KiwiRail

Network Signals, Indicators and Boards Manual

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1. Introduction

1.1 Overview of the Manual

This Manual supports the **Rail Operating Rules** as part of the **Rail Operating Rules** Framework.

The Manual describes signals, indicators, and boards currently used on the KiwiRail Railway Network. The specific description and meaning of signals for the track warrant control area can be found in Section 8.

1.2 Train Control System Overview

The Train Control System brings the movement of all trains in any particular area under the direction of the Train Controller. The Train Controller's close supervision combined with all Rail Personnel's cooperation provides safe working, improved timekeeping and utilisation of track access.

1.2.1 Features and Functions of Train Control

A principal feature of Train Control is direct communication with all terminals and attended stations in the area. Radio is used for direct communication between Train Controllers, Operators and Rail Personnel.

Train Controllers:

- direct and record the movements of all trains
- minimise en route delays by altering train crossings as required
- authorise on-track maintenance movements
- oversee arrangements made by Rail Operators.

When required, Station Personnel/Signallers are responsible for advising the Train Controller of train arrival and departure times. This information is plotted on the Train Control diagram in red and enables Train Controllers to see at a glance whether the train is maintaining time or running late, by comparing the red line of the actual run with the train schedule drawn on the diagram

1.2.2 Train Control Systems

Rail vehicles run as directed by Train Control in accordance with the **Rail Operating Rules** for the Train Control System in which the rail vehicle is worked.

Table 1 provides information on locations, and the type of Train Control Systems used.

- **y** indicates two person crewing of locomotives is in operation.
- **#** indicates that this does not apply to locomotive hauled passenger trains only.
- No symbol indicates single person crewing of locomotives is in operation.

NOTE
Train Control Emergency 0800 808 400

Table 1: Train Control System Locations

Signalling Systems	
Section	**System Worked**

North Island	
Otiria – Portland	Track Warrant Control
y Portland - Helensville	Track Warrant Control
Helensville – Waitākere	Track Warrant Control
Waitākere – Westfield	Automatic Signalling
Auckland – Newmarket Line	Automatic Signalling
Maungawhau – Wellington (NIMT)	Automatic Signalling
East Coast Main Trunk	Automatic Signalling
Kinleith Branch	Automatic Signalling
Mt Maunganui Branch	Automatic Signalling
Murupara Branch	Track Warrant Control
y Johnsonville Line	Automatic Signalling
Breakwater – New Plymouth – Lepperton	Automatic Signalling
Lepperton – Whareroa	Track Warrant Control
Whareroa - Wanganui	Track Warrant Control
y Wanganui Freight Branch	Automatic Signalling
Wanganui – Marton	Automatic Signalling
y Kapuni Branch	Track Warrant Control
y Wairoa – Napier	Track Warrant Control
Napier – Hastings	Automatic Signalling
Hastings – Woodville	Track Warrant Control
Woodville – Palmerston North	Automatic Signalling
y Woodville – Masterton	Track Warrant Control
#y Masterton – Featherston	Track Warrant Control
#y Featherston – Upper Hutt	Automatic Signalling
Upper Hutt – Wellington	Automatic Signalling
South Island	
Picton – Vernon	Automatic Signalling
Vernon – Belfast	Track Warrant Control
Belfast – Addington	Automatic Signalling
Rolleston – Arthur's Pass	Automatic Signalling - Midland
Arthur's Pass – Otira	Automatic Signalling
Otira – Stillwater	Automatic Signalling – Midland
Stillwater – Greymouth	Track Warrant Control
Stillwater – Ngakawau Line	Track Warrant Control
Rapahoe Branch	Track Warrant Control
Hokitika Line	Track Warrant Control
Lyttelton – Oamaru	Automatic Signalling
Oamaru – Sawyers Bay	Track Warrant Control
Sawyers Bay – Mosgiel	Automatic Signalling
Mosgiel – Invercargill	Track Warrant Control
y Taieri Branch	Automatic Signalling
y Bluff Branch	Track Warrant Control
y Ohai Line	Track Warrant Control

2. Automatic Signalling System

2.1 Description

Automatic running signals facilitate the regular movements of trains by dividing the line into sections and automatically maintaining a safe space interval between trains.

The system uses continuous track circuiting and/or axle counters and signals to:

- detect the presence of trains
- prevent following and opposing train entries into occupied sections of track
- ensure all points are correctly set and secure
- provide advanced warning of the status of the next signal
- indicate permissible speed.

The automatic signalling system allows trains to travel safely over:

- single lines: for movements in both directions.
- multiple lines: for movements in either direction or one direction only.

The automatic signalling area consists of five key features:

- Block Sections.
- Intermediate Sections.
- Switch Lock Sidings.
- Interlocked Stations.
- Interlocked Junctions.

If the automatic signalling system fails or is otherwise compromised (e.g., disabled train), a special method of safe working will be applied in accordance with **SO02 Automatic Signalling Authorities.**

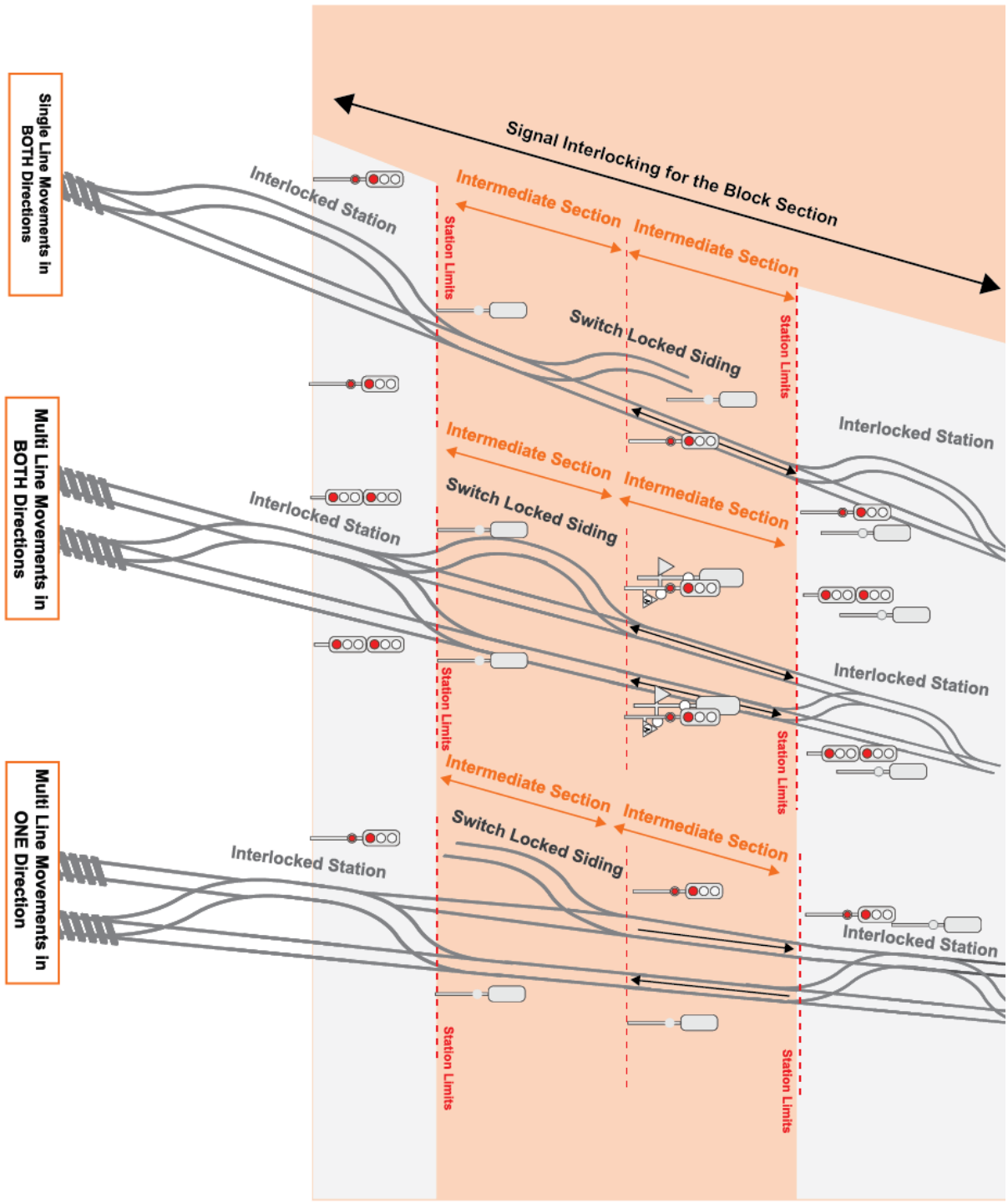
Variations to **SO02 Automatic Signalling Authorities** will apply to the Midland Line - automatic signalling area operations (South Island).

