

Subpart C – Interlocking - Standards

**§ 236.301 Where signals shall be provided.**

This rule requires that a signal be provided to govern train movements into and through interlocking limits except over electrically locked hand-operated switch equipped with either a pipe-connected derail or independently-operated electrically locked derail.

**Application:**

This rule applies to interlocking only. It does not apply to controlled points in traffic control systems.

Electric locks installed under this rule must conform to requirements of rules 314, 760, 768 without regard to speed.

All interlocked signals must be operative unless relief has been heretofore granted. The word "into" is defined as, "to or toward the inside of from outside; past or through the outer boundary

or limit." The word "through" is defined as, "into one side, end or point and out of the other." Therefore, an inoperative red signal does not meet these requirements.

Signals shall be provided to govern movements into and through interlocking limits. A carrier utilizing red inoperative signals for movement of trains or engines into and through interlocking limits is not in compliance.

A signal is not required to govern movements over a hand-operated switch into interlocking limits if the hand-operated switch is equipped with an electric lock and a derail is provided at the clearance point that is either pipe-connected or locked electrically. There are no restrictions on train speed at such installations.

A non-electrically locked switch without derail may be utilized within interlocking limits provided a signal is provided to govern movements on all routes and speed does not exceed 20 mph.

An electrically locked switch without derail but with signal governing movements out of the switch may be utilized without restriction on train speed.

Where an electrically locked switch and/or derail is used within the interlocking, locking must protect against all possible conflicting routes and once the locking has been released, it should be impossible to clear a conflicting route.

All electrically locked switches and derails within interlocking limits must have approach or time locking.

CLASSIFICATION OF DEFECTS

236 0301 01 Signal not provided to govern train movements into and through interlocking limits. (Note: This does not apply to a turnout 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 Section 236.314 (without reference to the 20-mile exceptions), and those of either Section 236.760 or Section 236.768, as may be appropriate.)

**§ 236.302 Track Circuits and Route Locking.**

This rule requires track circuits, and route locking where power operated switches are used, be provided throughout interlocking limits.

**Application:**

Applies to interlocking only.

Route locking shall be effective at a point not more than 13 feet in advance of the signal measured from the center of the signal mast or if there is no mast, from the center of the signal.

When a train or engine passes a signal displaying any type of proceed aspect, including "proceed at restricted speed," track circuits and route locking shall be provided. Electric locking, either in the interlocking machine or the wayside equipment, that prevents the movement of any switch, movable point frog, or derail in the route entered is required. However, it may be so arranged that after a train clears a track section of the route, the locking affecting that section may be released.

Route locking is not required nor provided where there is an absence of a power-operated switch, movable point frog or derail in the route.

## CLASSIFICATION OF DEFECTS

236 0302 01 Track circuits not provided throughout interlocking limits.

236 0302 02 Route locking not provided throughout interlocking limits. (Note: 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.)

236 0302 03 Route locking not effective.

**§ 236.303 Control circuits for signals, selection through circuit controller operated by switch points or by switch locking mechanism.**

This rule is a standard that requires control circuits of signal aspects with indications more favorable than "proceed at restricted speed" be selected through switch circuit controller or relay operated by circuit controller of each hand-operated, power-operated, or mechanically-operated switch; movable-point frog; or derail in the route governed. It requires each switch, movable- point frog, or derail to be in proper position before such signal aspect can be displayed.

**Application:**

Applies to both interlocking and traffic control systems. This rule is not applicable to control circuits of aspects indicating "proceed at restricted speed."

Each switch, movable-point frog or derail shall be equipped with a switch circuit controller operated directly by the switch points or by a circuit controller operated by a switch locking mechanism. An aspect with an indication more favorable than "proceed at restricted speed" must be selected through such switch, movable-point frog or derail circuit controller.

This rule applies to all hand-operated, power-operated or mechanically-operated switches within interlockings or traffic control systems. These include power switches of any kind, (electric, electro-pneumatic, or hydraulic) and pipe-connected switches operated from a lever of a mechanical interlocking machine.

Non-compliance with this rule should be reflected in indication locking tests for power-operated switches, movable point frogs and derails. Test hand-operated switches by opening contacts of switch circuit controller.

Rule 236.6 is a maintenance standard that is applicable to hand-operated switches, (both electrically locked and non-electrically locked).

Rule 236.13 is a design standard that is applicable to spring switches installed in interlockings, traffic control systems, and automatic block signal systems. This rule prescribes the requirements for signal control circuits governing facing-point movements where spring switches are installed in interlockings, traffic control, and ABS systems. It should be noted that 236.13 does not require the signal control circuits for aspects governing trailing movements over a spring switch to check the position of the switch points.

Rules 236.334 and 236.342 are maintenance standards that dictate that the circuit controllers be maintained in such condition as to fulfill the requirements of Section 236.303.

The combination of indication and/or mechanical locking, as provided by an electro-mechanical interlocking machine, does not comply with this rule. A circuit controller is required at each switch through which control circuits of aspects more favorable than "proceed at restricted speed" must be selected.

Switch selection circuits are required for each aspect of a power-operated signal with an indication more favorable than "proceed at restricted speed" regardless of whether the speed through the interlocking is restricted by carrier operating rule or civil speed restriction.

#### CLASSIFICATION OF DEFECTS

236 0303 01 Control circuit for signal aspect with indication more favorable than "proceed at restricted speed" of power-operated signal governing movements over switches, movable-point frogs, and derails not selected through circuit controller operated directly by switch points or by switch locking mechanism, or through relay controlled by such switch circuit controller on each switch, movable-point frog, and derail in the routes governed by the signal.

236 0303 02 Control circuit for signal aspect with indication more favorable than "proceed at restricted speed" is not so arranged that such aspect can only be displayed by a signal when each switch, movable-point frog, and derail in the route governed is in proper position.

#### § 236.304 Mechanical locking or same protection effected by circuits.

This rule requires that mechanical locking or the equivalent protection by means of circuits be provided at each interlocking.

#### **Application:**

Each interlocking is required to be arranged either mechanically and/or electrically so that operation of controlling devices or apparatus must succeed each other in proper sequence before a proceed aspect can be displayed.

#### CLASSIFICATION OF DEFECTS

236 0304 01 Mechanical locking, or the same protection effected by means of circuits not provided.

#### § 236.305 Approach or time locking.

This rule requires approach or time locking be provided in connection with signals displaying aspects with indications more favorable than "proceed at restricted speed."

#### **Application:**

Any signal that displays an aspect more favorable than "proceed at restricted speed" must have approach or time locking.

This is applicable to any aspect more favorable than "proceed at restricted speed" no matter what speed restriction the carrier has on the track. For example, a green aspect interlocking signal that does not have approach or time locking where the speed is 10 mph does not comply with these requirements.

This rule requires the time or approach locking be effective for the maximum authorized speed permitted on each route.

#### CLASSIFICATION OF DEFECTS

236 0305 01 Approach or time locking not provided in connection with signal displaying aspects with indication more favorable than "proceed at restricted speed."

236 0305 02 Approach locking not effective.

236 0305 03 Time locking not effective.

#### § 236.306 Facing point lock or switch-and-lock movement.

Facing point lock or switch and lock movement is required for mechanically-operated switch, movable-point frog or split-point derail.

##### **Application:**

Mechanically-operated, as applied to this part, refers to a switch, movable-point frog or derail operated by the control operator from a central point by means of pipe connection. It would also apply to a mechanically operated cabin-type interlocking with the appurtenances operated by trainmen. It does not apply to hand-operated derails or switches.

#### CLASSIFICATION OF DEFECTS

236 0306 01 Facing-point lock or switch-and-lock movement not provided for mechanically operated switch, movable- point frog, or split-point derail.

#### § 236.307 Indication locking.

This rule requires indication locking 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, except light signals with all aspects controlled by polar or coded track circuits, or line circuits so installed that a single fault will not permit a more favorable aspect than intended to be displayed.

##### **Application:**

Applies to both interlocking and traffic control systems.

Indication locking is electric locking which assures that the operation of signal appliances succeed each other in proper sequence. Indication locking falls into three primary categories; levers, signals, and switches.

Depending upon the type of interlocking machine, indication locking of levers prevents the lever from being operated full-stroke until the operated unit has properly completed its movement, or prevents the final lever from being operated until all units have properly completed their required movements.

Indication locking of home signals prevents the established route from being changed. It prevents the operation of all switches, movable point frogs, derails, and other operative units in the route and prevents the clearing of conflicting signals. Indication locking of approach signals prevents the route governed by

a home signal from being changed until the approach signal displays an aspect not more favorable than "Approach Next Signal Prepared to Stop."

Indication locking of switches, movable point frogs, derails and other operative units such as bridge locking members prevents the clearing of signals governing movements over the unit until each operative unit has completed its required movement.

Inoperative approach signals, mechanically-operated (pipe-connected) home signals and switches are excluded from these requirements.

Each operative approach signal of the semaphore type, power-operated home signal, power-operated switch, movable-point frog or derail is required to be provided with indication locking.

Each operative approach signal of the light type shall be provided with indication locking except where its aspects are controlled by polar or coded track circuits, or by line circuits so arranged that a single fault will not permit a false proceed signal to be displayed.

#### CLASSIFICATION OF DEFECTS

236	0307	01	Indication locking not provided for semaphore type approach signal.
236	0307	02	Indication locking not provided for power-operated home signal.
236	0307	03	Indication locking not provided for power-operated switch, movable point frog, or derail.
236	0307	04	Indication locking not provided for approach signal of the light type. (Applies to each light signal except light signal all aspects of which are controlled by polar or coded track circuits or line circuits so arranged that a single fault will not permit a more favorable aspect than intended to be displayed.)
236	0307	05	Single fault in line circuit controlling approach signal aspect, where indication locking is not provided, permits more favorable aspect than intended to be displayed.
236	0307	06	Indication locking not effective.

#### § 236.308 Mechanical or electric locking or electric circuits; requisites.

This rule prohibits display of conflicting aspects except on track used for switching movements only by one train at a time. Manual interlockings installed prior to October 1, 1950, are excluded provided simultaneous opposing movements are not permitted between stations on either side of the interlocking when it is unattended.

#### Application:

Mechanical locking, electric locking, or electric circuits are required to be installed so that signals cannot display aspects which permit conflicting movements.

Opposing signals on track used for switching movements only are excluded and may display aspect indicating "proceed at restricted speed" when used by only one train at a time. This arrangement is prohibited for use by through trains. It is prohibited for more than one switch crew to perform movements on track used for switching only.

Unattended manual interlockings having signals that display conflicting aspects that are interconnected with automatic block signal systems meet the requirements of this rule.

## CLASSIFICATION OF DEFECTS

236 0308 01 Signals can display aspects which permit conflicting movements. (Does not apply to signals that may display restricting aspects at the same time on a track used for switching movements only, by one train at a time, or to opposing signals on the same track at manual interlocking which are permitted simultaneously to display aspects authorizing conflicting movements when interlocking is unattended, provided that simultaneous train movements in opposite directions on the same track between stations on either side of the interlocking are not permitted.)

**§ 236.309 Loss of shunt protection; where required.**

This rule requires that loss of shunt of 5 seconds or less, regardless if it occurs on the approach circuit or on a track circuit within the limits of an automatic interlocking, must not permit established route to be changed. It also requires that loss of shunt of 5 seconds or less shall not permit the release of route locking.

**Application:**

Applies to all automatic interlockings whether or not they are connected to other signal systems, and to traffic control systems. Includes automatic drawbridges, manual interlockings arranged for automatic operation when unattended, and interlockings having both automatic and controlled routes. Applies to route locking of power-operated switch installed after February 26, 1984.

Test for compliance on approach circuits that activate approach locking should be made by placing a shunt on the approach circuit to establish a route. The route is established when the interlocked signal displays an aspect authorizing movement into interlocking limits. After the route is established, remove the shunt while observing the interlocked signal to assure its aspect does not change until the expiration of five or more seconds. Each track circuit in the approach circuit should be tested.

Test for compliance on approach circuits that activate time locking should be made by placing a shunt on the approach circuit to establish a route. The route is established when the interlocked signal displays an aspect authorizing movement into interlocking limits. After the route is established, remove the shunt and determine that when the interlocked signal obtains an aspect indicating stop, a predetermined time interval is activated which prevents the clearing of a conflicting signal or operation of an interlocked device. Each track circuit in the approach circuit should be tested.

Test for compliance on track circuits within interlocking limits should be made by making an operating shunt test into interlocking limits, then place a shunt on the approach circuit of a conflicting route. Remove the shunt from the track circuit within interlocking limits while observing the conflicting route home signal to assure it does not clear until after the expiration of more than five seconds. Each track circuit within interlocking limits should be tested.

Test for compliance at power-operated switch by clearing signal governing movement over the switch; place a shunt on track circuit in approach to signal; place a shunt on track circuit in advance of signal; remove shunt from track circuit in approach to signal; remove shunt in advance of signal and determine that switch cannot be operated for at least five seconds. If more than one track circuit is in the route locking circuit, check each circuit in turn.

## CLASSIFICATION OF DEFECTS

236 0309 01 Loss of shunt for five seconds or less permits established route at automatic interlocking to be changed.

236 0309 02 Loss of shunt of five seconds or less permits the release of route locking of power-operated switch, movable point frog, or derail. (Does not apply to power-operated switch, movable point frog, or derail installed prior to February 27, 1984.)

**§ 236.310 Signal governing approach to home signal.**

This rule requires that a signal be provided on main track to govern the approach with the current of traffic to any home signal. It excludes the first signal encountered when leaving yards or stations and authorized speed approaching home signal is not higher than slow speed. It provides for use of inoperative approach signal when authorized speed between home signals on route governed is 20 miles per hour or less.

**Application:**

Applies to both interlocking and traffic control systems.

A signal to govern the approach to a home signal is required on main track only. Auxiliary tracks are excluded regardless of how heavily traveled.

An approach signal is required for current of traffic only where normal operation is with the current of traffic.

A signal is not required to govern the approach to the first signal encountered when leaving a yard or station where all trains originate or stop if the authorized speed approaching the first signal encountered is not higher than slow speed. If trains are operated that do not stop at the yard or station, an approach signal must be provided. In addition, the first signal encountered must be within yard or station limits. If it is outside yard or station limits, it becomes the first signal encountered after leaving the yard or station and requires that an approach signal be provided.

Where speed between home signals of an interlocking or controlled point exceeds 20 miles per hour, an operative approach signal must be provided.

An operative approach signal must comply with Rule 236.803, i.e., its aspect must convey advance information about the indication of the home signal. This requires that operative approach signals be capable of displaying aspects less restrictive than, "approach next signal prepared to stop," when the home signal displays an aspect indicating proceed.

An approach signal capable of displaying a single aspect, yellow or lunar, is an inoperative signal.

An approach signal capable of displaying two aspects, red and yellow, is an inoperative signal in the application of this rule. It cannot furnish advance information about the indication of the home signal when the home signal displays an aspect indicating proceed.

An approach signal in non-signaled territory capable of displaying two aspects, yellow and green, is an operative signal.

An approach signal capable of displaying three aspects, red, yellow, and green, is an operative signal.

#### CLASSIFICATION OF DEFECTS

236 0310 01 Approach signal not provided for home signal on main track. (Does not apply where home signal is the first signal encountered when leaving yard or station where authorized speed approaching such signal is not higher than slow speed).

236 0310 02 Inoperative approach signal provided for home signal where authorized speed between home signals is greater than 20 miles per hour.

**§ 236.311 Signal control circuits, selection through track relays or devices functioning as track relays and through signal mechanism contacts and time releases at automatic interlocking.**

This rule requires that at all interlockings, the control circuit for aspect with indication more favorable than "proceed at restricted speed", be selected through relays or devices that function as track relays of all track circuits in the route governed or through repeating relays for such track circuits. Additionally, at automatic interlocking, such control circuits shall be selected through relays or devices that function as track relays of track circuits in all conflicting routes or through repeating relays for such track circuits; through signal mechanism contacts or through relay contacts closed when conflicting signals display stop aspects; and through normal contacts of time releases or timing devices for conflicting routes or contact of relays repeating the normal position of contacts on such time releases or timing devices.

