

**CONSOLIDATED RAIL CORPORATION**

**CONRAIL**



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**RULES, STANDARDS  
AND  
INSTRUCTIONS  
FOR  
SIGNAL SYSTEMS  
ISSUED BY  
UNITED STATES  
DEPARTMENT OF TRANSPORTATION**

C&S 33 Rev. 4-76



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**C. & S. 33**

**SUBPART A—RULES AND INSTRUCTIONS—  
ALL SYSTEMS**

***General.***

**236.1 *Plans, where kept.***—Track layout plan, circuit plan, and where mechanical locking is used, locking sheet and dog chart, shall be kept at each interlocking and circuit plan shall be kept at each controlled point in traffic control systems; circuit plan for each automatic signal shall be available at the headquarters of the employee directly responsible for the maintenance of such signal; copies of all of the foregoing plans, and profile plan, drawn to scale, showing locations of signals, grades and alinement, for the sections of railroad under the jurisdiction of a divisional signal supervisory officer shall be kept at his headquarters; copies of plans pertaining to signal and interlocking facilities under the jurisdiction of general regional or system signal officers shall be kept at their offices. All plans shall be correct and legible and available for use by the Federal Railroad Administration representatives.

**236.2 Grounds.**—Each circuit, the functioning of which affects the safety of train operations, shall be kept free of any ground or combination of grounds which will permit a flow of current equal to or in excess of 75 percent of the release value of any relay or other electromagnetic device in the circuit, except circuits which include any track rail and except the common return wires of single-wire, single-break, signal control circuits using a grounded common, and alternating current power distribution circuits which are grounded in the interest of safety. (Revised 1-24-66.)

**236.3 Locking of instrument cases and interlocking machine cabinets.**—Outdoor signal and instrument cases shall be locked, except signal mechanism housings at interlockings where maintenance forces are continuously on duty. Power interlocking machine cabinets, time releases, and electric locks exposed on interlocking machines shall be locked or sealed.

**236.4 Interference with normal functioning of device.**—The normal functioning of any device shall not be interfered with in testing or otherwise without first taking measures for insuring safety of train operation which depends on normal functioning of such device.

**236.5 Design of control circuits on closed circuit principle.**—All control circuits the functioning of which affects safety of train operation shall be designed on the closed circuit principle, except circuits for roadway equipment of intermittent automatic train stop system.

**236.6 Hand operated switch equipped with switch circuit controller.**—Hand-operated switch equipped with switch circuit controller connected to the point, or with facing-point lock and circuit controller, shall be so maintained that when point is open one-fourth inch or more on facing-point switch and three-eighths inch or more on trailing-point switch, track or control circuits will be opened or shunted or both, and if equipped with facing-point lock with circuit controller, switch cannot be locked. On such hand-operated switch, switch circuit controllers, facing-point locks, switch-and-lock movements, and their connections shall be securely fastened in place, and contacts maintained with an opening of not less than one-sixteenth inch when open. (Revised 1-24-66.)

**236.7 Circuit controller operated by switch-and-lock movement.**—Circuit controller operated by switch-and-lock movement shall be maintained so that normally open contacts will remain closed and normally closed contacts will remain open until the switch is locked.

**236.8 Operating characteristics of electromagnetic apparatus.**—Operating characteristics of electromagnetic apparatus shall be maintained in accordance with the limits within which such apparatus is designed to operate.

**236.9 Selection of circuits through indicating or annunciating instruments.**—Signal control and electric locking circuits shall not be selected through the contacts of instruments designed primarily for indicating or annunciating purposes in which an indicating element attached to the armature is arranged so that it can in itself cause improper operation of the armature.

**236.10 Electric locks, force drop type, where required.**—Electric locks on new installations and new electric locks applied to existing installations shall be of the forced drop type.

**236.11 Adjustment, repair, or replacement of component.**—When any component of a system or interlocking, the proper functioning of which is essential to the safety of train operation, fails to perform its intended signaling function, it shall be adjusted, repaired or replaced without undue delay. (Revised 1-24-66.)

**236.12 Spring switch and signal protection, where required.**—Signal protection shall be provided for facing and trailing movements through spring switch within interlocking limits, and through spring switch hereafter installed in automatic block signal, train stop, train control or cab signal territory where train movements over the switch are made at a speed exceeding 20 miles per hour, except that signal protection shall be required only with the current of traffic on track signaled for movement in only one direction.

**236.13 Spring switch, selection of signal control circuits through circuit controller.**—The control circuits of signals governing facing movements over a main track spring switch shall be selected through the contacts of a switch circuit controller, or through the contacts of relay repeating the position of such circuit controller, which, when normally closed switch point is open one-fourth inch or more, will cause such signals to display their most restrictive aspects, except that where a separate aspect is displayed for facing movements over the switch in the reverse position the signal shall display its most restrictive aspect when the switch points are open one-fourth inch or more from either the normal or reverse position.

**236.14 Spring switch signal protection, requirements.**—  
(a) The indication of signal governing movements from siding to main track with the current of traffic on track signaled for movements in only one direction through a spring switch in automatic block signal territory shall be not less restrictive than "Proceed at Restricted Speed" when the block, into which movements are governed by the signal, is occupied, and shall be "Stop" when the main track is occupied by a train approaching the switch within at least 1500 feet in approach of the approach signal located stopping distance from the main track signal governing trailing movements over switch, except that the indication may be caused to be less restrictive if approach or time locking is used.

(b) The indication of signal governing movements against the current of traffic from the reverse main of main tracks to a single track, or signal governing movements from a siding to a main track signaled for movements in either direction, through a spring switch, in automatic block signal territory, shall be not less restrictive than "Proceed at Restricted Speed" when the block, into which movements are governed by the signal, is occupied by a preceding train, and shall be "Stop" when the block on the single track into which the signal governs is occupied by an opposing train.

(c) The indication of signal governing movements against the current of traffic from the reverse main of main tracks to a single track or signal governing movements from a siding to a main track signaled for movements in either direction through a spring switch in automatic block signal territory shall be "Stop" when the normal direction main track of the double track or the single track signaled for movements in both directions is occupied by a train approaching the switch within at least 1500 feet in approach of the approach signal located stopping distance from the main track signal governing trailing movements over switch, except that indication may be caused to be less restrictive if approach or time locking is used.

**236.15** *Timetable instructions.*—Automatic block, traffic control, train stop, train control and cab signal territory shall be designated in timetable instructions.

**236.16** *Relief.*—Relief from the requirements of this part will be granted upon an adequate showing by an individual carrier. Relief heretofore granted to any carrier by order of the Commission shall constitute relief to the same extent from the requirements of this part. (Added 1-24-66.)

#### **Roadway signals and cab signals**

**236.21** *Location of roadway signals.*—Each roadway signal must be (a) positioned and aligned so that the indication it displays can be clearly associated with the track it governs and (b) located over or to the right of the track it governs in other than single-track territory.

**236.22** *Semaphore signal arm, clearance to other objects.*—At least one-half inch clearance shall be provided between semaphore signal arm, and any object that may interfere with its operation.

**236.23** *Aspects and indications.*—Aspects shall be shown by the position of semaphore blades, color of lights, position of lights, flashing of lights, or any combination thereof. They may be qualified by marker plate, number plate, letter plate, marker light, shape and color of semaphore blades or any combination thereof, subject to the following conditions:

Night aspects of roadway signals, except qualifying appurtenances, shall be shown by lights; day aspects by lights or semaphore arms. A single white light shall not be used.

Reflector lenses or buttons or other devices which depend for visibility upon reflected light from an external source shall not be used in night aspects, except qualifying appurtenances.

The aspects of cab signals shall be shown by lights or by illuminated letters.

Each aspect displayed by a signal shall be identified by a name and shall indicate action to be taken. Only one name and indication shall apply to those aspects indicating the same action to be taken; the same aspect shall not be used with any other name and indication.

The fundamental indications of signal aspect shall conform to the following:

A red light, a series of horizontal lights, or a semaphore blade in a horizontal position shall be used to indicate stop.

A yellow light, a lunar light, or a series of lights or a semaphore blade in the upper or lower quadrant at an angle of approximately 45° to the vertical, shall be used to indicate that speed is to be restricted and stop may be required.

A green light, a series of vertical lights, or a semaphore blade in a vertical position in the upper quadrant or 60° or 90° in the lower quadrant shall be used to indicate proceed at authorized speed.

The names, indications, and aspects of roadway signals and cab signals shall be defined in lock-signal and interlocking rules in effect on each railroad subject to these rules, standards, and instructions. Copy of such block-signal and interlocking rules shall be filed with the Interstate Commerce Commission within 6 months after the date of this order and copy of subsequent modifications shall be filed with said Commission within 30 days after such modifications become effective. Such rules and any modifications thereof shall remain in effect until otherwise ordered by the Commission.

**236.24 Spacing of roadway signals.**—Each roadway signal shall be located with respect to the next signal or signals in advance which govern train movements in the same direction so that the indication of a signal displaying a restrictive aspect can be complied with by means of a brake application, other than an emergency application, initiated at such signal, either by stopping at the signal where a stop is required, or by a reduction in speed to the rate prescribed by the next signal in advance where reduced speed is required.

**236.25 False restrictive position of semaphore signal arm or failure of lamp in light signal.**—If an arm of a semaphore signal assumes a false restrictive position or if a lamp in a light signal fails the signal shall not display a less restrictive aspect than intended.

