Standard Symbols

FOR

Railway Signal Plans

1911
THE UNION SWITCH AND SIGNAL COMPANY.
GENERAL RAILWAY SIGNAL COMPANY.
HALL SIGNAL COMPANY.
FEDERAL SIGNAL COMPANY.
AMERICAN RAILWAY SIGNAL COMPANY.

PRESENTED BY:
STANDARD SYMBOLS.

FOREWORD.

LITTLE more than four years ago the Signal Companies united in compiling and publishing a standard code of symbols for the representation of apparatus on signal plans. This code was considered fairly adequate for the demands of that time and was quite universally adopted. Since that time the growth of railway signaling has been so extensive that all have come to realize that advancement must be made in the graphic representation of signal apparatus as well as in the apparatus itself. Railroad Companies as well as Signal Companies have, therefore, been forced to the adoption of certain special symbols to supply their own demands. This sort of procedure naturally results in confusion. The Manufacturing companies, realizing that they are more seriously affected by this confusion than the railroad companies, and knowing that very little attempt has been made toward bringing about concerted action in this matter, therefore, recently called together a committee composed of one representative from each Signal Company to revise the book issued in 1906.

This committee realized the importance and difficulties pertaining to their task, and it can be truly said that no time or effort has been spared in their attempt to develop a scheme that will be, not only adequate, but practical.

Much emphasis has been placed upon the importance of simplicity from a drafting standpoint. It has also been the purpose throughout to produce a systematic scheme that will be logical and easy to read. Arbitrary features have been avoided as far as possible, and the committee has sought to avoid any more radical changes from former practice than are absolutely necessary.

After the Manufacturers' Committee had spent about six months on the subject, having held no less than seven meetings in that time, at their request joint meetings were held with R. S. A. Sub-Committee No. 1. Valuable suggestions were presented as a result of these joint meetings. Revisions were made accordingly and the subject was presented to the Railway Signal Association for consideration at their March, 1911, meeting in Chicago. Again suggestions of great value were brought forward by various members of the Association. Soon after the Chicago meeting the Manufacturers' Committee again met in joint session with R. S. A. Sub-Committee No. 1. The various suggestions were carefully considered and adopted as was thought best.
A few words of a general nature in regard to the symbols will be sufficient. Pages 4 and 5 have to do with symbols for signals. On account of the recent development, not only in methods of control, but also in the number of indications which signals are made to display, it is here that the most changes have become necessary. It will be noted on Page 4 that the horizontal column of characteristics, which might be termed the characteristics of operation, are grouped under six headings, with a seventh to cover special or unusual features.

By “non-automatic” signal is meant a signal which is in no way controlled by a track circuit, while “automatic,” of course, refers to a signal, the primary control of which is the track circuit, or, perhaps more properly, it is a signal which automatically gives indication in regard to the integrity of the track through its block. The term “slotted” is only made to cover a mechanical signal equipped with an electric slot. A “semi-automatic” signal is taken to be a manually controlled automatic signal and may, or may not, be interlocked. As to whether it is, or is not, interlocked will be apparent from its position on the plan and its relation to other signals. It is to be understood that this manual control is direct and that a signal is not to be considered “semi-automatic” because some feature of its control is dependent upon another signal which is manually controlled. By “stick semi-automatic” signal is meant a semi-automatic signal which will not clear automatically after it has been put to stop by interruption of the track circuit until the manually operated device controlling it has been restored to normal and reversed again. A “non-stick semi-automatic” signal is taken to be a signal which will operate automatically as long as all contacts (lever, signal controller, etc.) other than track relay contacts, affecting its control are closed.

Again, referring to Page 4, it will be noted that the vertical column of characteristics has to do with the positions which the signal is capable of assuming. In “three-position” signaling these characteristics are represented by lines, which are not necessary in the case of “two-position” signaling. The distinction between “two-position” signaling and “three-position” signaling should not be lost sight of. “Two-position” signaling is understood to include signaling where a distinctive arm is used to display the distant indication, while “three-position” signaling includes signaling where one-arm may give both the home and distant indications.