**Application:**

Applies to both interlocking and traffic control systems.

This rule does not require control circuits at manual or remote controlled interlockings or controlled points be selected through track relays or devices that function as track relays on conflicting routes, nor through contacts of signal mechanisms, or relay contacts closed when such signals display "stop" for conflicting routes, nor through "check" contacts closed when timing relays, releases, or devices are in their normal state.

This rule does not apply to control circuits of signals displaying aspects with indications of "proceed at restricted speed" aspects except at automatic interlockings.

CLASSIFICATION OF DEFECTS

236 0311 01 Control circuit for aspect with indication more favorable than "Proceed at restricted speed" not selected through relays or devices that function as track relays for all track circuits in the route governed or through repeating relays for such track circuits.

236 0311 02 Signal control circuit at automatic interlocking not selected through relays or devices that function as track relays for all track circuits in the route governed or through repeating relays for such track circuits.

236 0311 03 Signal control circuit at automatic interlocking not selected through relays or devices that function as track relays for track circuits in all conflicting routes within interlocking limits or through repeating relays for such track circuits.

236 0311 04 Signal control circuit at automatic interlocking not selected through signal mechanism contacts for signals on all conflicting routes or through relay contacts closed when such signals display stop aspects.

236 0311 05 Signal control circuit at automatic interlocking not selected through normal contacts of time releases or timing devices for all conflicting routes or through contacts of relays repeating the normal position of contacts of such time releases or timing devices.

**§ 236.312 Movable bridge, interlocking of signal appliances with bridge devices.**

This rule requires that interlocking of movable bridge be so interconnected with bridge devices that bridge must be properly locked and track properly aligned before a signal governing movements over the bridge can display an aspect to proceed.

**Application:**

There are three types of movable spans, bascule, lift and swing. Regardless of the type of bridge, the sequence of operation for rail traffic is as follows:

1. The bridge must be seated, then locked.
2. The movable rails must be determined to be in proper surface and alinement with the rails on the abutment or fixed span.
3. Derails, if any, must be placed in non derailing position.
4. Interlocked signal may then be operated to display proceed aspect.

For water traffic the sequence of operation is precisely the opposite.

Bascule and lift spans require bridge locking devices that can drive locking members between the movable span and abutment or fixed span only when the bridge is properly seated. Locking devices are required on both ends of lift spans. Only the lift end of bascule spans must be locked. When the locking members are within one inch of being fully driven, the bridge is considered to be properly locked. Bridge locks are not designed to hold the movable span down, but to determine that the bridge is properly seated. The movable rails of bascule and lift bridges frequently correctly aline before the bridge seats, hence the need of bridge locks.

Swing spans are properly seated when the wedges are driven to lift the span off the center pier. Consider swing spans locked when the wedges are within one inch of being fully driven. The latches of swing spans are not bridge locking members but are provided to stop swing bridges in proper alinement as it is being closed.

Rails which slide or lower to butt with those of the abutment or fixed span, or risers that slide into position in the movable joint must be locked in proper alinement.

Conley frogs are designed to be self alining and are not required to be locked or electrically checked for alinement. They are required to be checked for surface.

All movable joints are required to be locked or electrically determined to be in proper surface except for those on the hinged end of bascule bridges. If surface is checked electrically, closely inspect plungers and mechanical connections for binding.

Movable joints are "soft" joints. The three-eighths inch requirement of this rule was not revised by the Track Safety Standards and movable joints are not required to be maintained to meet these standards.

At automatic and remote-controlled movable bridge interlockings, those devices used to detect and govern movement of water traffic such as audible devices, signal aspects and electric eyes are considered interlocking appliances and must operate in their proper sequence and perform their intended function.

All the rules of Subpart C are applicable to interlocked draw bridges.

Test of bridge locking is determined by withdrawing locking member or wedge more than one inch and determining whether or not control circuits are opened.

Test of movable rails for alinement is made by measuring difference in alined rails. Slide and lift rails should also be tested by manually applying lateral force to the movable rails.

Test of movable rails for surface should be made by placing a one-half inch obstruction on each rail seat and determining whether or not rail can be locked or, if electrically checked, whether or not circuit controller contacts are opened.

The RS&I does not define bridge locking, therefore it is permissible for the carrier to utilize any type of bridge locking they desire. The only requirement for the bridge lock is that the movable span must be locked with the fixed span.

Where an emergency release is provided at bridge locking, it is required to be kept locked or sealed to prevent the emergency release from being used for routine day to day operation. Operation of the emergency release shall not defeat the time or approach locking circuits.

#### CLASSIFICATION OF DEFECTS

236 0312 01 Signal appliances at movable bridge protected by interlocking not 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 properly aligned.

236 0312 02 Signal governing movements over movable bridge protected by interlocking can display aspect to proceed with bridge locking members displaced more than one inch from their proper position.

236 0312 03 Signal governing movements over movable bridge protected by interlocking can display aspect to proceed with the track rail on the movable span more than three- eighths inch from correct surface with the rail seating device on the bridge abutment or fixed span.

236 0312 04 Signal governing movements over movable bridge protected by interlocking can display aspect to proceed with the track rail on the movable span more than three- eighths inch from correct alignment with the rail seating device on the bridge abutment or fixed span.

236 0312 05 Emergency bypass switch or device not locked or sealed.

#### § 236.314 Electric lock for hand-operated switch or derail.

This rule requires each hand-operated switch or derail within interlocking limits where train speeds exceed 20 miles per hour be electrically locked. At manually operated interlocking it shall be controlled by the operator of the machine. Approach or time locking shall be provided.

#### **Application:**

Applies to interlocking only. Applies to all hand-operated switches and derails in interlocking limits where speeds exceed 20 miles per hour.

Applies to each electric lock applied to a hand-operated switch or derail installed under provisions of 236.301 regardless of speed.

Approach or time locking must be provided for each electrically locked switch or derail regardless of speed.

#### CLASSIFICATION OF DEFECTS

236 0314 01 Electric lock not provided for hand-operated switch or derail within interlocking limits. (Does not apply where train movements are made at speeds not exceeding 20 m.p.h.)

236 0314 02 Electric lock on hand-operated switch or derail at manually operated interlocking not controlled by operator of the machine.

- 236 0314 03 Electric lock on hand-operated switch or derail within interlocking limits can be unlocked before signals governing movements over such switch or derail display aspects indicating stop.
- 236 0314 04 Approach or time locking not provided for electric lock on hand-operated switch or derail within interlocking limits.
- 236 0314 05 Electric lock on hand-operated switch or derail within interlocking limits can be unlocked before the expiration of the predetermined time interval, where time locking is provided.
- 236 0314 06 Electric lock on hand-operated switch or derail within interlocking limits can be unlocked before the expiration of the predetermined time interval, with approach section occupied, where approach locking is provided.
- 236 0314 07 Approach or time locking of electric lock at hand-operated switch or derail can be defeated by the unauthorized use of emergency device which is not kept sealed in the non-release position.
- 236 0314 08 Approach locking not effective.
- 236 0314 09 Time locking not effective.

#### Rules and Instructions

#### **§ 236.326 Mechanical locking removed or disarranged; requirements for permitting train movements through interlocking.**

This rule prescribes the procedures for train operation through interlocking when the mechanical interlocking is being changed or is removed from the machine, or locking becomes disarranged or broken.

#### **Application:**

The procedures prescribed by this rule apply when mechanical locking is being modified, is broken and during repairs, becomes disarranged and is inoperable or uncertain in its operation, is being replaced by electric circuits and for those occasions when interlocking is destroyed or heavily damaged by fire, derailment or storm.

When mechanical locking is inoperable, equivalent protection may be provided by electric locking or electric circuits. If such equivalent protection is not provided, each switch, movable point frog or derail in the route must be spiked, clamped or blocked in proper position before train movement is permitted, such movement not to exceed restricted speed. It is not necessary to spike, clamp or block each switch, movable point frog, or derail if protection is provided in accordance with 236.303 and control circuits are arranged to prevent display of aspects more favorable than "proceed at restricted speed."

#### CLASSIFICATION OF DEFECTS

236 0326 01 Train movement permitted through interlocking while mechanical locking of interlocking machine is being changed or is removed, or when locking is disarranged or broken, without each switch, movable point frog, and derail in route over which movement is made being spiked, clamped, or blocked so that it cannot be moved by its controlling lever. (Does not apply if protection equivalent to mechanical locking is provided by electric locking or electric circuits, or where protection is in service in accordance with Section 303 of the Rules, Standards and Instructions for all signal aspects, and 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 0326 02 Train movement exceeds restricted speed through interlocking while mechanical locking of interlocking machine is being changed, is removed from the machine, or is disarranged or broken.

**§ 236.327 Switch, movable-point frog or split-point derail.**

This rule requires that lock rod of switch, movable point frog or split point derail be so adjusted that locking is prevented when the switch point is obstructed by three-eighths inch obstruction.

**Application:**

Applies to both interlocking and traffic control systems.

Applies to power-operated or mechanically-operated switches, movable-point frogs and derails.

Test should be made by placing three-eighths inch obstruction between the switch point and stock rail about six inches from the end of the point, and then operating switch until the lock dog on the slide bar strikes lock rod.

Test may be made either under power or by operation of the hand operation lever or crank where such machine is designed to lock up in hand operation. Inspector should be alert for instances where excessive switch point pressure prevents the locking dog from moving far enough to strike lock rod.

CLASSIFICATION OF DEFECTS

236 0327 01 Switch, movable-point frog, or split-point derail can be locked when switch point is open three-eighths inch.

**§ 236.328 Plunger of facing-point lock.**

This rule requires that plunger of lever operated facing-point lock have at least 8 inch stroke and, when unlocked, clear the lock rod not more than one inch.

**Application:**

Applies to both interlocking and traffic control systems.

Applies only to independently operated mechanical pipe-connected facing-point lock. Does not apply to hand-operated switch machines or mechanically operated switch and lock movements.

CLASSIFICATION OF DEFECTS

236 0328 01 Stroke of plunger of facing-point lock less than 8 inches.

236 0328 02 End of lock plunger clears lock rod more than one inch when lock lever is in unlocked position.

**§ 236.329 Bolt Lock.**

This rule requires that bolt lock be so maintained that signal governing movement over a switch or derail cannot display an aspect to proceed unless derail is in non-derailing position and switch is within one-half inch of its proper position.

**Application:**

Applies to mechanically operated signal governing movements over switch or derail equipped with bolt lock.

#### CLASSIFICATION OF DEFECTS

236 0329 01 Bolt lock does not prevent signal from being operated to display an aspect less restrictive than "Stop" while derail is in derailing position.

236 0329 02 Bolt lock does not prevent signal from being operated to display an aspect less restrictive than "Stop" when switch point is open one-half inch or more.

#### § 236.330 Locking dog of switch-and-lock movement.

This rule requires that locking dog of switch-and-lock movement extend through lock rod one-half inch or more when locked in either normal or reverse position.

#### Application:

Applies to both interlocking and traffic control systems.

Applies only to pipe-connected, mechanically-operated switch-and-lock movements. Does not apply to power-operated switch machines such as US&S M2, M3, M22, or M23 machines or GRMS Model 5 or 55 switch machines.

Holes and notches in lock rod should have square edges to prevent forcing locking dog or plunger into lock rod.

(Reference Technical Bulletin S-96-01)

#### CLASSIFICATION OF DEFECTS

236 0330 01 Locking dog of switch-and-lock movement extends through lock rod less than one-half inch in normal or reverse position.

#### § 236.334 Point detector.

This rule requires that point detector be so maintained that contacts cannot be opened by manually applying force at the closed point when switch is locked in either normal or reverse position. Its circuit controller contacts shall 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 three-eighths inch where latch-out device is used.

#### Application:

Applies to power-operated switches only in both interlocking and traffic control systems. Tests for compliance should be made in the same manner as switch obstruction test described under Section 236.327, by placing an appropriate gauge between the stock rail and switch point about 6 inches from the end of the switch point and closing the switch point on the gauge.

Where carriers maintain lock rods to obstruct on one-fourth inch obstruction it may be necessary to either loosen the lock rod or displace point detector rod in order to test the point detector contact adjustment.

Lateral force should be applied to the closed switch point to determine if contacts can be opened because of excessive size of notch in lock rod, loose lock rod connections or improper point detector rod adjustment.

The inspector should determine latch-out device is properly adjusted and functioning within prescribed limit. If latch-out is not connected or functioning properly, point detector adjustment must comply with one-fourth inch requirements.

CLASSIFICATION OF DEFECTS

236 0334 01 Point detector contacts can be opened by manually applying force at the closed switch point when switch mechanism is locked in normal or reverse position.

236 0334 02 Point detector circuit controller contacts assume the position corresponding to switch point closure when switch point is prevented by an obstruction from closing to within one-fourth inch. (Applies only to point detector where latch-out device is not used.)

236 0334 03 Point detector circuit controller contacts assume position corresponding to switch point closure when switch point is prevented by an obstruction from closing to within three-eighths inch. (Applies only to point detector where a latch-out device is used.)

**§ 236.335 Dogs, stops and trunnions of mechanical locking.**

This rule requires that driving pieces, dogs, stops and trunnions be rigidly fastened to locking bars, that swing dogs have full and free movement and that top plates be securely fastened in place.

**Application:**

Applies to mechanical locking only.

Does not apply to locking of switch machines.

Mechanical locking cabinets should be opened to fully expose locking and close inspection made to assure compliance.

The floor of and around interlocking machine cabinets should be closely observed for parts that have fallen from locking; screws, rivets, shavings, chips, and other evidence of poor maintenance or abuse of locking.

CLASSIFICATION OF DEFECTS

236 0335 01 Driving piece not rigidly secured to locking bar.

236 0335 02 Dog not rigidly secured to locking bar.

236 0335 03 Stop not rigidly secured to locking bar.

236 0335 04 Trunnion not rigidly secured to locking bar.

236 0335 05 Swing dog does not have full or free movement.

236 0335 06 Top plate not secured in place.

**§ 236.336 Locking bed.**

This rule requires that 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.

Application:

Locking bed must be securely fastened in place for proper operation.

CLASSIFICATION OF DEFECTS

236 0336 01 Locking bed parts or supports or tappet stop rail not rigidly secured in place.

236 0336 02 Locking bed parts or supports or tappet stop rail not alined to permit free operation of locking.

**§ 236.337 Locking faces of mechanical locking; fit.**

This rules requires locking faces fit squarely against each other when locked with minimum engagement of at least one-half the designed locking face.

**Application:**

Apply this rule to broken or badly worn locking pieces, dogs, tappets and cross locking.

Some cross locking may require removal of cover plates for inspection.

CLASSIFICATION OF DEFECTS

236 0337 01 Locking faces do not fit squarely against each other.

236 0337 02 Locking faces fit with a minimum engagement when locked of less than one-half the designed locking face.

**§ 236.338 Mechanical locking required in accordance with locking sheet and dog chart.**

This rule requires that mechanical locking in service be in accordance with locking sheet and dog chart.

**Application:**

Rule 236.1 requires locking sheet and dog chart to be kept at mechanical interlocking and be correct and legible. Locking should be carefully examined to determine compliance with locking sheet and dog chart.

Most mechanical locking, being old, has been altered. Locking that is no longer in service is not required to be removed from locking bed and not required to be shown on locking sheet and dog chart.

CLASSIFICATION OF DEFECTS

236 0338 01 Mechanical locking not in accordance with locking sheet and dog chart currently in effect.

**§ 236.339 Mechanical locking, maintenance requirements.**

This rule requires that locking and connections be maintained so that motion of levers or latches, when locked, do not exceed prescribed tolerances.