**236.26 Buffing device, maintenance.**—Buffing device shall be maintained so as not to cause the signal to display a less restrictive aspect than intended.

**236.27 Phantom signal aspect.**—Measures shall be taken to prevent recurrence of a phantom signal aspect.

#### Track Circuits.

**236.51 Track circuit requirements.**—Track relay shall be in deenergized position whenever any of the following conditions exists, and the track circuit of an automatic train-stop, train-control or cab signal system shall be deenergized in the rear of the point where any of the following conditions exists:

(a) When a rail is broken or a rail or switch-frog is removed except when a rail is broken or removed in a shunt fouling circuit or a turnout or crossover, provided, however, that shunt fouling circuit may not be used in a turnout through which permissible speed is greater than 45 miles per hour. It shall not be a violation of this requirement if a track circuit is energized: (1) When a break occurs between the end of rail and track circuit connector; within the limits of rail-joint bond, appliance or other protective device, which provides a bypath for the electric current, or (2) As result of a leakage current or foreign current in the rear of a point where break occurs or a rail is removed.

(b) When a train, locomotive, or car occupies any part of a track circuit, including fouling section of turnout except turnouts of hand-operated main track crossover. It shall not be a violation of this requirement where the presence of sand, rust, dirt, grease, or other foreign matter prevents effective shunting, except that where such conditions are known to exist adequate measures to safeguard train operation must be taken.

(c) Where switch shunting circuit is used:

1. Switch point is not closed in normal position.
2. A switch is not locked where facing-point lock with circuit controller is used.
3. An independently operated fouling-point derail equipped with switch circuit controlled is not in derailing position. (Revised 1-24-66.)

**236.52 Relayed cut-section.**—Where relayed cut-section is used in territory where noncoded direct-current track circuits are in use, the energy circuit to the adjoining track circuit shall be open and the track circuit shunted when the track relay at such cut-section is in deenergized position.

**236.53 Track circuit feed at grade crossing.**—At grade crossing with an electric railroad where foreign current is present, the electric energy for non-coded direct-current track circuit shall feed away from the crossing.

**236.54 Minimum length of track circuit.**—The length of any track circuit, except trap circuit or special circuit not used for control of signaling facilities, shall be greater than maximum inner wheel base of any locomotive or car.

**236.55 Dead section, maximum length.**—Where dead section exceeds 35 feet, special circuit shall be installed. Where shortest-outer wheel base of a locomotive operating over such dead section is less than 35 feet, the maximum length of the dead section shall not exceed the length of the outer wheel base of such locomotive unless special circuit is used.

**236.56 Shunting sensitivity.**—Track circuit shall be so maintained that track relay will be in deenergized position if, when track circuit is dry, a shunt of 0.06 ohm resistance is connected across the track rails of the circuit, including fouling sections of turnouts.

**236.57 Shunt wires.**—Shunt wires and fouling wires, except shunt wires to switch circuit controller through which signal control circuits are controlled and track circuits are shunted, shall consist of at least two conductors and each shall be of sufficient conductivity and maintained in such condition that the track relay will be in deenergized position when the circuit is shunted.

**236.58 Turnout, fouling section.**—Fouling section of turnout shall extend to clearance point.

**236.59 Insulated rail joints.**—Insulated rail joints shall be maintained in condition to prevent sufficient track circuit current from flowing between the rails separated by the insulation to cause a failure of any track circuit involved.

#### **Wires and cables**

**236.71 Signal wires on pole lines.**—Signal wires carried on pole lines shall be securely tied in on insulators.

**236.72 Clearance of overhead signal wires and cables.**—Where men are permitted to be on top of cars the clear space between the lowest overhead signal line conductor and the top of track rails shall be not less than 27 feet at 60° F., no wind. The distance may be reduced to 25 feet for guys and for cables carried on messengers.

**236.73 Open-wire transmission line, clearance to other circuits.**—Open-wire transmission line operating at voltage of 750 volts or more shall be placed not less than 4 feet above the nearest crossarm carrying signal or communication circuits.

**236.74 Protection of insulated wire; splice in underground wire.** Insulated wire shall be protected from mechanical injury. The insulation shall not be punctured for test purposes. Splice in underground wire shall have insulation resistance at least equal to the wire spliced.

**236.75 Insulated wires and cables, supports.**—Insulated wires and cables used aerially shall be supported on insulators or by messengers.

**236.76 Interference of wires with operating parts of mechanisms.**—Wires shall not interfere with operating parts of mechanisms.

**236.77 Tagging of wires.**—Each wire shall be tagged or otherwise marked so it can be identified at each terminal. Nomenclature shall correspond to that of the circuit plan. Tags or other marks of identification in instrument cases and apparatus housings shall be made of insulating material and shall not interfere with moving parts of apparatus.

**236.78 Lightning arrester.**—Lightning arrester shall be properly connected and ground maintained with resistance to ground preferably not more than 25 ohms.

#### **Inspections and tests, all systems**

**236.101 Purpose of inspections and tests; removal from service of relay failing to meet test requirements.**—The following inspections and tests shall be made in accordance with specifications of the carrier subject to approval of the FRA to determine if the apparatus and/or equipment is maintained in condition to perform its intended function. Relay or other electromagnetic device which fails to meet the requirements of specified tests shall be removed from service and shall not be restored to service until its operating characteristics are in accordance with the limits within which such relay or electromagnetic device is designed to operate.

**236.102 Signal mechanism.**—Signal mechanism shall be inspected at least once every 6 months, and tests of the operating characteristics of all parts shall be made at least once every 2 years.

**263.103 Switch circuit controller.**—Switch circuit controller shall be inspected and tested at least once every 3 months.

**236.104 Shunt fouling circuit.**—Shunt fouling circuit shall be inspected and tested at least once every 3 months.

**236.105 Electric lock.**—Electric lock, except forced-drop type, shall be tested at least once every 2 years.

**236.106 Relays.**—Relay in service, except locomotive relay, shall be tested at least once every 2 years.

**236.107 Lightning arresters.**—Gas and vacuum type lightning arresters shall be tested at least once a year.

**236.108 Insulation resistance tests.**—Insulation resistance tests shall be made when wires, cables, and insulation are dry. Wires and cables, except wires connected directly to track rails, shall be tested in accordance with the following schedule. Conductors shall be promptly repaired or renewed when insulation resistance is below the following values:

Description	Period (years)	Minimum allowable resistance
Low voltage (660 volts or less) wires and cables with insulation and protective outer covering not specifically designed for underground use, any part of which is underground or in trunking.	5	1 megohm
Low voltage (660 volts or less) wires and cables with insulation and protective outer covering not specifically designed for underground use, no part of which is underground or in trunking.	8	Do.
Low voltage (660 volts or less) wires and cables with insulation and protective outer covering designed specifically for underground use, or in underground conduit, or as submarine cables.	8	Do.
Local signal wiring . . . . .	8	Do.
Lead covered signal power cable . . . . .	8	100 megohms between sectionalizing switches
Underground signal power lines not lead sheathed . . . . .	5	<div style="border-left: 1px solid black; border-right: 1px solid black; padding-left: 5px;">                     40 megohms for voltages up to and including 660 volts for section tested                      100 megohms between sectionalizing switches for voltages exceeding 660                 </div>

**236.109 Records of results of tests; forms for keeping records; where filed.**—Results of tests made in compliance with §§ 236.102 to 236.108, inclusive, 236.376 to 236.387, inclusive, and 236.576, 236.577, 236.586, 236.588, and 236.589 shall be recorded on forms provided by the railroad. Such forms shall show name of railroad, place and date, equipment tested, repairs, replacements, adjustments made, and condition in which apparatus was left, and signature of employee making the test. Each form shall be filed in the office of a divisional officer of the division on which the tests were made.

**SUBPART B—AUTOMATIC BLOCK-SIGNAL SYSTEM**

**Standards**

**236.201 Track circuit control of signals.**—The control circuits for home signal aspects with indications more favorable than “proceed at restricted speed” shall be controlled automatically by track circuits extending through the entire block. (Revised 1-24-66.)

**236.202 Signal governing movements over hand-operated switch.**—Signal governing movements over hand-operated switch in the facing direction shall display its most restrictive aspect when the normally closed point is open one-fourth inch or more and, in the trailing direction, three-eighths inch or more, except that where a separate aspect is displayed for facing movements over the switch in the normal and in the reverse position, the signal shall display its most restrictive aspect when the switch points are open one-fourth inch or more from either the normal or reverse position.

**236.203 Hand-operated crossover between main tracks, protection.**—At hand-operated crossover between main tracks protection shall be provided by one of the following: (1) An arrangement of one or more track circuits and switch circuit controllers, (2) facing-point locks on both switches of the crossover, with both locks operated by a single lever, or (3) electric locking of the switches of the crossover. Signals governing movements over either switch shall display their most restrictive aspect when any of the following conditions exists: (a) Where protection is provided by one or more track circuits and switch circuit controllers, and either switch is open or the crossover is occupied by a train, locomotive, or car in such a manner as to foul the main track; it shall not be a violation of this requirement where the presence of sand, rust, dirt, grease or other foreign matter on the rail prevents effective shunting; (b) where facing-point locks with a single lever are provided, and either switch is unlocked; and (c) where the switches are electrically locked, before the electric locking releases.