Entry to and exit from sections of line can be governed by colour light signals or, in some cases, notice boards.

Control of movements is accomplished by the system holding signals governing entry into a section of line at stop when a train enters the section. The signal is held at stop until the train has cleared the section.

When the section is not occupied, some signals:

- will automatically show a clear or caution indication
- will require a Signaller to manually operate the signal to show a clear or caution indication.



Examples of Typical Track Layouts

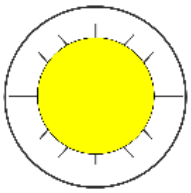
2.2 Controlling Rail Vehicle Movements

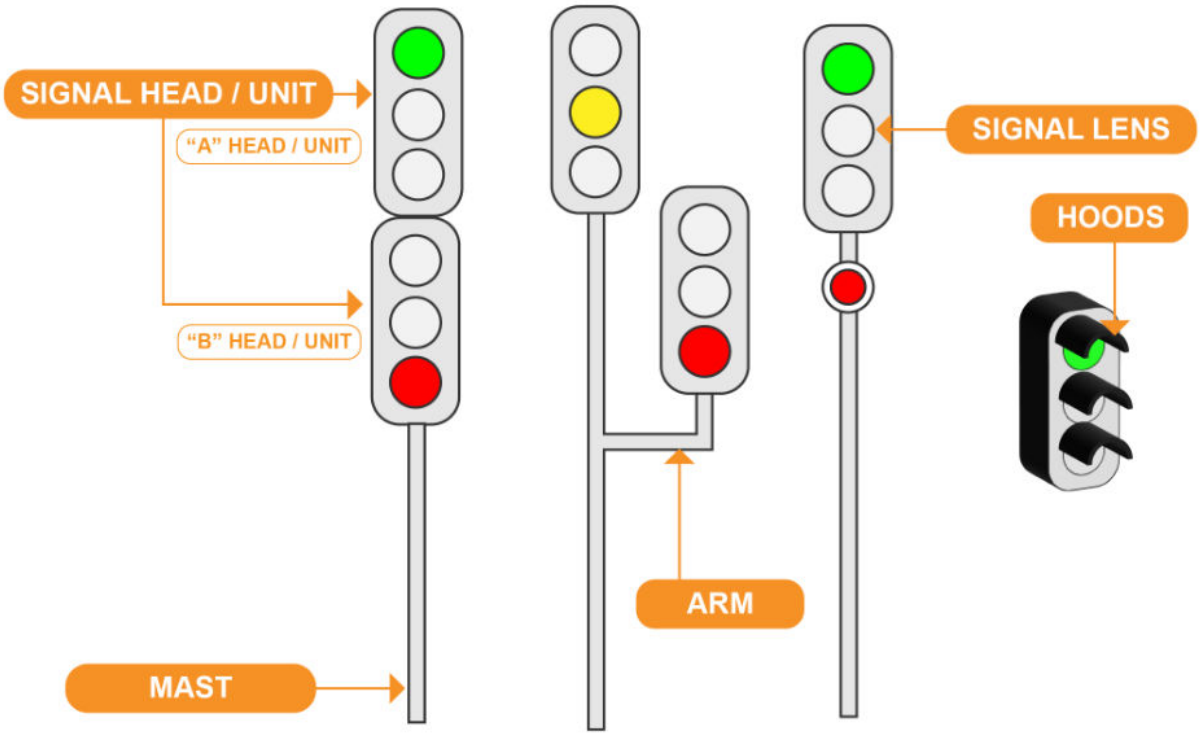
Automatic running signals are fixed signals located at specified locations shown on Signalling and Interlocking diagrams, commonly referred to as S&I diagrams.

The signals are usually three position signals in that they will display a stop (red), caution (yellow) or clear (green) indication.

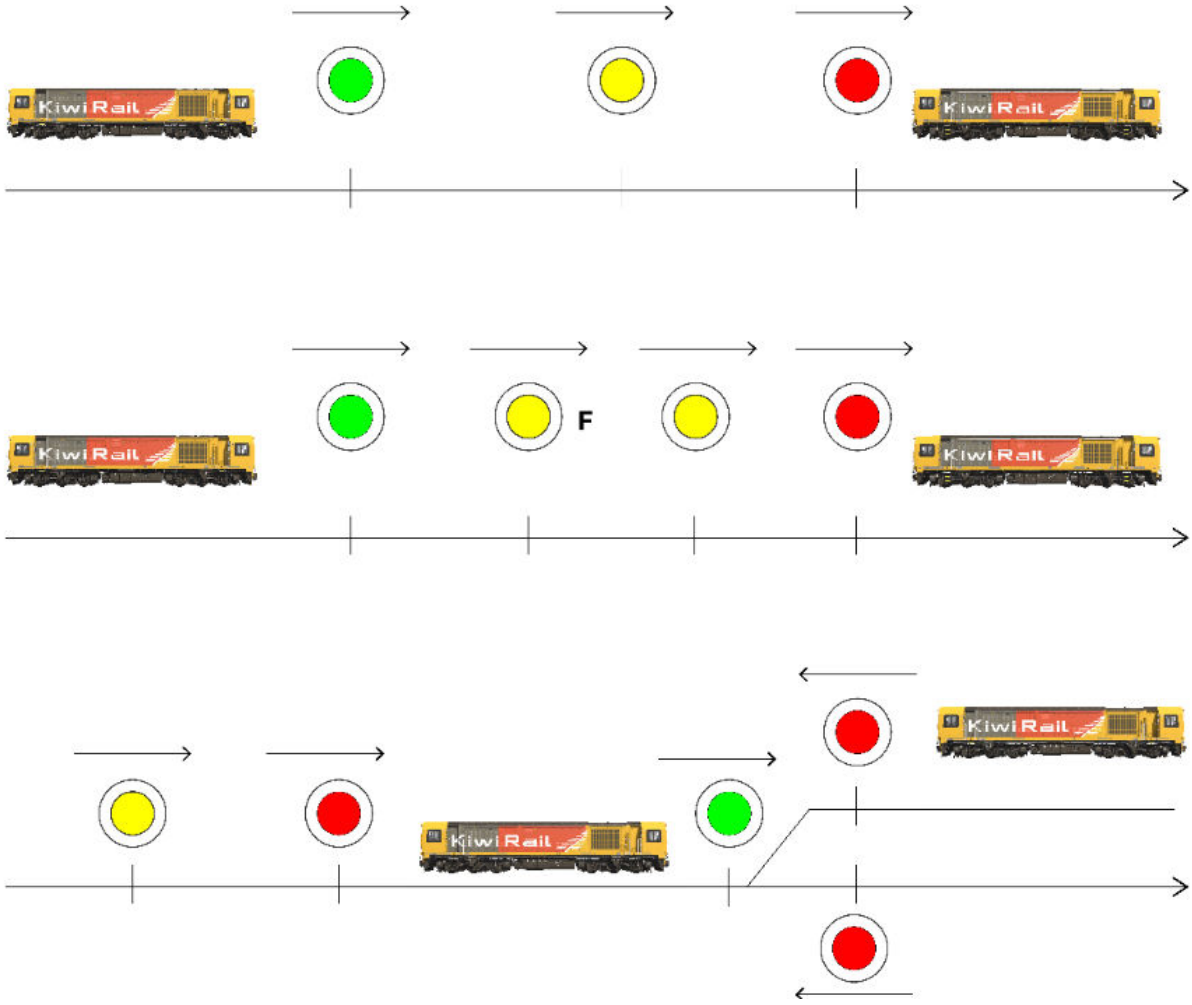
A fourth position is sometimes added, usually where restricted braking distances require an additional warning. This indication is called an advanced caution (flashing yellow). It will be displayed on the signal preceding the signal showing caution.