Referring to the $0^\circ$ to $90^\circ$ signal in “three-position” signaling, it will be
noted that this is distinguished by a vertical line, meaning that it is capable of moving from the horizontal to the vertical. When this signal is shown on the plan in the 90° position, it has the line drawn in the same position with respect to the outline of the blade, but is horizontal with respect to the signal mast, and, therefore, indicates that the signal is capable of moving from vertical to horizontal. The 0° to 45° signal has a diagonal line sloping downward from the signal mast. This indicates that the signal moves from the horizontal to the diagonal. Where the signal is shown in the 45° position, the same line means that it moves to the horizontal. The symbol for 45° to 90° signal has the line in the reverse position, and the symbol for the signal taking all three positions—0°, 45° and 90°—has both of these lines. Theoretically, these lines should be drawn at an angle of 45° from the corners of the signal arm, but for simplicity in drafting, they are drawn from corner to corner. It will be noted that the symbol for the fixed arm is absolutely in accordance with the same basic principle.

The committee is thoroughly aware of the fact that there are a great number of different conditions that may enter into the control of a signal; in recognition of this fact, the column headed “Special—Requires Reference to Notes” has been provided. Also two of the more generally used special conditions of control are covered by the two special symbols E.24 and E.25.

Other features having to do with signal symbols are shown on Page 5 and need no explanation. The remaining pages, covering “Location Symbols” and “Symbols for Circuit Plans”, are self-explanatory. Special mention might be made of Page 12—“Circuit Controllers Operated by Levers”. An attempt has been made to bring about uniform practice along this line. Here­tofore no uniform scheme has been followed. In order to afford as large latitude as possible, both letter symbols and graphic symbols have been provided. Letters have been assigned to the basic positions over which a lever passes—full normal, normal indication, central, reverse indication, and full reverse, and these letters are to be combined to form the symbols for the “Letter System”. Graphic symbols for each of these positions are given, by combination of which all necessary symbols may be derived for the “Graphic System”.

The Committee, therefore, respectfully submits this matter to all those interested in railway signaling and asks for hearty co-operation in its universal adoption.
# SYMBOLS FOR SIGNALS

## Operating Characteristics

<table>
<thead>
<tr>
<th>Two Position Signaling</th>
<th>Non-Automatic</th>
<th>Semi-Automatic (Power)</th>
<th>Special Requires Reference to Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Position, 0 to 60-0 to 70 0 to 75-0 to 90</td>
<td>A1</td>
<td>A2</td>
<td>A3</td>
</tr>
<tr>
<td>2-Position, 0 to 90</td>
<td>B1</td>
<td>B2</td>
<td>B3</td>
</tr>
<tr>
<td>2-Position, 0 to 45</td>
<td>C1</td>
<td>C2</td>
<td>C3</td>
</tr>
<tr>
<td>2-Position, 45 to 90</td>
<td>D1</td>
<td>D2</td>
<td>D3</td>
</tr>
<tr>
<td>3-Position, 0 to 45 to 90</td>
<td>E1</td>
<td>E2</td>
<td>E3</td>
</tr>
</tbody>
</table>

## Special - 3 Position Non-Automatic

- 0 to 45: Semi-Automatic Stick, 45 to 90.

## Absolute Stop Signal

- Distant Signal

## Permissive Stop Signal

- Train Order Signal

## Note:

Arms should always be shown in normal position.

- Special - 3 Position Non-Automatic, 0 to 45.
- Semi-Automatic Stick, 45 to 90.

- Special - 3 Position Non-Automatic, 0 to 45.
- Semi-Automatic Non-Stick, 45 to 90.

## Ends of Blades in Symbols

- Ends of blades in symbols are to be of the actual forms used by the road concerned. If not specified, the above forms will be used on plans.