**236.204 Track signaled for movements in both directions, requirements.**—On track signaled for movements in both directions, a train shall cause one or more opposing signals immediately ahead of it to display the most restrictive aspect, the indication of which shall be not more favorable than "proceed at restricted speed." Signals shall be so arranged and controlled that if opposing trains can simultaneously pass signals displaying proceed aspects and the next signal in advance of each such signal then displays an aspect requiring a stop, or its most restrictive aspects, the distance between opposing signals displaying such aspects shall be not less than the aggregate of the stopping distances for movements in each direction. Where such opposing signals are spaced stopping distance apart for movements in one direction only, signals arranged to display restrictive aspects shall be provided in approach to at least one of the signals. Where such opposing signals are spaced less than stopping distance apart for movements in one direction, signals arranged to display restrictive aspects shall be provided in approach to both such signals. In absolute permissive block signaling when a train passes a head block signal it shall cause the opposing head block signal to display an aspect requiring a stop. (Revised 1-24-66.)

**236.205 Signal control circuits, requirements.**—The circuits shall be so installed that each signal governing train movements into a block will display its most restrictive aspect when any of the following conditions obtains within the block: (1) Occupancy by a train, locomotive, or car, (2) when points of a switch are not closed in proper position, (3) when an independently operated fouling point derail equipped with switch cir-

cuit controller is not in derailing position, and (4) when a track relay is in deenergized position; or when signal control circuit is deenergized.

**236.206 Battery or power supply with respect to relay, location.**—The battery or power supply for each signal control relay circuit, where an open-wire circuit or a common return circuit is used, shall be located at the end of the circuit farthest from the relay.

**236.207 Electric lock on hand-operated switch, control.**—Electric lock on hand-operated switch shall be controlled so that it cannot be unlocked until control circuits of signals protecting such switch have been opened. Approach or time locking shall be provided.

#### SUBPART C—INTERLOCKING

**236.301 Where signals shall be provided.**—Signals shall be provided to govern train movements into and through interlocking limits, except that a signal shall not be required to govern movements over a hand-operated switch into interlocking limits if the switch is provided with an electric lock and a derail at the clearance point, either pipe-connected to the switch or independently locked, electrically. Electric locks installed under this rule must conform to the time and approach locking requirements of rule 314 (without reference to the 20-mile exceptions), and those of either Rule 760 or Rule 768, as may be appropriate. (Revised 1-24-66.)

**236.302 Track circuits and route locking.**—Track circuits and route locking shall be provided. Route locking shall be effective when the first pair of wheels of a locomotive or car passes a point not more than 13 feet in advance of the signal governing the movement. (Revised 1-24-66.)

**NOTE.**—Existing installations on each railroad which do not conform to the requirements of this section shall be brought into conformity on or before December 31, 1970.

**236.303 Control circuits for signals, selection through circuit controllers operated by switch points or by switch locking mechanism.**—The control circuit for each aspect with indication more favorable than "proceed at restricted speed" of power-operated signal governing movements over switches, movable-point frogs and derrails shall be selected through circuit controller operated directly by switch points or by switch locking mechanism, or through relay controlled by such circuit controller, for each switch, movable-point frog, and derail in the routes governed by such signal. Circuits shall be arranged so that such signal can display an aspect more favorable than "proceed at restricted speed," only when each switch, movable-point frog, and derail in the route is in proper position. (Revised 1-24-66.)

**NOTE.**—Existing installations on each railroad which do not conform to the requirements of this section shall be brought into conformity on or before December 31, 1970.

**236.304 Mechanical locking or same protection effected by circuits.**—Mechanical locking, or the same protection effected by means of circuits, shall be provided.

**236.305 Approach or time locking.**—Approach or time locking shall be provided in connection with signals displaying aspects with indications more favorable than "proceed at restricted speed." (Revised 1-24-66.)

**236.306 Facing-point lock or switch-and-lock movement.**—Facing-point lock or switch-and-lock movement shall be provided for mechanically operated switch, movable-point frog, or split-point derail.

**236.307 Indication locking.**—Indication locking shall be provided for operative approach signals of the semaphore type, power-operated home signals, power-operated switches, movable-point frogs, and derails, and for all approach signals hereafter installed, except light signals all aspects of which are controlled by coded track circuits or by double-wire line circuits.

**236.308 Mechanical or electric locking or electric circuits, requisites.**—Mechanical or electric locking or electric circuits shall be installed to prevent signals from displaying aspects which permit conflicting movements except that opposing signals may display an aspect indicating proceed at restricted speed at the same time on a track used for switching movements only, by one train at a time. Manual interlocking in service as of the date of this order at which opposing signals on the same track are permitted simultaneously to display aspects authorizing conflicting movements when interlocking is unattended, may be continued, provided that simultaneous train movements in opposite directions on the same track between stations on either side of the interlocking are not permitted.

**NOTE.**—Relief from the requirement of this section will be granted upon an adequate showing by an individual carrier to allow opposing signals on the same track simultaneously to display aspects to proceed through an interlocking which is unattended, provided that train movements in opposite directions on the same track between stations on either side of the interlocking are not permitted at the same time.

**236.309 Loss of shunt at automatic interlocking.**—At automatic interlocking, a loss of shunt for 5 seconds or less shall not permit an established route to be changed.

**236.310 Signal governing approach to home signal.**—A signal shall be provided on main track to govern the approach with the current of traffic to any home signal except where the home signal is the first signal encountered when leaving yard or station and authorized speed approaching such signal is not higher than slow speed. When authorized speed between home signals on route governed is 20 miles per hour or less, an inoperative signal displaying an aspect indicating “approach next signal prepared to stop” may be used to govern the approach to the home signal.

**236.311 Signal control circuits, selection through track relays, and through signal mechanism contacts and time releases at automatic interlocking.**—The control circuits for aspects with indications more favorable than “proceed at restricted speed” shall be selected through track relays for all track circuits in the route governed, or through repeating relays for such track relays. At automatic interlocking, signal control circuits shall be selected (1) through track relays for all track circuits in the route governed, and in all conflicting routes within interlocking limits, or through repeating relays for such track relays; (2) through signal mechanism contacts or relay contacts closed when signals for such conflicting routes display stop aspects; and (3) through normal contacts of time releases for such conflicting routes or contacts of relays repeating the normal position of contacts for such time releases. (Revised 1-24-66.)

**236.312 Movable bridge, interlocking of signal appliances with bridge devices.**—When movable bridge is protected by interlocking the signal appliances shall be so interlocked with bridge devices that before a signal governing movements over the bridge can display an aspect to proceed the bridge must be locked and the track alined, with bridge locking members within one inch of their proper positions and with the rail on the movable span within three-eighths inch of correct surface and alinement with rail seating device on bridge abutment or fixed span. (Revised 1-24-66.)

**236.313 Pipe for operating connections, requirements.**—Steel or wrought-iron pipe 1 inch or larger, or members of equal strength shall be used for operating connections for switches, derails, movable-point frogs, facing-point locks, rail-locking devices of movable bridge protected by interlocking, and mechanically operated signals, except up-and-down rod which may be three-fourths inch pipe or solid rod. Pipes shall be fully screwed into coupling and both ends of each pipe shall be riveted to pipe plug with two rivets. Pipeline shall not be out of alinement sufficiently to interfere with the proper operation of the interlocking, shall be properly compensated for temperature changes, and supported on carriers spaced not more than 8 feet apart on tangent and curve of less than 2° and not more than 7 feet apart on curve of 2° or more. With lever in any position couplings in pipeline shall not foul carriers.

**236.314 Electric lock for hand-operated switch or derail.**—Electric lock shall be provided for each hand-operated switch or derail within interlocking limits, except where train movements are made at not exceeding 20 miles per hour. At manually operated interlocking it shall be controlled by operator of the machine and shall be unlocked only after signals governing movements over such switch or derail displays aspects indicating stop. Approach or time locking shall be provided. (Revised 1-24-66.)

#### **Rules and instructions**

**236.326 Mechanical locking removed or disarranged, requirement for permitting train movements through interlocking.**—When mechanical locking of interlocking machine is being changed or is removed from the machine, or locking becomes disarranged or broken, unless protection equivalent to mechanical locking is provided by electric locking or electric circuits, train movements through the interlocking shall not be permitted until each switch, movable-point frog, or derail in the route is spiked, clamped, or blocked in proper position so that it cannot be moved by its controlling lever, and then train movements shall not exceed restricted speed until the interlocking is restored to normal operation. It will not be necessary to comply with this requirement at interlockings where protection is in service in accordance with section 303, provided that the signal controls are arranged so that the signals cannot display an aspect the indication of which is less restrictive than "proceed at restricted speed."

**236.327 Switch, movable-point frog, or split-point derail.**—Switch, movable-point frog, or split-point derail shall be maintained so that it cannot be locked if the switch point is prevented by an obstruction from closing to within three-eighths inch.

**236.328** *Plunger of facing-point lock.*—Plunger of lever operated facing-point lock shall have at least 8-inch stroke. When lock lever is in unlocked position the end of the plunger shall clear the lock rod not more than one inch. (Revised 1-21-66.)

**236.329** *Bolt lock.*—Bolt lock shall be so maintained that signal governing movements over switch or derail and displaying an aspect indicating stop cannot be operated to display a less restrictive aspect while derail is in derailing position, or when switch point is open one-half inch or more.

