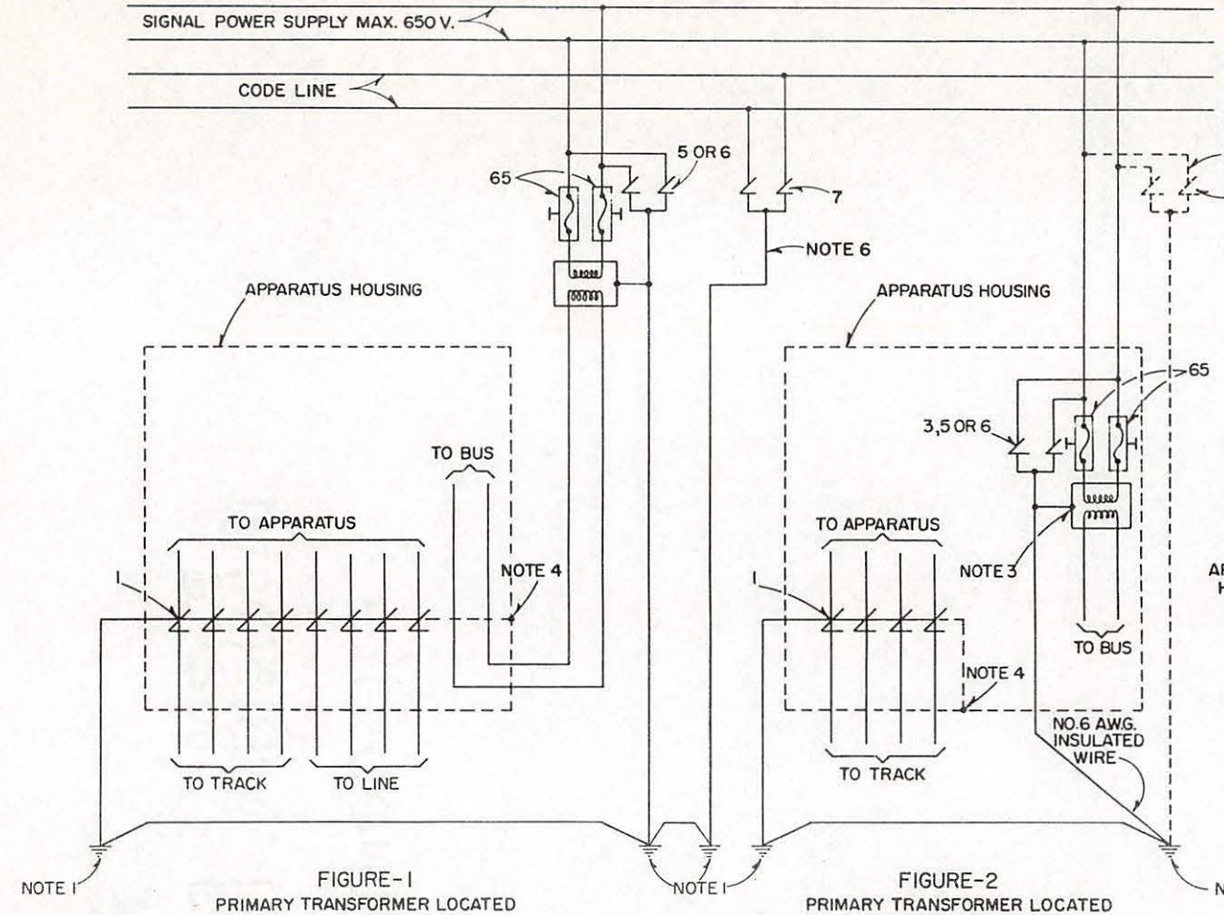


FIGURE-1
PRIMARY TRANSFORMER LOCATED ON POLE

FIGURE-2
PRIMARY TRANSFORMER LOCATED IN APPARATUS HOUSING

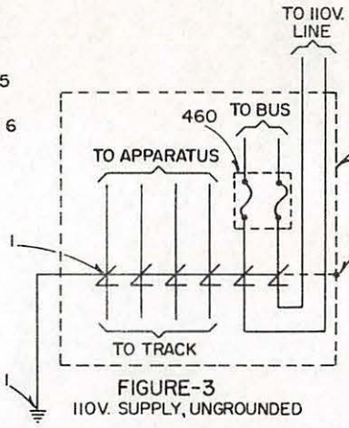


FIGURE-3
110V. SUPPLY, UNGROUNDED

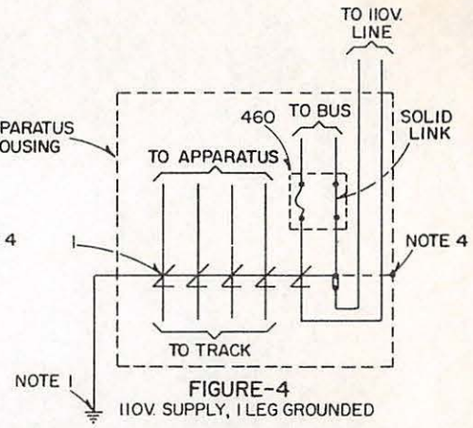


FIGURE-4
110V. SUPPLY, 1 LEG GROUNDED

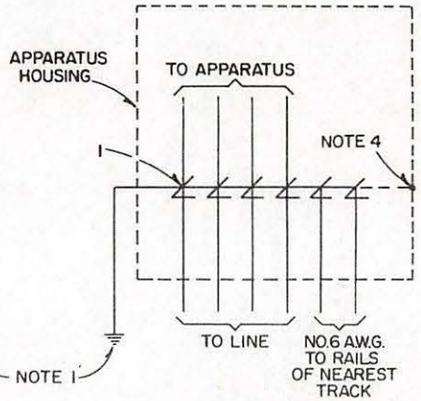
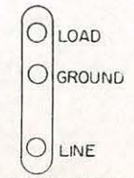


FIGURE-5
LOCATIONS WHERE TRACK CIRCUITS DO NOT ENTER HOUSING

NOTES:

1. See Instruction 256 for ground installation and plan 6315 for detail of connections
2. Where arresters other than those shown are to be used the Chief Signal Engineer's approval must be obtained.
3. Where no ground post is provided, mounting screw will serve as ground connection.
4. Omit where other than steel housing is used.
5. Alternate location of arresters to be used where signal power supply is installed in multiple conductor cable with other signal circuits in accord with plan 7700.
6. Where code line arrester is installed on pole a separate ground wire shall be used from the arrester to ground and located on opposite side of pole from power line ground.
7. Ground wires to be bare No. 6 A.W.G. except as otherwise indicated.

REF.	ITEM	VOLTAGE RANGE AC	VOLTAGE RANGE DC	ORDERING REFERENCE	USE
1	ARRESTER	0-125	0-30	RACO NO. 485-3 CLEARVIEW	SIGNAL CONTROL CIRCUITS
3	ARRESTER	110-650		G.E. NO. 9LA15B22 THYRITE PROTECTOR	SIGNAL POWER TRANS. LINES
5	ARRESTER	110-650	120	G.E. NO. 9LA15A7 VALVE TYPE - SINGLE	" " " "
6	ARRESTER	110-650		L-M NO. AS1A2 VALVE TYPE - DOUBLE	" " " "
7	ARRESTER	110-650		L-M NO. AS3A2 VALVE TYPE - DOUBLE	CODE LINE
65	FUSED CUTOUT	250-650	250-650	L-M NO. FS1A1 WITH FUSE NO. FL1A3	SIGNAL POWER SUPPLY MAX. 20 AMP.
460	DISCONNECT SWITCH	0-250	0-250	RACO NO. 324	" " "



MOUNTING POSITION OF ITEM NO. 1

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TYPICAL CIRCUITS
ARRESTER APPLICATION