Table: Signal Meanings

	Indication	Meaning
	Indicates signal at stop	Stop
	Indicates signal at caution	Proceed cautiously and prepare to stop at the next signal
	Indicates signal at advanced caution	Proceed cautiously and prepare to stop at the second signal ahead
	Indicates signal at clear	Proceed to the next signal, which shows caution or clear



Signal Component Descriptions



Examples of Automatic Running Signals Controlling the Movement of Trains.

2.3 New or Altered Signals

New signals must not be brought into use, or any alteration made to any existing signals regarding the position or use without the approval of the Professional Head Signals.

2.4 Colour Light Signals Not In Use

Where colour light signals are not in use, they must:

- have the power supply removed from the signal so that it is not lit, and
- have a cover that completely conceals the signal indications over the signal, or
- arrange to have a white 'X' sign placed over the signal to define that it is not in use, or
- turn the signal head away from the view of the Operator.

2.5 Applicability of Signals

Fixed signals apply only to trains travelling in the correct direction and must not be used for any other purpose.

2.6 Identification of Signals

Signals not controlled by a lever or control function are numbered in accordance with the meterage at which they are located and displayed on a signal marker plate. The exception is when an approach signal is numbered using the prefix A, followed by the number of the signal next in advance.

Down signals are identified by odd numbers, and up signals by even numbers.

3. Signals

3.1 Description of Automatic Signals

Automatic signals are either:

- Colour light shunting signals, or
- Automatic running signals.

Colour light shunting signals have one shunting signal unit and display one light. Where specified in S&I diagrams, three position colour light shunting signals may also be used as starting or directing signals.

Automatic running signals must be used for shunting movements where shunting signals are not provided.

The units which display the coloured lights, which, in combination with one another, give the indications of automatic running signals, are detailed in this section.

3.1.1 Multi-Aspect Units

Coloured lights (usually three) are set in a vertical line one below the other and display the following as required:

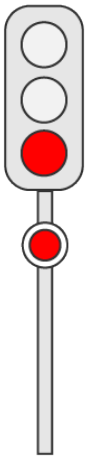
- flashing green, or
- steady green, or
- flashing yellow, or
- steady yellow, or
- steady red light.

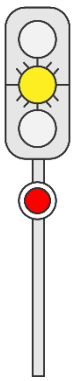
IMPORTANT

Arrival signals at track warrant control stations will only show yellow and red as required.

Table: Signal Lens Colours

Lens	Colour	Indication
Top	Green	Flashing aspect on some signals
Centre	Yellow	Flashing aspect on some signals
Bottom	Red	Steady





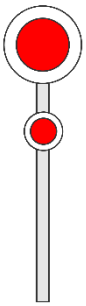
Left image: Multi-Aspect Unit Showing a Steady Red Indication

Right image: Multi-Aspect Unit Showing a Flashing Yellow Indication

3.1.2 Searchlight Units

Searchlight units with one lens display either one of the following as required:

- steady green, or
- flashing yellow, or
- steady yellow, or
- steady red light.



Searchlight Unit Showing a Steady Red Indication

3.1.3 Marker Lights and Discs

Marker lights are placed below the multi-aspect or searchlight unit of signals, with only one such unit to identify the signal class. The marker light displays a steady red of low power.

Most signals are now fitted with a red marker disc instead of the marker light.

Left image: Marker Light

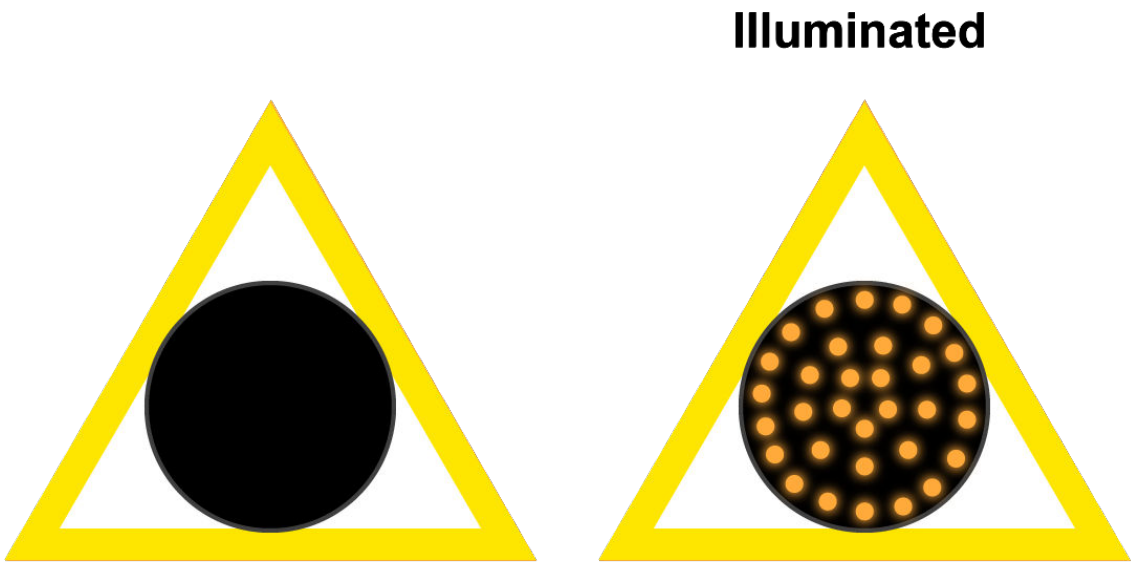
Right image: Marker Disc

3.1.4 Low Speed Light

Where a reduction to low speed may be required, a low-speed light is provided. For double unit signals, this is placed below the lower multi-aspect or searchlight unit, and for single unit signals below the marker light/disc.