**236.330** *Locking dog of switch-and-lock movement.*—Locking dog of switch-and-lock movement shall extend through lock rod one-half inch or more in either normal or reverse position.

**236.331** *Repairs to switch and signal valves and cylinders.*—Repairs to switch and signal valves and cylinders shall not be made while they are in service.

**236.332** *Air distribution system, draining condensation.*—Provision shall be made for draining condensation out of air distribution system at low points. Condensers, tanks, reservoirs, and air distribution lines shall be drained frequently enough to avoid overflow of condensation into branch lines and apparatus.

**236.333** *Pole changer on electric switch operating mechanism.*—Pole changer on electric switch operating mechanism shall be maintained so that movement of switch mechanism follows movement of controlling lever.

**236.334** *Point detector.*—Point detector shall be maintained so that when switch mechanism is locked in normal or reverse position, contacts cannot be opened by manually applying force at the closed switch point. Point detector circuit controller shall be maintained so that the contacts will not assume the position corresponding to switch point closure if the switch point is prevented by an obstruction, from closing to within one-fourth inch where latch-out device is not used, and to within three-eighths inch where latch-out device is used.

**236.335** *Dogs, stops, and trunnions of mechanical locking.*—Driving pieces, dogs, stops, and trunnions shall be rigidly secured to locking bars. Swing dogs shall have full and free movement. Top plates shall be maintained securely in place.

**236.336** *Locking bed.*—The various parts of the locking bed, locking bed supports, and tappet stop rail shall be rigidly secured in place, and alined to permit free operation of locking.

**236.337** *Locking faces of mechanical locking, fit.*—Locking faces shall fit squarely against each other with a minimum engagement when locked of at least one-half the designed locking face.

**236.338** *Mechanical locking required in accordance with locking sheet and dog chart.*—Mechanical locking shall be in accordance with locking sheet and dog chart currently in effect.

**236.339 Mechanical locking, maintenance requirements.**—Locking and connections shall be maintained so that, when a lever or latch is mechanically locked the following will be prevented:

(a) *Mechanical machine:*

(1) Latch-operated locking. Raising lever latch block so that bottom thereof is within three-eighths inch of top of quadrant.

(2) Lever-operated locking. Moving lever latch block more than the three-eighths inch on top of quadrant.

(b) *Electromechanical machine:*

(1) Lever moving in horizontal plane. Moving lever more than five-sixteenths inch when in normal position or more than nine-sixteenths inch when in reverse position.

(2) Lever moving in arc. Moving lever more than 5°.

(c) *Power machine:*

(1) Latch-operated locking. Raising lever latch block so that the bottom thereof is within seven thirty-seconds inch of top of quadrant.

(2) Lever moving on horizontal plane. Moving lever more than five-sixteenths inch when in normal position or more than nine-sixteenths inch when in reverse position.

(3) Lever moving in arc. Moving lever more than 5°. (Revised 1-24-66.)

**236.340 Electromechanical interlocking machine, locking between electrical and mechanical levers.**—In electromechanical interlocking machine, locking between electric and mechanical levers shall be maintained so that mechanical lever cannot be operated except when released by electric lever.

**236.341 Latch shoes, rocker links, and quadrants.**—Latch shoes, rocker links, and quadrants of Saxby and Farmer machines shall be maintained so that locking will not release if a downward force not exceeding a man's weight is exerted on the rocker while the lever is in the midstroke position.

**236.342 Switch circuit controller.**—Switch circuit controller connected at the point to switch, derail, or movable-point frog, shall be maintained so that its contacts will not be in position corresponding to switch point closure when switch point is open one-fourth inch or more.

### Inspections and tests

**236.376 Mechanical locking.**—Mechanical locking in interlocking machine shall be tested when new locking is placed in service or change in locking is made. Complete test shall be made at least once every 4 years.

**236.377 Approach locking.**—Approach locking shall be tested at least once a year.

**236.378 Time locking.**—Time locking shall be tested at least once a year.

**236.379 Route locking.**—Route or other type of switch locking shall be tested at least once every 3 months.

**236.380 Indication locking.**—Indication locking for semaphore signals and for switch or lock levers shall be tested at least once a year, and for light signals at least once every 2 years.

**236.381 Traffic locking.**—Traffic locking shall be tested at least once a year.

**236.382 Switch obstruction test.**—Switch obstruction test shall be made at least once a month.

**236.383 Valve locks and valve magnets.**—Valve locks on valves of the noncut-off type, valves, and valve magnets shall be tested at least once every 3 months.

**236.384 Cross protection.**—Cross protection shall be tested at least once every 3 months.

**236.385 Time releases and timing relays.**—Time releases and timing relays shall be tested at least once every 3 months. The timing shall be maintained at not less than 90 percent of the predetermined time interval, which shall be shown on the plans or marked on the time release or relay.

**236.386 Restoring feature on power switches.**—Restoring feature on power switches shall be tested at least once every 3 months.

**236.387 Movable bridge locking.**—Movable bridge locking shall be tested at least once a year.

#### SUBPART D—TRAFFIC-CONTROL SYSTEMS

##### Standards

**236.401 Automatic block-signal system and interlocking standards applicable to traffic control systems.**—The standards prescribed in §§ 236.201 to 236.203, inclusive, §§ 236.205, 236.206, 236.303, 236.307, 236.310, and 236.311 shall apply to traffic-control systems.

**236.402 Signals controlled by track circuits and control operator.**—The control circuits for home signal aspects with indications more favorable than "proceed at restricted speed" shall be controlled by track circuits extending through the entire block. Also in addition, at controlled point they may be controlled by control operator, and, at manually operated interlocking, they shall be controlled manually in cooperation with control operator. (Revised 1-24-66.)

**236.403 Signals at controlled point.**—Signals at a controlled point shall be so interconnected that aspects to proceed cannot be displayed simultaneously for conflicting movements.

**236.404 Signals at adjacent controlled points.**—Signals at adjacent controlled points shall be so interconnected that aspects to proceed on track signaled for movements at greater than restricted speed cannot be displayed simultaneously for conflicting movements. (Revised 1-24-66.)

**236.405 Track signaled for movements in both directions, change of direction of traffic.**—On track signaled for movements in both directions, occupancy of the track between opposing signals at adjacent controlled points shall prevent changing the direction of traffic from that

which obtained at the time the track became occupied, except that when a train having left one controlled point reaches a section of track immediately adjacent to the next controlled point at which switching is to be performed, an aspect permitting movement at not exceeding restricted speed may be displayed into the occupied block. (Revised 1-24-66.)

**236.406** *Indication of track circuit occupancy at controlled points.*—Occupancy of track circuits at controlled points shall be automatically indicated at the control station.

**236.407** *Approach or time locking, where required.*—Approach or time locking shall be provided for all controlled signals. (Revised 1-24-66.)

**236.408** *Route locking.*—Route locking shall be provided where switches are power-operated. Route locking shall be effective when the first pair of wheels of a locomotive or car passes a point not more than 13 feet in advance of the signal governing its movement. (Revised 1-24-66.)

NOTE 1.—Existing installations on each railroad, which do not conform to the requirements of the last sentence of this section shall be brought into conformity on or before December 31, 1970. (added 1-24-66.)

**236.409** *Control machine, indication of switch operation.*—It shall be indicated on the control machine when power-operated switch has completed its movement and is locked.

**236.410** *Locking, hand-operated switch.*—(a) Each hand-operated switch in main track shall be locked either electrically or mechanically in normal position, except where:

(1) Train speeds over switch do not exceed 20 miles per hour; or

(2) Trains are not permitted to clear the main track at such switch; or

(3) Both switch and traffic-control system were installed prior to October 1, 1950.

(b) Approach or time locking shall be provided and locking may be released either automatically, or by the control operator, but only after the control circuits of signals governing movement in either direction over the switch and which display aspects more favorable than "proceed at restricted speed" have been opened directly or by shunting of track circuit.

NOTE.—Each carrier subject to this rule is hereby authorized to remove electrical or mechanical locks now installed within the purview of Section 236.410 when either exception (1) or (2) of the present rule is satisfied, subject to the condition that the following procedures and actions be accomplished:

1. Each carrier intending to remove a lock under the findings made herein and based on the existence of one or more of the circumstances as set forth in exceptions (1) or (2) as contained in the revised section, shall

(a) notify the FRA by letter setting forth the location of the lock involved and the specific exception on which removal is based.

(b) include in the letter to the FRA an assurance that the excepting circumstances relied upon will not be changed without either reinstallation of the electric or mechanical lock, or approval of the FRA of the changed circumstances.

(c) Publish in its Time Table the not-to-exceed 20 miles per hour speed limit covering the area of the switch, when that is the exception relied upon; or, where exception (2)

is relied upon, publish either in the Special Instructions part of its Time Table or in a separate printed Special Instructions the location of each hand-operated switch where electric or mechanical lock is removed and, where train movements are made in excess of twenty (20) miles per hour, concurrently issuing specific instructions by stating therein, that trains are not to be permitted to clear the main track at such switch.

2. Following the foregoing, and upon acknowledgment of the letter to the FRA, such acknowledgment to be made promptly as an administrative action by the FRA's Bureau of Railroad Safety, and such acknowledging letter to be retained by the carrier as authority for the removal and as a record of the exemption on which relied, the lock may be removed.