**Application:****Mechanical Machine:**

When this rule was first adopted, more than 90% of mechanical interlocking machines installed were of two types: Saxby and Farmer and Style A. Both have latch operated locking. They are easily recognizable in that S&F machines have rocker arms that stand above the quadrants and Style A machines have rocker arms that stand below the quadrants. Other latch operated machines are dwarf S&F, Johnson and National.

When locked, the latch block of each lever may not be raised so that the bottom thereof is within three-eighths inch of top of quadrant.

The balance of the machines installed have lever operated locking. The majority of these were Style C and Stevens which are almost identical, and dwarf machines other than S&F. These machines are easily recognizable by the absence of rocker arms.

When locked, the lever latch block may not be moved more than the three-eighths inch on top of the quadrant.

**Electromechanical Machine:**

Electromechanical machines are combinations of electric machines and mechanical machines. The electric machine levers are located above the mechanical levers and are usually Model 14, Model 2, Model 5 or Style S-8 type machines which control electrical circuits and which operate miniature type locking to release or lock the mechanical levers.

When locked, electric levers operating in horizontal plane may not be moved more than five- sixteenths inch in normal position or more than nine-sixteenths inch in reverse position.

When locked, electric levers moving in an arc may not be moved more than five degrees.

When locked, the mechanical levers must comply with requirements for mechanical machines.

**Power Machine:**

At some large manual interlockings power (electric) interlocking machines manufactured by the Federal Railway Signal Company were installed. These machines are a miniature Type S&F mechanical machine with dwarf type of S&F locking with latch locking. When locked, the latch block of each lever may not be raised so that the bottom thereof is within seven thirty-seconds inch of top of quadrant.

The majority of power interlocking machines installed at large manual interlockings were Model 2, Model 14, and Model 5. At small interlockings, Style TC and Type A table interlocking machines are frequently found. Model 2 and Model 5 machines have levers that move in a horizontal plane. The levers of these machines must meet the same requirements as the electric levers of electro-mechanical machines.

## CLASSIFICATION OF DEFECTS

236 0339 01 Lever latch block can be raised so that its bottom is within three-eighths inch of top of quadrant when latch is mechanically locked. (Applies only to mechanical interlocking machine with latch-operated locking.)

236 0339 02 Lever latch block can be moved more than three-eighths inch on top of quadrant when lever is mechanically locked. (Applies only to mechanical interlocking machine with lever-operated locking.)

236 0339 03 Lever which is mechanically locked in normal position can be moved more than five- sixteenths inch. (Applies only to electro-mechanical interlocking machine with levers moving in a horizontal plane.)

236 0339 04 Lever which is mechanically locked in reverse position can be moved more than nine- sixteenths inch. (Applies only to electro-mechanical interlocking machine with levers moving in a horizontal plane.)

236 0339 05 Lever which is mechanically locked can be moved more than 5 degrees. (Applies only to electro-mechanical machine with levers moving in an arc.)

236 0339 06 Lever latch block can be raised so that its bottom is within seven thirty-seconds inch of top of quadrant, when latch is mechanically locked. (Applies only to power interlocking machine with latch-operated locking.)

236 0339 07 Lever which is mechanically locked in normal position can be moved more than five- sixteenths inch. (Applies only to power interlocking machine with levers moving in a horizontal plane.)

236 0339 08 Lever which is mechanically locked in reverse position can be moved more than nine- sixteenths inch. (Applies only to power interlocking machine with levers moving in a horizontal plane.)

236 0339 09 Lever which is mechanically locked can be moved more than 5 degrees. (Applies only to power interlocking machines with levers moving in an arc.)

**§ 236.340 Electromechanical interlocking machine; locking between electrical and mechanical levers.**

This rule requires that locking between electric and mechanical levers of electro-mechanical interlocking machine be maintained so that mechanical lever cannot be operated except when released by electric lever.

**Application:**

The mechanical levers that operate switches, movable point frogs and derails must be locked by the electric levers.

CLASSIFICATION OF DEFECTS

236 0340 01 Locking between electric and mechanical levers of electromechanical interlocking machine not effective to prevent operation of mechanical lever without being released by electric lever.

**§ 236.341 Latch shoes, rocker, links, and quadrants.**

This rule requires that latch shoes, rocker links, and quadrants of S&F machines be maintained so that locking will not release when a downward force not exceeding a man's weight is exerted on the rocker with the lever in mid-stroke position.

**Application:**

Care should be exercised when making this test. Rocker arms are cast metal and can easily be broken with lever in mid-stroke position. A cracked rocker arm or worn linkage will release the locking. If locking is worn, very little pressure is needed to ascertain a failure to meet the requirements.

## CLASSIFICATION OF DEFECTS

236 0341 01 Mechanical locking of Saxby and Farmer interlocking machine releases when a downward force not exceeding a man's weight is exerted on rocker while lever is in mid-stroke position.

**§ 236.342 Switch circuit controller.**

This rule requires that switch circuit controller connected at the point to switch, derail, or movable point frog be maintained so that its contacts will not be in position corresponding to switch point closure when point is open one-fourth inch or more in either normal or reverse position.

**Application:**

Applies to both interlocking and traffic control systems.

Apply this rule where switch circuit controller is connected to spring switch, to pipe connected switch, derail, or movable-point frog, and where external circuit controller is added to power- operated switch.

## CLASSIFICATION OF DEFECTS

236 0342 01 Contacts of switch circuit controller connected at the point to switch, derail, or movable-point frog are in position corresponding to switch point closure when switch point is open one-fourth inch or more.

Inspections and Tests

**§ 236.376 Mechanical locking.**

This rule requires testing of mechanical locking when new locking is installed, when there is a change in locking or when locking is restored after being disarranged. It requires a complete test of all mechanical locking at least once every two years.

**Application:**

Mechanical locking tests should be made by establishing a route and trying all conflicting signal control levers before pulling the signal lever. The signal lever should then be pulled. This should lock out all opposing and conflicting route lineups and prevent the movement of any lever controlling any switch, movable-point frog, or derail in the route lined up.

On levers equipped with electric locks, the lock should be de-energized and the latch rattled and moved around to see that it is mechanically impossible to release the lock.

Test should be made to insure that levers equipped with electric locks mechanically lock all levers previously operated in that lineup.

Check shall be made to determine that the locking is in accordance with the locking sheet and dog chart as required by Rule 236.338.

Test should not be made when the route has been cleared for a rail movement or if rail traffic is within the route or a conflicting route.

Compliance with rules Nos. 236.326, 236.335, 236.336, 236.337, 236.338, 236.339, 236.340, and 236.341 is required.

## CLASSIFICATION OF DEFECTS

236	0376	01	Mechanical locking of interlocking machine not tested when new locking is placed in service.
236	0376	02	Mechanical locking not tested when change in locking is made.
236	0376	03	Mechanical locking not tested when restored after being disarranged.
236	0376	04	Complete test of mechanical locking in interlocking machine not made at least once every two years.

**§ 236.377 Approach locking.**

This rule requires that approach locking be tested when installed, modified or disarranged and at least once every two years thereafter.

**Application:**

Applies to both interlocking and traffic control systems. Applies to approach locking of both power operated devices and electrically locked hand-operated switches in both interlockings and traffic control systems.

Tests shall not be made if any route has been cleared for rail movement or if rail movement is within route to be tested or conflicting route.

Manual interlocking and controlled point:

Each track section within the limits of the approach circuit shall be shunted and inspection made to determine that the approach relay is de-energized by each shunt.

Signal shall then be cleared by regular operation and shunt placed in approach section or approach relay de-energized. Signal shall then be restored to its stop indication and inspection made to determine that timing relay or timing device, if provided, is energized. Each switch, movable point frog, derail, or electrically locked switch in route governed shall be tried to insure their positions cannot be changed or a conflicting signal be cleared during the predetermined time interval.

Where time release must be operated, each switch, movable point frog or derail must be tried to insure their positions cannot be changed or conflicting signal be cleared both prior to operation of time release and after its operation during its predetermined time interval.

Test each route governed by each signal.

Automatic interlockings:

Each track section within the limits of the approach circuit shall be shunted and inspection made to determine that the approach relay is de-energized by each shunt.

Clear home signal by placing a shunt in the approach section or by opening the approach circuit. Then place a shunt in the approach section or open the approach circuit of a conflicting route. Then operate the time release or push button for the conflicting route and determine that the home signal is immediately restored to its stop position and that the conflicting route is not established until the prescribed time interval has expired.

Some interlockings have superior routes that, when the approach section is occupied, causes any cleared signals governing conflicting routes, to display stop indications and timing relay or timing device to

operate, and after the expiration of the predetermined time interval, clears the signal governing the superior route. Some automatic interlockings have inferior routes that, when the approach section is occupied and home signal cleared, timing relay or timing device begins operating, and after the expiration of a predetermined time interval, restores the home signal to its stop indication. Regardless of the arrangement, changeover shall not occur until after the expiration of the prescribed predetermined time interval.

Hand-operated Electrically locked switches:

Signal shall be cleared for movement over the switch and a shunt placed on an approach section of the approach locking circuit. Then an attempt should be made to unlock the switch. The locking should prevent the unlocking of the switch. Where time is also provided, the switch may be unlocked after the expiration of a predetermined time interval. Each approach circuit should be checked individually.

#### CLASSIFICATION OF DEFECTS

236 0377 01 Approach locking not tested when installed, modified, or after being disarranged.

236 0377 02 Approach locking not tested at least once every two years.

#### § 236.378 Time Locking.

This rule requires time locking to be tested when installed, modified, or disarranged and at least once every two years thereafter.

#### Application:

Applies to interlocking and traffic control systems.

This rule applies not only to power operated devices but also to electrically locked hand- operated switches within interlocking and traffic control systems where such electric locks are provided with time locking.

Test should not be made if any rail traffic is approaching or within route or conflicting routes.

Test shall be made by clearing a signal by regular operation. The signal shall then be restored to its stop indication and check made to determine timing relay or timing device, if provided, is energized. Each switch, movable point frog, derail or electrically locked switch in route governed shall be tried to insure their positions cannot be changed or a conflicting signal established during the predetermined time interval.

Where time release must be operated, the above units must be tried both prior to operation of time release and after its operation during its predetermined time interval.

Test of time locking of electrically locked switch shall be made by clearing a signal governing movement over the switch and attempting to unlock the switch. The electric lock on such switch should not energize and unlock the switch until a predetermined time interval has expired after all signals governing movement over the switch have assumed their most restrictive aspects. This test should be made for each signal governing movement over the switch.

#### CLASSIFICATION OF DEFECTS

236 0378 01 Time locking not tested when installed, modified, or after being disarranged.

236 0378 02 Time locking not tested at least once every two years.

**§ 236.379 Route locking.**

This rule requires that route or any other type of switch locking be tested when installed, modified, or disarranged and at least once every two years thereafter.

**Application:**

Applies to both interlocking and traffic control systems.

Tests should not be made if rail traffic is approaching or within route to be tested or with conflicting routes.

Test shall be made for all mechanical or power-operated switches and hand-operated electrically locked switches or derails that are locked in both the reverse and normal positions.

Test shall be made by clearing signal for an established route after which each track circuit within the route shall be progressively shunted beginning with the first track circuit in advance of the signal. While each track circuit is shunted, each switch, movable point frog, derail and facing point lock lever in the route shall be tried to insure their positions cannot be changed.

The rule permits sectional release locking that will release the locking of switches, movable point frogs, derails and facing point lock levers in the rear of the progressive shunt. Inspection shall be made to determine that as each section is released, a route cannot be established that would result in improper clearance between train movements.

Route locking tests shall be conducted over each route governed by each signal and repeated in each direction for each route.

Excerpt from Mr. Walsh's letter of January 3, 1985  
To: Mr. L. M. Himmel, Sr. Executive Director  
Operations and Maintenance Department  
Communications and Signals Division  
Association of American Railroads

\* \* \* \* \*

- Section 236.376 Mechanical locking.
- Section 236.377 Approach locking.
- Section 236.378 Time locking.
- Section 236.379 Route locking.
- Section 236.380 Indication locking.
- Section 236.381 Traffic locking.

The AAR requested clarity of the term "disarranged"; questioned whether the removal of two or more wires constituted a disarrangement which required the above tests be performed; and suggested FRA's Technical Manual be revised to exempt the requirements of testing where a device is provided with plug couplers or the replacement is accomplished by removal of not more than one wire at a time.

These rules prescribe inspection and tests of the various types of locking. The rules require mechanical locking be tested when new locking is installed; electric locking be tested when placed in service; and all locking be tested thereafter when modified, disarranged, or at least once every two years, whichever shall occur first.

Major sources of false proceed failures for more than five years have been errors in connection and errors in design. The revision of these rules resulted in the requirements that tests be performed at the time such errors should be detected, before they present hazards to the safety of train operation.

Accordingly, mechanical locking is considered to be disarranged when (i) one or more pieces of locking are broken; or (ii) one or more pieces are removed.

Electric locking is considered to be disarranged when (i) a relay is replaced with another; (ii) when two or more signal line wires or a cable having two or more conductors are severed; (iii) when a cable or conductor in a locking circuit is replaced with another; or (iv) when wires are removed at the same time from more than one terminal of a relay or terminal board.

#### CLASSIFICATION OF DEFECTS

236 0379 01 Route or other type of switch locking not tested when installed, modified, or after being disarranged.

236 0379 02 Route or other type of switch locking not tested at least once every two years.

#### § 236.380 Indication locking.

This rule requires that indication locking be tested when installed, modified, or disarranged and at least once every two years thereafter.

#### Application:

Applies to both interlocking and traffic control systems.

Indication locking for signals.

Home and approach signals shall be cleared by means of regular operation. Where a separate relay repeating only the red and yellow indications of the approach signal is used, visual check shall be made to insure that the clearing of the approach signal causes such relay to become de-energized. Where such relay is not used, then a voltmeter shall be connected to the control wire for the indication lock at a point between the home and approach signals (line arresters) to insure that the clearing of the approach signal removes energy from such wire. Where two or more approach signals are involved, test must be made to insure that the clearing of each one of the approach signals accomplishes this result.

After this part of the test has been completed, the approach signal shall be set in its restrictive position by opening its control circuit and then with the home signal clear, a visual check shall be made to insure that the indication lock on the signal lever or lock lever is properly de-energized, or in the case of all relay type locking, that the lock relay is de-energized.

Next, disconnect a coil wire of the home signal red repeater relay or lock relay or open the control wire of the indication lock where the meter reading was previously taken and then restore the home signal to stop indication. Visual check shall then again be made to insure that indication lock or lock relay is de-energized.

After above tests are made to insure that the clearing of either the home or approach signal de-energizes the indication lock or lock relay, test shall be made to insure that switches, derails, and movable point frogs in route cannot be changed and that conflicting signal cannot be obtained with indication lock or lock relay de-energized.

The test is then completed, where indication lock is used on a lever, by de-energizing the lock by opening its control circuit at the coil terminal and clearing the home signal. If the lock is on the home signal lever, it shall be tried to insure it cannot be latched full normal. If the indication lock is on a lock lever, the home signal lever shall be placed normal and the lock lever tried to insure that it cannot be unlatched from the reverse position. Where all relay type locking is used, open lock circuit at each signal control relay or red repeater relay and visually check to insure the lock relay becomes de-energized. At automatic interlocking, proceed as above except check stick locking circuits in lieu of indication locking circuits.

Where signals are of the semaphore type, visual inspection must also be made to insure that locking becomes effective with the signal blade not over five degrees above the 45 degree position on upper quadrant approach signals or five degrees below the 45 degree position on lower quadrant approach signal, and not over five degrees from horizontal on home signals.

Indication locking for switches:

Where indication lock is on control lever, with switch in full normal position, the reverse switch point shall be obstructed so that the switch cannot operate full throw. The lever shall then be operated so that the switch will operate against the obstruction and test made to insure lever cannot be latched reverse with the switch unlocked.