Approved H. A. Scott
Chief Signal Engineer

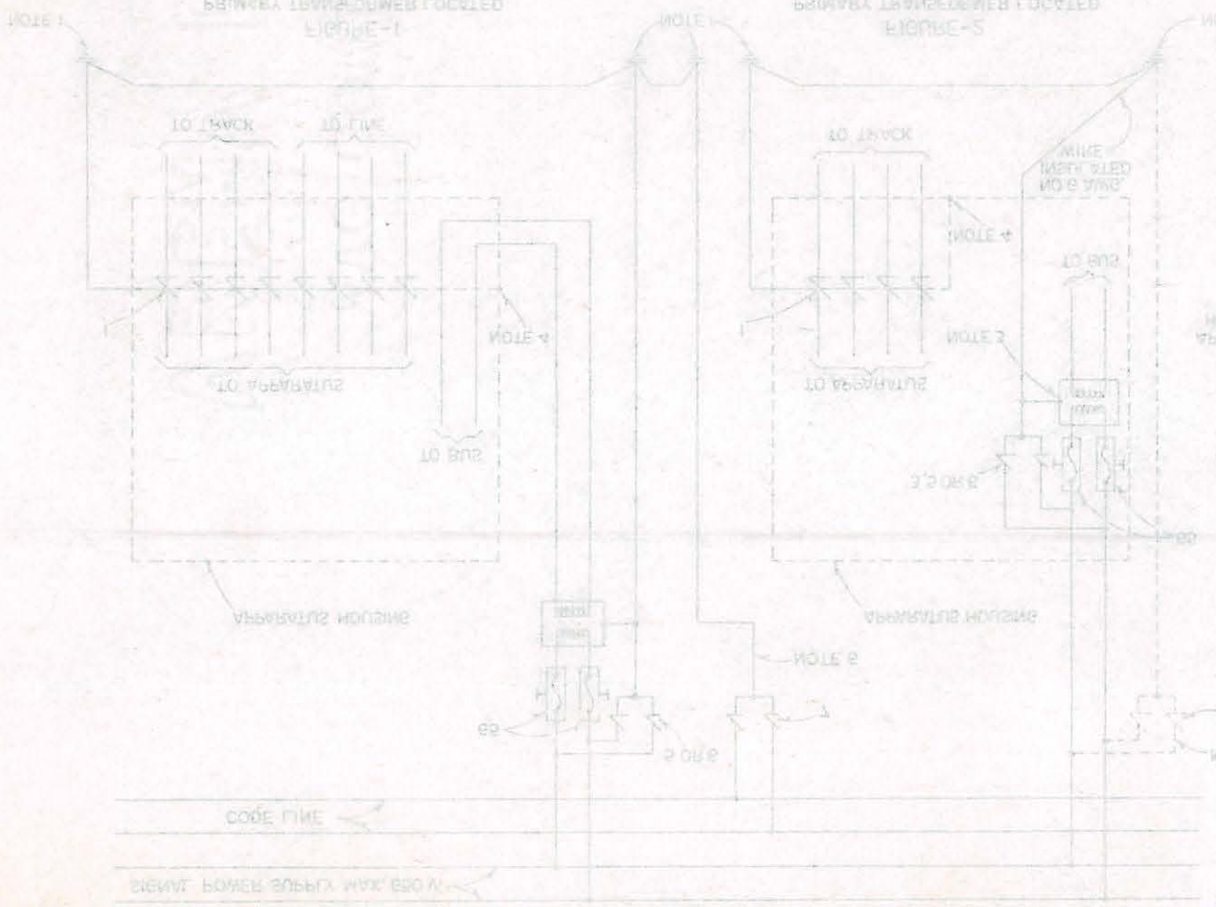
S-9038

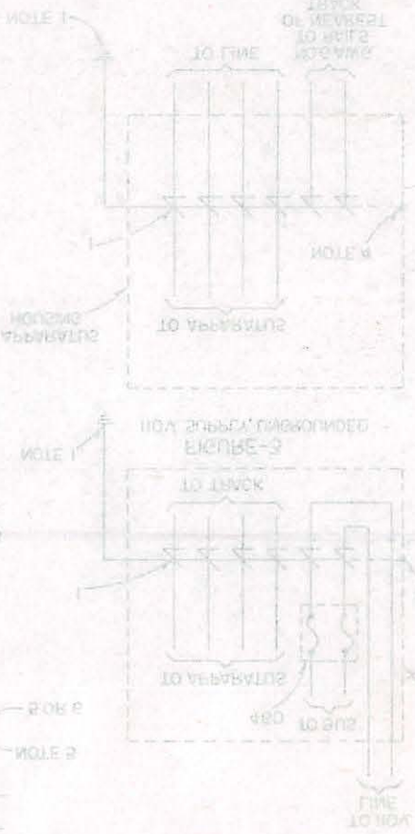
ISSUED 12-18-57

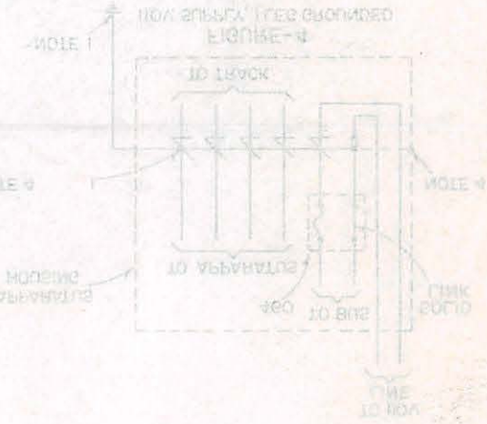
SHEET 1 Cont'd on Sh

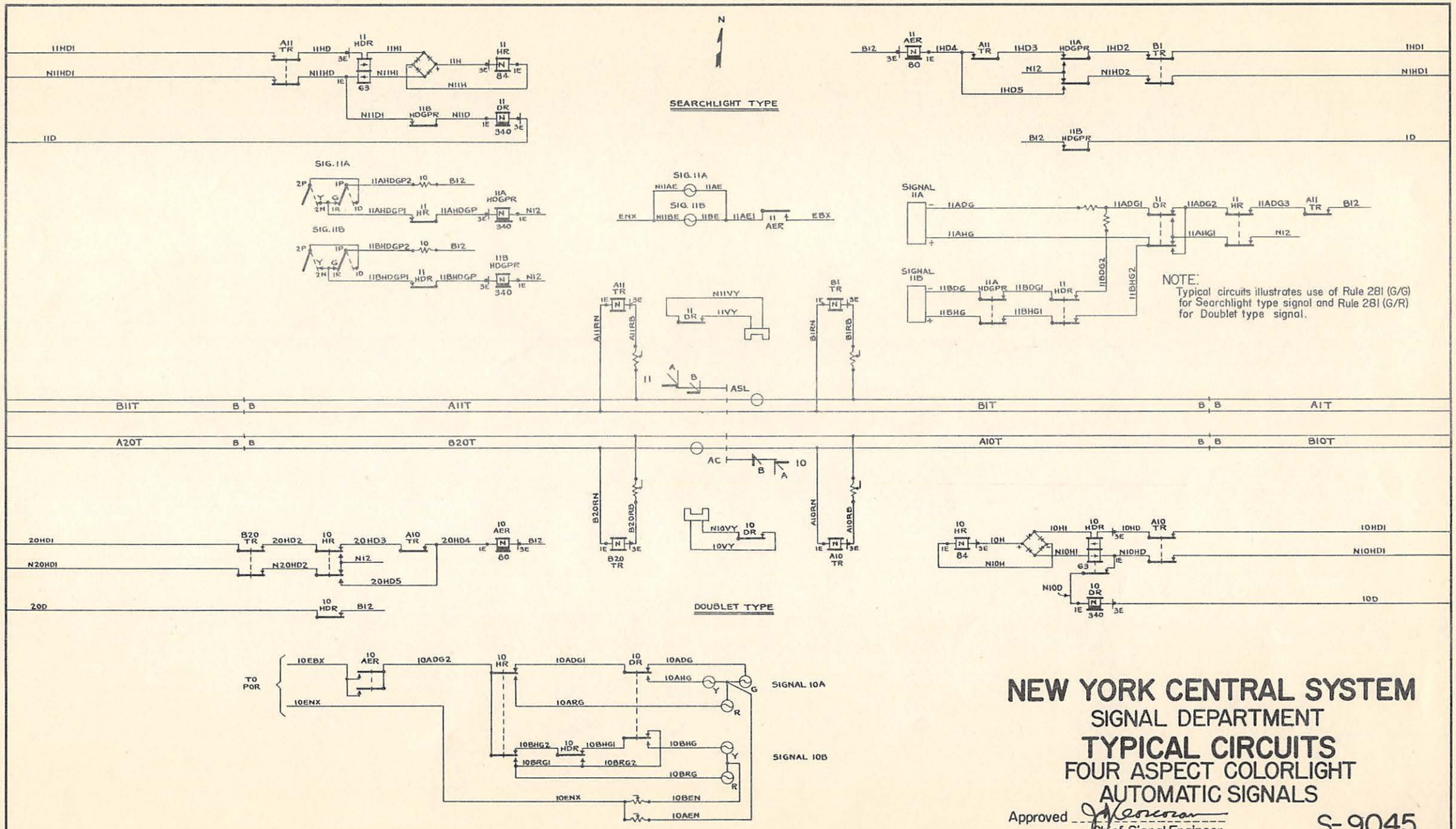
Printed in U. S. A.

RECEIVED
FEB 10 1958
CUSTOMER SERVICES DEPT.
ORD. SECT.









NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

TYPICAL CIRCUITS

FOUR ASPECT COLORLIGHT AUTOMATIC SIGNALS

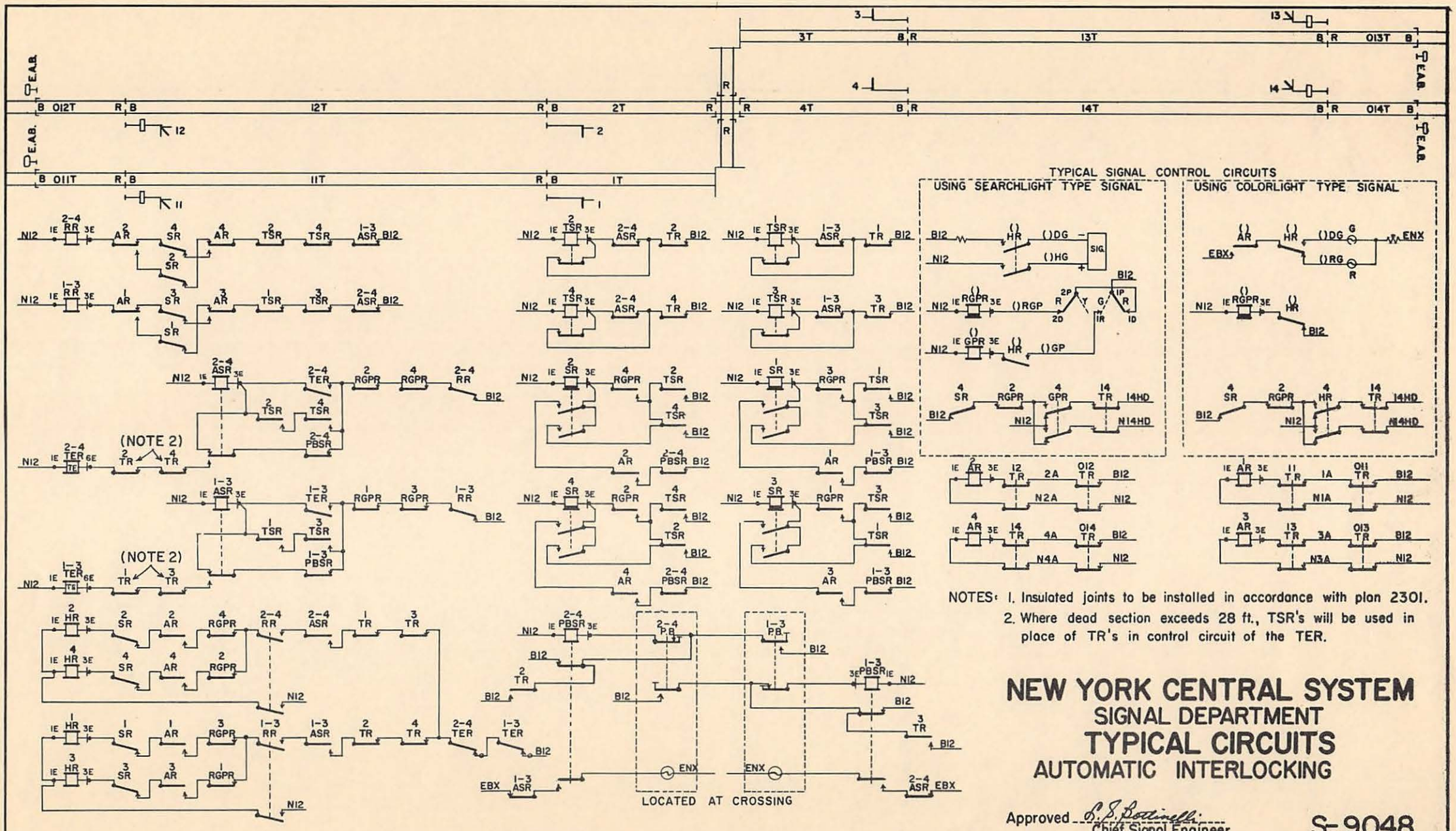
Approved _____
Chief Signal Engineer

S-9045

Printed in U.S.A.

ISSUED 10-1-54

SHEET 1 Cont'd on Sh.



NOTES: 1. Insulated joints to be installed in accordance with plan 2301.
2. Where dead section exceeds 28 ft., TSR's will be used in place of TR's in control circuit of the TER.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TYPICAL CIRCUITS
AUTOMATIC INTERLOCKING

Approved B. J. Bottinelli
Chief Signal Engineer

S-9048

ISSUED 2-17-59

SHEET 1 Cont'd. on Sh.

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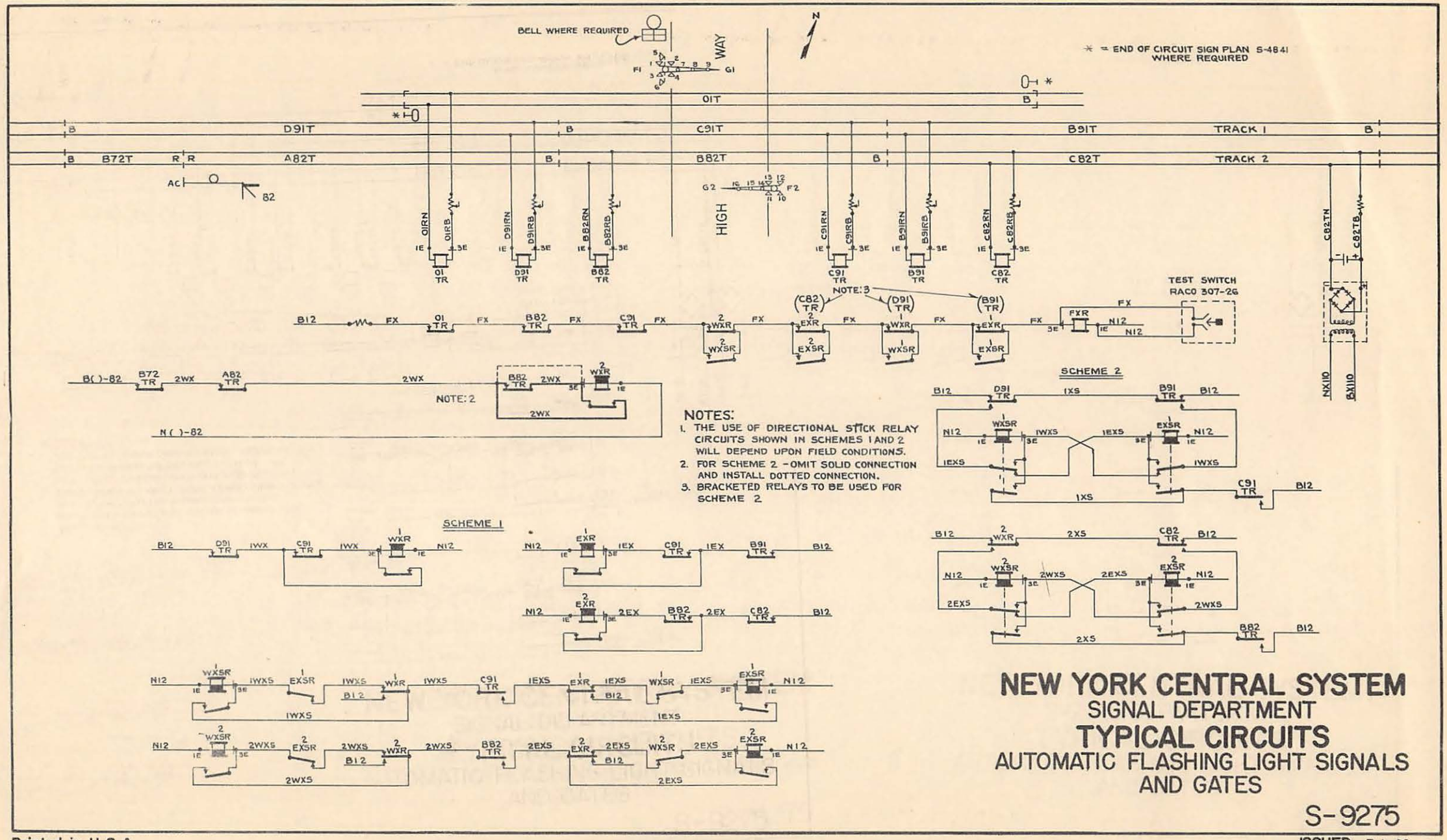
MAR 25 1959
ORD. ENTRY SECT.