Low Speed lights display a short-range steady yellow light when at proceed but do not show any light when not in use for a movement.

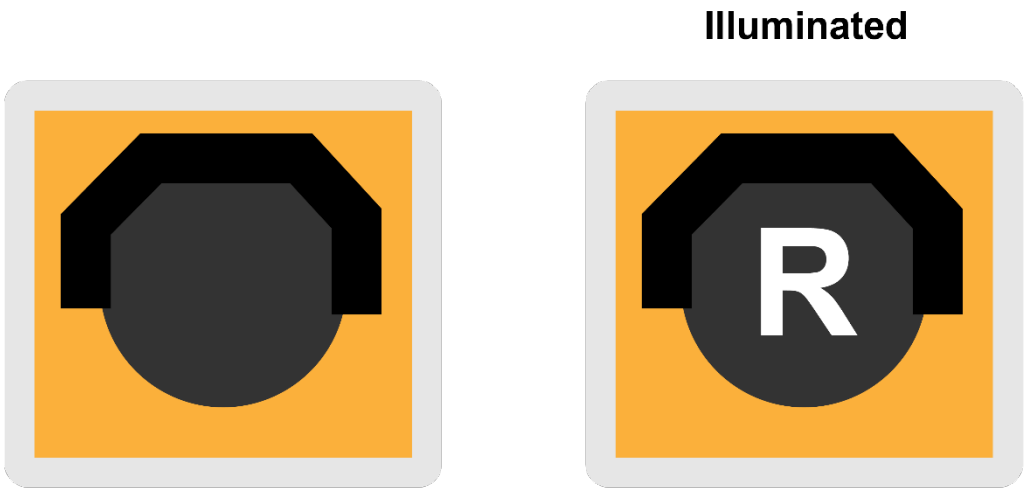
The lamps of Low Speed lights are backed by a white triangular metal plate with a yellow border.



Low Speed Light

3.1.5 Restricted Speed Light

Restricted Speed lights display a short-range steady white 'R' light when at proceed but do not show any light when not used for movement. The lamps of Restricted Speed lights are backed by an orange square metal plate with a white border.



Restricted Speed Light

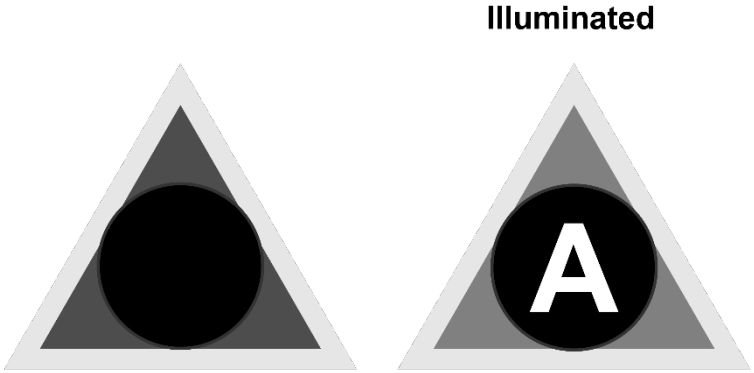
3.1.6 'A' Light

At some stations where the points of the crossover track or sidings are only occasionally used, the Signal Box may be switched in or out as required.

In such cases, the absolute signals at the station are equipped with an additional light unit placed below and to the right of the lower unit or marker light/disc.

The additional fixed unit displays no light when the station is switched in. When the station is switched out, it only displays an illuminated letter 'A', visible at short range.

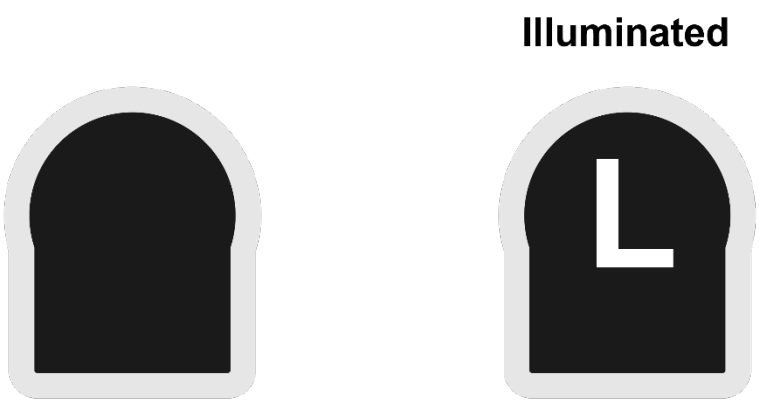
'A' lights are backed by a triangular metal plate painted black with a white border.



'A' Light

3.1.7 'L' light

An 'L' light illuminated indicates that the points are set for the crossing loop or between the branch and main line but not necessarily that the route is unobstructed. 'L' lights must be passed at low speed.

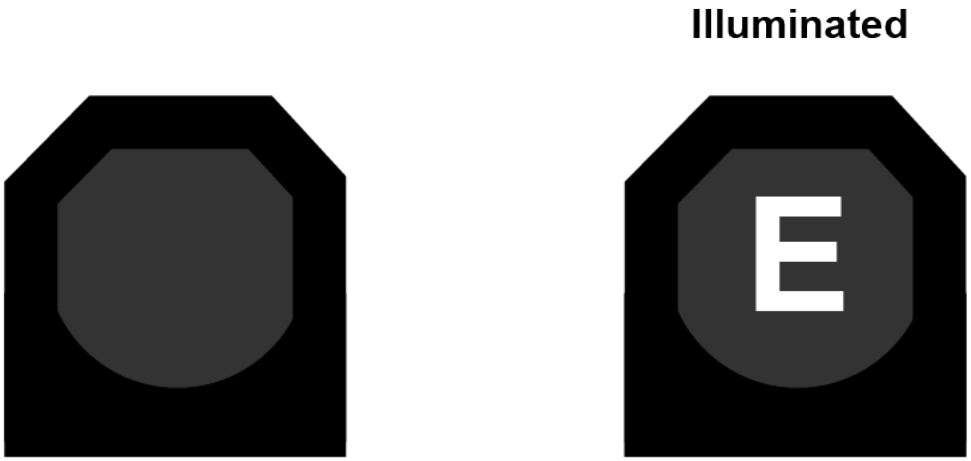


'L' Light

3.1.8 'E' Light

An illuminated 'E' Light indicates the route is set to an electrified road.

NOTE
An 'E' Light does not indicate whether the OLE is live or isolated.



'E' Light

3.2 Signal Displays

Each automatic running signal will display at least two lights or one light and a red marker disc.

3.2.1 Double Unit Signals

Double unit signals with two multi-aspect or two searchlight units (or a mixture of both) are provided as follows:

- where one or more lines diverge from the main line
- at junctions
- at locations where a reduction to intermediate or medium speed is required
- at locations approaching a signal which may require a reduction to intermediate or medium speed.

Double Unit Signals

3.2.2 Single Unit Signals

Where double unit signals are not required, only one multi-aspect or one searchlight unit is provided.

Single unit signals have a marker light or disc as the second and lower light. Marker lights/discs are short-range indications that show the class of signal.