Where all relay type locking is used, the above method of obstruction and switch operation shall be followed and visual check made to insure indication light on control panel remains unlighted and trial made to insure signals governing movements over the switch cannot be cleared.

Above tests shall be made for both the normal and reverse positions of each switch.

(Reference Technical Bulletin S-96-02)

#### CLASSIFICATION OF DEFECTS

- |     |      |    |   |
|-----|------|----|---|
| 236 | 0380 | 01 | Indication locking not tested when installed, modified, or after being disarranged. |
| 236 | 0380 | 02 | Indication locking not tested at least once every two years.                        |

#### § 236.381 Traffic locking.

This rule requires that traffic locking be tested when installed, modified, or disarranged and at least once every two years thereafter.

#### **Application:**

Applies only to interlockings. This testing rule does not apply to traffic control systems.

Tests should not be conducted if rail traffic is approaching or within the route to be tested.

Tests shall be performed by clearing signal governing entrance to the traffic block and checking that traffic levers cannot be changed or opposing signal cleared until signal is restored to "Stop" position and approach or time locking released. Drop each track relay in the traffic block section and see that traffic lever cannot be moved, direction of traffic changed, or opposing signal cleared.

#### CLASSIFICATION OF DEFECTS

- |     |      |    |  |
|-----|------|----|--|
| 236 | 0381 | 01 | Traffic locking not tested when installed, modified, or after being disarranged. |
| 236 | 0381 | 02 | Traffic locking not tested at least once every two years.                        |

#### § 236.382 Switch obstruction test.

This rule requires that a switch obstruction test be made when lock rod is installed and at least once a month thereafter.

#### **Application:**

Applies to interlocking and traffic control systems.

Test should not be conducted if rail traffic is approaching or within the route to be tested.

This rule applies to pipe-connected, mechanically operated switches; electric switches; electro- hydraulic switches; electro-pneumatic switches; and hand-operated switch machines with lock rods, where such hand-operated switch machines are located within interlockings or traffic control systems.

This rule does not apply to hand-operated switches not equipped with switch-and-lock- movements.

To test power-operated and mechanical pipe-connected switches for compliance with Section 236.327, place a three-eighths inch obstruction between the switch point and stock rail, six inches from the end of the switch point and attempt to lock up the switch.

To test a hand-operated switch-and-lock movement for compliance with Section 236.6, follow the same procedure, but use a one-fourth inch obstruction to make the test.

#### CLASSIFICATION OF DEFECTS

236	0382	01	Switch obstruction test not made when lock rod installed.
236	0382	02	Switch obstruction test not made at least once each month.

#### § 236.383 Valve locks and valve magnets.

This rule requires that valve locks on valves of the non-cutoff type be tested at least once every three months and valves and valve magnets be tested once every year.

#### Application:

This rule applies to interlocking and traffic control systems. Tests should not be conducted while rail traffic is approaching or within any route which might be affected by the tests.

Test shall be conducted by removing valve stem or control wire from lock magnet of electro- pneumatic switch. Switch should not move.

Where "CP" valves are used, place switch lever normal, close globe valve and remove plug in reverse side of switch cylinder, then move lever to reverse indicating point. Indication should not be received when lever is moved to reverse. Restore plug and open globe valve, reverse switch, and repeat test.

Test "D" valve of non-cutoff type in normal and reverse positions by removing armature stem in lock valve magnet and operating controlling lever; switch should not respond.

Test each set of cutoff valves with switch in normal position by holding lock and reverse armature in for about one minute while normal magnet is energized; switch should not respond. Repeat in reverse position, holding lock and normal armatures while reverse magnet is energized.

#### CLASSIFICATION OF DEFECTS

236	0383	01	Valve lock in electropneumatic interlocking not tested at least every three months. (Applies only to valves of the non-cut-off type.)
236	0383	02	Valve in electropneumatic interlocking not tested at least once every year.
236	0383	03	Valve magnet in electropneumatic interlocking not tested at least once every year.

**§ 236.384 Cross protection.**

This rule requires that cross protection be tested at least once every six months.

**Application:**

This rule applies only to those interlockings provided with cross protection devices. Tests should not be conducted while rail traffic is approaching or within the section of interlocking to be tested.

This test insures that switches, signals, etc., do not respond when current is improperly applied to circuits. It is recommended that a variable resistor be used in making the test.

Tests should be made when plant voltage is at the maximum.

Make temporary connection between normal and reverse operating wires for each switch at the pole changer. This should open polar relay or circuit breaker.

Make temporary positive battery connection from the nearest switch to the signal control wire as close as practicable to the signal motor. This should open the polar relay or circuit breaker.

If the signal control circuit is connected to the common return wire through one or more switch circuit controllers, the energy should be applied to this wire, first opening the connection to the main common to prevent blowing fuse in the switch circuit. If plant is sectionalized, one or more functions in each section should be crossed with wires taking energy from each of the other sections. In case functions in various sections are too widely separated, the temporary crosses can be made between the binding posts on the terminal board of the interlocking machine. This should open the section breakers.

## CLASSIFICATION OF DEFECTS

236 0384 01 Cross protection not tested at least once every six months.

**§ 236.386 Restoring feature on power switches.**

This rule requires that restoring feature on power switches be tested once every three months.

**Application:**

Applies to interlocking and traffic control systems.

Applies only to electro-pneumatic switches. Air shall be removed from switch before testing. Test shall be made by using a bar and moving slide bar of switch movement toward opposite position where locking dog will become disengaged from lock rod. Test to ascertain that indication circuits are opened and/or lock magnet circuit is energized before locking dog is completely withdrawn from lock rod. Restore air to determine that slide bar is driven back to its original position.

## CLASSIFICATION OF DEFECTS

236 0386 01 Restoring feature on power switch not tested at least once every three months.

**§ 236.387 Movable bridge locking.**

This rule requires movable bridge locking to be tested at least once a year.

**Application:**

Applies to movable bridge interlockings. Test shall be made by displacing bridge locking members more than one inch from their proper position and determine that signals cannot be cleared to authorize movement over the movable bridge.

When movable bridge is equipped with circuit controllers with or without mechanical rail locks, movable rails shall be displaced ½ inch from their correct surface or alignment with adjacent fixed rail by an obstruction. With the movable rail thus displaced, the rail lock should not lock up and if rail lock is not provided, signals cannot be cleared to authorize movement over the movable bridge.

This test should be made for each rail lock or circuit controller on the bridge that checks for correct rail alinement or surface.

Check operation of all circuit controllers connected to the wedges, latches, rail locks, etc., to see that contacts make or break when corresponding functions are in their proper position.

## CLASSIFICATION OF DEFECTS

236 0387 01 Movable bridge locking not 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.**

This rule prescribes the following automatic block signal system and interlocking standards be applied to traffic control systems:

- 236.201 Track-circuit control of signals.
- 236.202 Signal governing movements over hand-operated switch.
- 236.203 Hand-operated crossover between main tracks; protection.
- 236.205 Signal control circuits; requirements.
- 236.206 Battery or power supply with respect to relay; location.
- 236.303 Control circuits for signals, selection through circuit controller operated by switch points or by switch locking mechanism.
- 236.307 Indication locking.
- 236.309 Loss of shunt protection; where required.
- 236.310 Signal governing approach to home signal.
- 236.311 Signal control circuits, selection through track relays, or devices functioning as track relays, and through signal mechanism contacts and time releases at automatic interlocking.

**Application:**

The above automatic block signal and interlocking standards apply to traffic control systems.

**§ 236.402 Signals controlled by track circuits and control operator.**

This standard requires that all home signal aspects more favorable than "proceed at restricted speed" be controlled by track circuit extending through the entire block. At a controlled point the control circuits may be controlled by a control operator and at manually operated interlockings the home signals shall be controlled manually in cooperation with control operator.

**Application:**

Any aspect more favorable than "proceed at restricted speed" must be selected through track relays regardless of any speed limit or restriction. The aspects and indications of the governing signals determine compliance with this standard, not the authorized train speed.

A block extends from a signal to the next governing signal or from a signal to the limits or end of the system.

Control circuits do not have to be manually controlled by the operator and may be automatic. However, it is not the intention of this rule to give control to any other individual operation in opposition to or in conflict with the control operator.

## CLASSIFICATION OF DEFECTS

236 0402 01 Signal control circuits for home signal aspects more favorable than "proceed at restricted speed" not controlled by track circuits extending through the entire block.

236 0402 02 Signal at manually operated interlocking not controlled manually in cooperation with control operator.

**§ 236.403 Signals at controlled point.**

This rule requires signals at a controlled point to be so interconnected that aspects to proceed cannot be displayed simultaneously for conflicting movements, except they may display an aspect indicating "proceed at restricted speed" at the same time on track used for switching movements only.

**Application:**

Signals at every controlled point must be so interconnected that aspects to proceed cannot be displayed simultaneously for conflicting train movements.

This is a companion rule to 236.308 in that it permits display of aspect indicating "proceed at restricted speed" at the same time on track used for switching movements only by one train at a time.

## CLASSIFICATION OF DEFECTS

236 0403 01 Signals at controlled point simultaneously can display aspect to proceed for conflicting train movements. (Does not apply to signals on track used for switching movements only by one train at a time).

236 0403 02 Signals at controlled point on track used for switching movements only simultaneously can display aspect more favorable than "proceed at restricted speed" for conflicting train movements.

**§ 236.404 Signals at adjacent control points.**

This rule requires that signals at adjacent controlled points to be interconnected so that aspects to proceed on tracks signaled for movements at greater than restricted speed cannot be displayed simultaneously for conflicting movements.

**Application:**

This rule permits restricted speed aspects to be displayed simultaneously for opposing or converging routes at adjacent control points provided the speed restrictions between the control points do not exceed 20 mph. The rule was revised in 1964 primarily to permit restricted speed conflicting movements into a siding from each end. The maximum authorized speed between adjacent controlled points where signals can simultaneously display aspects indicating proceed at restricted speed shall not exceed 20 mph regardless of more favorable aspects displayed and regardless whether or not track is signaled.

## CLASSIFICATION OF DEFECTS

236 0404 01 Signals at adjacent controlled points not so interconnected that aspects to proceed, on tracks signaled for movements at greater than restricted speed, cannot be displayed simultaneously for conflicting movements.

**§ 236.405 Track signaled for movements in both directions, change of direction of traffic.**

This rule prevents the changing of the direction of traffic from that which was obtained at the time the track was occupied between opposing signals at adjacent controlled points on track signaled for movement in both directions 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.

**Application:**

After a train or engine has passed a signal displaying an aspect permitting it to proceed into and through a controlled point, the opposing signals at the adjacent controlled point shall not display any aspect with an indication other than "stop", as long as the section of track between controlled points is occupied.

Rule 236.405's exception to the traffic locking requirements applies only in instances when a train is left on the main track while its engine and/or cars move into an adjacent siding or yard for switching purposes and must, in returning to its train, reverse its direction for a short distance. It is permissible in such instances to permit such movements to be made with a signal aspect indicating "proceed not to exceed restricted speed" into the occupied block.

## CLASSIFICATION OF DEFECTS

236 0405 01 On track signaled for movements in both directions, occupancy of track between opposing signals at adjacent controlled points does not prevent changing the direction of traffic from that which obtained at the time the track became occupied. (Note: Exception added 1/24/66 permits display of an aspect not less restrictive than that indicating "proceed at restricted speed" by a signal to permit a locomotive, with or without cars, to return to a standing portion of the train in the immediate approach to a controlled point during switching operations. Where a carrier provides the necessary arrangement to permit a locomotive to return to its train, as set forth in the exception, such an arrangement when actuated does not constitute a violation of Section 236.405 and should not be reported as such.)

**§ 236.407 Approach or time locking; where required.**

This rule requires that approach or time locking be provided for each controlled signal where route or direction of traffic can be changed.

**Application:**

This rule applies to all controlled signals at controlled points where route can be changed or where direction of traffic can be changed. Does not apply to so called "holding signals" between controlled points where the direction of traffic cannot be changed.

## CLASSIFICATION OF DEFECTS

236 0407 01 Approach or time locking not provided for controlled signal where route or direction of traffic can be changed.

236 0407 02 Approach locking not effective.

236 0407 03 Time locking not effective.

**§ 236.408 Route locking.**

This rule specifies where route locking shall be provided and where it shall become effective in the route entered.

**Application:**

At any location in traffic control territory where switches are power-operated, route locking must be provided and it must be effective when the first pair of wheels of a locomotive or car passes a point 13 feet in advance of the signal governing its movement.

The 13feet shall be measured from the center of the signal mast to the effective insulated joint. Where the signal is not mounted on a vertical ground mast, the 13 feet shall be measured from the center of the signal. This rule does not apply to automatic signals or controlled signals that do not have power-operated switches in the route governed.

## CLASSIFICATION OF DEFECTS

236 0408 01 Route locking not provided where switches are power-operated.

236 0408 02 Route locking not effective

236 0408 03 Route locking not effective until first pair of wheels of locomotive or car passes a point more than 13 feet in advance of the signal governing the movement.

**§ 236.410 Locking, hand-operated switch.**

This rule requires that hand-operated switch in main track be locked either electrically or mechanically in normal position, or a signal be provided to govern train movements to the signaled track. It exempts those hand-operated switches on main track where train speeds do not exceed 20 mph, on signaled sidings without intermediate signals where train speeds do not exceed 30 mph, or where trains are not permitted to clear the signaled track. It requires approach or time locking and provides that locking may be released either automatically or by the control operator after the control circuits of signals governing movements over the switch have been opened directly or by shunting of track circuit.

**Application:**

Any signaled track in traffic control territory is considered as main track. If speed on main track, except signaled sidings, exceeds 20 miles per hour, each hand-operated switch must comply with this section. Speed may be controlled by permanent speed zone or by signal indication.

Sidings provided with signal protection and without intermediate signals are signaled sidings. If train speed exceeds 30 mph on a signaled siding, each hand-operated switch on such siding must comply with this section.

Hand-operated switches are not required to be locked where trains are not permitted to clear the main track.

Trains may enter such switches provided a car is left on main track, the switch is left open, or derail equipped with switch circuit controller is left in non-derailing position.

Approach or time locking must be provided for each lock, must be effective, and must be installed in such a manner that it cannot be defeated by any action of train crew members.

Locks may be provided with emergency release device which must be kept sealed. Emergency release device with broken or missing seals, except such release device with latch out feature that opens signal control circuits until reset by signal maintained, is prohibited.

Lock may be released either automatically or by control operator. Control circuits of signals governing movements over the switch which display aspects more favorable than "Proceed at Restricted Speed" must be opened, or track circuit must be shunted before locking is released.

Electric or mechanical lock provided with time locking must not release until after expiration of a predetermined time interval sufficient to permit a train, having passed the signal governing movement over the switch displaying an aspect with an indication more favorable than proceed at restricted speed, to pass the switch; or, to permit a train approaching the signal governing movement over the switch displaying an aspect of "stop" or "stop and proceed", to stop, or where the signal governing movement over the switch displays a "restricting" aspect, to permit the train to reduce to restricted speed.

Electric or mechanical lock provided with approach locking must not release when approach section is occupied until after expiration of a predetermined time interval sufficient to permit a train to stop or to pass the switch, or where signal governing movement over the switch displays "restricting" as its most restrictive aspect, the train can reduce its speed to restricted speed. If approach section is unoccupied, lock may release immediately after signal control circuits are opened.

Control circuit for electric lock must be so arranged and installed that shunting of turnout will not release lock for movement to main track.

Locking member of electric or mechanical lock must be so maintained that it cannot be displaced from its locked position by quickly operating the lock lever or pedestal.

Where signal is provided in lieu of a lock to govern train movements to signaled track, an aspect permitting a train to proceed shall not be displayed until the control circuits for all signals governing movement over the switch on the signaled track are opened, and approach circuits in both directions are unoccupied, or a predetermined time interval has expired.