NOTES:

1. THE USE OF DIRECTIONAL STICK RELAY CIRCUITS SHOWN IN SCHEMES 1 AND 2 WILL DEPEND UPON FIELD CONDITIONS.
2. FOR SCHEME 2 - OMIT SOLID CONNECTION AND INSTALL DOTTED CONNECTION.
3. BRACKETED RELAYS TO BE USED FOR SCHEME 2.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

TYPICAL CIRCUITS

AUTOMATIC FLASHING LIGHT SIGNALS AND GATES

S-9275

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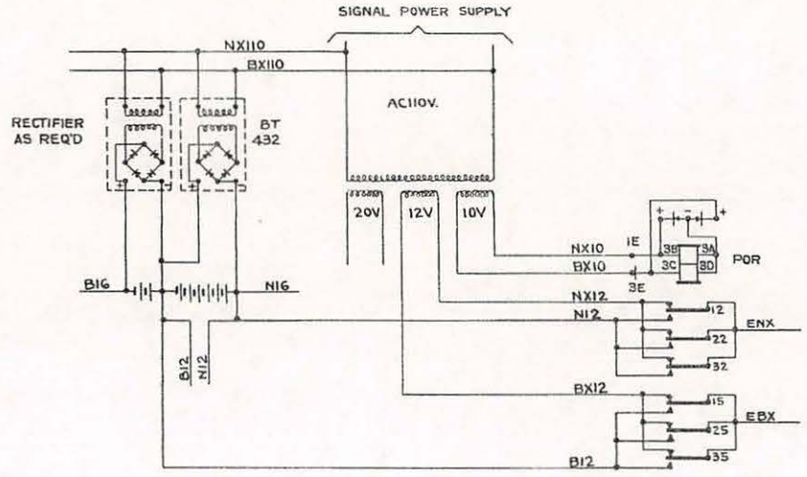
ISSUED 7-1-60

SHEET 1 Cont'd on Sh. 2



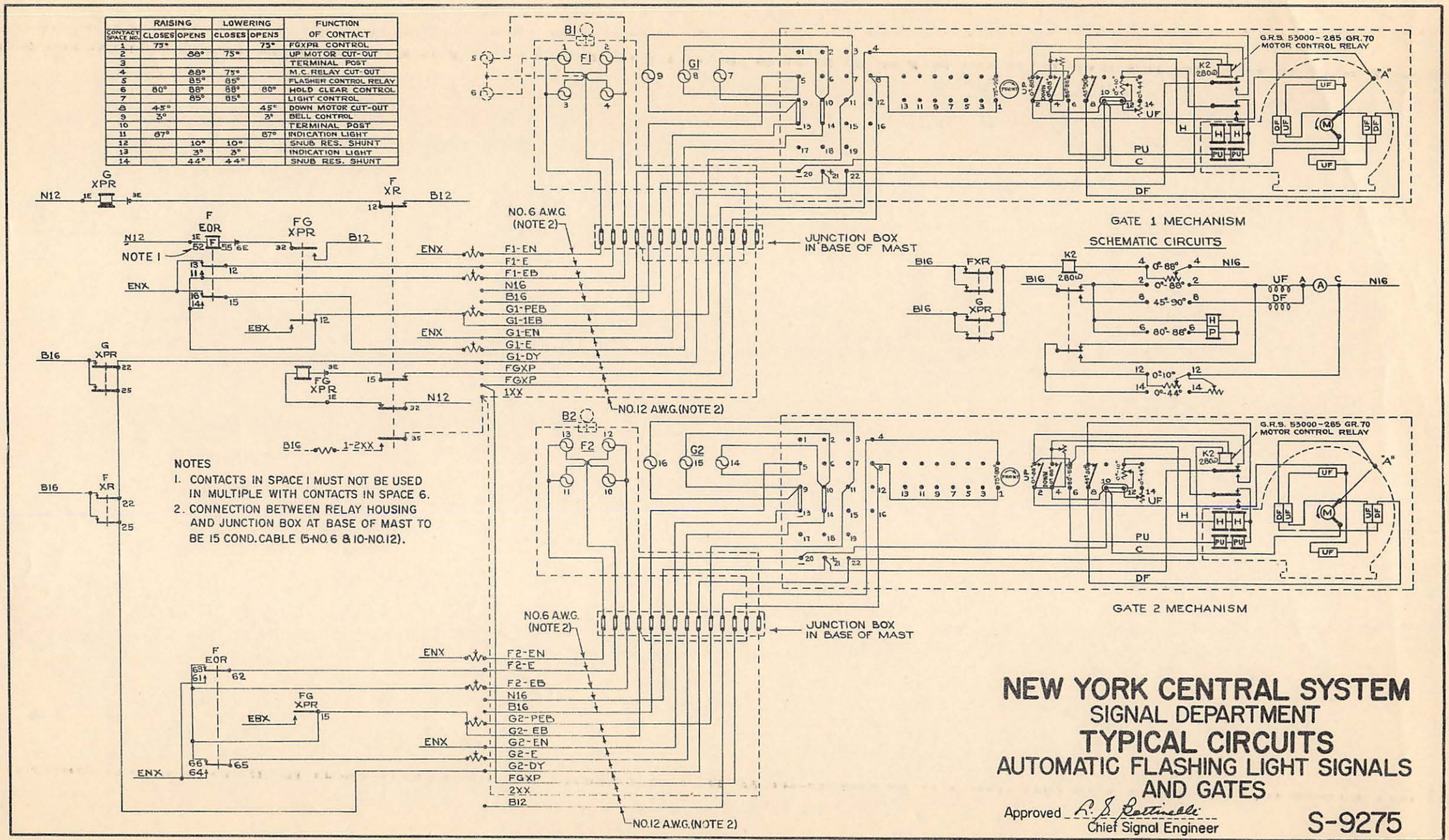
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TYPICAL CIRCUITS
AUTOMATIC FLASHING LIGHT SIGNALS AND GATES

S-9275

Printed in U.S.A.

ISSUED 7-1-60

SHEET 2 Cont'd on Sh. 3



NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TYPICAL CIRCUITS
AUTOMATIC FLASHING LIGHT SIGNALS AND GATES

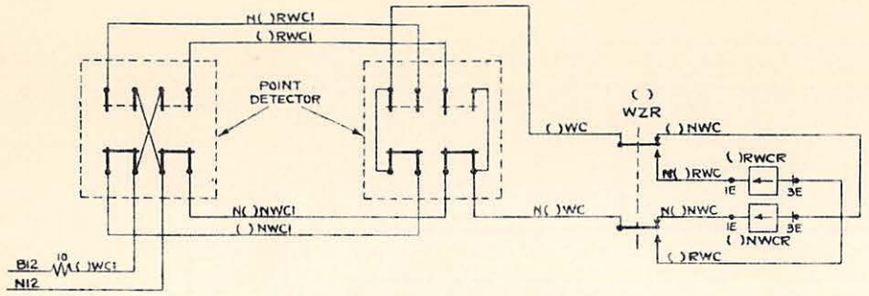
Approved C. J. Pattinelli
Chief Signal Engineer

S-9275

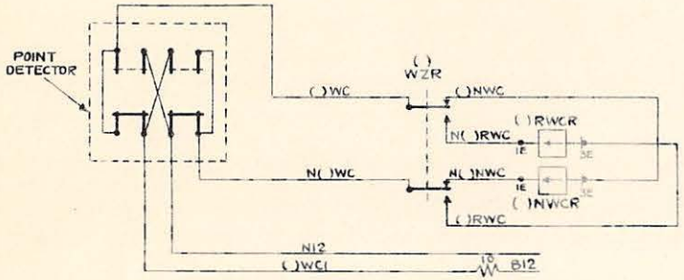
Printed in U.S.A.

ISSUED 7-1-60

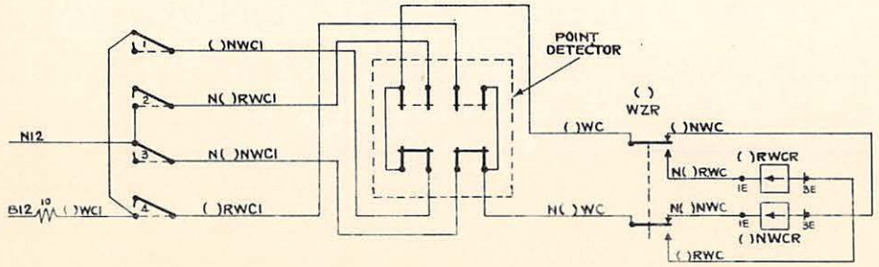
SHEET 3 Cont'd on Sh.



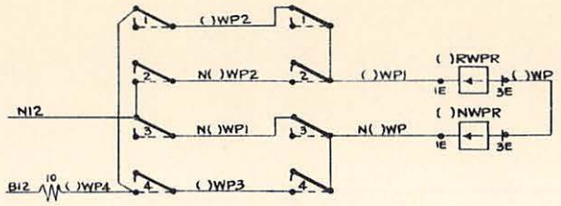
Crossover (Model 5A or 5C Switch Machine)



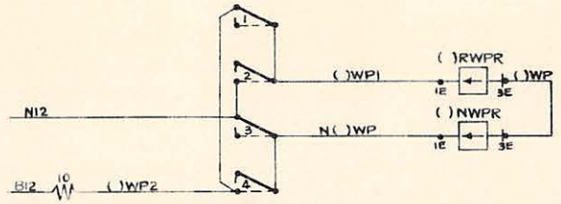
Single Switch(Model 5A or 5C Switch Machine)



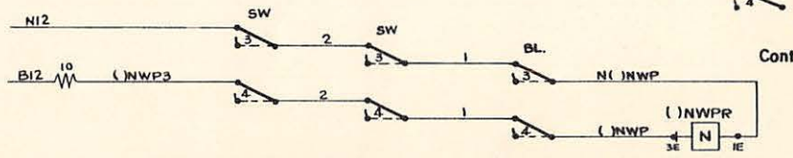
Switch and Derail (Switch Circuit Controller and Model 5A or 5C Switch Machine)



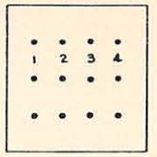
Crossover (Switch Circuit Controller)



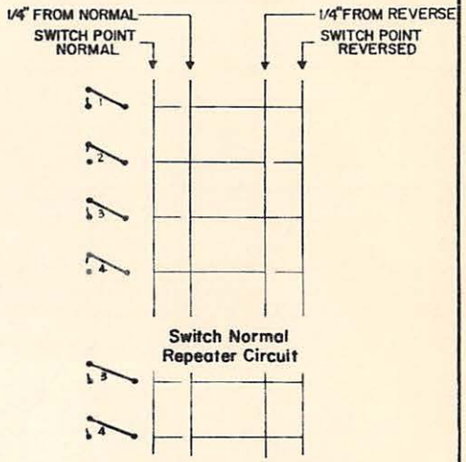
Single Switch (Switch Circuit Controller)



Normal Switch Repeater (Switch Circuit Controller)



Switch Circuit Controller Adjustments Polarized Circuits



Switch Normal Repeater Circuit

Contacts Shown with Switch in Normal Position

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TYPICAL CIRCUITS
SWITCH REPEATER