Single Unit Signals

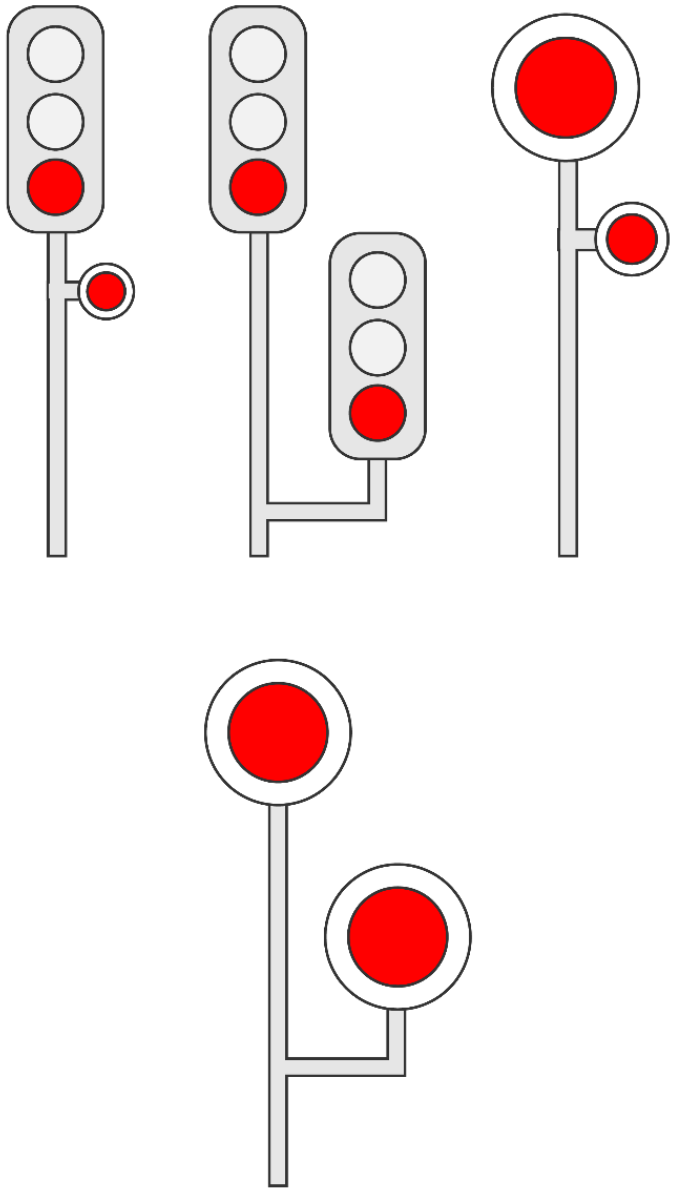
3.3 Two and Three Position Signals

3.3.1 Three Position Signals

The three position signals are automatic, are always colour light signals and indicate:

- permissible speed, and
- give advance information about the next signal ahead.

The presence of a train controls the indications of automatic signals, although some automatic signals are also manually controlled, subject to automatic control.

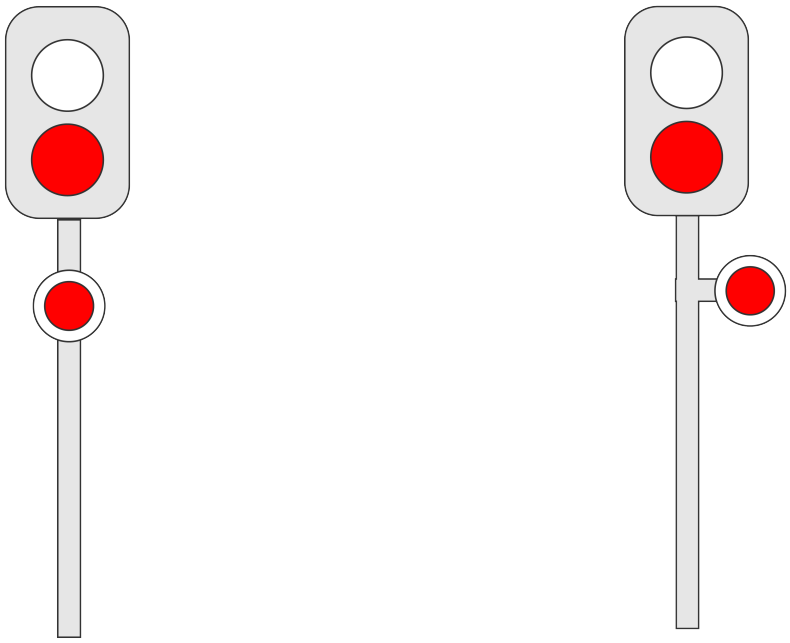


Three Position Signal

NOTE
In three position signalling areas where an aspect is not required for operational purposes, the signal aspect not required may be covered, or the signal may be fitted with a two position head. The normal meaning and actions for the displayed aspects still apply.

3.3.2 Two Position Signals

Some colour light signals are two position signals. They indicate the route authorised but not the permissible speed. Indications displayed by two position signals are described on S&I diagrams and **Local Network Instructions**.



Two Position Signals

3.4 Fixed Signals

3.4.1 Classes of Fixed Signals

Fixed signals are colour light signals and are classified according to use.