### Rules and instructions

**236.426 Interlocking rules and instructions applicable to traffic-control systems.**—The rules and instructions prescribed in §§ 236.327 and 236.328, 236.330 to 236.334, inclusive, and 236.342 shall apply to traffic control systems.

### Inspections and tests

**236.476 Interlocking inspections and tests applicable to traffic-control systems.**—The inspections and tests prescribed in §§ 236.377 to 236.380, inclusive, and 236.382, 236.383, 236.385, and 236.386 shall apply to traffic-control systems.

## SUBPART E—AUTOMATIC TRAIN-STOP, TRAIN-CONTROL, AND CAB-SIGNAL SYSTEMS

### Standards

**236.501 Forestalling device and speed control.**—(a) An automatic train-stop system may include a device by means of which the automatic application of the brakes can be forestalled.

(b) Automatic train-control system shall include one or more of the following features:

(1) Low-speed restriction, requiring the train to proceed under slow speed after it has either been stopped by an automatic application of the brakes, or under control of the engineman, its speed has been reduced to slow speed, until the apparatus is automatically restored to normal because the condition which caused the restriction no longer affects the movement of the train.

(2) Medium-speed restriction, requiring the train to proceed under medium speed after passing a signal displaying an approach aspect or when approaching a signal requiring a stop, or a stop-indication point, in order to prevent an automatic application of the brakes.

(3) Maximum-speed restriction, effecting an automatic brake application whenever the predetermined maximum speed limit is exceeded.

**NOTE.**—Relief from the requirements of subparagraphs (1) and (2) of this paragraph will be granted, insofar as speed limits fixed by definitions of slow and medium speeds are concerned, upon an adequate showing by an individual carrier where automatic train-control systems now in service enforce speed restrictions higher than those required by definitions in §§ 236.700 to 236.838 inclusive.

**236.502 Automatic brake application, initiation by restrictive block conditions stopping distance in advance.**

—An automatic train-stop or train-control system shall operate to initiate an automatic brake application at least stopping distance from the entrance to a block, wherein any condition described in 236.205 obtains, and at each main track signal requiring a reduction in speed. (Revised 1-24-66.)

**236.503 Automatic brake application, initiation when predetermined rate of speed exceeded.**

—An automatic train-control system shall operate to initiate an automatic brake application when the speed of the train exceeds the predetermined rate as required by the setting of the speed control mechanism.

**236.504 Operation interconnected with automatic block-signal system.**

—An automatic train-stop or train-control system shall operate in connection with an automatic block-signal system and shall be so interconnected with the signal system as to perform its intended function in event of failure of the engineman to obey a main track signal requiring a reduction in speed. (Revised 1-24-66.)

**236.505 Proper operative relation between parts along roadway and parts on locomotive.**

—Proper operative relation between the parts along the roadway and the parts on the locomotive shall obtain under all conditions of speed, weather, wear, oscillation, and shock.

**236.506 Release of brakes after automatic application.**

—The automatic train-stop or train-control apparatus shall prevent release of the brakes after automatic application until a reset device has been operated, or the speed of the train has been reduced to a predetermined rate, or the condition that caused the brake application no longer affects the movement of the train. If reset device is used it shall be arranged so that the brakes cannot be released until the train has been stopped, or it shall be located so that it cannot be operated by engineman without leaving his accustomed position in the cab.

**236.507 Brake application, full service.**

—The automatic train-stop or train-control apparatus shall, when operated, cause a full service application of the brakes.

**236.508 Interference with application of brakes by means of brake valve.**

—The automatic train-stop, train-control, or cab-signal apparatus shall be arranged so as not to interfere with the application of the brakes by means of the brake valves and not to impair the efficiency of the air-brake system.

**236.509 Two or more locomotives coupled.**

—The automatic train-stop, train-control, or cab-signal apparatus shall be arranged so that when two or more locomotives are coupled, or a pushing or helping locomotive is used, it can be made operative only on the locomotive from which the brakes are controlled.

**236.510 Conformance with established clearances.**

—The automatic train-stop, train-control, and cab-signal apparatus shall be arranged so as to conform to carriers' established clearances for equipment and structures.

**236.511 Cab signals controlled in accordance with block conditions stopping distance in advance.**—The automatic cab-signal system shall be arranged so that cab signals will be continuously controlled in accordance with conditions described in § 236.205 that obtain at least stopping distance in advance.

**236.512 Cab-signal indication when locomotive enters block where restrictive conditions obtain.**—The automatic cab-signal system shall be arranged so that when a locomotive enters or is within a block, wherein any condition described in § 236.205 obtains, the cab signals shall indicate "proceed at restricted speed."

**236.513 Audible indicator.**—The automatic cab-signal system shall be arranged so that when the cab signal changes to display a more restrictive aspect, an audible indicator will sound continuously until silenced by manual operation of an acknowledging device.

**236.514 Interconnection of cab-signal system with roadway-signal system.**—The automatic cab-signal system shall be interconnected with the roadway-signal system so that the cab-signal indication will not authorize operation of the train at a speed higher than that authorized by the indication of the roadway signal that governed the movement of a train into a block except when conditions affecting movement of trains in the block change after the train passes the signal.

**236.515 Visibility of cab signals.**—The cab signals shall be plainly visible to members of the locomotive crew from their stations in the cab.

**236.516 Cab indicator, requirements.**—The cab indicator shall have a distinctive sound which will be clearly audible throughout the cab under all operating conditions.

#### Rules and instructions, roadway

**236.526 Roadway element not functioning properly.**—When a roadway element except track circuit of automatic train-stop, train-control, or cab-signal system is not functioning as intended, the signal associated with such roadway element shall be caused manually to display its most restrictive aspect until such element has been restored to normal operative condition.

**236.527 Roadway element insulation resistance.**—Insulation resistance between roadway inductor or magnet winding and ground shall be maintained at not less than 10,000 ohms.

**236.528 Restrictive condition resulting from open hand-operated switch, requirement.**—When a facing-point hand-operated switch is open one-fourth inch or more, or a trailing-point hand-operated switch three-eighths inch or more, or hand-operated switch is not locked where facing-point lock with circuit controller is used, the resultant restrictive condition of an automatic train-stop or train-control device of the continuous type or the resultant restrictive cab-signal indication of an automatic cab-signal device on an approaching locomotive shall be maintained to within 300 feet of the points of the switch.

**236.529 Roadway element inductor, height and distance from rail.**—Inductor of the inert roadway element type shall be maintained with the inductor pole faces at a height above the plane of the tops of the rails, and with its inner edge at a horizontal distance from the gage side of the nearest running rail, in accordance with specifications of the carrier on file with the Commission.

**236.530 Ramp, height and distance from rail.**—Ramp of automatic train-stop device shall be maintained with its contact surface at its highest point at a height above the plane of the tops of the rails, and with its center line at a horizontal distance from the gage side of the nearest running rail, in accordance with specifications of the carrier on file with the Commission.

**236.531 Trip arm, height and distance from rail.**—Trip arm of automatic train-stop device when in stop position shall be maintained at a height above the plane of the tops of the rails, and a horizontal distance from its center line to gage side of the running rail, in accordance with specifications of the carrier on file with the Commission.

**236.532 Strap iron inductor, use restricted.**—No railroad shall use strap iron inductor, short ramp, or other roadway element with characteristics differing from its standard type, on track where speed higher than restricted speed is permitted.

**236.533 Track magnet, height.**—Track magnet located between the rails of a track shall not extend above the plane of the tops of the rails.

**236.534 Entrance to equipped territory, requirements.**—Where trains are not required to stop at the entrance to equipped territory, except when leaving yards and stations and speed until entering equipped territory does not exceed restricted speed, the automatic train-stop, train-control, or cab-signal device shall be operative at least stopping distance from the entrance to such territory except where the approach thereto is governed by automatic approach signal.

#### Rules and instructions, locomotives

**236.551 Power-supply voltage, requirement.**—The voltage of power supply shall be maintained within 10 percent of rated voltage.

**236.552 Insulation resistance, requirement.**—Insulation resistance between wiring and ground shall be not less than the following:

Continuous inductive automatic train-stop, train-control, and cab-signal systems, 250,000 ohms.

Intermittent inductive automatic train-stop systems, 20,000 ohms.

**236.553 Seal, where required.**—Seal shall be maintained on any device other than brake-pipe cut-out cock (double-heading cock), by means of which the operation of the pneumatic portion of automatic train-stop or train-control apparatus can be cut out. (Revised 1-24-66.)

**236.554 Rate of pressure reduction, equalizing reservoir or brake pipe.**—The equalizing-reservoir pressure or brake-pipe pressure reduction during an automatic brake application shall be at a rate not less than that which results from a manual service application.

**236.555** *Repaired or rewound receiver coil.*—Receiver coil which has been repaired or rewound shall have the same operating characteristics which it possessed originally or as currently specified for new equipment.

**236.556** *Adjustment of relay.*—Change in adjustment of relay shall be made only in a shop equipped for that purpose except when receiver coils, electropneumatic valve, or other essential part of the equipment is replaced. Irregularities in power-supply voltage or other variable factors in the circuit shall not be compensated for by adjustment of the relay.