Approved J. Corcoran
Chief Signal Engineer

S-9800

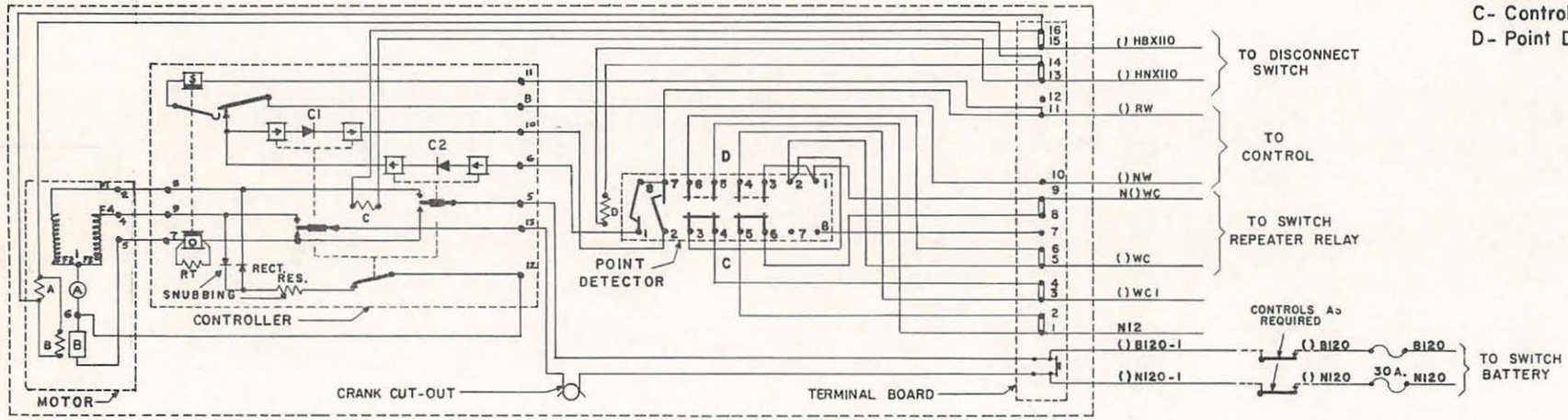
Printed in U.S.A.

ISSUED 7-1-54

NOTES:

1. Circuits shown are for right hand layout.
2. Left hand layout requires the following change in connections,
   - connect ( )RW to terminal 10
   - " ( )NW " " 11
   - " N( )WCI " " 5
   - " ( )WCI " " 9
3. Switch heaters:

A- Motor	25 W. G.R.S 56090-12 gr. 1
B- Brake	12 W. G.R.S. 56090-10 gr. 3
C- Controller	15 W. G.R.S. 56090-20gr. 1
D- Point Detector	25 W. G.R.S. 56090- 6 gr. 4



NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

TYPICAL CIRCUITS

SINGLE SWITCH

G.R.S. MOD. 50 110 V. SWITCH MACHINE

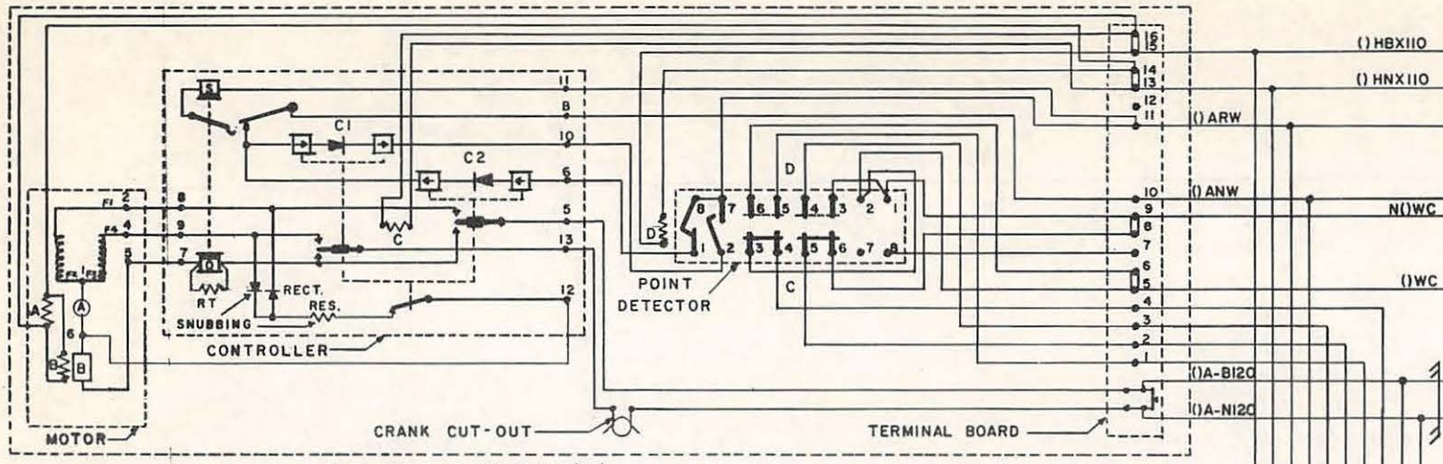
Approved H. A. Scott
Chief Signal Engineer

S-9801

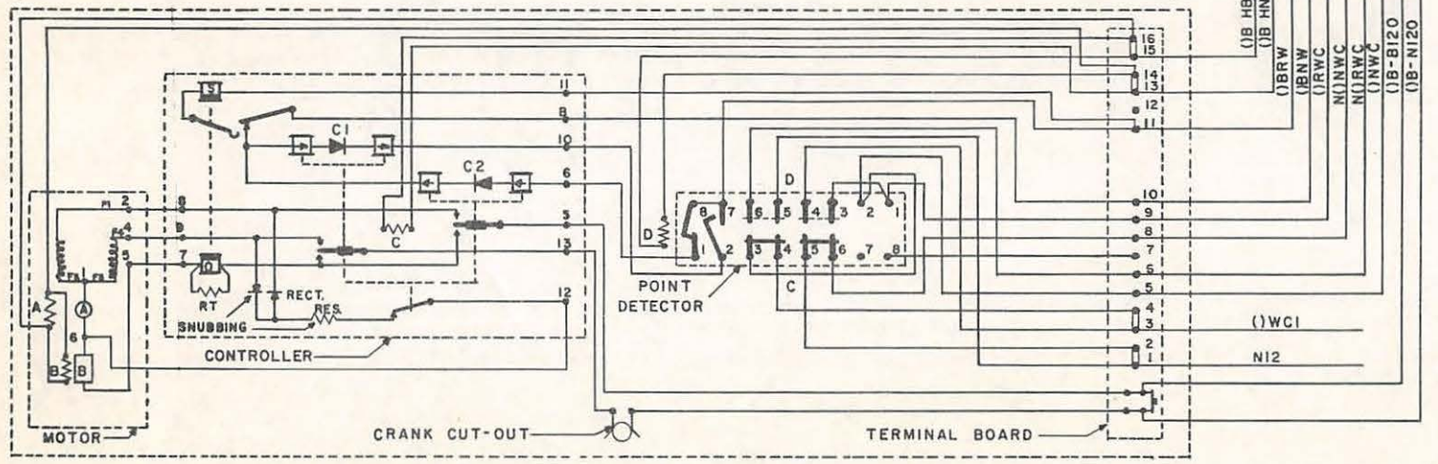
Printed in U.S.A

ISSUED 10-15-58

SHEET 1 Cont'd on Sh



NEAR SWITCH MACHINE "A"



FAR SWITCH MACHINE "B"

NOTES: 1. Circuits shown are for right hand layout.

2. Left hand layout requires the following changes in connections—

MACHINE "A"—connect ()ARW to terminal 10
" ()ANW " " 11
" N()WC " " 5
" ()WC " " 9

MACHINE "B"—connect ()BRW to terminal 10
" ()BNW " " 11

Tagging changes—()RWC becomes ()NWC
N()RWC " N()NWC
()NWC " ()RWC
N()NWC " N()RWC

3. Switch heaters:

A-Motor	25W. G.R.S. 56090-12 gr. 1
B-Brake	12W. G.R.S. 56090-10 gr. 3
C-Controller	15W. G.R.S. 56090-20 gr. 1
D-Point Detector	25W. G.R.S. 56090-6 gr. 4

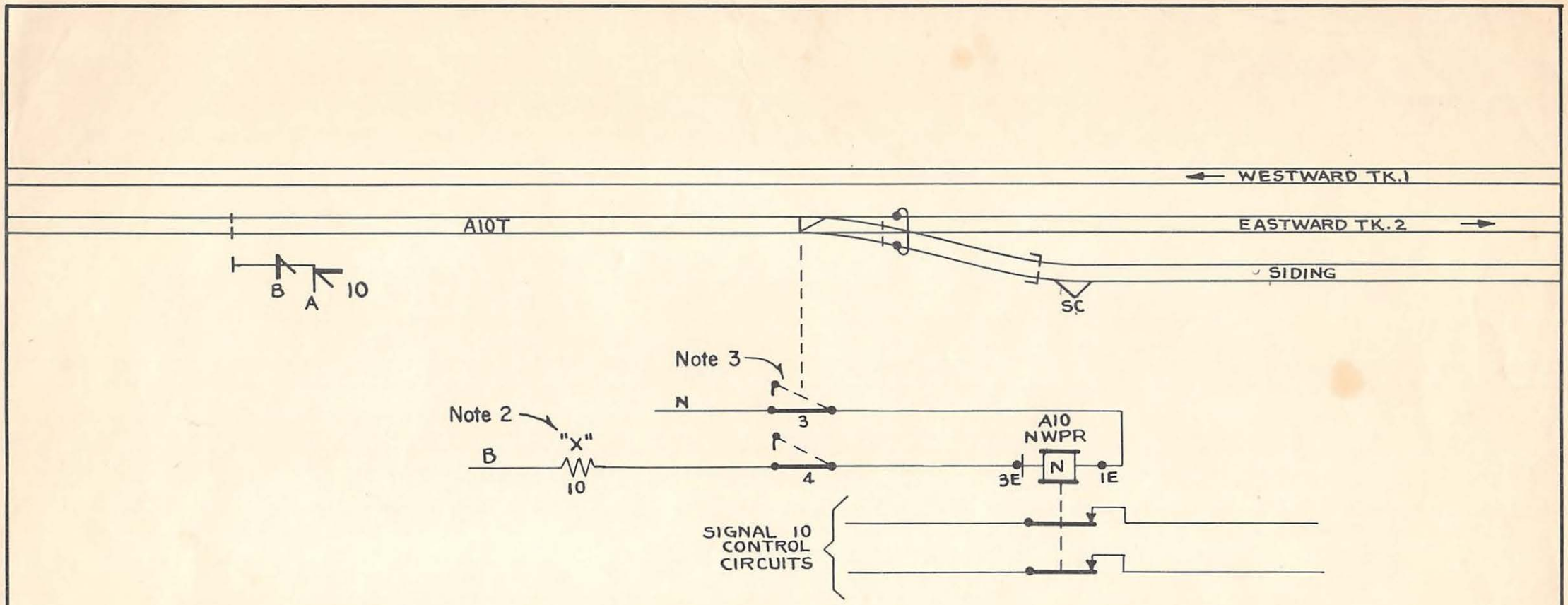
NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TYPICAL CIRCUITS
CROSSOVER
G.R.S. MOD. 5C-110V. SWITCH MACHINE

Approved H. A. Scott
Chief Signal Engineer

S-9802

Printed in U.S.A.

ISSUED 10-15-58



NOTES:

1. Where the use of the battery at a signal location is not economically feasible, a wet or dry primary cell in combination with a 4 ohm relay is to be used.
2. Where primary cell is used resistance "X" to be adjusted to limit the current through the relay to 125% of the maximum working at nominal cell voltage.
3. For circuit controller adjustment see plan 9800.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TYPICAL CIRCUITS
SWITCH REPEATER
HAND OPERATED SWITCH

Approved H.D. Scott
Chief Signal Engineer

S-9803

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ISSUED 2-1-55

SHEET 1 Cont'd on Sh.

→ A. J. Carey (Equip. Engr.)
attached is extra set
for your file. One
set to H. W. Barker on 7/29 and
two sets retained by
Proj Engr.
AJC
CWG

NEW YORK CENTRAL SYSTEM

H. A. SCOTT
CHIEF SIGNAL ENGINEER
L. S. BOTTINELLI
ASSISTANT CHIEF SIGNAL ENGINEER

1324 WEST THIRD STREET
CLEVELAND 13, OHIO

May 13, 1957

File 569

JK 7/29

Union Switch & Signal Co.,
Division of Westinghouse Air Brake Co.,
Swissvale,
Pittsburgh 18, Pa.