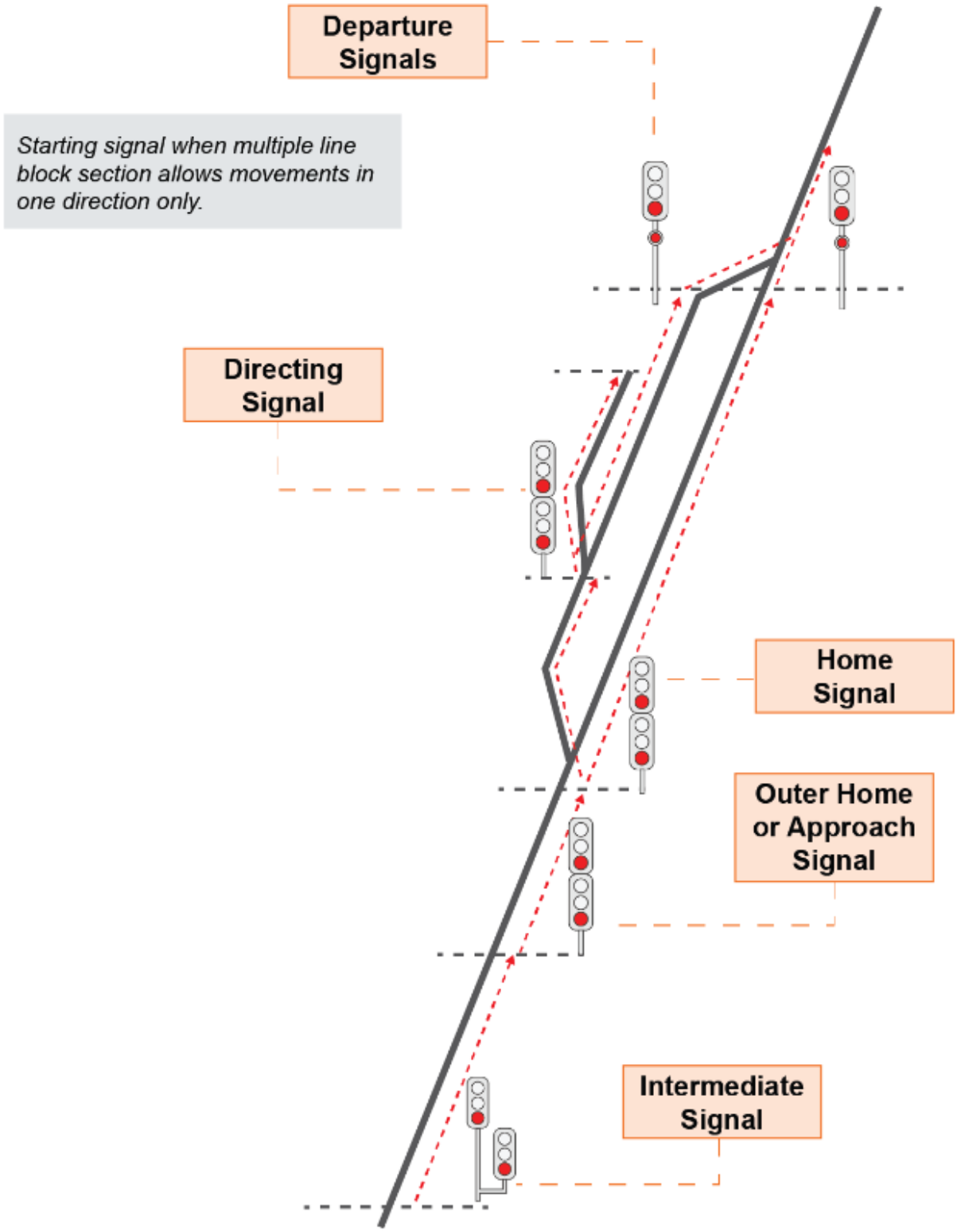
Table: Fixed Signal Descriptions

Signal	Description
Distant	A fixed signal located outside a home signal at a station equipped with two position signals.
Home	Provided where necessary to govern entry into a station or junction.

Signal	Description
Outer Home	Governs entry into a station and located in advance of a home signal. Provided in situations where station limits are extended from the home signal.
Starting	Controls the entrance of trains to the section ahead where movements are signalled in one direction. Where specified in S&I diagrams, three position colour light shunting signals will also be used as starting signals.
Directing	They are used in station limits to direct trains to the various platforms, sidings, or positions to which the signals apply and protect those lines to which they apply. Where specified in S&I diagrams, three position colour light shunting signals will also be used as directing signals.
Shunting	Controls the passage of trains and shunting movements within station limits. Where shunting signals are provided, they must be used for shunting movements.
Departure	Controls the entry into a block section where movements are signalled in both directions.
Approach	They may be provided where it is necessary to control the speed of trains approaching junctions, points, or other interlocked areas. An approach signal is an absolute signal placed in the rear of another absolute signal.
Note: When the signal in advance of the approach signal is at stop, the approach signal is also at stop until, at the expiration of a prearranged time delayed period, it displays a proceed indication.	
Arrival	Controls the entrance to a crossing station on the Midland Line and most warrant stations in track warrant control areas. Where provided arrival signals and points indicators are controlled by track circuiting and operate automatically for most movements, they may also be controlled manually by pushbutton controls.
Intermediate	Where necessary, in ASR areas, divide the line into shorter sections and control the entry of trains into such sections. These signals may also be provided approaching a station and within station limits where the station is equipped with three position signals.

Notes:

- Intermediate signals may also be provided approaching stations in track warrant control areas with three position signals.
- Intermediate signals are usually permissive signals but may be absolute signals at localities where it is necessary to ensure that only one train is within an intermediate section at a time (e.g., sections where tunnels and curves reduce a clear view of the line ahead).
- The passing of intermediate signals at stop within station limits will be in accordance with **SO02 Automatic Signalling Authorities** unless otherwise provided for in S&I diagrams.
- Intermediate signals may be provided in place of station warning boards in track warrant control areas.
- Intermediate signals in advance of home signals in ASR areas do not provide for following train movements.



Example of Signal Positions

IMPORTANT
Automatic running signals must be used for shunting movements when shunting signals are not provided.

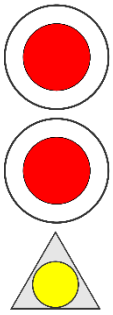
3.5 Aspects Displayed by Signals and Indicators

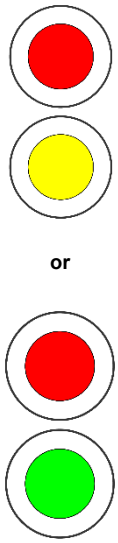
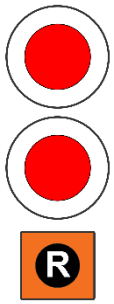
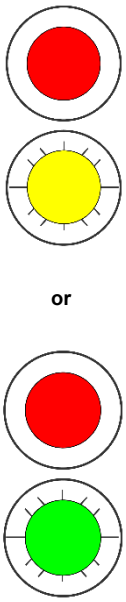
Automatic running signals show the speed at which trains may proceed. The indications in each case also give advance information of the next signal ahead.

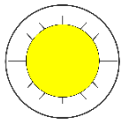
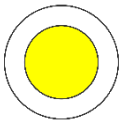
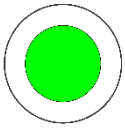
A proceed signal shows a clear or caution indication for normal, intermediate, medium, or low speed.

3.5.1 Speed Indicated by Automatic Running Signals

Table: Speed Meaning

Speed	Display		Means
Low speed	Displayed by two red lights with a Low Speed light below		The Operator must proceed cautiously at such a speed (not exceeding 25 km/h) to stop clear of any obstruction. This indicates that the points are in the correct setting but not necessarily that the track is unoccupied. **WARNING** While the points may be in the correct setting, they may not be set for the intended route.

Speed	Display		Means
Medium speed	Always includes the upper unit at red with yellow or green in the lower light unit		The Operator must not exceed 25 km/h unless one of the following authorises a higher speed: • Speed board, or • Dynamic Speed Indicator (DSI), or • ETCS Medium speed must be maintained until the rail vehicle is clear of all points to which the signal applies. Should a lower speed be displayed on a DSI or ETCS, the the Operator must not exceed the speed displayed.
Restricted speed	Displayed by two red lights with a restricted speed light below		The Operator must proceed cautiously, being able to stop short of an obstruction within half the distance of clear line that is visible ahead. **Not to exceed 40 km/h.**
Intermediate speed	Always includes the upper unit at red with flashing yellow or flashing green in the lower unit		The Operator must not exceed 50 km/h. The intermediate speed must be maintained until the rail vehicle is clear of all points to which the signal applies.

Speed	Display		Means
Normal speed	Always includes flashing yellow, yellow or green in the upper light unit	 **or**  **or** 	The Operator must not exceed the maximum speed for the locality.

WARNING

The maximum speeds authorised by automatic running signals may be subject to further reduction by permanent or temporary speed restrictions.

3.5.2 Aspects Displayed by Automatic Running Signals

Table: Absolute Signal

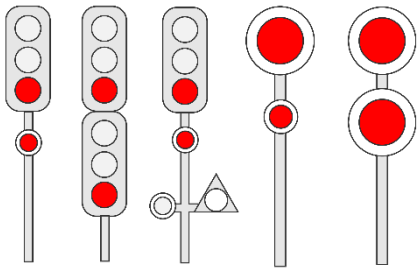
Name	Signal call	Action
Stop **Absolute Signal**	**All Red** **Stop**	**Stop**. Only pass if authorised by the prescribed verbal or written instruction.
		