Where exception (1) is relied upon, it is permissible for trains, after approaching the switch at speeds not exceeding 20 miles per hour, to accelerate after the locomotive occupies the switch points.

The provision of exception (2) does not apply to maintenance-of-way work equipment. Such maintenance-of-way equipment as motor cars and track machinery such as tampers, liners, burro cranes with or without cars, Sperry test car, and Spent Rail Grinder equipment is not considered to be a train, and may clear the main track in TCS territory without regard to requirements of this rule.

A footnote to this rule requires that all hand-operated switches in traffic control territory be brought into compliance with these provisions on or before December 31, 1986.

## CLASSIFICATION OF DEFECTS

- 236 0410 01 Hand-operated switch on main track not electrically or mechanically locked in normal position where signal is not provided to govern movement to main track and train movements are made at speeds in excess of 20 miles per hour and train or engine movements may clear the main track.
- 236 0410 02 Hand-operated switch on signaled siding not electrically or mechanically locked in normal position where signal is not provided to govern movements to signaled siding and train movements are made at speeds in excess of 30 miles per hour and train or engine movements may clear the signaled siding.
- 236 0410 03 Approach or time locking not provided for electric lock on hand-operated switch.
- 236 0410 04 Time locking not provided in connection with mechanical lock on hand-operated switch.
- 236 0410 05 Approach or time locking not provided for signal used in lieu of electric or mechanical lock.
- 236 0410 06 Electric or mechanical lock on hand-operated switch can be unlocked before control circuits of signals governing movements over the switch, which display aspects more favorable than "proceed at restricted speed", have been opened directly or track circuit has been shunted.
- 236 0410 07 Signal provided in lieu of electric or mechanical lock can display an aspect to proceed before control circuits of signals governing movements over the switch have been opened.
- 236 0410 08 Electric or mechanical lock on hand-operated switch can be unlocked before expiration of predetermined time interval where time locking is provided.
- 236 0410 09 Signal provided in lieu of electric or mechanical lock can display an aspect to proceed before expiration of predetermined time interval where time locking is provided.
- 236 0410 10 Electric lock on hand-operated switch can be unlocked before expiration of predetermined time interval, with approach section occupied, where approach locking is provided.
- 236 0410 11 Signal provided in lieu of electric or mechanical lock can display an aspect to proceed before expiration of predetermined time interval, with approach section occupied, where approach locking is provided.
- 236 0410 12 Approach or time locking of electric lock at hand-operated switch can be defeated by the unauthorized use of emergency release device of electric lock which is not kept sealed in the non-release position.

**§ 236.426 Interlocking rules and instructions applicable to traffic control systems.**

This rule prescribes the following interlocking rules and instructions be applied to traffic control systems.

- §236.327 Switch, movable-point frog split-point derail.
- §236.328 Plunger of facing point lock.
- §236.330 Locking dog of switch-and-lock movement.
- §236.334 Point detector.

§236.342 Switch circuit controller.

**Application:**

Above rules and instructions apply to traffic control systems.

**§ 236.476 Interlocking inspections and tests applicable to traffic control systems.**

This rule prescribes the following interlocking inspections and tests be made of traffic control systems.

§236.377 Approach locking.

§236.378 Time locking.

§236.379 Route locking.

§236.380 Indication locking.

§236.382 Switch obstruction test.

§236.383 Valve locks, vales and valve magnets.

§236.386 Restoring feature on power switches.

**Application:**

Above inspections and tests apply to traffic control systems. Results of tests shall be recorded in compliance with Rule 236.110.

Subpart E – Automatic Train Stop, Train Control and Cab Signal Systems - Standards

**§ 236.501 Forestalling device and speed control.**

This rule permits the use of a forestalling device in automatic train stop systems and sets forth the minimum requirements for control of speed in automatic train control systems.

**Application:**

Applies to automatic train stop and train control systems.

An automatic train stop system may, but is not required to, include an acknowledging device by means of which the automatic application of the brakes can be forestalled.

An automatic train control system is required to have one or more of the following features:

- (1) A low-speed restriction, effective as long as the condition that causes the restriction exists, that prohibits movement exceeding slow speed either after the train has been stopped by automatic application of the brakes or its speed reduced to slow speed by manual application of the brakes.
- (2) A medium-speed restriction that, in order to prevent an automatic application of the brakes, requires 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.
- (3) A maximum-speed restriction that will effect an automatic brake application whenever the predetermined maximum authorized speed is exceeded.

The speeds imposed by the slow speed or medium speed restrictions must comply with the carrier's definition of slow speed or medium speed which may not exceed that defined by Rules 236.813 or 236.811, respectively, without approval of FRA. Each carrier establishes its own maximum speed.

#### CLASSIFICATION OF DEFECTS

236 0501 01 Automatic train control system with low-speed restriction does not enforce slow speed after train has been stopped by an automatic application of the brakes, until the apparatus is automatically restored to normal because the condition which caused the restriction no longer affects the movement of the train.

236 0501 02 Automatic train control system with low-speed restriction does not enforce slow speed after the speed of the train, under control of the engine man, 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.

236 0501 03 Automatic train control system with medium-speed restriction does not require train to proceed under medium speed after passing a signal displaying an approach aspect in order to prevent an automatic application of the brakes.

236 0501 04 Automatic train control system with medium-speed restriction does not require train to proceed under medium speed when approaching a signal requiring a stop, or a stop indication point, in order to prevent an automatic application of the brakes.

236 0501 05 Automatic train control system with maximum-speed restriction does not require train to proceed at or under maximum authorized speed in order to prevent an automatic application of the brakes.

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

This is a companion rule to Rule 236.504 and requires that the automatic brake application be initiated at least stopping distance from the entrance of a block where any condition exists as described in Rule 236.205.

#### **Application:**

Applies to automatic train stop and train control systems.

This rule requires that an automatic train stop or train control system be so arranged that it will operate to initiate an automatic brake application at least stopping distance in approach to a block wherein any condition described in Rule 236.205 exists and at each main track signal requiring a reduction in speed.

This rule is applicable to signals governing movements on or onto the main track. Signals on auxiliary tracks and sidings, whether signaled or non-signaled, are exempt from the requirements of this rule.

#### CLASSIFICATION OF DEFECTS

236 0502 01 Automatic train stop or train control system does not operate to initiate an automatic brake application at least stopping distance from the entrance to a block occupied by a train, locomotive, or car.

236 0502 02 Automatic train stop or train control system does not operate to initiate an automatic brake application at least stopping distance from the entrance to a block in which the points of a switch are not closed in proper position.

236 0502 03 Automatic train stop or train control system does not operate to initiate an automatic brake application at least stopping distance from the entrance to a block in which an independently operated fouling-point derail equipped with switch circuit controller is not in derailing position.

236 0502 04 Automatic train stop or train control system does not operate to initiate automatic brake application at least stopping distance from the entrance to a block in which a track relay is in de-energized position or device which functions as a track relay is in its most restrictive state.

236 0502 05 Automatic train stop or train control system does not operate to initiate an automatic brake application at signal requiring a reduction in speed.

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

This is a companion rule to Rule 236.501 and requires overspeed protection of all restrictive features used in automatic train control systems.

**Application:**

Applies to automatic train control systems only. This rule requires that automatic train control apparatus function to initiate an automatic brake application whenever the speed of the train exceeds any predetermined setting of the speed control mechanism. A tolerance of three miles per hour is permitted in excess of the predetermined setting of the speed control mechanism.

CLASSIFICATION OF DEFECTS

236 0503 01 Automatic train control system does not 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.**

This rule prescribes the interconnection and operation of an automatic train stop or train control system with a wayside block signal system.

**Application:**

Applies to automatic train stop and train control systems.

This rule requires that an automatic train stop or train control system operate in connection with an automatic block signal system. The train stop or train control system must be so interconnected with the signal system that it will impose an automatic application of the brakes in event the engine man fails, (1) to obey or acknowledge the indication of a cab signal requiring a reduction in speed in a continuous inductive automatic train stop or train control system; or (2) to acknowledge a restrictive wayside signal in an intermittent automatic inductive train stop system.

This rule is applicable only to those signals governing movements on or onto the main track. Signals on auxiliary tracks are exempt from the requirements of this rule.

CLASSIFICATION OF DEFECTS

236 0504 01 Automatic train stop or train control system does not operate in connection with an automatic block signal system.

236 0504 02 Automatic train stop or train control system not so interconnected with the signal system as to perform its intended function in the event of failure of the engine man to acknowledge or obey a signal requiring a reduction in speed.

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

This rule requires that proper operation occur between parts along the roadway and parts on the locomotive under all conditions.

**Application:**

Applies to automatic cab signal, train stop and train control systems.

This rule requires that apparatus on locomotives and at wayside locations be properly interconnected and function as intended regardless of speed, weather, wear, oscillation or shock.

CLASSIFICATION OF DEFECTS

236 0505 01 Proper operative relation between the parts along the roadway and the parts on the locomotive does not obtain under all conditions of speed, weather, wear, oscillation, and shock.

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

This rule prescribes the conditions under which the brakes may be released following an automatic brake application.

**Application:**

Applies to automatic train stop and train control systems.

An intermittent inductive automatic train stop system shall not permit release of the brakes following an automatic brake application until after the train has been stopped.

A continuous inductive automatic train stop system shall not permit release of the brakes following an automatic brake application until after the train has been stopped, unless the condition that caused the brake application no longer exists.

An automatic train control system shall not permit release of the brakes following an automatic brake application until the speed has been reduced to a predetermined rate or until the train has been stopped unless the condition that caused the brake application no longer exists.

This rule prohibits use of a reset device in the control compartment that, when operated, permits release of the brakes before the train has been stopped.

CLASSIFICATION OF DEFECTS

236 0506 01 Automatic train stop apparatus permits release of the brakes after automatic application before a reset device has been operated, while the condition that caused the brake application still affects the movement of the train.

236 0506 02 Automatic train control apparatus permits release of the brakes after automatic application before the speed of the train has been reduced to a predetermined rate, while the condition that caused the brake application still affects the movement of the train.

236 0506 03 Reset device so located that it can be operated by engineer without leaving his/her accustomed position in the cab and not so arranged as to prevent release of the brakes until the train has been stopped.

236 0506 04 Brakes can be released following automatic brake application after reset device has been operated before train has been stopped, while the condition that caused the brake application still affects the movement of the train.

**§ 236.507 Brake application; full service.**

This is a companion rule to Rule 236.502 and requires the apparatus on the locomotive, when operated, to impose a full service application of the brakes.

**Application:**

Applies to automatic train stop and train control systems

This rule requires that an automatic train stop or train control brake application be a full service brake application as defined by Rule 236.701. The imposition of an emergency brake application is prohibited.

CLASSIFICATION OF DEFECTS

236 0507 01 Automatic train stop or train control apparatus, when operated, does not cause a full service application of the brakes.

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

This rule prohibits use of apparatus that affects the proper functioning of the brake system.

**Application:**

Applies to automatic cab signal, train stop and train control systems.

When devices covered by this subpart are cut in service, the air passage of the automatic brake valve is necessarily altered, especially in train stop and train control systems.

This rule prohibits the installation and use of apparatus that interferes with the manual application of the brakes by means of the independent or automatic brake valves or that impairs the efficiency of the air brake or blended brake system when operated manually.

CLASSIFICATION OF DEFECTS

236 0508 01 Automatic train stop, train control, or cab signal apparatus interferes with the application of the brakes by means of the brake valves.

236 0508 02 Automatic train stop, train control, or cab signal apparatus impairs the efficiency of the brake system.

**§ 236.509 Two or more locomotives coupled.**

This rule requires automatic train stop, train control, or cab signal apparatus be operative only on the locomotive from which the brakes are controlled.

**Application:**

Applies to automatic cab signal, train stop and train control systems.

When two or more equipped locomotives are coupled together, or a pushing or helping locomotive is used, the automatic train stop, train control or cab signal apparatus affecting movement of that train must be so arranged that it is operative only on the locomotive from which the brakes are controlled.

#### CLASSIFICATION OF DEFECTS

236 0509 01 Automatic train stop, train control, or cab signal apparatus not 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.

#### **§ 236.511 Cab signals controlled in accordance with block conditions stopping distance in advance.**

This rule requires that automatic cab signals be continuously controlled and provide proper aspects and stopping distances to conditions described in Rule 236.205.

#### **Application.**

Cab signals are required to be continuously controlled to indicate that speed is to be restricted and stop may be required at least stopping distance to all conditions described in Rule 236.205.

Conditions that cause wayside false restrictive aspects such as open or crossed light circuit conductors or burned out lamp bulbs, except where light-out protection is provided, are exempt from these requirements.

#### CLASSIFICATION OF DEFECTS

236 0511 01 Automatic cab signal system not so arranged that cab signals are continuously controlled in accordance with conditions that obtain at least stopping distance in advance. (Applies only to conditions described in parts (a), (b), (c), and (d) of Section 236.205 of the Rules, Standards, and Instructions.)

#### **§ 236.512 Cab signal indication when locomotive enters block where restrictive conditions obtain.**

This is a companion rule to Rule 236.514 and requires the cab signal indicate "Proceed at Restricted Speed" when a locomotive enters or is within a block in cab signal territory wherein a condition described in Rule 236.205 exists.

#### **Application:**

This rule requires that the cab signal indicate "Proceed at Restricted Speed" when the locomotive enters or is within a block occupied by a train, locomotive or car; in which the points of a switch are not closed in proper position; in which an independently operated fouling point derail equipped with switch circuit controller is not in derailing position; or, where there are two or more track circuits, a track relay is in de-energized position.

Rule 236.514 permits the cab signal to change to a more favorable aspect after the train has passed the condition that exists or if the condition ceases to exist.

#### CLASSIFICATION OF DEFECTS

236 0512 01 Automatic cab signal does not indicate "Proceed at Restricted Speed" when locomotive enters or is within a block occupied by a train, locomotive, or car.

236 0512 02 Automatic cab signal does not indicate "Proceed at Restricted Speed" when locomotive enters or is within a block in which the points of a switch are not closed in proper position.

236 0512 03 Automatic cab signal does not indicate "Proceed at Restricted Speed" when locomotive enters or is within a block in which an independently operated fouling- point derail equipped with switch circuit controller is not in derailing position.

236 0512 04 Automatic cab signal does not indicate "Proceed at restricted Speed" when locomotive enters a block in which a track relay is in de-energized position or device that functions as a track relay is in its most restrictive state. (Where there is more than one track circuit in the block.)

### § 236.513 Audible indicator.

This rule requires that when the cab signal aspect changes to a more restrictive indication, an audible indicator shall sound continuously until silenced by manual operation of an acknowledging device. It requires that the cab indicator have a distinctive sound that can be clearly audible throughout the cab under all conditions.

#### **Application:**

Applies to automatic cab signal, train stop, and train control systems.

This rule requires an audible indicator be provided in cab signal systems and so arranged that it will sound continuously, until silenced by manual operation of an acknowledging device, when the cab signal changes to display a more restrictive aspect. The audible indicator may be electrically or pneumatically operated and must have a distinctive sound that identifies it with the system and be clearly audible through the cab under all operating conditions. The audible indicator may be so arranged that it will sound continuously during an overspeed condition and silenced only by reducing to proper speed.

Methods to silence or muffle the cab indicator such a wrapping or plugging with paper or cloth or bending or breaking the air pipe to reduce air flow are prohibited.

#### CLASSIFICATION OF DEFECTS

236 0513 01 Audible cab indicator of automatic cab signal system does not sound continuously until silenced by manual operation of acknowledging device, when cab signal changes to a more restrictive aspect.

236 0513 02 Cab indicator does not have a distinctive sound.

236 0513 03 Cab indicator not clearly audible throughout cab under all operating conditions.

### § 236.514 Interconnection of cab signal system with roadway signal system.

This rule prohibits the cab signal from indicating a speed higher than that authorized by roadway signal indication except when the condition changes after the roadway signal has been passed.