Gentlemen:

Herewith four (4) copies of new New York Central System Standard Instruction S-441 (7 sheets) to be inserted in System Standard Book in numerical order.

Indexing

Plan No.	Date	Title	Insert in Index
S-441	5-6-57	Instructions: Track Circuit Adjustment (1-7)	Following 440B on Page 7 of Index.

Yours truly,

H. A. Scott

Chief Signal Engineer.

NEW YORK CENTRAL SYSTEM

H. A. SCOTT
CHIEF SIGNAL ENGINEER
L. S. BOTTINELLI
ASSISTANT CHIEF SIGNAL ENGINEER

1324 WEST THIRD STREET
CLEVELAND 13, OHIO

June 5, 1957

File 569

Union Switch & Signal Co.,
Division of Westinghouse Air Brake Co.,
Swissvale,
Pittsburgh 18, Pa.

Gentlemen:

We are attaching hereto four (4) copies each of Sheets 8 thru 11 of new System Standard Signal Instruction S-441 to be inserted in System Standard Signal Books following Sheet #7 of S-441.

Yours truly,

H. A. Scott

Chief Signal Engineer.

RECEIVED
JUN 6 1957
EQUIP'T. ENG'R

The purpose of this instruction is to establish uniform procedures in the adjustment of steady energy DC track circuits employing standard track relays fed from one cell of storage battery and to obtain maximum practical shunting sensitivity consistent with apparatus employed and variations in ballast resistance.

BATTERY END

The adjustments covered by the instruction are based upon a total resistance of .1 ohm in the battery leads to rail, with an inserted resistance of 1 ohm where lead cells are used and .65 ohm where nickel-iron cells are used.

Normally a 1 ohm fixed resistor can be used with lead cells and a Raco Type 605 1 ohm adjustable resistor set at .65 ohm used with nickel-iron cells, however, it is recommended that the adjustable unit be used for all circuits.

If the leads between the battery and rails are longer than normal, the additional resistance introduced by the added length must be taken into account when making adjustments. To adjust the total limiting resistance (leads plus inserted resistance), connect a low resistance shunt (#6 AWG Copper or larger) across the rails at the battery end of the track circuit and, with the charge off, set the adjustable resistor to allow approximately 2 amperes to flow. The shunt should be applied to the rails with clamps to insure a good connection.

When reading the current to track, a low resistance ammeter with leads as short as practicable should be used and to further reduce the error introduced by the measuring circuit, the current should be read on the 15 ampere scale of the meter.

RELAY END

To facilitate adjustment, the amount of series resistance which may be inserted in the relay leads has been calculated for various minimum ballast settings and the results plotted as curves which form a part of this instruction. The calculations are based upon a bonded track resistance of .025 ohm per thousand feet which is the equivalent of 127# rail with rail head bonds.

Three minimum ballast settings are plotted for each type of relay. The four ohm adjustment may be used where ballast and ties are in excellent condition, the three ohm setting may be used generally under average ballast and tie conditions. While the two ohm setting should be used where ballast and ties are poor.

USE OF ADJUSTMENT CURVES

After determining that proper limiting resistance has been inserted in the battery leads, select the Figure which covers the type of relay and cell to be used. From the minimum ballast curve (2, 3 or 4 ohms) read the series resistance to be inserted in the relay leads for the length of circuit under adjustment.

For example using Figure 1, which covers a B1 track relay Dwg. 56001-714 Gr. 1 with coils in multiple and a lead storage cell, the amount of resistance inserted to adjust a 3,000 foot circuit to 4 ohm ballast per thousand feet is found to be 5 ohms.

In some cases within interlocking limits, an additional relay is installed in a turnout along with the regular relay on the main track. This calls for adjusting a circuit with two relays fed from the same cell. To make this adjustment, the total length of track circuit is taken as the distance from the battery end to the relay end of the circuit on the main track plus the length of the turnout. Using this total circuit length, the amount of series resistance to be added is read from the curve and 85% of the value indicated inserted in each relay.

MEASURING BALLAST AND RAIL RESISTANCE

It is unnecessary to measure ballast and rail resistance in order to use the adjustment curves, however, when a circuit does not operate properly with normal adjustment or where it is suspected that some abnormal condition obtains within the circuit, it may be necessary to measure its characteristics.

To measure ballast and rail resistance, disconnect the track relay and place a low resistance shunt, attached to the rail with clamps, across the track at the relay end of the circuit. Measure the voltage (E) across the rails and the current (I) to track at the feed end with the circuit so shunted. The approximate rail resistance R_m is then determined by E/I. Remove the shunt and again read the voltage across the rails and the current to track at the feed end. The approximate ballast resistance B_m is then determined by E/I.

For all practical purposes these values for rail and ballast resistance may be assumed to be correct, however, on long circuits having very low ballast and high rail resistance, an appreciable error may exist. The degree of error can be readily determined by dividing R_m by B_m to arrive at a ratio. In Figure A, the ratios R_m/B_m are plotted as abscissae enabling a correction factor to be read from the curve. Multiplying R_m by the correction factor and dividing B_m by the correction factor will give true values for rail and ballast resistance. It will be noted from Figure A that ratios less than .15 result in errors of less than 5.5% which may be neglected.

Dividing the measured rail resistance for the circuit by the length of the circuit in thousands of feet will give the rail resistance per thousand feet of track, which value should not exceed .025 ohm.

Multiplying the measured ballast resistance for the circuit by the length of the circuit in thousands of feet will give the ballast resistance per thousand feet of track.

To determine minimum ballast resistance for a particular circuit, readings should be taken during, or shortly after a rain. The lowest ballast resistance for any circuit usually occurs at the start of a rain storm after a long dry spell, however, readings taken on wet track should be sufficiently accurate as the adjustment curves are based upon maximum rail resistance, minimum ballast resistance, maximum relay working current, and a minimum battery voltage all occurring at the same time.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
TRACK CIRCUIT ADJUSTMENT
AND MEASUREMENT OF BALLAST AND RAIL RESISTANCE — INSTRUCTIONS