Table: Permissive Signals

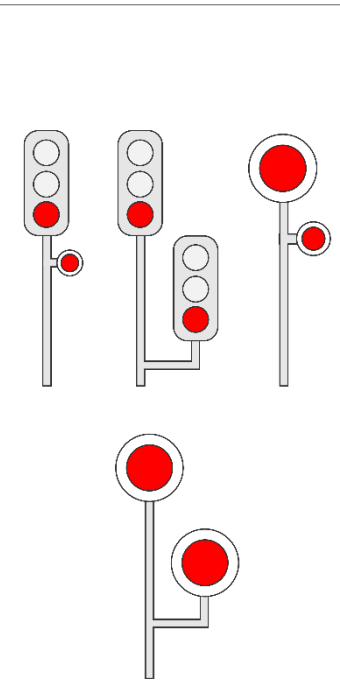
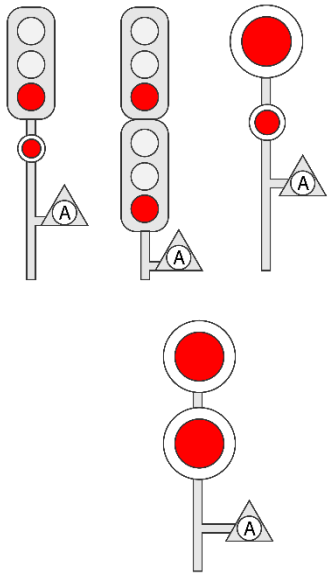
Name	Signal call	Action
Stop **Permissive Signal** 	**All Red** **Stop**	**Stop**. Wait 10 seconds, then proceed cautiously and prepare to stop clear of any obstruction. • The track may be occupied or obstructed. • Points may be wrongly set. • Rail may be broken or displaced. • Level crossing alarms may not be working.
	**All Red** **Stop**	**Stop.** Wait 10 seconds, then proceed cautiously and prepare to stop clear of any obstruction. • Station switched out, or double line switch lock siding closed. • The track may be occupied or obstructed. • Rail may be broken or displaced. • Level crossing alarms may not be working. • Signal classification changed from absolute to permissive.

Table: Restricted Speed

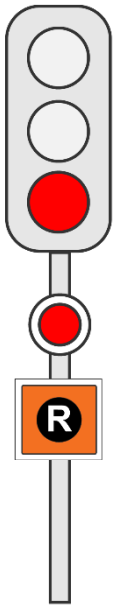
<table>
<tr><th>Name</th><th>Signal call</th><th>Action - ETCS Services</th><th>Action - All other services</th></tr>
<tr><td>Restricted Speed</td><td rowspan="3">Restricted Speed</td><td>Stop

Contact the Train Controller and ascertain the reason for the 'R' light being displayed

Or

Prepare to Stop**

Approach the signal below release speed or 40 km/h, whichever is lower. When passing signal acknowledge transition to on-sight mode.</td><td>Stop.

Contact the Train Controller and ascertain why the 'R' light is displayed.</td></tr>
<tr><td rowspan="2">  </td><td colspan="2">Then proceed cautiously at restricted speed

• Prepared to find track occupied or obstructed.
• Being able to stop short of an obstruction within half the distance of clear line that is visible ahead.
• Not to exceed 40 km/h.</td></tr>
<tr><td colspan="3">Note: ** ETCS fitted services may be advised the reason for an 'R' light being displayed while stationary at the platform before that signal</td></tr>
</table>

'R' lights are used:

- where axle counters do not restore due to miscounting or failure (resetting of axle counter)
- when a rail vehicle is disabled in the affected section, and assistance is provided in the following direction
- where rail vehicle frequency requires rail vehicles to be stacked (passenger services awaiting loadings at platforms near stadium events)
- when a unit aspect of a signal has failed, or is imperfectly displayed.

'R' lights are interlocked and can only be cleared if:

- the interlocking is correctly set for the movement
- the movement into the block section follows the previously cleared movement, and the block direction is also in the same direction (this also applies to movements to the Melling Branch)
- the block open light from the opposing end of the block section is not available.

Table: Low Speed

Name	Signal call	Action
Low Speed	**Low Speed**	Proceed cautiously at low speed: • Points are in the correct position. • Prepare to find the track occupied or obstructed. • Ready to stop short of any obstruction.

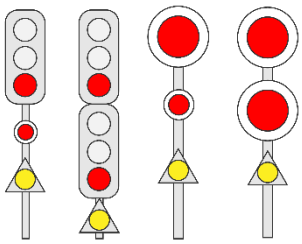
Name	Signal call	Action
		

Table: Stop - Midland Line Arrival Signal

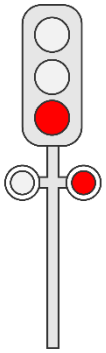
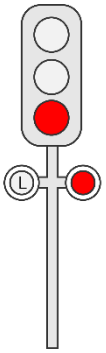
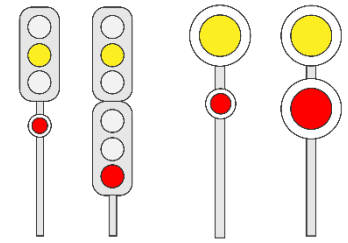
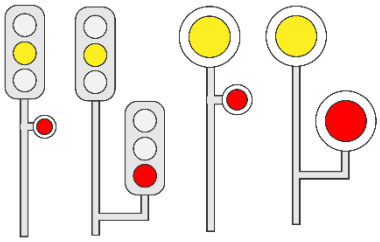
Name	Signal call	Action
Stop (Midland Line Arrival Signal) 	**All Red Stop**	**Stop.** Wait 10 seconds, then proceed cautiously, being prepared to stop clear of any obstruction. • The track may be occupied or obstructed. • Points may be wrongly set. • Rail may be broken or displaced. • Level crossing alarms may not be working.
Low Speed to Loop (Midland Line Arrival signal) 	**Low Speed to Loop**	The route is set for a loop. • Proceed cautiously at low speed. • All points are in the correct position. • Prepare to find the track occupied or obstructed. • Be ready to stop short of any obstruction.

Table: Caution - Prepare to Stop

Name	Signal call	Action
Caution Prepare to Stop	**Caution to Stop**	Proceed cautiously, being prepared to stop at the next signal.
		
		

Where the spacing between signals has a short distance to either stop or reduce to the required speed at the next signal in advance:

- the aspect will be repeated on the signal in the rear, or
- an advanced caution aspect may be provided on the signal in the rear, or
- a permanent speed restriction has been applied.

Where the section beyond a signal terminates at an All Trains Stop board or at the end of the line, a caution medium prepare to stop or caution normal prepare to stop signal will mean that the section is clear up to the All Trains Stop board or the end of the line.