**236.557** *Receiver, intermittent inductive, location with respect to rail.*—Receiver of intermittent inductive automatic train-stop device of the inert roadway element type shall be maintained with bottom of the receiver at a height above the plane of the tops of the rails, and with its outer edge at a horizontal distance from the gage side of the nearest rail, in accordance with specifications of the carrier on file with the Commission.

**236.558** *Contact shoe, location with respect to rail.*—Contact face of shoe of automatic train-stop and train-control device shall be maintained at a height above the plane of the tops of the rails, and with center line of shoe at a horizontal distance from the gage side of the nearest rail, in accordance with specifications of the carrier on file with the Commission.

**236.559** *Receiver, intermittent magnetic, location with respect to rail.*—Receiver of intermittent magnetic inductive automatic train-stop device shall be maintained with lower surface of receiver at a height above the plane of the tops of the rails, in accordance with specifications of the carrier on file with the Commission.

**236.560** *Contact element, mechanical trip type, location with respect to rail.*—Contact element of automatic train-stop device of the mechanical trip type shall be maintained at a height above the plane of the tops of the rails, and at a horizontal distance from the gage side of the rail, in accordance with specifications of the carrier on file with the Commission.

**236.561** *Safety chain or safety hanger.*—Safety chain or safety hanger provided for receiver of continuous inductive automatic train-stop, train-control, or cab-signal device shall clear receiver core 1 inch or more.

**236.562** *Minimum rail current required.*—The minimum rail current required to restore the locomotive equipment of continuous inductive automatic train-stop or train-control device to normal condition, or to obtain a proceed indication of automatic cab-signal device (pick-up) shall be in accordance with specifications of the carrier on file with the Commission.

**236.563** *Delay time.*—Delay time of automatic train-stop or train-control system shall not exceed 8 seconds and the spacing of signals to meet the requirements of 236.24 shall take into consideration the delay time.

**236.564** *Acknowledging time.*—Acknowledging time of intermittent automatic train-stop device shall not be more than 30 seconds. (Revised 1-24-66.)

**236.565** *Provision made for preventing operation of pneumatic brake-applying apparatus by double-heading cock, requirement.*—Where provision is made for preventing the operation of the pneumatic brake-applying apparatus of an automatic train-stop or train-control device when the double-heading cock is placed in double heading position, the automatic train-stop or train-control device shall not be cut out before communication is closed between the engineman's automatic brake valve and the brake pipe, when operating double-heading cock toward double-heading position.

**236.566** *Locomotive of each train operating in train-stop, train-control or cab-signal territory, equipped.*—The locomotive from which brakes are controlled, of each train operating in automatic train-stop, train-control, or cab-signal territory shall be equipped with apparatus responsive to the roadway equipment installed on all or any part of the route traversed, and such apparatus shall be in operative condition.

**236.567** *Restrictions imposed when device fails or cut out en route.*—Where an automatic train-stop, train-control, or cab-signal device fails and/or is cut out en route, train may proceed at restricted speed or if an automatic block-signal system is in operation according to signal indication but not to exceed medium speed, to the next available point of communication where report must be made to a designated officer. Where no automatic block-signal system is in use train shall be permitted to proceed at restricted speed or where automatic block-signal system is in operation according to signal indication but not to exceed medium speed to a point where absolute block can be established. Where an absolute block is established in advance of the train on which the device is inoperative train may proceed at not to exceed 79 miles per hour.

**236.568** *Difference between speeds authorized by roadway signal and cab signal, action required.*—If for any reason a cab signal authorizes a speed different from that authorized by a roadway signal, when a train enters the block governed by such roadway signal, the lower speed shall not be exceeded.

#### **Inspections and tests, roadway**

**236.576** *Roadway element.*—Roadway elements, except track circuits, including those for test purposes, shall be gaged monthly for height and alinement, and shall be tested at least once every 6 months. (Revised 1-24-66.)

**236.577** *Test, acknowledgment, and cut-in circuits.*—Test, acknowledgment, and cut-in circuits shall be tested at least once every 6 months.

#### **Inspections and tests, locomotive**

**236.586** *Daily or after-trip test.*—The automatic train-stop, train-control, or cab-signal apparatus on each locomotive operating in equipped territory shall be inspected and tested either once every 24 hours or within 24 hours before departure upon each trip, except that such inspection and tests of the automatic train-stop, train-control, or cab-signal equipment on Diesel-electric and

electric locomotives shall not be required provided that periodic tests be made on such locomotives each 6,000 miles, or at intervals of not more than 2 months, whichever shall occur first.

**236.587** *Departure test.*—A test of the automatic train-stop, train-control, or cab-signal apparatus on each locomotive, except locomotives and multiple-unit cars equipped with mechanical trip stop only, shall be made over track elements or test circuits or with portable test equipment, either on departure of locomotive from its initial terminal or, if locomotive apparatus is cut out between initial terminal and equipped territory, prior to entering equipped territory, to determine if such apparatus is in service and is functioning properly. If a locomotive makes more than one trip in any 24 hour period only one departure test shall be required in such 24-hour period. If departure test is made by an employee other than engineman, the engineman shall be informed of results of such tests and a record kept thereof. (Revised 1-24-66.)

**236.588** *Periodic test.*—Except as provided in 236.586, periodic tests of the automatic train-stops, train-control, or cab-signal apparatus shall be made at least once every 3 months, and on multiple-unit cars as specified by the carrier, subject to approval by the Commission.

**236.589** *Relays.*—At least once every 4 years each relay shall be removed from service, subjected to thorough test, necessary repairs and adjustments made, and shall not be replaced in service unless its operating characteristics are in accordance with the limits within which such relay is designed to operate.

**236.590** *Pneumatic apparatus.*—Automatic train-stop, train-control, or cab-signal pneumatic apparatus shall be inspected and cleaned at least once every 24 months.

#### SUBPART F—DRAGGING EQUIPMENT AND SLIDE DETECTORS, AND OTHER SIMILAR PROTECTIVE DEVICES

**236.601** *Signals controlled by devices, location.*—Signals controlled by devices used to provide protection against unusual contingencies, such as landslides, dragging equipment, burned bridges or trestles, and washouts shall be located so that stopping distance will be provided between the signal and the point where it is necessary to stop the train.

**236.602** (Deleted 1-24-66.)

#### DEFINITIONS

**236.700** *Definitions.*—For the purpose of these rules, standards, and instructions, the following definitions will apply:

**236.701** *Application, brake; full service.*—An application of the brakes resulting from a continuous or a split reduction in brake-pipe pressure at a service rate until maximum brake-cylinder pressure is developed. As applied to an automatic or electropneumatic brake with speed governor control, an application other than emergency which develops the maximum brake-cylinder pressure, as determined by the design of the brake equipment for the speed at which the train is operating.

**236.702** *Arm, semaphore.*—The part of a semaphore signal displaying an aspect. It consists of a blade fastened to a spectacle.

**236.703** *Aspect.*—The appearance of a roadway signal conveying an indication as viewed from the direction of an approaching train; the appearance of a cab signal conveying an indication as viewed by an observer in the cab.

**236.704** *Aspect, phantom signal.*—An aspect displayed by a light signal, different from the aspect intended, caused by light from an external source being reflected by the optical system of the signal.

**236.705** *Bar, locking.*—A bar in an interlocking machine to which the locking dogs are attached.

**236.706** *Bed, locking.*—That part of an interlocking machine that contains or holds the tappets, locking bars, cross locking, dogs, and other apparatus used to interlock the levers.

**236.707** *Blade, semaphore.*—The extended part of a semaphore arm which shows the position of the arm.

**236.708** *Block.*—A length of track of defined limits, the use of which by trains is governed by block signals, cab signals, or both.

**236.709** *Block, absolute.*—A block in which no train is permitted to enter while it is occupied by another train.

**236.710** *Block, latch.*—The lower extremity of a latch rod which engages with a square shoulder of the segment or quadrant to hold the lever in position.

**236.711** *Bond, rail joint.*—A metallic connection attached to adjoining rails to insure electrical conductivity.

**236.712** *Brake pipe.*—A pipe running from the engine-man's brake valve through the train, used for the transmission of air under pressure to charge and actuate the automatic brake equipment and charge the reservoirs of the electropneumatic brake equipment on each vehicle of the train.

**236.713** *Bridge-movable.*—That section of a structure bridging a navigable waterway so designed that it may be displaced to permit passage of traffic on the waterway.

**236.714** *Cab.*—The compartment of a locomotive from which the propelling power and power brakes of the train are manually controlled.

**236.715** *Chain, safety.*—A chain provided for the purpose of preventing the receiver of a continuous inductive automatic train-stop, train-control, or cab-signal device from falling should it become detached from its normal support.

**236.716** *Changer, pole.*—A device by which the direction of current flow in an electrical circuit may be changed.

**236.717** *Characteristics, operating.*—As applied to electrical apparatus, the measure of the electrical values at which the apparatus operates. (Drop-away, pickup, working value, et cetera.)