## Diagrams of Proportions

- Fixed Arm
- Upper Quadrant Signal
- Lower Quadrant Signal
- Vertical Marker Lights
- Staggered Marker Lights

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**PLATE 1.**

[Diagram of proportions for making symbols for signal blades]
GROUND MAST.

GROUND MAST WITH
BRACKET ATTACHMENT.

OFFSET
BRACKET POST.

BRACKET
POST.

SUSPENDED
MAST.

RING ENCLOSED
CHARACTERISTICS
MEAN LIGHT SIGNAL
ONLY.

POT SIGNAL.

SMASH SIGNAL

HOME
PROCEED.

HOME
STOP.

DISTANT
PROCEED

DISTANT
CAUTION.

DOUBLE
FUNCTIONED.

PRESENT SIGNAL TO BE REMOVED.

PRESENT SIGNAL TO REMAIN.

RELATION OF THE SIGNAL TO THE TRACK AND THE DIRECTION OF TRAFFIC.

RIGHT HAND LOCATIONS.

RIGHT HAND SIGNAL.

LEFT HAND LOCATIONS.

LEFT HAND SIGNAL.

PLATE 2.
LOCATION SYMBOLS

**Insulating Rail Joints.**

- **Track Circuits in Both Directions.**
- **Track Circuit on Left, None on Right.**
- **Track Circuit on Right, None on Left.**

**Impedance Bond.** **Traffic Direction.** **Track Pan.**

- **Station.**
- **Crossing Gate.**
- **Signal Power Station.**
- **Signal Sub-Station.**

- **Tunnel.** **Bridge or Viaduct.** **Draw Bridge.** **Lift Bridge.**

**NOTE:** State whether Deck, Half-Through or Through Bridge.

- **Overhead Bridge.**
- **Signal Bridge.**
- **Highway Crossing.**
- **Railway Crossing.** **Proposed Railway Crossing.**

**NOTE:** Specify whether Steam or Electric Ry. Crossing.

- **Mail Crane.**
- **Water Tank.**
- **Water Column.**
- **Track Instrument.**
- **Torpedo Machine.**

**Train Stops.**

- **Stop.**
- **Clear.**

**Non-Automatic.** **Mechanical.** **Power.** **Slotted.** **Semi-Automatic.** **Automatic.**

- **Power Switch Machine.**
- **Insulated Switch Rod.**
- **Turn-Out and Switch Stand.**
- **Electric Switch Lock.**

**PLATE 3.**
LOCATION SYMBOLS—(Continued)

RELAY BOX.  JUNCTION BOX.  TERMINAL BOX.  LIGHTNING ARRESTER BOX.

BATTERY CHUTE.  RELAY BOX AND POST.  BATTERY CHUTE, RELAY BOX AND POST COMBINED.

NOTE: TYPE OF INDICATOR TO BE COVERED BY GENERAL NOTE.

SWITCH BOX LOCATION.  SWING INDICATOR.  SWING INDICATOR AND SWING BOX.

CABLE POST ONLY.  WITH ONE INDICATOR.  WITH TWO INDICATORS.  WITH RELAY BOX.  WITH RELAY BOX AND ONE INDICATOR.  WITH RELAY BOX AND TWO INDICATORS.

ABOVE SURFACE.

HALF ABOVE SURFACE.  BATTERY SHELTER.

BELOW SURFACE.  (FIGURES INDICATE CAPACITY)

HIGHWAY CROSSING BELL.

TRACK BATTERY.

PLATE 4.
LOCATION SYMBOLS—(Continued)

INTERLOCKED SWITCHES AND DERAILS.

Switch-Set for Turn-Out.

Derail-Point Type-Derailing.

Derail-Lifting Rail Type-Derailing.

Derail-Lifting Block Type-Derailing.

NOTE: Non-interlocked switches and derails to be shown same as above except shading in triangles omitted.

RUNS of CONNECTIONS.

Pipe-Wire (Mech).

Wire Duct.

Compressed Air.

Pipe-Wire and Duct.

Pipe-Wire and Air.

Duct and Air.

Pipe-Wire, Duct and Air.