#### **Application:**

Applies to automatic cab signal systems.

This rule requires the locomotive cab signal apparatus be so interconnected to the wayside signals system that it will not authorize operation at a speed higher than that authorized by the wayside signal indication except when conditions affecting the movement of trains in a block change after the train passes the wayside signal.

These requirements apply to all signaled track, including signaled sidings and signaled auxiliary tracks, in automatic cab signal territory.

CLASSIFICATION OF DEFECTS

236 0514 01 Cab signal indication authorizes operation of train at a speed higher than that authorized by indication of roadway signal that governed movement of train into block. (Does not apply when conditions affecting movement of train in the block change after train passes signal.)

**§ 236.515 Visibility of cab signals.**

This rule requires that the cab signal be so located that the locomotive crew member or members can plainly see the aspect.

**Application:**

Applies to automatic train stop, train control and cab signal systems.

Cab signals are required to be so installed that the crew member or members can plainly see the aspect displayed from their accustomed positions in the cab.

The cab signal is required to be properly illuminated, without cracked or broken roundels and its view not obstructed by other equipment installed in the cab.

CLASSIFICATION OF DEFECTS

236 0515 01 Cab signal not plainly visible to member of locomotive crew from his/her station in the cab.

**§ 236.516 Power supply.**

This rule requires that each automatic train stop, train control or cab signal device hereafter installed on a locomotive operate from a separate or isolated power supply.

**Application:**

Applies to automatic train stop, train control, and cab signal systems.

The rule requires that the automatic train stop, train control or cab signal device be provided with a dedicated power supply used solely to operate the device. It is prohibited to utilize the power supply to provide power to any other device or system.

Devices installed on locomotive prior to the effective date of these RS&I are exempt from this requirement.

CLASSIFICATION OF DEFECTS

236 0516 01 Automatic train stop, train control, or cab signal device not provided with an isolated or separate power supply. (Does not apply to devices installed prior to February 27, 1984.)

236 0516 02 Power supply used to operate equipment other than automatic train stop, train control, or cab signal device.

## RULES AND INSTRUCTIONS: ROADWAY

**§ 236.526 Roadway element not functioning properly.**

This rule requires that when the roadway element, except track circuit, of an automatic train stop, train control, or cab signal system has failed to perform its intended function, the associated signal shall be caused manually to display the most restrictive aspect.

**Application:**

Applies to automatic train stop, train control, and cab signal systems.

This rule requires that when a roadway element such as a tripper, inductor, loop, or electric circuit, except track circuit, becomes defective or is being repaired or replaced, the signal associated with the device must be manually caused to display its most restrictive aspect. It is prohibited to permit the signal to display a less restrictive aspect until the device has been restored to its normal operative condition.

## CLASSIFICATION OF DEFECTS

236 0526 01 Signal not caused manually to display its most restrictive aspect when roadway element associated with such signal is not functioning as intended. (Does not apply to track circuit.)

236 0526 02 Signal which has been caused manually to display its most restrictive aspect when roadway element associated with the signal is not functioning as intended, caused to display a less restrictive aspect before such element has been restored to normal operative condition. (Does not apply to track circuit.)

**§ 236.527 Roadway element insulation resistance.**

This rule requires insulation resistance between roadway inductor winding and ground shall be maintained at not less than 10,000 ohms.

**Application:**

Applies to intermittent inductive automatic train stop systems.

This rule applies only to the roadway inductor winding. The insulation resistance of cable or conductors that connect the inductor to its associated signal must comply with the requirements of Rule 236.108.

Disconnect the coil wires and test each to ground. Do not test the coils against each other with an insulation resistance tester.

## CLASSIFICATION OF DEFECTS

236 0527 01 Insulation resistance between roadway inductor winding and ground less than 10,000 ohms.

**§ 236.528 Restrictive condition resulting from open hand-operated switch; requirement.**

This rule requires that the restrictive condition of continuous inductive automatic train stop or train control device or restrictive cab signal indication of an automatic cab signal device be maintained to within 300 feet of an open hand-operated switch or unlocked facing-point lock in equipped territory.

**Application:**

Applies to continuous inductive automatic train stop, train control and cab signal systems.

This rule requires that switch shunting circuits or switch repeating circuits of hand-operated switch or facing-point lock with circuit controller effectively shunt the track circuit or open the signal control circuits to the extent that the restrictive condition of continuous inductive automatic train stop or train control device or restrictive aspect of cab signal device of an approaching locomotive is maintained to within 300 feet of a facing-point switch opened one-fourth inch or more, a trailing point switch opened three-eighths inch or more, or, a facing-point lock that is not locked.

#### CLASSIFICATION OF DEFECTS

236 0528 01 Restrictive condition of automatic train stop or train control device of the continuous type on an approaching locomotive not maintained to within 300 feet of the points of a facing-point hand-operated switch which is open one-fourth inch or more.

236 0528 02 Restrictive condition of automatic train stop or train control device of the continuous type on an approaching locomotive not maintained to within 300 feet of the points of a trailing-point hand-operated switch which is open three-eighths inch or more.

236 0528 03 Restrictive condition of automatic train stop or train control device of the continuous type on an approaching locomotive not maintained to within 300 feet of the points of a hand-operated switch which is not locked, where such switch is equipped with facing-point lock with circuit controller.

236 0528 04 Restrictive cab signal indication of automatic cab signal device on an approaching locomotive not maintained to within 300 feet of the points of a facing-point hand-operated switch which is open one-fourth inch or more.

236 0528 05 Restrictive cab signal indication of automatic cab signal device on an approaching locomotive not maintained to within 300 feet of the points of a trailing-point hand-operated switch which is open three-eighths inch or more.

236 0528 06 Restrictive cab signal indication of automatic cab signal device on an approaching locomotive not maintained to within 300 feet of the points of a switch which is not locked, where such switch is equipped with facing-point lock with circuit controller.

#### § 236.529 Roadway element inductor; height and distance from rail.

This rule requires that inductors of the inert roadway type be installed and maintained in position in accordance with specifications of the carrier.

#### **Application:**

Applies to intermittent inductive automatic train stop systems.

This rule requires that the inductor pole faces be maintained at a height above the plane of the tops of the rails with its inner edge at a horizontal distance from the gage side of the nearest running rail in accordance with the carrier's specifications.

#### CLASSIFICATION OF DEFECTS

236 0529 01 Inductor of the inert roadway element type too high.

236 0529 02 Inductor of the inert roadway element type too low.

- |     |      |    |  |
|-----|------|----|--|
| 236 | 0529 | 03 | Inductor of the inert roadway element too close to gage side of nearest running rail.      |
| 236 | 0529 | 04 | Inductor of the inert roadway element type too far from gage side of nearest running rail. |

**§ 236.531 Trip arm; height and distance from rail.**

This rule requires that trip arm of automatic train stop device, when in stop position, be installed and maintained in position in accordance with specifications of the carrier.

**Application:**

Applies to mechanical trip type automatic train stop system.

This rule requires that trip arm, when in stop position, be maintained at a height above the plane of the tops of the rails with its centerline at a horizontal distance from the gage side of the nearest running rail in accordance with the carrier's specifications.

CLASSIFICATION OF DEFECTS

- |     |      |    |  |
|-----|------|----|--|
| 236 | 0531 | 01 | Trip arm of automatic train stop device, in stop position, too high.                               |
| 236 | 0531 | 02 | Trip arm of automatic train stop device, in stop position, too low.                                |
| 236 | 0531 | 03 | Trip arm of automatic train stop device, in stop position, too close to gage side of running rail. |
| 236 | 0531 | 04 | Trip arm of automatic train stop device, in stop position, too far from gage side of running rail. |

**§ 236.532 Strap iron inductor; use restricted.**

This rule restricts the use of strap iron inductors or other roadway element with characteristics different from its standard type.

**Application:**

Applies to intermittent inductive automatic train stop system.

The use of strap iron inductors or other roadway element with characteristics differing from its standard type is prohibited on track where speed higher than 20 mph is permitted.

CLASSIFICATION OF DEFECTS

- |     |      |    |   |
|-----|------|----|---|
| 236 | 0532 | 01 | Strap iron inductor or other roadway element with characteristics differing from standard type used on track where speed higher than restricted speed is permitted. |
|-----|------|----|---|

**§ 236.534 Entrance to equipped territory; requirements.**

This rule requires that 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.

**Application:**

Applies to automatic train stop, train control, and cab signal systems.

This rule requires that automatic train stop, train control, or cab signal device be operative at least stopping distance from the entrance to equipped territory except where trains are required to stop at the entrance to equipped territory, or the approach thereto is governed by an operative approach signal, or when leaving yards and stations where speed until entering equipped territory does not exceed restricted speed.

CLASSIFICATION OF DEFECTS

236 0534 01 Automatic train stop, train control, or cab signal device not operative at least stopping distance from entrance to equipped territory. (Does not apply where trains are required to stop at entrance to equipped territory or where the approach thereto is governed by automatic approach signal.)

RULES AND INSTRUCTIONS: LOCOMOTIVES

**§ 236.551 Power supply voltage; requirement.**

This rule prescribes the tolerance within which the power supply voltage shall be maintained.

**Application:**

Applies to automatic train stop, train control and cab signal systems.

The voltage of the power supply must be maintained to within 10 percent of the rated voltage.

CLASSIFICATION OF DEFECTS

236 0551 01 Voltage of power supply more than 10 percent above rated voltage.

236 0551 02 Voltage of power supply more than 10 percent below rated voltage.

**§ 236.552 Insulation resistance; requirement.**

This rule prescribes the minimum insulation resistance permitted between wiring and ground.

**Application:**

Applies to automatic train stop, train control and cab signal systems.

The insulation resistance between wiring and ground of continuous inductive automatic train stop, train control and cab signal systems shall be not less than one (1) megohm when periodic test is performed and not less than 250,000 ohms between periodic tests.

The insulation resistance between wiring and ground of intermittent inductive automatic train stop system shall be not less than 250,000 ohms when periodic test is performed and not less than 20,000 ohms between periodic tests.

## CLASSIFICATION OF DEFECTS

236 0552 01 Insulation resistance between wiring and ground of continuous inductive type automatic train stop, train control, or cab signal device less than 1 megohm not corrected when periodic test is performed.

236 0552 02 Insulation resistance between wiring and ground of continuous inductive type automatic train stop, train control, or cab signal device less than 250,000 ohms between periodic tests.

236 0552 03 Insulation resistance between wiring and ground of intermittent inductive automatic train stop device less than 250,000 ohms not corrected when periodic test performed.

236 0552 04 Insulation resistance between wiring and ground of intermittent inductive automatic train stop device less than 20,000 ohms between periodic tests.

**§ 236.553 Seal, where required.**

This rule requires that a seal be maintained on any device other than brake pipe cutout cock (double heading cock), by means of which the operation of pneumatic portion of automatic train stop or train control apparatus can be cut out.

**Application:**

Applies only to automatic train stop and train control systems. Does not apply to automatic cab signal systems.

This rule requires that automatic train stop or train control apparatus be cut in and a seal applied to any device or cutout cock, except double heading cock, by means of which any part of the pneumatic portion of the apparatus can be cut out. The seal is required to be applied in such a manner that the device cannot be operated to cut out the apparatus without breaking the seal.

## CLASSIFICATION OF DEFECTS

236 0553 01 Device by means of which operation of pneumatic portion of apparatus can be cut out, not sealed. (Does not apply to brake-pipe cut-out cock, or double heading cock, of automatic train stop or train control equipped locomotive or to the cut-out cock for the pneumatic whistle of an automatic cab signal system on an equipped locomotive.)

**§ 236.554 Rate of pressure reduction; equalizing reservoir or brake pipe.**

This is a companion rule to Rule 236.507 and requires that the equalizing reservoir pressure or brake pipe pressure reduction during an automatic brake application be at a rate not less than that which results from a manual service application.

**Application:**

Applies to automatic train stop and train control systems.

An automatic full service brake application is accomplished by piping and venting arrangements different than that accomplished manually.

This rule requires that the efficiency of the automatic brake application be at least equal to the efficiency of the manual application of the brakes.

CLASSIFICATION OF DEFECTS

236 0554 01 Equalizing reservoir or brake pipe pressure during automatic brake application reduces at a rate less than that which obtains during a manual service application.

**§ 236.555 Repaired or rewound receiver coil.**

This rule requires that a receiver coil which has been repaired or rewound have the same operating characteristics which it possessed originally or as currently specified for new equipment.

**Application:**

Applies to automatic cab signal, train stop and train control systems.

This rule requires receivers to be rewound with the same size wire and number of turns to achieve the resistive value and inductance it originally possessed or as currently specified for new equipment. The rule prohibits repair of receivers by removing turns of wire to eliminate shorts or opens.

CLASSIFICATION OF DEFECTS

236 0556 01 Receiver coil which has been repaired or rewound does not have same operating characteristics which it possessed originally or as currently specified for new equipment.

**§ 236.556 Adjustment of relay.**

This rule prohibits the adjustment of a relay elsewhere than in a shop equipped for that purpose except when receiver coils, electro-pneumatic valve or other essential part of the equipment is replaced.

**Application:**

Applies to automatic cab signal, train stop, and train control systems.

This rule requires that adjustment of relay be made only in a shop equipped for that purpose except when receiver coils, electro-pneumatic valve or other essential part of the equipment is replaced. The rule prohibits adjustment of the relay to compensate for irregularities in power supply voltage or other variable factors in its circuit.

CLASSIFICATION OF DEFECTS

236 0556 01 Change in adjustment of relay made elsewhere than in a shop equipped for that purpose. (Does not apply when receiver coils, electro-pneumatic valve, or other essential part of equipment is replaced.)

236 0556 02 Relay adjusted to compensate for irregularities of power-supply voltage or other variable factors in circuit.

**§ 236.557 Receiver; location with respect to rail.**

This rule requires that the receiver of an intermittent inductive automatic train stop device or the receiver of a continuous inductive automatic train stop, train control or cab signal device on locomotive equipped with onboard test device be maintained in accordance with specifications of the carrier.

**Application:**

Applies to all intermittent inductive automatic train stop systems and to those continuous inductive automatic train stop, train control or cab signal devices that are installed on locomotives equipped with onboard test device.

This rule requires that the receiver of covered devices 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.

## CLASSIFICATION OF DEFECTS

236 0557 01 Receiver of intermittent inductive automatic train stop device of the inert roadway element type, or continuous inductive automatic train stop, train control, or cab signal device on locomotive equipped with onboard test device, too high.

236 0557 02 Receiver of intermittent inductive automatic train stop device of the inert roadway element type, or continuous inductive automatic train stop, train control, or cab signal device on locomotive equipped with onboard test device, too low.

236 0557 03 Receiver of intermittent inductive automatic train stop device of the inert roadway element type, or continuous inductive automatic train stop, train control, or cab signal device on locomotive equipped with onboard test device, too close to gage side of nearest rail.

236 0557 04 Receiver of intermittent inductive automatic train stop device of the inert roadway element type, or continuous inductive automatic train stop, train control, or cab signal device on locomotive equipped with onboard test device, too far from gage side of nearest rail.

**§ 236.560 Contact element, mechanical trip type; location with respect to rail.**

This rule requires that the contact element of automatic train stop device of the mechanical trip type be maintained in accordance with specifications of the carrier.

**Application:**

This rule requires that the contact element of automatic train stop device of the mechanical trip type be installed and maintained at a height above the tops of the plane of the rails and at a horizontal distance from the nearest rail in accordance with specifications of the carrier.

## CLASSIFICATION OF DEFECTS

236 0560 01 Contact element of automatic train stop device of the mechanical trip type too high.

236 0560 02 Contact element of automatic train stop device of the mechanical trip type too low.

236 0560 03 Contact element of automatic train stop device of the mechanical trip type too close to gage side of rail.

236 0560 04 Contact element of automatic train stop device of the mechanical trip type too far from gage side of rail.