- 236.718** *Chart, dog.*—A diagrammatic representation of the mechanical locking of an interlocking machine, used as a working plan in making up, assembling, and fitting the locking.
- 236.719** *Circuit, acknowledgment.*—A circuit consisting of wire or other conducting material installed between the track rails at each signal in territory where an automatic train-stop system or cab-signal system of the continuous inductive type with two-indication cab signals is in service, to enforce acknowledgment by the engineer at each signal displaying an aspect requiring a stop.
- 236.720** *Circuit, common return.*—A term applied where one wire is used for the return of more than one electric circuit.
- 236.721** *Circuit, control.*—An electrical circuit between a source of electric energy and a device which it operates.
- 236.722** *Circuit, cut-in.*—A roadway circuit at the entrance to automatic train-stop, train-control, or cab-signal territory by means of which locomotive equipment of the continuous inductive type is actuated so as to be in operative condition.
- 236.723** *Circuit, line; double-wire.*—An electric circuit not employing a common return wire; a circuit formed by individual wires throughout.
- 236.724** *Circuit, shunt fouling.*—The track circuit in the fouling section of a turnout, connected in multiple with the track circuit in the main track.
- 236.725** *Circuit, switch shunting.*—A shunting circuit which is closed through contacts of a switch circuit controller.
- 236.726** *Circuit, track.*—An electrical circuit of which the rails of the track form a part.
- 236.727** *Circuit, track; coded.*—A track circuit in which the energy is varied or interrupted periodically.
- 236.728** *Circuit, trap.*—A term applied to a circuit used where it is desirable to provide a track circuit but where it is impracticable to maintain a track circuit.
- 236.729** *Cock, double-heading.*—A manually operated valve by means of which the control of brake operation is transferred to the leading locomotive.
- 236.730** *Coil, receiver.*—Concentric layers of insulated wire wound around the core of a receiver of an automatic train-stop, train-control, or cab-signal device on a locomotive.
- 236.731** *Controller, circuit.*—A device for opening and closing electric circuits.
- 236.732** *Controller, circuit; switch.*—A device for opening and closing electric circuits, operated by a rod connected to a switch, derail, or movable-point frog.
- 236.733** *Current, foreign.*—A term applied to stray electric currents which may affect a signaling system, but which are not a part of the system.

**236.734** *Current of traffic.*—The movement of trains on a specified track in a designated direction.

**236.735** *Current, leakage.*—A stray electric current of relatively small value which flows through or across the surface of insulation when a voltage is impressed across the insulation.

**236.736** *Cut-section.*—A location other than a signal location where two adjoining track circuits end within a block.

**236.737** *Cut-section, relayed.*—A cut-section where the energy for one track circuit is supplied through front contacts or through front and polar contacts of the track relay for the adjoining track circuit.

**236.738** *Detector, point.*—A circuit controller which is part of the switch operating mechanism and operated by a rod connected to a switch, derail, or movable-point frog to indicate that the point is within a specified distance of the stock rail.

**236.739** *Device, acknowledging.*—A manually operated electric switch or pneumatic valve by means of which, on a locomotive equipped with an automatic train-stop or train-control device, an automatic brake application can be fore-stalled, or by means of which, on a locomotive equipped with an automatic cab-signal device, the sounding of the cab indicator can be silenced.

**236.740** *Device, reset.*—A device whereby the brakes may be released after an automatic train-control brake application.

**236.741** *Distance, stopping.*—The maximum distance on any portion of any railroad which any train operating on such portion of railroad at its maximum authorized speed, will travel during a full service application of the brakes, between the point where such application is initiated and the point where the train comes to a stop.

**236.742** *Dog, locking.*—A steel block attached to a locking bar or tappet of an interlocking machine, by means of which locking between levers is accomplished.

**236.743** *Dog, swing.*—A locking dog mounted in such a manner that it is free to rotate on a trunnion which is riveted to a locking bar.

Cross reference: Element, contact. See Receiver.

**236.744** *Element, roadway.*—That portion of the roadway apparatus of automatic train-stop, train-control, or cab-signal system, such as electric circuit, inductor, magnet, ramp, or trip arm to which the locomotive apparatus of such system is directly responsive.

**236.745** *Face, locking.*—The locking surface of a locking dog, tappet, or cross locking of an interlocking machine.

**236.746** *Feature, restoring.*—An arrangement on a power-operated switch movement by means of which power is applied to restore the switch movement to full normal or to full reverse position, before the driving bar creeps sufficiently to unlock the switch, with control lever in normal or reverse position.

**236.747** *Forestop*.—As applied to an automatic train-stop or train-control device, to prevent an automatic brake application by operation of an acknowledging device or by manual control of the speed of the train.

**236.748** *Hanger, safety*.—A rigid member provided for the purpose of preventing the receiver of a continuous inductive automatic train-stop, train-control, or cab-signal device from falling should it become detached from its normal support.

**236.749** *Indication*.—The information conveyed by the aspect of a signal.

Cross reference: Inductor. See Element, roadway.

**236.750** *Interlocking, automatic*.—An arrangement of signals, with or without other signal appliances, which function through the exercise of inherent powers as distinguished from those whose functions are controlled manually, and which are so interconnected by means of electric circuits that their movements must succeed each other in proper sequence, train movements over all routes being governed by signal indication.

**236.751** *Interlocking, manual*.—An arrangement of signals and signal appliances operated from an interlocking machine and so interconnected by means of mechanical and/or electric locking that their movements must succeed each other in proper sequence, train movements over all routes being governed by signal indication.

**236.752** *Joint, rail; insulated*.—A joint in which electrical insulation is provided between adjoining rails.

**236.753** *Limits, interlocking*.—The tracks between the opposing home signals of an interlocking.

**236.754** *Line, open wire*.—An overhead wire line consisting of single conductors as opposed to multiple-conductor cables.

**236.755** *Link, rocker*.—That portion of an interlocking machine which transmits motion between the latch and the universal link.

**236.756** *Lock, bolt*.—A mechanical lock so arranged that if a switch, derail, or movable-point frog is not in the proper position for a train movement, the signal governing that movement cannot display an aspect to proceed; and that will prevent a movement of the switch, derail, or movable-point frog unless the signal displays its most restrictive aspect.

**236.757** *Lock, electric*.—A device to prevent or restrict the movement of a lever, a switch, or a movable bridge, unless the locking member is withdrawn by an electrical device, such as an electromagnet, solenoid, or motor.

**236.758** *Lock, electric; forced-drop*.—An electric lock in which the locking member is mechanically forced down to the locked position.

**236.759** *Lock, facing-point*.—A mechanical lock for a switch, derail, or movable-point frog, comprising a plunger stand and a plunger which engages a lock rod attached to the switch point to lock the operated unit.

**236.760** *Locking, approach.*—Electric locking effective while a train is approaching, within a specified distance, a signal displaying an aspect to proceed, and which prevents, until after the expiration of a predetermined time interval after such signal has been caused to display its most restrictive aspect, the movement of any interlocked or electrically locked switch, movable-point frog, or derail in the route governed by the signal, and which prevents an aspect to proceed from being displayed for any conflicting route.

**236.761** *Locking, electric.*—The combination of one or more electric locks and controlling circuits by means of which levers of an interlocking machine, or switches or other units operated in connection with signaling and interlocking, are secured against operation under certain conditions.

**236.762** *Locking, indication.*—Electric locking which prevents manipulation of levers that would result in an unsafe condition for a train movement if a signal, switch, or other operative unit fails to make a movement corresponding to that of its controlling lever, or which directly prevents the operation of a signal, switch, or other operative unit, in case another unit which should operate first fails to make the required movement.

**236.763** *Locking, latch-operated.*—The mechanical locking of an interlocking machine which is actuated by means of the lever latch.

**236.764** *Locking, lever-operated.*—The mechanical locking of an interlocking machine which is actuated by means of the lever.

**236.765** *Locking, mechanical.*—An arrangement of locking bars, dogs, tappets, cross locking, and other apparatus by means of which interlocking is effected between the levers of an interlocking machine and so interconnected that their movements must succeed each other in a predetermined order.

**236.766** *Locking, movable bridge.*—The rail locks, bridge locks, bolt locks, circuit controllers, and electric locks used in providing interlocking protection at a movable bridge.

**236.767** *Locking, route.*—Electric locking, effective when a train passes a signal displaying an aspect for it to proceed, which prevents the movement of any switch, movable-point frog, or derail in advance of the train within the route entered. It may be so arranged that as a train clears a track section of the route, the locking affecting that section is released.

**236.768** *Locking, time.*—A method of locking, either mechanical or electrical, which, after a signal has been caused to display an aspect to proceed, prevents, until after the expiration of a predetermined time interval after such signal has been caused to display its most restrictive aspect, the operation of any interlocked or electrically locked switch, movable-point frog, or derail in the route governed by that signal, and which prevents an aspect to proceed from being displayed for any conflicting route.