BOLT LOCKS.

1-Way.

2-Way.

3-Way.

CRANKS.

1-Way.

2-Way.

3-Way.

S.L.M. = Switch & Lock Movement.

F.P.L. = Facing Point Lock.

B.L. = Bolt Locked Switch.

Compensator.

Arrow indicates direction of movement of pipe line—normal to reverse.

Oil Enclosed Pipe Line.

INTERLOCKING OR BLOCK STATION.

Showing relative position of station, operator and track.

NOTE: Unless otherwise specified on plan it will be assumed that where an interlocked signal is shown clear or a derail shown in non-derailing position the controlling lever is reversed, and that all other levers are normal.

PLATE 5.
INTERLOCKED SWITCHES, DERAILS, ETC.

1 - SIMPLE TURN-OUT.
2 - SIMPLE CROSS-OVER.
3 - DERAIL-POINT TYPE.
4 - SINGLE SLIP SWITCH.
5 - DOUBLE SLIP SWITCH.
6 - MOVABLE POINT CROSSING FROG (M.P.F.)
7 - SINGLE SLIP SWITCH WITH M.P.F.
8 - DOUBLE SLIP SWITCH WITH M.P.F.

ROCKING SHAFT LEAD-OUT.

PIECE LINE.
WIRE LINE.
WHEEL.

CRANK LEAD-OUT.

2-WAY CRANK.
1-WAY CRANK.
4-WAY CRANK.

DEFLECTING BAR LEAD-OUT.

HORIZONTAL DEFLECTING BARS.
VERTICAL DEFLECTING BARS.
RELAYS, INDICATORS AND LOCKS.

Elements of Symbols to be combined as necessary.

D.C. Electro Magnet.

A.C. Electro Magnet.

Coil Energized or De-energized.

Neutral Front Contact - Closed or Open.

Neutral Back Contact - Closed or Open.

Polarized Armature - With Contacts.

3-Position Armature - With Contacts.

High Current Contact.

Magnetic Blow-out Contact.

Bell Attachment.

Double Winding - Specify if Differential.

Slow Acting.

Disc Type Indicator. O = Disc Invisible. ● = Disc Visible.

Semaphore Type Indicator. ⌦ = 3-Position.

Wire Wound Rotor.

Stationary Winding. ⊥⊥⊥⊥⊥⊥⊥⊥ = High Voltage Winding.

Electric Lock - Show segments for Lever in Normal Position.

(See next page for examples of combinations.)
Relays, Indicators and Locks.
Examples of Combinations.

D.C. Relay - Neutral - Energized
One Independent Front Contact Closed
One Independent Back Contact Open.

D.C. Relay - Polarized - Energized
Two Combination Front and Back Neutral Contacts
Two Polarized Contacts Closed
Two Polarized Contacts Open.

D.C. Indicator - Semaphore Type - Energized
Three Front Contacts Closed
Bell Attachment.

D.G. Indicator - Semaphore Type - Arm Horizontal -
Energized - Without Contacts.

Note: Indicators (or repeaters) without contacts should be shown with armatures to indicate whether energized or de-energized.

A.C. Relay - One Energizing Circuit Type (Single Phase)
Energized - One Front Contact.

A.C. Relay - Two Energizing Circuit Type - Energized
Wire Wound Rotor
Two Neutral Front Contacts.

A.C. Relay - Two Energizing Circuit Type - Energized
Wire Wound Rotor
Two Polarized Contacts.

A.C. Relay - Two Energizing Circuit Type - Energized
Stationary Windings
One Neutral Front Contact
Two 3-Position Contacts.

D.G. Interlocked Relay.

D.C. Electric Bell.

Designate Resistance in Ohms of All D.C. Relays, Indicators and Locks.

Plate 8.
**Circuit Controllers Operated by Levers**

Use either Letter System or Graphic System.

**Levers with Extreme End Position as Normal.**
- **N** - Full Normal Position of Lever.
- **B** - Normal Indication Position.
- **C** - Central Position.
- **D** - Reverse Indication Position.
- **R** - Full Reverse Position.