Approved H A Scott
Chief Signal Engineer

S-4

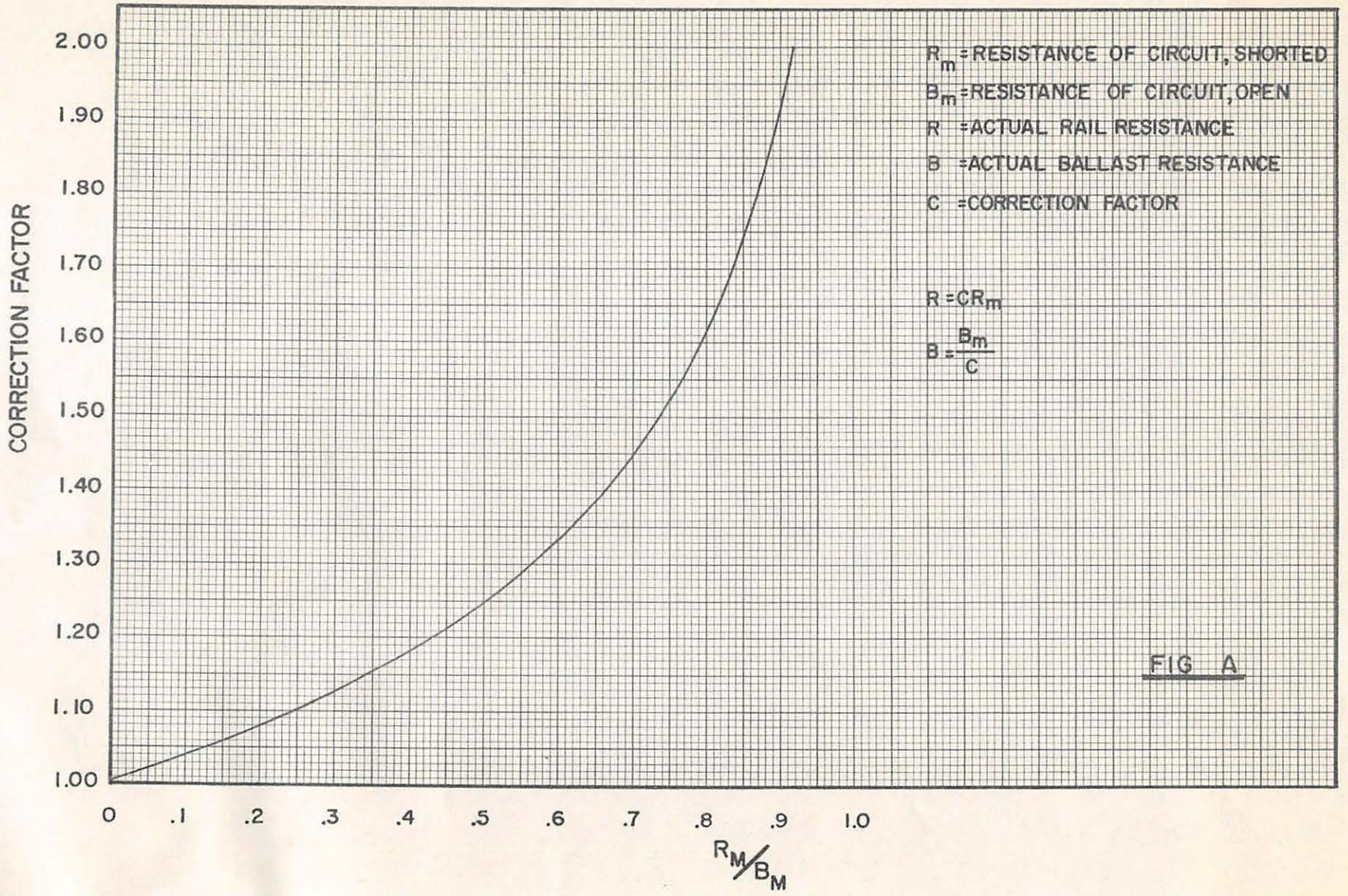

FIG A

S-441

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SHEET 2 Cont'd on SH 3

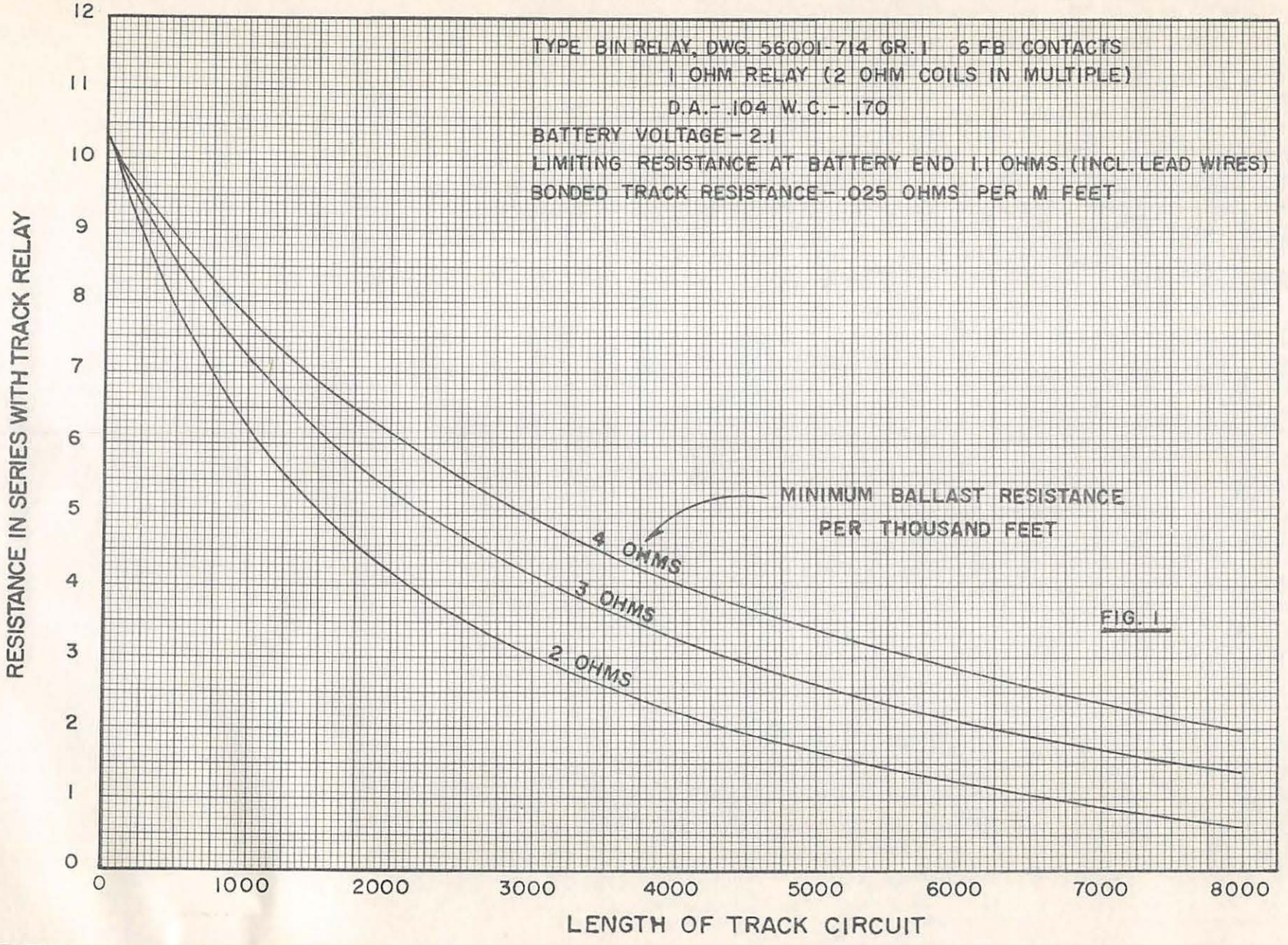

FIG. 1

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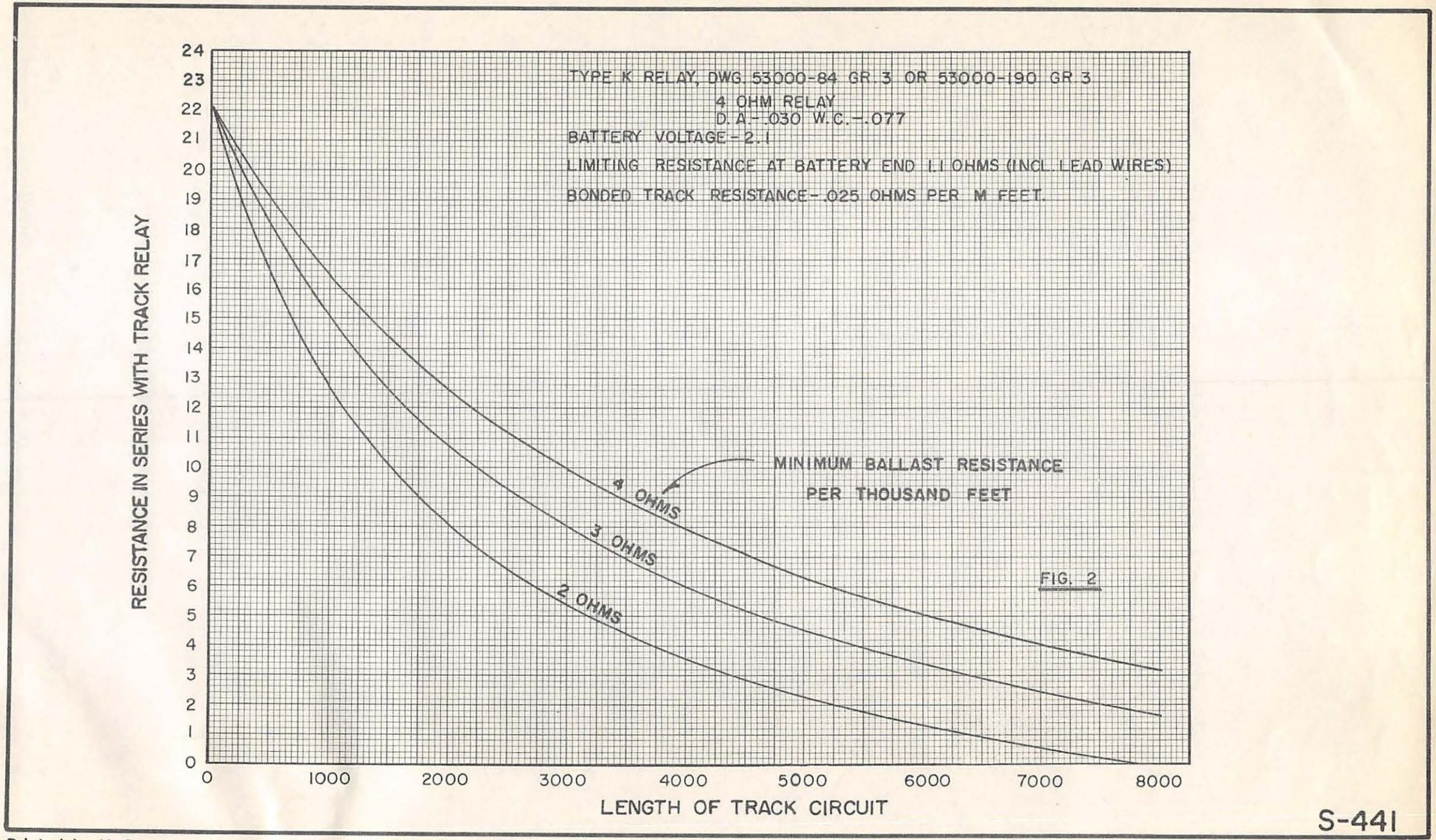
SHEET 3 Cont'd on SH 4



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SHEET 4 Cont'd on SH 5

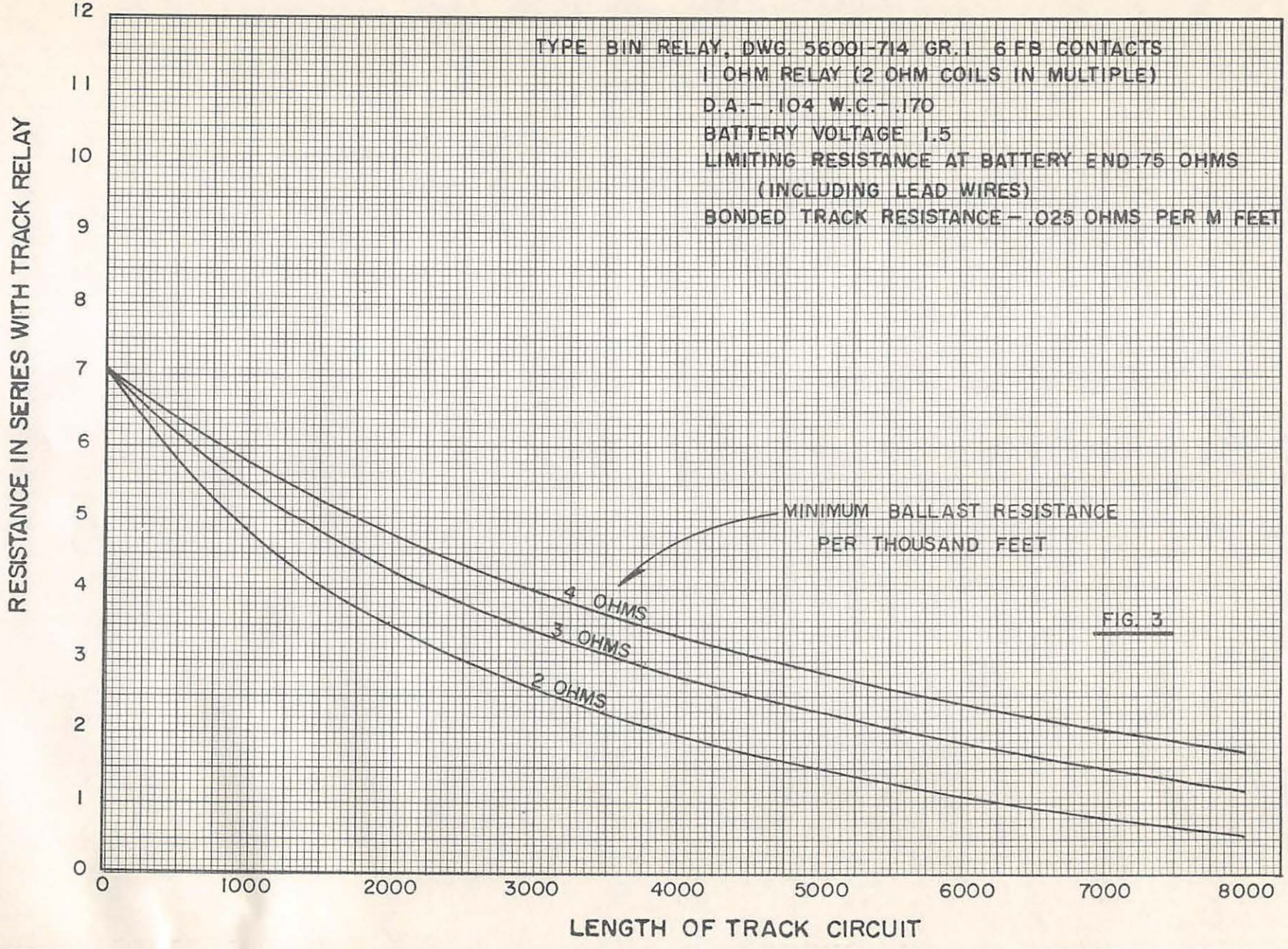

TYPE BIN RELAY, DWG. 56001-714 GR. I 6 FB CONTACTS
1 OHM RELAY (2 OHM COILS IN MULTIPLE)
D.A. - .104 W.C. - .170
BATTERY VOLTAGE 1.5
LIMITING RESISTANCE AT BATTERY END 75 OHMS
(INCLUDING LEAD WIRES)
BONDED TRACK RESISTANCE - .025 OHMS PER M FEET
MINIMUM BALLAST RESISTANCE
PER THOUSAND FEET
4 OHMS
3 OHMS
2 OHMS
RESISTANCE IN SERIES WITH TRACK RELAY
LENGTH OF TRACK CIRCUIT
0
1
2
3
4
5
6
7
8
9
10
11
12
0
1000
2000
3000
4000
5000
6000
7000
8000