**§ 236.562 Minimum rail current required.**

This rule requires that the minimum pick-up value of the locomotive apparatus be maintained in accordance with specifications of the carrier.

**Application:**

Applies to continuous inductive automatic cab signal, train stop and train control systems.

This rule requires that 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 be in accordance with specifications of the carrier.

## CLASSIFICATION OF DEFECTS

236 0562 01 Pick-up of locomotive equipment of continuous inductive automatic train stop, train control, or cab signal device too high.

236 0562 02 Pick-up of locomotive equipment of continuous inductive automatic train stop, train control, or cab signal device too low.

**§ 236.563 Delay time.**

This rule prescribes that the delay time of automatic train stop or train control system not exceed 8 seconds and that the spacing of signals to meet the requirements of Rule 236.24 take into consideration the delay time.

**Application:**

Applies to both intermittent inductive and continuous inductive automatic train stop and train control systems.

Delay time is provided to give the engineer enough time to take proper action to prevent an automatic brake application. This rule prohibits the delay time from exceeding eight seconds before the brakes begin to apply. The rule also requires that spacing of signals in equipped territory include the distance traveled at maximum authorized speed for eight seconds in order that trains may be stopped by the automatic brake application at the signal where a stop is required, or by reduction in speed to the rate prescribed by the next signal in advance where reduced speed is required.

Delay time is defined in the Definitions section of the RS&I as follows: "§236.831 Time, delay. As applied to an automatic train stop or train control system, the time which elapses after the onboard apparatus detects a more restrictive indication until the brakes start to apply."

When a test is made to determine the delay time, the elapsed time should be measured from the time the onboard device recognizes the change in track circuit current or code rate, or detects the passage over an inductor at a signal displaying an aspect less favorable than "proceed", until the actuation of the valves that initiate the braking. Or to put it more simply, the delay time is measured from the time the cab signal or indicator changes to a more restrictive aspect, until a reduction in brake-pipe pressure is started and the pressure in the brake cylinders starts to increase. In the case of the intermittent inductive train stop system, the delay time is measured from the instant the alarm whistle or electronic tone starts to sound until the brakes start to apply. The application of the brakes can be detected by watching the brake pipe-pressure gauge and the brake cylinder gauge, and by listening for venting of air from the braking system.

## CLASSIFICATION OF DEFECTS

236 0563 01 Delay time of automatic train stop or train control system exceeds 8 seconds.

236 0563 02 Spacing of signals to meet the requirements of Section 236.24 of the Rules, Standards and Instructions not adequate in consideration of delay time during automatic train stop or train control brake application.

**§ 236.564 Acknowledging time.**

This rule prescribes that the acknowledging time of intermittent automatic train stop device not exceed 30 seconds.

**Application:**

Applies only to intermittent inductive automatic train stop systems.

Acknowledging time is provided in order to furnish the engineer an ample time period to forestall an automatic brake application by holding the acknowledging lever in reverse position while the locomotive passes a restricting signal. This rule prohibits the acknowledging lever from being held in the acknowledging position longer than 30 seconds before the brakes start to apply.

Acknowledging time is defined in the RS&I's Definitions as: "§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 an acknowledging device."

The acknowledging time should be tested by moving the handle to the acknowledging position and holding until the brakes start to apply. The application of the brakes can be detected by watching the brake-pipe pressure gauge for a reduction and listening for the venting of air from the braking system.

CLASSIFICATION OF DEFECTS

236 0564 01 Acknowledging time of intermittent automatic train stop device exceeds 30 seconds.

**§ 236.565 Provision made for preventing operation of pneumatic brake-applying apparatus by double-heading cock; requirements.**

This rule requires that 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 double-heading cock shall be so arranged that the automatic brake valve is cut out in advance of or simultaneously with the train stop or train control apparatus.

**Application:**

Applies to automatic train stop and train control systems.

This rule prohibits operation of the double-heading cock to the extent that the automatic train stop or train control pneumatic apparatus is rendered inoperative before the automatic brake valve.

CLASSIFICATION OF DEFECTS

236 0565 01 Automatic train stop or train control device is cut out before communication is closed between engineer'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.**

This rule requires that 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.

**Application:**

Applies to automatic cab signal, train stop and train control systems.

This rule requires that each locomotive from which the brakes are controlled which traverses automatic train stop, train control or cab signal territory be equipped with apparatus responsive to the roadway equipment installed on all or any part of the route traversed. The rule further requires that the apparatus of the locomotive be in operative condition upon departure from its initial terminal.

## CLASSIFICATION OF DEFECTS

236 0566 01 Locomotive from which brakes are controlled on train operating in automatic train stop, train control, or cab signal territory not equipped with apparatus responsive to roadway equipment installed on all or any part of route traversed.

236 0566 02 Automatic train stop, train control, or cab signal apparatus on locomotive from which brakes are controlled of train operating in automatic train stop, train control, or cab signal territory not in operative condition.

**§ 236.567 Restrictions imposed when device fails and/or is cut out en route.**

This rule sets forth the procedures and restrictions that shall be followed when an automatic train stop, train control or cab signal device fails and/or is cut out en route.

**Application:**

Applies to automatic cab signal, train stop and train control systems.

This rule requires that when an automatic cab signal, train stop or train control device fails or is cut out en route the train shall proceed not exceeding 20 miles per hour, or, if an automatic block signal system is in operation, according to signal indication not exceeding 40 miles per hour, to the next available point of communication where a report must be made to a designated officer. Radio communications are permissible for this purpose.

Following the required report, in the event the train is in territory in which an automatic block signal system is not in use, the train may be permitted to proceed at not exceeding 20 miles per hour to a point where an absolute block is established.

In the event an automatic block signal system is in operation in the territory in which the train is operating, the train may be permitted to proceed according to signal indication at not exceeding 40 miles per hour to a point where an absolute block is established.

An "absolute block" is defined by §236.709 as "A block in which no train is permitted to enter while it is occupied by another train."

An absolute block may be established in both signaled and non signaled territory by use of manual block rules, train orders, track warrants, or other method of train operation, defined by the carrier's operating rules. An absolute block may also be established in block signal territory by designating in the carrier's

operating rules, that when an onboard train stop or train control device fails, all wayside signals displaying "restricting" or "stop and proceed" aspects will be considered to be displaying a "stop" aspect for the train with the failed device. Thus, an absolute block will essentially be established in front of that train.

Upon establishment of an absolute block in front of the train with the inoperative device, the train may then proceed at speeds not in excess of 79 miles per hour.

The carrier's operating rules shall effect these requirements.

(Reference technical Bulletin S-96-03)

#### CLASSIFICATION OF DEFECTS

236 0567 01 Train permitted to proceed at higher than restricted speed to next available point of communication when automatic train stop, train control, or cab signal device fails and/or is cut out en route and no automatic block signal system is in operation.

236 0567 02 Train permitted to proceed at higher than medium speed to next available point of communication when automatic train stop, train control, or cab signal device fails and/or is cut out en route and an automatic block signal system is in operation.

236 0567 03 Report not made to designated officer at next available point of communication after automatic train stop, train control, or cab signal device fails and/or is cut out enroute.

236 0567 04 Train permitted to proceed at higher than restricted speed to point where absolute block can be established when automatic train stop, train control, or cab signal device fails and/or is cut out en route and no automatic block signal system is in use.

236 0567 05 Train permitted to proceed at higher than medium speed to point where absolute block can be established when automatic train stop, train control, or cab signal device fails and/or is cut out en route and an automatic block signal system is in use.

236 0567 06 Train permitted to proceed at a speed exceeding 79 miles per hour where automatic train stop, train control, or cab signal devices fails and/or is cut out enroute when an absolute block is established in advance of the train on which the device is inoperative.

236 0567 07 Train permitted to proceed at a speed other than restricted speed after communications has been established, where automatic train stop, train control, or cab signal device fails and/or is cut out en route when an absolute block is not established in advance of the train on which the device is inoperative and no automatic block signal system is in operation.

#### **§ 236.568 Difference between speeds authorized by roadway signal and cab signal; action required**

The rule requires that in the event a cab signal authorizes a speed different from that authorized by a roadway signal, the most restrictive speed shall not be exceeded.

#### **Application:**

Applies to continuous inductive automatic cab signal, train stop, and train control systems.

This rules requires that 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 the signal, the lower speed shall not be exceeded.

The carrier's operating rules shall effect this requirement.

## CLASSIFICATION OF DEFECTS

236 0568 01 Train operated at a speed higher than that authorized by the more restrictive indication when the speed authorized by the cab signal indication is different than that authorized by the indication of the roadway signal when train entered block governed by such signal.

## INSPECTIONS AND TESTS: ROADWAY

**§ 236.576 Roadway element.**

This rule requires that 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.

**Application:**

Applies to automatic train stop systems.

This rule requires that inductor of the inert roadway type and trip arm be gaged monthly for height and alinement. The rule further requires testing of inductor for defective conditions in its winding or external controlling circuit and of trip arm valves and return springs every six months.

## CLASSIFICATION OF DEFECTS

236 0576 01 Roadway element not gaged monthly for height and alinement.

236 0576 02 Roadway element not tested at least once every six months.

**§ 236.577 Test, acknowledgment and cut-in circuits.**

This rule requires that test, acknowledgment and cut-in circuits shall be tested at least once every twelve months.

**Application:**

Applies to automatic cab signal, train stop and train control systems.

This rule requires test at least once every twelve months of test circuits, including test equipment, acknowledgment and cut-in circuits.

An acknowledgment circuit is installed between the track rails at each signal or stop indication point in territory where an automatic train stop system of the continuous inductive type with two-indication cab signals is in service, to enforce acknowledgment by the engineer of restrictive conditions in order to forestall an automatic brake application. The acknowledgment circuit is required to be continuously energized and, if interrupted, it must de-energize its associated track circuit.

A cut-in circuit is a roadway circuit located at the entrance of equipped territory by means of which locomotive equipment of continuous inductive type system is actuated so as to be in an operative condition. The cut-in circuit shall be so arranged that it requires acknowledgment by the engineer of all restrictive features provided by the device.

Test circuits, including portable and onboard test equipment, may be used for performing the prescribed tests of apparatus on equipped locomotives.

## CLASSIFICATION OF DEFECTS

236	0577	01	Test circuit not tested at least once every twelve months.
236	0577	02	Acknowledgment circuit not tested at least once every twelve months.
236	0577	03	Cut-in circuit not tested at least once every twelve months.
236	0577	04	Onboard test equipment not tested at least once every twelve months.

## INSPECTIONS AND TESTS; LOCOMOTIVE

**§ 236.586 Daily or after trip test.**

This rule prescribes inspection and test daily or after each trip of the automatic cab signal, train stop, or train control apparatus on each locomotive operating in equipped territory, except where periodic tests are performed on such locomotives at intervals of not more than two months.

**Application:**

Applies to automatic cab signal, train stop, and train control systems.

This rule requires that the automatic cab signal, train stop, or train control apparatus on each locomotive operating in equipped territory be inspected and tested either once every 24 hours or within 24 hours before departure on each trip. Daily or after trip inspections and tests are not required for locomotives which are subject to periodic tests at intervals of not more than two months.

The purpose of the test is to determine the device is functioning properly before being dispatched into equipped territory. The test is required to be made by an employee capable of detecting defective conditions and taking corrective action prior to the locomotive being dispatched from its initial terminal. In all systems the daily or after trip test shall consist of a general inspection of the apparatus for evidence of damage or wear and a complete cycle of the systems's functions, in addition to the following:

In intermittent inductive automatic train stop system, the test shall determine if the apparatus is properly sensitive, that an automatic application can be forestalled, that an automatic application causes a full service application, that the brakes cannot be released during an automatic application until sufficient time has elapsed to stop a train from maximum authorized speed (reset time), and that seals are properly applied unless device is to be cut out between initial terminal and equipped territory.

In continuous inductive automatic train stop system, the test shall determine that an automatic application can be forestalled, that an automatic application causes a full service brake application, that the brakes cannot be released during an automatic application until sufficient time has elapsed to stop a train from maximum authorized speed (reset time), or the condition that caused the automatic application ceases to exist, and in noncoded continuous inductive automatic train stop system that pick-up of the device is within specified limits, and that seals are properly applied unless device is to be cut out between initial terminal and equipped territory.

In continuous inductive automatic train control system, the test shall determine that overspeed causes an automatic brake application unless suppressed, that an automatic application causes a full service brake application, that the brakes cannot be released during an automatic application until sufficient time has elapsed to stop a train from maximum authorized speed (reset time) or the speed of the train has been slowed to a predetermined rate, or the condition that caused the automatic application ceases to exist, and in noncoded continuous inductive automatic train control system, that pick-up of the device is within specified limits, and that seals are properly applied unless device is to be cut out between initial terminal and equipped territory.

In automatic cab signal system, the test shall determine that cab signal indications correspond to proper codes or track conditions, that the audible indicator has a distinctive sound and can be heard clearly throughout the cab and that the audible indicator sounds continuously until silenced manually each time the cab signal changes to a more restrictive indication.

Results of the daily or after trip test are required to be recorded by Rule 236.110.

#### CLASSIFICATION OF DEFECTS

236 0586 01 Automatic train stop, train control, or cab signal apparatus on locomotive operating in equipped territory not tested either once every 24 hours or within 24 hours before departure on each trip. (Does not apply to locomotive on which periodic test is made at least once every two months.)

#### **§ 236.587 Departure test.**

This rule requires that the automatic train stop, train control, or cab signal apparatus on each locomotive be tested prior to entering equipped territory to determine if such apparatus is in service and functioning properly.

#### **Application:**

Applies to automatic cab signal, train stop, and train control systems, except automatic train stop system of the mechanical trip type.

The rule requires the departure test be made on departure of the locomotive from its initial terminal and before it enters equipped territory. If the apparatus is cut out between initial terminal and equipped territory, the departure test must be made prior to entering equipped territory.

The purpose of the test is to determine the apparatus is in service and is functioning properly.

The rule permits departure tests to be made over track elements or test circuits permanently installed for that purpose, or with portable test equipment, or with onboard test equipment. In any case, it must be so arranged that it will produce any of the various track circuit, or restrictive conditions encountered in actual service.

If a locomotive makes more than one trip in a 24-hour period, only one departure test is required in such 24-hour period.

Rule 236.587 requires that whoever performs the test shall certify in writing that the test was made and that the certification and results of the tests shall be posted in the cab of the locomotive. Further, a copy of the certification and results of the tests is required to be left at the test location for filing in the office of the supervisory official having jurisdiction. The records of departure tests must be retained for at least 92 days. Rule 236.110 also requires that a record be made of the departure test.

The rule takes cognizance of locations where it is impractical for a copy of the test to be left at the location being tested, by providing that the results of the tests may be transmitted to either the dispatcher or to one other designated individual at each location. In either case, the employee who receives the information is required to keep a written record of the results of the tests and the name of the person performing the tests.

The rule does not permit the railroad to use a third party for reporting purposes, should the person designated not be available for reporting of departure tests. If the designated person is not available, the engineer must report the results of the departure test and the name of the person making such test to the dispatcher, or else leave a written record of such test at the test location.

## CLASSIFICATION OF DEFECTS

236 0587 01 Test of automatic train stop, train control, or cab signal apparatus on locomotive not made on departure of locomotive from its initial terminal if equipment on locomotive is not cut out between its initial terminal and equipped territory. (Does not apply to locomotives and multiple-unit cars equipped with mechanical trip stop, or locomotives making more than one trip in each twenty-four hours where a departure test has been made on the locomotive equipment within the corresponding twenty-four hour period.)

236 0587 02 Test of automatic train stop, train control, or cab signal apparatus on locomotive not made immediately prior to entering equipped territory, if equipment on locomotive is cut out between its initial terminal and equipped territory.

236 0587 03 Automatic train stop, train control, or cab signal apparatus on locomotive making more than one trip within a twenty-four hour period not given a departure test within the corresponding twenty-four hour period.