- 236.769 Locking, traffic.**—Electric locking which prevents the manipulation of levers or other devices for changing the direction of traffic on a section of track while that section is occupied or while a signal displays an aspect for a movement to proceed into that section.
- 236.770 Locomotive.**—A self-propelled unit of equipment which can be used in train service.
- 236.771 Machine, control.**—An assemblage of manually operated devices for controlling the functions of a traffic-control system; it may include a track diagram with indication lights.
- 236.772 Machine, interlocking.**—An assemblage of manually operated levers or other devices for the control of signals, switches, or other units.  
Cross reference Magnet, track. See Element, roadway.
- 236.773 Movements, conflicting.**—Movements over conflicting routes.
- 236.774 Movement, facing.**—The movement of a train over the points of a switch which face in a direction opposite to that in which the train is moving.
- 236.775 Movement, switch-and-lock.**—A device, the complete operation of which performs the three functions of unlocking, operating, and locking a switch, movable-point frog, or derail.
- 236.776 Movement, trailing.**—The movement of a train over the points of a switch which face in the direction in which the train is moving.
- 236.777 Operator, control.**—An employee assigned to operate the control machine of a traffic-control system.
- 236.778 Piece, driving.**—A crank secured to a locking shaft by means of which horizontal movement is imparted to a longitudinal locking bar.
- 236.779 Plate, top.**—A metal plate secured to a locking bracket to prevent the cross locking from being forced out of the bracket.
- 236.780 Plunger, facing-point lock.**—That part of a facing-point lock which secures the lock rod to the plunger stand when the switch is locked.
- 236.781 Point, clearance.**—The location on a turnout at which the carrier's specified clearance is provided between tracks.
- 236.782 Point, controlled.**—A location where signals and/or other functions of a traffic-control system are controlled from the control machine.
- 236.783 Point, stop-indication.**—As applied to an automatic train-stop or train-control system without the use of roadway signals, a point where a signal displaying an aspect requiring a stop would be located.
- 236.784 Position, deenergized.**—The position assumed by the moving member of an electromagnetic device when the device is deprived of its operating current.

**236.785** *Position, false restrictive.*—A position of a semaphore arm that is more restrictive than it should be.

**236.786** *Principle, closed circuit.*—The principle of circuit design where a normally energized electric circuit which, on being interrupted or deenergized, will cause the controlled function to assume its most restrictive condition.

**236.787** *Protection, cross.*—An arrangement to prevent the improper operation of a signal, switch, moveable-point frog, or derail as the result of a cross in electrical circuits.

Cross reference: Ramp. See Element, roadway.

**236.788** *Receiver.*—A device on a locomotive, so placed that it is in position to be influenced inductively or actuated by an automatic train-stop, train-control, or cab-signal roadway element.

**236.789** *Relay, timing.*—A relay which will not close its front contacts or open its back contacts, or both, until the expiration of a definite time interval after the relay has been energized.

**236.790** *Release, time.*—A device used to prevent the operation of an operative unit until after the expiration of a predetermined time interval after the device has been actuated.

**236.791** *Release value.*—The electrical value at which the movable member of an electromagnetic device will move to its deenergized position.

**236.792** *Reservoir, equalizing.*—An air reservoir connected with and adding volume to the top portion of the equalizing piston chamber of the automatic brake valve, to provide uniform service reductions in brake-pipe pressure regardless of the length of the train.

Cross reference: Rocker. See Link, rocker.

**236.793** *Rod, lock.*—A rod, attached to the front rod or lug of a switch, movable-point frog, or derail, through which a locking plunger may extend when the switch points or derail are in the normal or reverse position.

**236.794** *Rod, up-and-down.*—A rod used for connecting the semaphore arm to the operating mechanism of a signal.

**236.795** *Route.*—The course or way which is, or is to be, traveled.

**236.796** *Routes, conflicting.*—Two or more routes, opposing, converging, or intersecting, over which movements cannot be made simultaneously without possibility of collision.

**236.797** *Route, interlocked.*—A route within interlocking limits.

**236.798** *Section, dead.*—A section of track, either within a track circuit or between two track circuits, the rails of which are not part of a track circuit.

**236.799** *Section, fouling.*—The section of track between the switch points and the clearance point in a turnout.

**236.800** *Sheet, locking.*—A description in tabular form of the locking operations in an interlocking machine. (Shoe) Cross reference: See Receiver 236.788.

**236.801** *Shoe, latch.*—The casting by means of which the latch rod and the latch block are held to a lever of a mechanical interlocking machine.

**236.802** *Shunt.*—A bypath in an electrical circuit.

**236.802a** *Siding.*—An auxiliary track for meeting or passing trains. (Added 1-24-66.)

**236.803** *Signal, approach.*—A roadway signal used to govern the approach to another signal and if operative so controlled that its indication furnishes advance information of the indication of the next signal.

**236.804** *Signal, block.*—A roadway signal operated either automatically or manually at the entrance to a block.

**236.805** *Signal, cab.*—A signal located in engineman's compartment or cab, indicating a condition affecting the movement of a train and used in conjunction with interlocking signals and in conjunction with or in lieu of block signals.

**236.806** *Signal, home.*—A roadway signal at the entrance to a route or block to govern trains in entering and using that route or block.

**236.807** *Signal, interlocking.*—A roadway signal which governs movements into or within interlocking limits.

**236.808** *Signals, opposing.*—Roadway signals which govern movements in opposite directions on the same track.

**236.809** *Signal, slotted mechanical.*—A mechanically operated signal with an electromagnetic device inserted in its operating connection to provide a means of controlling the signal electrically, as well as mechanically.

**236.810** *Spectacle, semaphore arm.*—That part of a semaphore arm which holds the roundels and to which the blade is fastened.

**236.811** *Speed, medium.*—A speed not exceeding 40 miles per hour.

**236.812** *Speed, restricted.*—A speed that will permit stopping short of another train or obstruction, but not exceeding 20 miles per hour.

**236.813** *Speed, slow.*—A speed not exceeding 20 miles per hour.

**236.814** *Station, control.*—The place where the control machine of a traffic-control system is located.

**236.815** *Stop.*—As applied to mechanical locking, a device secured to a locking bar to limit its movement.

**236.816** *Superiority of trains.*—The precedence conferred upon one train over other trains by train order or by reason of its class or the direction of its movement.

**236.817** *Switch, electropneumatic.*—A switch operated by an electropneumatic switch-and-lock movement.

**236.818** *Switch, facing-point.*—A switch, the points of which face traffic approaching in the direction for which the track is signaled.

**236.819** *Switch, hand-operated.*—A noninterlocked switch which can only be operated manually.

**236.820** *Switch, interlocked.*—A switch within the interlocking limits, the control of which is interlocked with other functions of the interlocking.

**236.821** *Switch, sectionalizing.*—A switch for disconnecting a section of a power line from the source of energy.

**236.822** *Switch, spring.*—A switch equipped with a spring device which forces the points to their original position after being trailed through and holds them under spring compression.

**236.823** *Switch, trailing-point.*—A switch, the points of which face away from traffic approaching in the direction for which the track is signaled.

**236.824** *System, automatic block-signal.*—A block-signal system wherein the use of each block is governed by an automatic block signal, cab signal, or both.

**236.825** *System, automatic train-control.*—A system so arranged that its operation will automatically result in the following:

A full service application of the brakes which will continue either until the train is brought to a stop, or, under control of the engineman, its speed is reduced to a predetermined rate.

When operating under a speed restriction, an application of the brakes when the speed of the train exceeds the predetermined rate and which will continue until the speed is reduced to that rate.

**236.826** *System, automatic train-stop.*—A system so arranged that its operation will automatically result in the application of the brakes until the train has been brought to a stop.

**236.827** *System, block signal.*—A method of governing the movement of trains into or within one or more blocks by block signals or cab signals.

**236.828** *System, traffic-control.*—A block-signal system under which train movements are authorized by block signals whose indications supersede the superiority of trains for both opposing and following movements on the same track.

**236.829** *Terminal, initial.*—The starting point of a locomotive for a trip.

**236.830** *Time, acknowledging.*—As applied to an intermittent automatic train-stop system, a predetermined time within which an automatic brake application may be forestalled by means of the acknowledging device.

**236.831** *Time, delay.*—As applied to an automatic train-stop or train-control system, the time which elapses after an automatic brake application is initiated until the brakes start to apply.

**236.831a** *Track, main.*—A track, other than auxiliary track, extending through yards and between stations, upon which trains are operated by timetable or train orders, or both, or the use of which is governed by block signals. (Added 1-24-66.)

**236.832** *Train.*—A locomotive or more than one locomotive coupled, with or without cars.

**236.833** *Train, opposing.*—A train, the movement of which is in a direction opposite to and toward another train on the same track.

**236.834** *Trip.*—A movement of a locomotive over all or any portion of automatic train-stop, train-control, or cab-signal territory between the terminals for that locomotive; a movement in one direction.

Cross reference: Trip-arm. See Element, roadway.

**236.835** *Trunking.*—A casing used to protect electrical conductors.

**236.836** *Trunnion.*—A cylindrical projection supporting a revolving part.

**236.837** *Valve, electropneumatic.*—A valve electrically operated which, when operated, will permit or prevent passage of air.

**236.838** *Wire, shunt.*—A wire forming part of a shunt circuit.

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236.811 Speed, medium.  
236.812 Speed, restricted.  
236.813 Speed, slow.  
236.814 Station, control.  
236.815 Stop.  
236.816 Superiority of trains.  
236.817 Switch, electropneumatic.  
236.818 Switch, facing-point.  
236.819 Switch, hand-operated.  
236.820 Switch, interlocked.  
236.821 Switch, sectionalizing.  
236.822 Switch, spring.  
236.823 Switch, trailing-point.  
236.824 System, automatic block-signal.  
236.825 System, automatic train-control.  
236.826 System, automatic train-stop.  
236.827 System, block-signal.  
236.828 System, traffic-control.  
236.829 Terminal, initial.  
236.830 Time, acknowledging.  
236.831 Time, delay.  
236.832 Train.  
236.833 Train, opposing.  
236.834 Trip.  
236.835 Trunking.  
236.836 Trunnion.  
236.837 Valve, electropneumatic.  
236.838 Wire, shunt.