FIG. 3

S-441

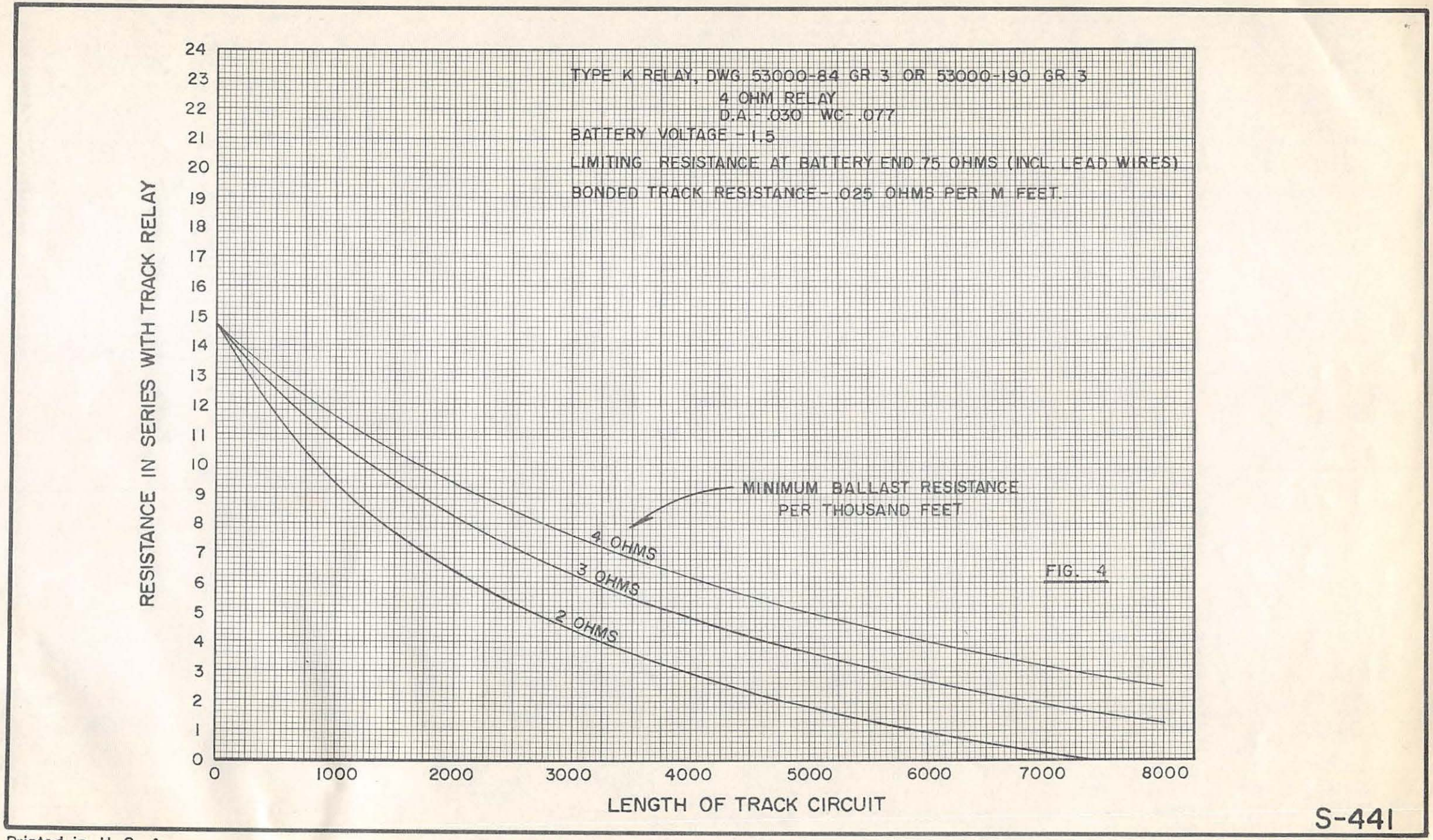

TYPE K RELAY, DWG. 53000-84 GR 3 OR 53000-190 GR. 3
4 OHM RELAY
D.A.-.030 WC-.077
BATTERY VOLTAGE - 1.5
LIMITING RESISTANCE AT BATTERY END 75 OHMS (INCL. LEAD WIRES)
BONDED TRACK RESISTANCE-.025 OHMS PER M FEET.
MINIMUM BALLAST RESISTANCE
PER THOUSAND FEET
4 OHMS
3 OHMS
2 OHMS
RESISTANCE IN SERIES WITH TRACK RELAY
LENGTH OF TRACK CIRCUIT
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
0
1000
2000
3000
4000
5000
6000
7000
8000

FIG. 4

S-441

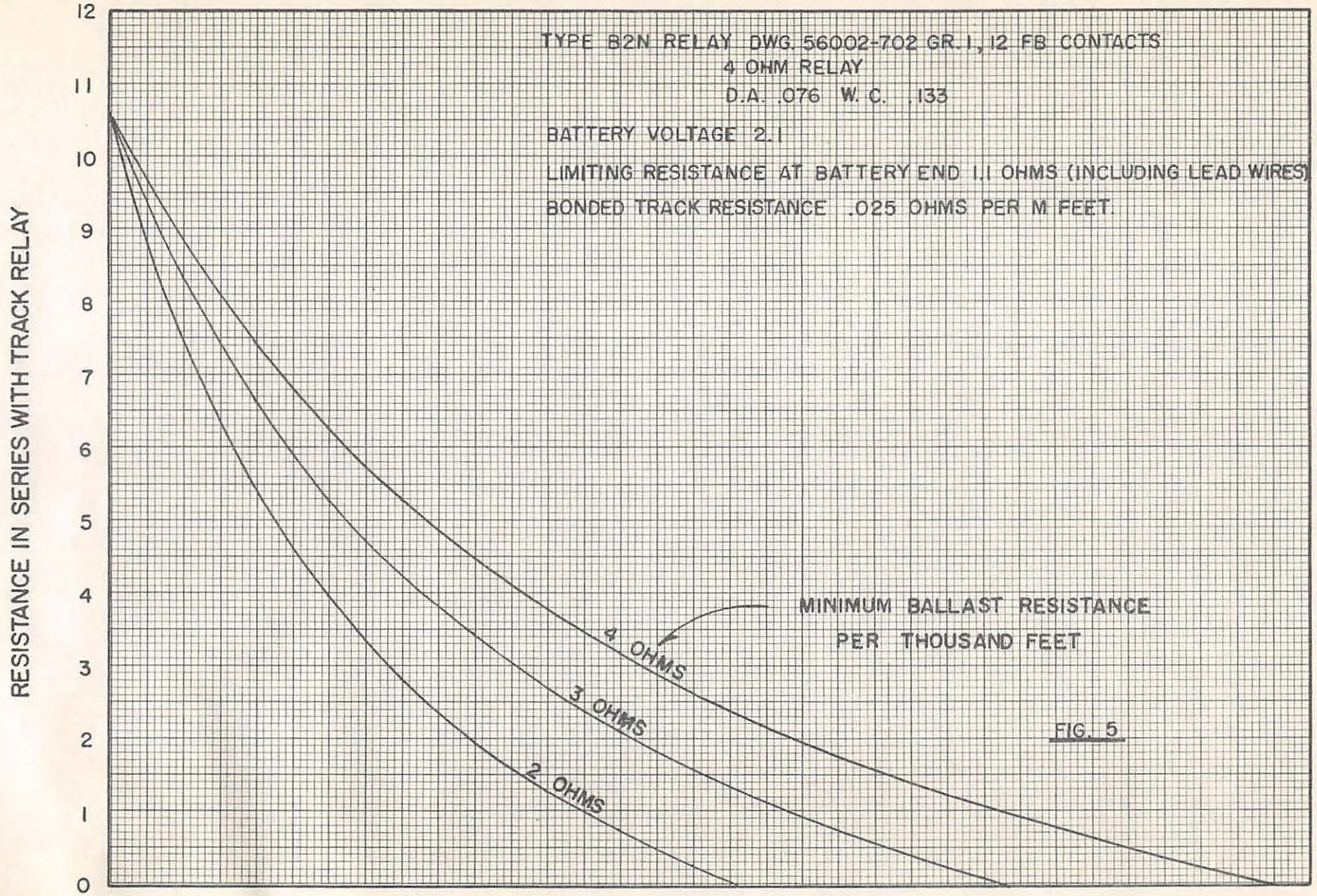
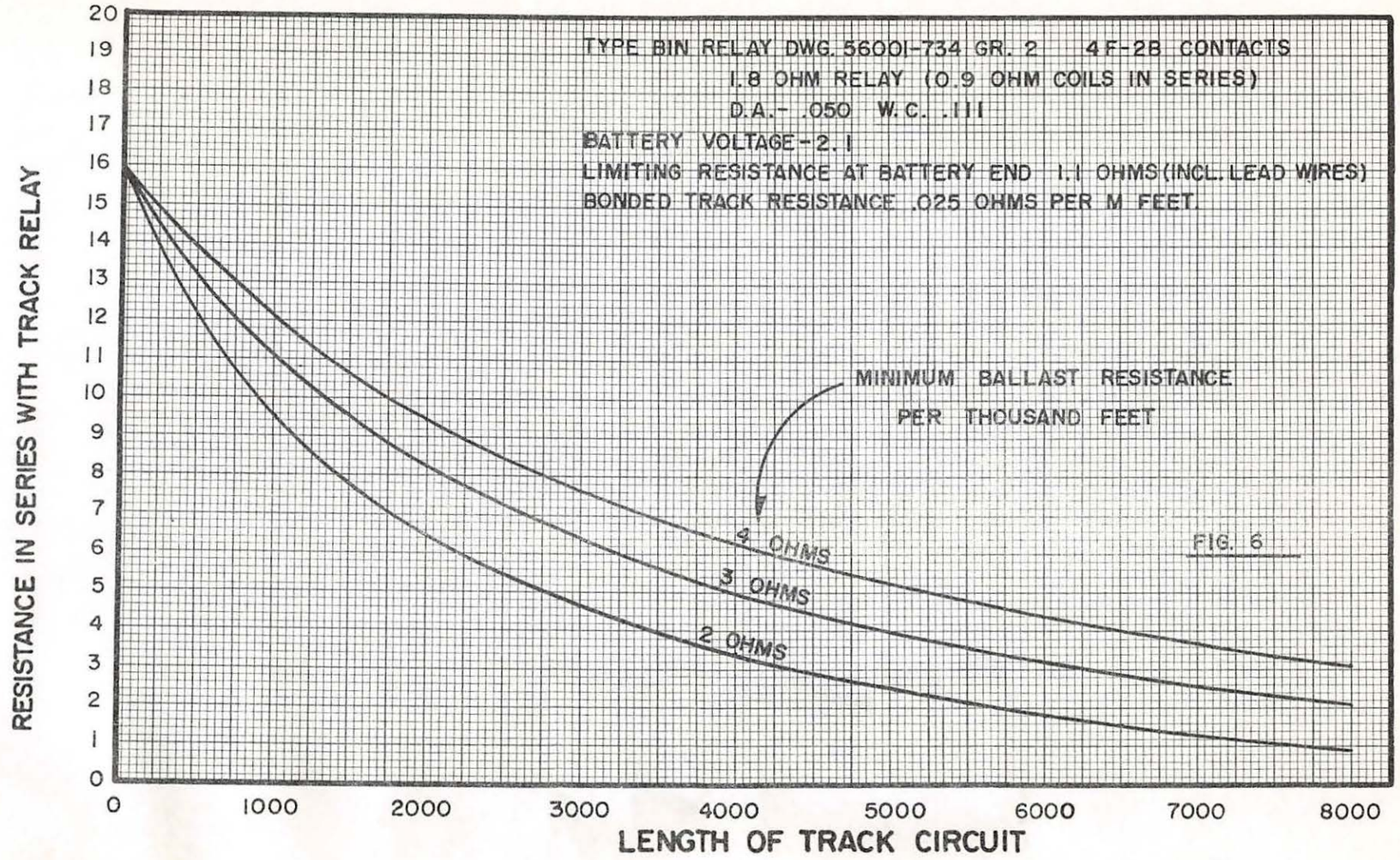
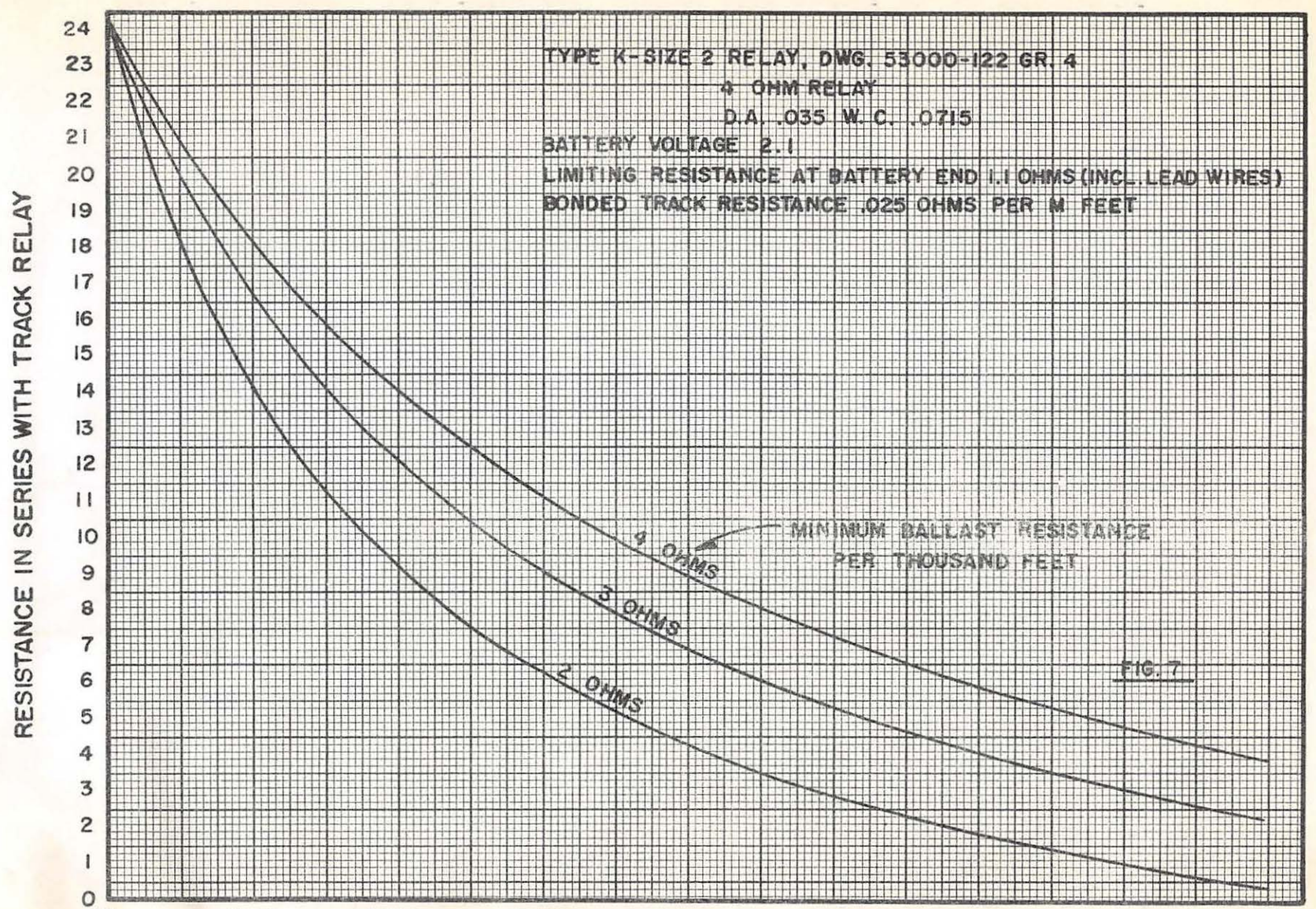