236 0587 04 Record of departure test of automatic train stop, train control, or cab signal equipment not posted in cab of locomotive.

236 0587 05 Record of departure test of automatic train stop, train control, or cab signal equipment on locomotive not kept, at test location. (Does not apply where impractical and, in lieu thereof, certification and results of test are transmitted to the dispatcher or a designated individual.)

236 0587 06 Record of departure test of automatic train stop, train control, or cab signal equipment on locomotive not signed by employee making test.

236 0587 07 Record of departure test of automatic train stop, train control, or cab signal equipment on locomotive not transmitted to dispatcher or designated individual. (Does not apply where it is practical to leave copy of record at test location.)

### § 236.588 Periodic test.

This rule requires that except as provided in Rule 236.586, periodic tests of the automatic train stop, train control, or cab signal apparatus shall be made at least once every 92 days, and on multiple-unit cars as specified by the carrier subject to approval by FRA.

#### **Application:**

Applies to automatic cab signal, train stop, and train control systems.

In keeping with Rule 236.586, the prescribed 92 day requirement of this rule is not applicable where periodic tests are made on locomotives at intervals of not more than two months. No other deviation from these requirements is permissible without approval of FRA.

The daily or after trip test prescribed by Rule 236.586 is a test to determine the device is in good condition and functioning properly before being dispatched into equipped territory. The departure test prescribed by Rule 236.587 is a test to determine that the device is turned on, in service and functioning as intended before actually departing into equipped territory. The purpose of the periodic test prescribed by Rule 236.588 is to provide a more thorough and in-depth test and inspection of the electrical and pneumatic equipment.

All defective conditions shall be immediately corrected during the periodic test which shall consist of at least the following tests and inspections:

1. Thorough examination of the electrical portion including measurement of the insulation resistance.
2. Measurement of the power supply voltage.
3. Measurement of the pickup value required to restore the device to normal condition.
4. Measurement of the release value of the device in continuous noncoded systems.
5. Test of sensitivity of intermittent inductive automatic train stop system.
6. Measurement of acknowledging time.
7. Measurement of delay time.
8. Measurement of reset time in train stop and train control systems.
9. Measurement of height of receiver of intermittent inductive automatic train stop and continuous inductive systems having onboard test equipment, and of tripper of mechanical trip stop system.
10. Test of audible indicator.
11. Replacement of relays with dates that expire prior to next scheduled periodic test.
12. Replacement of pneumatic apparatus with cleaning dates that expire prior to next scheduled periodic test.
13. Measurement of accuracy of governor in train control systems.
14. Cycle test of apparatus to determine that it functions as intended.

Rule 236.110 requires that the results of periodic tests be recorded on a form provided for that purpose.

#### CLASSIFICATION OF DEFECTS

236 0588 01 Periodic tests of automatic train stop, train control, or cab signal apparatus not made at least once every 92 days.

236 0588 02 Periodic tests of automatic train stop, train control, or cab signal apparatus not made at least once every two months where daily or after trip test is not performed.

236 0588 03 Periodic tests of automatic train stop, train control, or cab signal apparatus on multiple-unit car not made at periods specified by carrier.

#### **§ 236.589 Relays.**

This rule requires that each relay, except master or primary relay of torque type, be removed from service and shopped at least once every six years. Master or primary relay of torque type depending on spring tension to return contacts to deenergized position shall be removed from service and shopped at least once every two years.

#### **Application:**

Applies to automatic cab signal, train stop, and train control systems.

The rule requires that each relay be removed from service as prescribed, subjected to thorough test, and necessary repairs and adjustment made.

The rule prohibits the relay from being returned to service unless its operating characteristics are in accordance with the limits within which such relay is designed to operate. In order to preclude loss of shelf time, a date tag may be applied showing when the relay was placed in service. In the absence of a date tag, or where the date is altered or illegible, the shop date of the relay will be used to determine when the relay should be removed from service.

#### CLASSIFICATION OF DEFECTS

236 0589 01 Relay, other than a master or primary relay of torque type, not removed from service for test and necessary repairs and adjustment at least once every six years.

236 0589 02 Master of primary relay of torque type depending on spring tension to return contacts to deenergized position of noncoded system not removed from service for test and necessary repairs and adjustment at least once every two years.

236 0589 03 Relay replaced in service after test and repair with operating characteristics not in accordance with the limits within which such relay is designed to operate.

#### **§ 236.590 Pneumatic apparatus.**

This rule requires that automatic train stop, train control, or cab signal pneumatic apparatus be inspected, cleaned, and the results of such inspection recorded as provided by §229.29(a).

#### **Application:**

Applies to automatic train stop, train control, and cab signal systems.

This rule requires that pneumatic apparatus of the automatic train stop, train control, or cab signal device be inspected and cleaned at least once every 736 days.

The results of such inspection recorded as provided by 229.29.

When a locomotive with automatic train stop, train control, or cab signal pneumatic apparatus receives out-of-use credit pursuant to § 229.33, the automatic train stop, train control, or cab signal apparatus shall be tested in accordance with § 236.588 prior to the locomotive being placed in service.

Per revisions published in the July 1, 1996 Federal Register, the rule in Section 236.590 is revised to read as follows:

#### **§236.590 Pneumatic apparatus.**

Automatic train stop, train control, or cab signal pneumatic apparatus shall be inspected, cleaned, and the results of such inspection recorded as provided by §229.29(a). When a locomotive with automatic train stop, train control, or cab signal pneumatic apparatus receives out-of-use credit pursuant to §229.33, the automatic train stop, train control, or cab signal apparatus shall be tested in accordance with §236.588 prior to the locomotive being placed in service.

[49 FR 3387, Jan. 26, 1984; 61 FR 33870, July 01, 1996]

Effective Date Note: Section 236.590 was revised at 49 FR 3387, Jan. 26, 1984. The reporting/recordkeeping requirements contained in this section are subject to OMB approval and are not required until such approval has been obtained.

## CLASSIFICATION OF DEFECTS

- 236 0590 01 Automatic train stop, train control, or cab signal pneumatic apparatus not inspected and cleaned at least once every 736 days.
- 236 0590 02 Automatic train stop, train control, or cab signal pneumatic apparatus not inspected and cleaned as provided by § 229.29.
- 236 0590 03 The results of inspection and cleaning not recorded as provided by § 229.29.

## TECHNICAL BULLETIN

SUBJECT: CLASSIFICATION OF DEFECTS CODES FOR HARMON AUTOMATIC TRAIN CONTROL USED ON CONRAIL.

NUMBER: TB-89-2 ORIGINAL ISSUE NUMBER AND DATE: 1-18-89

DISCIPLINE: SIGNAL AND TRAIN CONTROL REISSUE DATES: \_\_\_\_\_

On November 19, 1987, the Federal Railroad Administration issued a Notice of Final Orders of Particular Applicability (52 FR 44513) requiring that all trains operating on the Northeast Corridor (NEC) spine be controlled by locomotives equipped with automatic train control (ATC). At the time of issuance of those orders, FRA was conducting analyses to determine the optimally safe braking specifications for ATC devices on freight trains on the NEC. The FRA concluded its study and determined that ATC does not present any undue safety risk for freight service on the NEC. On January 19, 1988, FRA issued its supplement to the Final Orders of Applicability (53 FR 1433) that established specifications for a microprocessor based ATC system for freight train operation on the NEC. These specifications do not apply to passenger train operations.

Conrail is in the process of placing a microprocessor-based ATC device (braking profile system (BPS)) in service on 100 freight locomotives operating in the NEC. The Providence and Worcester Railroad has indicated it will install the same type ATC device as Conrail. The device is manufactured by Harmon Electronics and is programmed with braking curves that permit the locomotive engineer to control the train by means other than a brake application as long as the train speed is within the parameters of the braking profile. Thus, this device provides equivalent protection as conventional ATC without the necessity of severe braking to forestall a penalty brake application.

The following is a paragraph-by-paragraph of FRA's specifications followed by enforcement instructions for S&TC inspectors.

\*Supplement to Final Orders:

In consideration of the foregoing the Final Orders of Particular Applicability issued November 19, 1987, are supplemented as follows;

1. Use of conventional ATC on freight train locomotives on the NEC is safe. Conventional ATC, which makes use of temporary suppression, results at most, in only moderate increases in buff forces. By careful use of the throttle during a temporary suppression application, the buff forces can be reduced. Therefore, no modification or specification changes are necessary for conventional ATC installation on freight train locomotives on the NEC."

For conventional Systems cite defective conditions using the classification of Defect Codes.

2. "Conrail's proposed ATC system utilizing a braking profile system, when used in conjunction with automatic cab signals supplemented with ATS, provides a safe alternative to conventional ATC systems." It is an acceptable ATC system for use on controlling locomotives of NEC freight trains provided that:

A. The BPS system complies with all provisions of 49 CFR Part 236 that apply to ATC systems, except as modified herein:

B. "The BPS system shall operate to initiate an automatic brake application at least stopping distance from the entrance to a block in which any condition described in Section 236.205 exists;"

Cite conditions that do not comply with paragraph 2B using Classification of Defect Codes 502.01, 502.02, 502.03 and 502.04.

C. "The BPS system shall operate to require a reduction in speed to that prescribed by a main track signal requiring a reduction in speed;"

Cite conditions that do not comply with paragraph 2C using Classification of Defect Code 502.05.

D. "The BPS system shall operate to initiate an automatic brake application within 27 seconds after the locomotive, at speeds exceeding 20 mph, enters or is within a block described in Section 236.205 occurs;"

Cite conditions that do not comply with paragraph 2D using Classification of Defect Code 235.5.05 and show the appropriate defect below in the "Description" column on the Signal and Train Control inspection report Form 6180.5.

- Automatic train control does not operate to initiate an automatic brake application within 27 seconds after the locomotive, at speeds above 20 mph, enters or is within a block occupied by a train, locomotive or car.

- Automatic train control system does not operate to initiate an automatic brake application within 27 seconds after the locomotive, at speeds above 20 mph, enters or is within a block in which the points of a switch are not closed in proper position.

- Automatic train control system does not operate to initiate an automatic brake application within 27 seconds after the locomotive, at speeds above 20 mph, enters or is within a block in which an independently operated fouling-point derail equipped with switch circuit controller is not in derailing position.

- Automatic train control system does not operate to initiate an automatic brake application within 27 seconds after the locomotive, at speeds above 20 mph, enters or is within a block in which a track relay is in deenergized position or device which functions as a track relay is in its most restrictive state. (Where there is more than one track circuit in the block.)

E. "The BPS system shall operate to initiate an automatic brake application when speed of the train exceeds the rate permitted by the braking profile curve;"

Cite conditions that do not comply with paragraph 2E using Classification of Defect Code 501.05.

F. "The BPS system shall operate to initiate an automatic brake application if the system is de-activated while the speed of the locomotive exceeds 20 mph;"

Cite conditions that do not comply with paragraph 2F using Classification of Defect Code 235.5.05 followed by the defect code below in the "Description" column on the Signal and Train Control Form 6180.5.

- Automatic train control system does not operate to initiate an automatic brake application when the system is de-activated while speed of the locomotive exceeds 20 mph.

G. "The visual display of the status of BPS is plainly visible to members of the locomotive crew from their stations in the cab;"

Cite conditions that do not comply with paragraph 2G using Classification of Defect Code 235.5-05 followed by the defect code below in the "Description" column on the Signal and Train Control inspection Form 6180.5.

- Automatic train control display not plainly visible to member of locomotive crew from his/her station in the cab.

H. "Indicators clearly visible from track side on both sides of each equipped locomotive are illuminated when BPS is activated and operating properly, and extinguished at all other times;"

Cite conditions that do not comply with Paragraph 2H using Classification of Defect Code 235- 5.05 followed by the defect code below in the "Description" column on the Signal and Train Control inspection Form 6180-5.

- Indicator on side of locomotive not clearly visible from track side when ATC system is activated and functioning as intended.

- Indicator on side of locomotive not illuminated when ATC system is activated and functioning as intended.

- Indicator on side of locomotive not extinguished when ATC system is de-activated.

I. "The BPS system shall be connected to an operating event recorder which records each instance of activation and de-activation of the BPS so that the time and location of each activation and de-activation can be determined for at least 48 hours following that event;"

Cite conditions that do not comply with paragraph 2I using Classification of Defect Code 235.5- 05 followed by the appropriate defect code below in the "Description" column on the Signal and Train Control inspection Form 6180.5.

- Automatic train control system not connected to an operating event recorder.
- Event recorder does not record when ATC system is de-activated.
- Event recorder does not record when ATC is activated.
- Time and location ATC system is activated or de-activated cannot be determined for at least 48 hours.

J. "Each profile braking curve program shall be identified by a unique identifying number that can be displayed on the BPS visual display for identification purposes;"

Cite conditions that do not comply with Paragraph 2J using Classification of Defect Code 235.5.05 followed by the appropriate defect code below in the "Description" column on the Signal and Train Control inspection Form 6180.5.

- Profile braking curve identifying number not displayed on ATC system display unit.
- Profile braking curve identifying number not currently in effect.
- More than one profile braking curve currently in effect.

K. "All components in the control circuits including, but not limited to programmable chips, are permanently installed by soldering;"

Cite conditions that do not comply with paragraph 2K using Classification of Defect Code 235.5.05 followed by the defect below in the "Description" column on the Signal and Train Control inspection Form 6180.5.

- Control circuit component not soldered in place.

L. "Installation is permanent on each controlling locomotive designated for operation on the NEC;"

Cite conditions that do not comply with paragraph 2L using Classification of Defect Code 235.5-05 followed by the defect below in the "Description" column on the Signal and Train Control inspection Form 6180.5.

- Automatic train control system not permanently installed on locomotive.

M. "Conrail and Amtrak issue operating rules governing operations of locomotives equipped with the BPS system that are in compliance with Part 236 and specifically address the situation in which the speed control system fails or is cut out en route;" and

Cite conditions that do not comply with paragraph 2M using Classification of Defect Codes 567.01, 567.02, 567.03, 567.04, 567.05, and 567.06.

N. "No train having a controlling locomotive with a failed or cut-out BPS system is permitted to depart its last terminal before entering the NEC."

Cite conditions that do not comply with paragraph 2N using Classification of Defect Code 566.02.

3. "Nothing contained herein, or in the Final Orders issued November 16, 1987, permits operation of non-ATC-equipped controlling locomotives after dates specified in the Final Orders. Carriers desiring to operate non-ATC equipped locomotives in switching, transfer or work train service must petition FRA for relief on a case-by-case basis through the waiver process as provided in 49 CFR Part 235."

Cite conditions that do not comply with paragraph 3 using Classification of Defect Code 566.01.

Subpart F – Dragging Equipment and Slide Detectors and Other Similar Protective Devices - Standards

**§ 236.601 Signals controlled by devices; location.**

This rule requires that signals controlled by devices to protect against unusual contingencies, such as landslides, dragging equipment, washouts, etc., shall be located so that stopping distance will be provided between the signal and the point where it is necessary to stop the train.

Application:

This rule is applicable to all signals or systems governing the movement of trains into one or more blocks that are not covered in Subparts B, C, D, and E of Part 236.

Subpart A of Part 236 shall be the section used when citing defective conditions of devices or systems covered by this rule.

Such protective devices are installed as safety features and shall not be removed without approval of FRA unless the condition that warranted their installation ceases to exist. If for some reason the signals or devices are removed from service for a temporary period the carrier shall take appropriate measures to protect safety of train operation.

#### CLASSIFICATION OF DEFECTS

236 0601 01 Signal controlled by device used to provide protection against unusual contingencies, such as landslides, dragging equipment, burned bridges or trestles, and washouts not located so that stopping distance is provided between the signal and the point where it is necessary to stop the train.

[Form FRA 6180.47](#) (Signal Systems Annual Report)

[Form FRA 6180.14](#) (False Proceed Signal Report)