<table>
<thead>
<tr>
<th>LETTER SYMBOL</th>
<th>GRAPHIC SYMBOL</th>
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<tbody>
<tr>
<td>N</td>
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<tr>
<td>B</td>
<td></td>
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<tr>
<td>C</td>
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<td>D</td>
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<td>R</td>
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**Levers with Middle Position as Normal.**
- **L** - Normal Position.
- **N** - Full Reverse Position to the Left.
- **B** - Indication Position to the Left.
- **D** - Indication Position to the Right.
- **R** - Full Reverse Position to the Right.

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<thead>
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<tr>
<td>L</td>
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<td>D</td>
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<tr>
<td>R</td>
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**Note:** Heavy horizontal lines indicate portion of cycle of lever through which circuit is closed.

**Plate 9.**
CIRCUIT CONTROLLERS OPERATED BY SIGNALS.

UPPER QUADRANT.

3-POSITION SIGNALS.

- Closed at 0° Only.
- Closed at 45° Only.
- Closed at 90° Only.
- Closed 0° to 45°
- Closed 45° to 90°

60°-70° or 75° SIGNALS.

- Closed at 0° Only.
- Closed in Clear Position Only.

LOWER QUADRANT.

SWITCH CIRCUIT CONTROLLER.

CIRCUIT CONTROLLER OPERATED BY LOCKING MECHANISM OF A SWITCH MOVEMENT.

POLE CHANGING CIRCUIT CONTROLLER.

BRIDGE CIRCUIT CONTROLLER.

SPRING HAND KEY OR PUSH BUTTON.

CIRCUIT SWITCH.

PLATE 10.
SYMBOLS FOR CIRCUIT PLANS—(Continued)

MANUAL TIME RELEASE• (ELECTRIC)

AUTOMATIC TIME RELEASE• (ELECTRIC)

EMERGENCY RELEASE• (ELECTRIC)

FLOOR PUSH.

LATCH CONTACT.

Track Instrument Contact.

KNIFE SWITCHES.

Rheostat.

Single Pole.

Double Pole.

Single Throw.

Double Throw.

Quick Acting Circuit Controllers may be Distinguished by the Letter "Q"

Fixed Resistance.

Variable Resistance.

Fuse.

Impedance without Iron Core.

Impedance with Iron Core.

Condenser.
**SYMBOLS FOR CIRCUIT PLANS—(Continued)**

**Battery.**

- Cells in Multiple. Specify Type and Number of Cells.
- Cells in Series.

D = Dry Battery.
G = Gravity "
P = Potash "
S = Storage "

Examples: 16P, 10S, etc.

**A.C. Terminals.**

**D.C. Terminals.**

**Rectifier.**

**Transformers.**

1-Secondary.
2-Or more secondaries.

**D.C. Motor.**

**D.C. Generator.**

**A.C. Motor.**

**A.C. Generator.**

**D.C.-D.C. Motor-Generator.**

**A.C.-D.C. Motor-Generator.**

**Ammeter.**

**Voltmeter.**

**Wattmeter.**

**Telephone.**

**Ingandescent Lamp.**

**Lightning Arrester.**

**Single.**

**Double.**

**Terminals.**

**Wires Gross.**

**Wires Join.**

**Ground.**

"Common" Wire.

Other than "Common" Wire.

Track Circuit Wire.

Direction of Current.
CIRCULAR LETTER

Mr. W. B. McCabe,
Superintendent.

In connection with my circular letters of December 21st and January 7th, in the matter of maintenance by Superintendents Divisions of right line plans showing switches, signals and certain other details:

You will probably note that the blue print showing general information for the making up of the right line signal plans specifies that R.S.A. Symbols should be used. We have, therefore, secured a supply and herewith enclose a copy of such symbols, which are contained in a small pamphlet entitled "Standard Symbols for Railway Signal Plans - 1911."

[Signature]
General Superintendent.

Min
Enc.