TYPE B2N RELAY DWG. 56002-702 GR. 1, 12 FB CONTACTS
4 OHM RELAY
D.A. .076 W.C. .133
BATTERY VOLTAGE 2.1
LIMITING RESISTANCE AT BATTERY END 1.1 OHMS (INCLUDING LEAD WIRES)
BONDED TRACK RESISTANCE .025 OHMS PER M FEET.
MINIMUM BALLAST RESISTANCE
PER THOUSAND FEET
4 OHMS
3 OHMS
2 OHMS
RESISTANCE IN SERIES WITH TRACK RELAY
0
1
2
3
4
5
6
7
8
9
10
11
12
0
1000
2000
3000
4000
5000
6000
7000
8000
LENGTH OF TRACK CIRCUIT

FIG. 5

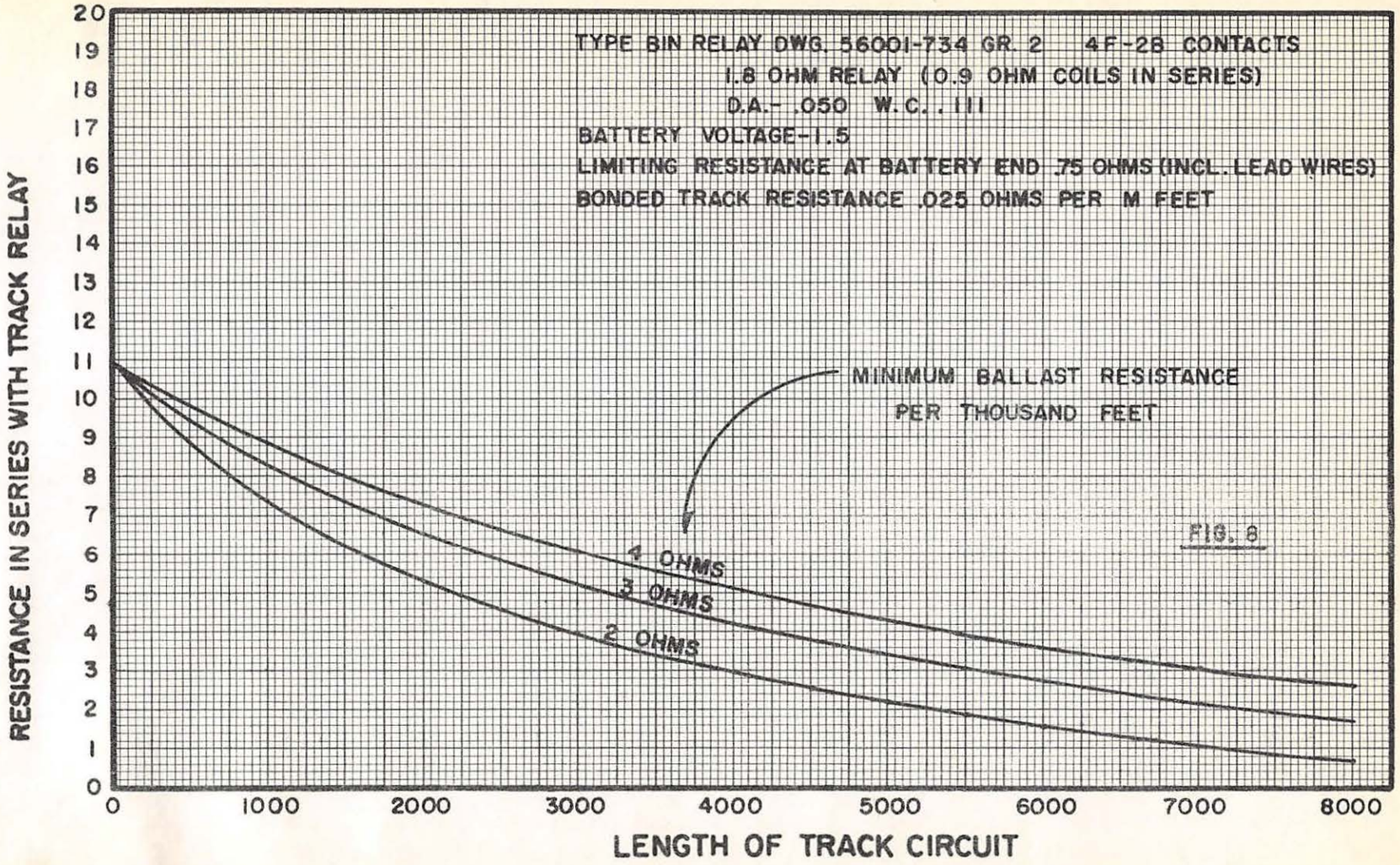
S-441


TYPE BIN RELAY DWG. 56001-734 GR. 2 4F-2B CONTACTS
1.8 OHM RELAY (0.9 OHM COILS IN SERIES)
D.A.- .050 W.C. .111
BATTERY VOLTAGE-2.1
LIMITING RESISTANCE AT BATTERY END 1.1 OHMS (INCL. LEAD WIRES)
BONDED TRACK RESISTANCE .025 OHMS PER M FEET.
MINIMUM BALLAST RESISTANCE
PER THOUSAND FEET
4 OHMS
3 OHMS
2 OHMS
FIG. 6
RESISTANCE IN SERIES WITH TRACK RELAY
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
0
1000
2000
3000
4000
5000
6000
7000
8000
LENGTH OF TRACK CIRCUIT

S-441


TYPE K-SIZE 2 RELAY, DWG. 53000-122 GR. 4
4 OHM RELAY
D.A. .035 W.C. .0715
BATTERY VOLTAGE 2.1
LIMITING RESISTANCE AT BATTERY END 1.1 OHMS (INCL. LEAD WIRES)
BONDED TRACK RESISTANCE .025 OHMS PER M FEET
MINIMUM BALLAST RESISTANCE PER THOUSAND FEET
4 OHMS
3 OHMS
2 OHMS
FIG. 7
RESISTANCE IN SERIES WITH TRACK RELAY
LENGTH OF TRACK CIRCUIT
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
0
1000
2000
3000
4000
5000
6000
7000
8000

S-441



S-441

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SHEET 10 Cont'd on SH 11

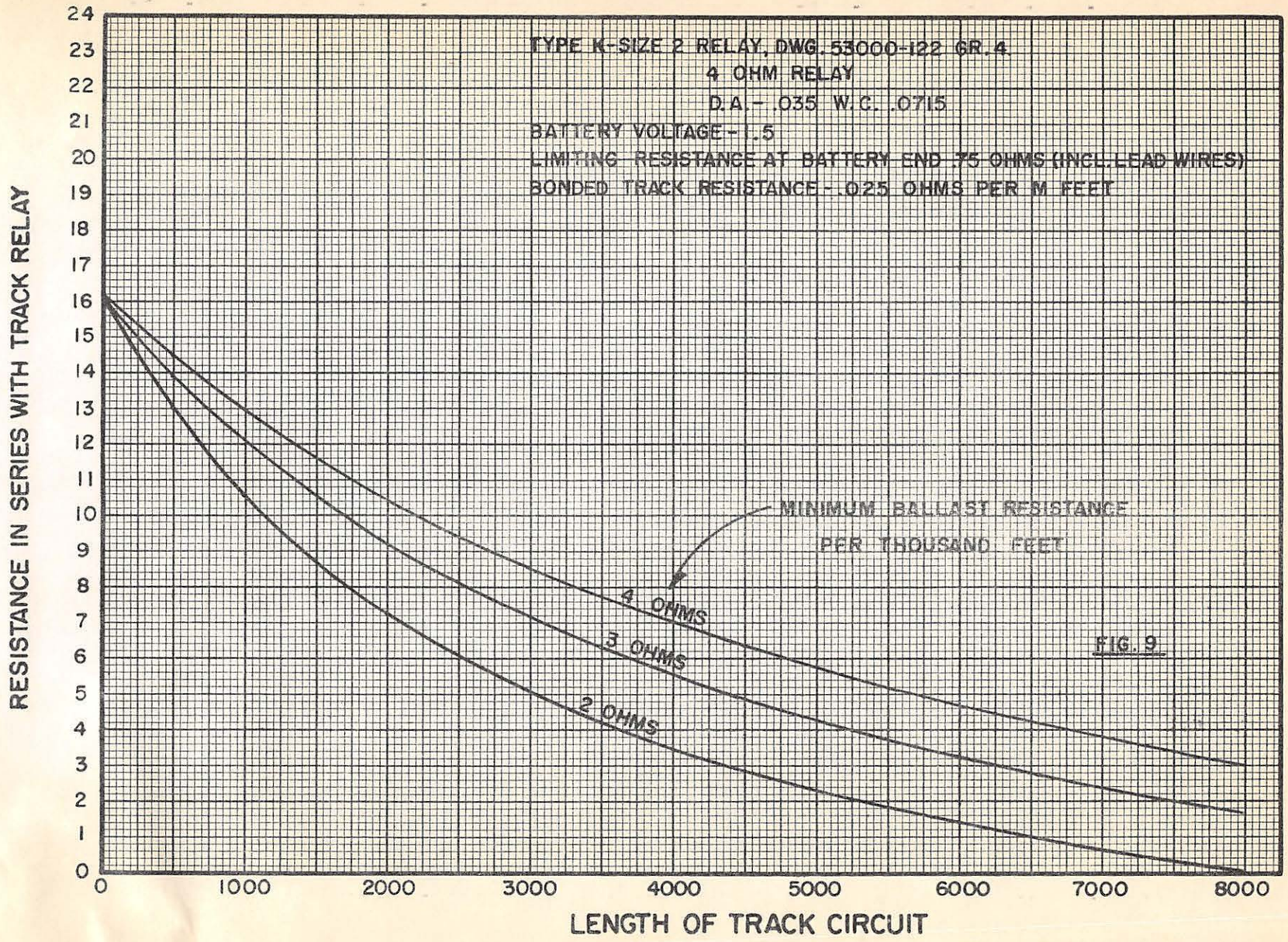
TYPE K-SIZE 2 RELAY, DWG. 53000-122 GR. 4
4 OHM RELAY
D.A. - .035 W.C. .0715
BATTERY VOLTAGE - 1.5
LIMITING RESISTANCE AT BATTERY END .75 OHMS (INCL. LEAD WIRES)
BONDED TRACK RESISTANCE - .025 OHMS PER M FEET
MINIMUM BALLAST RESISTANCE
PER THOUSAND FEET
4 OHMS
3 OHMS
2 OHMS
RESISTANCE IN SERIES WITH TRACK RELAY
LENGTH OF TRACK CIRCUIT
0
1000
2000
3000
4000
5000
6000
7000
8000
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

FIG. 9

S-441