Table: Advance Caution

Name	Signal call	Action
Advance Caution Prepare to Stop	**Advance Caution to Stop**	Proceed cautiously, being prepared to stop at the second signal ahead

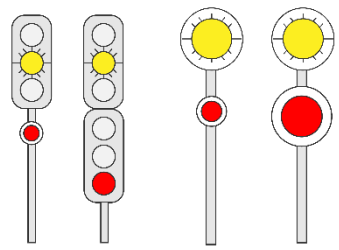
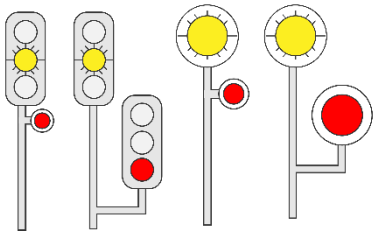
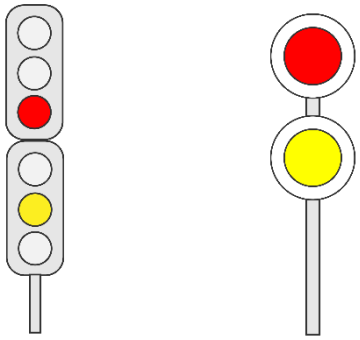
Name	Signal call	Action
		
		

Table: Medium Speed

Name	Signal call	Action
Caution Medium Speed Prepare to Stop	**Medium to Stop**	Proceed cautiously at medium speed, being prepared to stop at the next signal
		
Clear Medium Speed	**Medium, Clear**	Proceed at medium speed

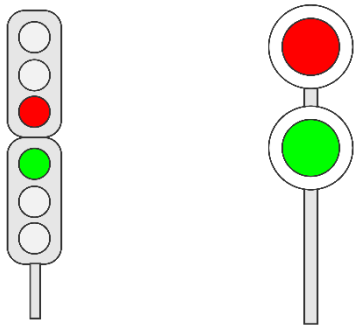
Name	Signal call	Action
		

Table: Caution - Medium Speed

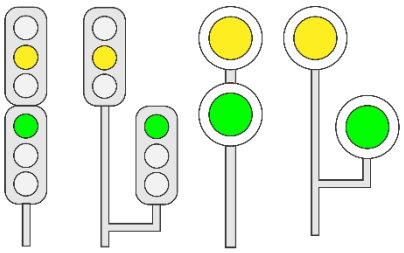
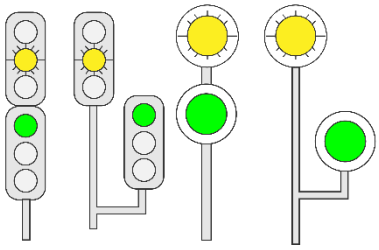
Name	Signal call	Action
Caution Reduce to Medium Speed	**Reduce to Medium**	Reduce speed being prepared to pass the next signal at medium speed
		
Advance Caution Normal Speed to Medium Speed	**Advance Caution to Medium**	Proceed cautiously, being prepared to pass the second signal ahead at medium speed
		

Table: Intermediate Speed

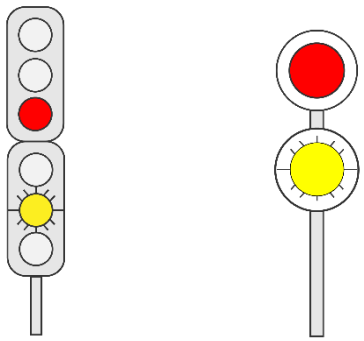
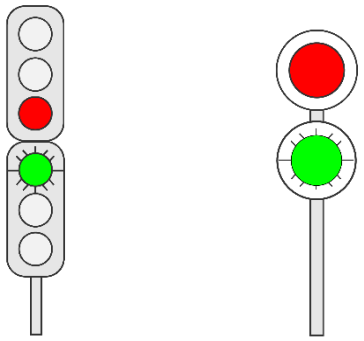
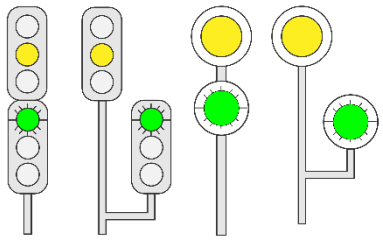
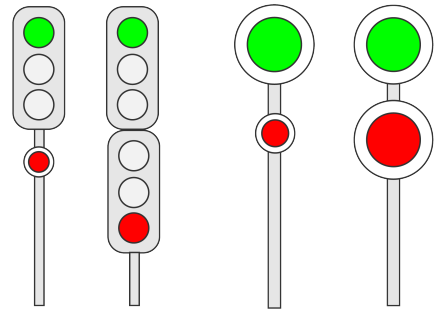
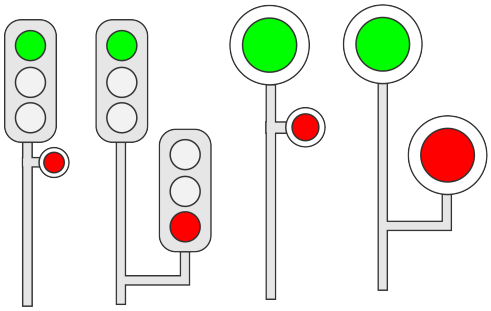
Name	Signal call	Action
Caution Intermediate Speed Prepare to Stop 	**Intermediate to Stop**	Proceed cautiously at intermediate speed and prepare to stop at the next signal
Clear Intermediate Speed 	**Intermediate, Clear**	Proceed at intermediate speed
Caution Reduce to Intermediate Speed 	**Reduce to Intermediate**	Reduce speed being prepared to pass the next signal at intermediate speed

Table: Normal Speed

Name	Signal call	Action
Normal Clear speed	**Normal Clear**	Proceed at a speed not exceeding the maximum speed laid down for the class of rail vehicle and locality

Name	Signal call	Action
		
		

3.6 Classification of Automatic Running Signals

3.6.1 The Three Classifications

Automatic running signals are divided into three main classes:

a. Absolute signals
b. Permissive signals
c. Departure signals.

The lower multi-aspect on searchlight units in the case of double-unit signals, and the marker lights/ discs in the case of single-unit signals, are so placed that by their position in relation to the upper lights, they serve to distinguish permissive signals from absolute or departure signals. In the case of a marker light, the position of the light itself provides this indication.

- The light units of absolute signals and departure signals are in a vertical line (i.e., the lower unit is vertically below the upper unit).
- The light units of permissive signals are staggered (i.e., the lower unit is in a diagonal line to the right and not vertically below the upper unit).

3.6.2 Further Classification

Automatic running signals are further classified as detailed in Table 17.

Table: Signal Type Classifications

Class	Signal Type	Action
Absolute	Intermediate signals (non-controlled)	Not controlled by the Signaller
	Approach signals	
	Intermediate signals (controlled)	Can be changed to a permissive signal by the Signaller
	Outer Home signals	Can be held at stop by the Signaller
	Home signals	
	Directing signals	
	Starting signals	
Permissive	Intermediate signals	Not controlled by the Signaller
	Arrival signals*	
Departure	Departure signals	Can be held at stop by the Signaller **NOTE** Some departure signals on the Midland Line cannot be held at stop by the Signaller.

* Arrival signals are permissive by default, as the A light is designed to be permanently illuminated under normal operating conditions. When the A light is extinguished, the signal must be passed in accordance with **Network Signals, Indicators and Boards Manual, 8.5.1 Meaning of Aspects** Table: Arrival Signals, row 4.

NOTE
At switch-out stations, the classification of absolute signals, as shown above, is applicable only when the station is switched in; when the station is switched out and the 'A' lights are illuminated, the signals become intermediate permissive signals.

3.7 Purpose of 'A' Lights and 'L' lights

When an illuminated letter 'A' is displayed on an absolute signal, the signal concerned will become a permissive signal, and then the **Rail Operating Rules** applicable to permissive signals are applied.

3.7.1 Intermediate Signals in Multi-Line Areas

'A' lights are also provided on some intermediate absolute signals to:

- protect points and crossover roads at switch lock sidings, and
- assist with recovering disabled rail vehicles, axle counter resets and signalling communication failures.

3.7.2 'L' light on Arrival Signals

The 'L' light illuminated means the route is set for the loop at low speed.

3.8 Shunt Signals

3.8.1 Types of Colour Light Shunt Signals

There are three types of colour light shunt signals:

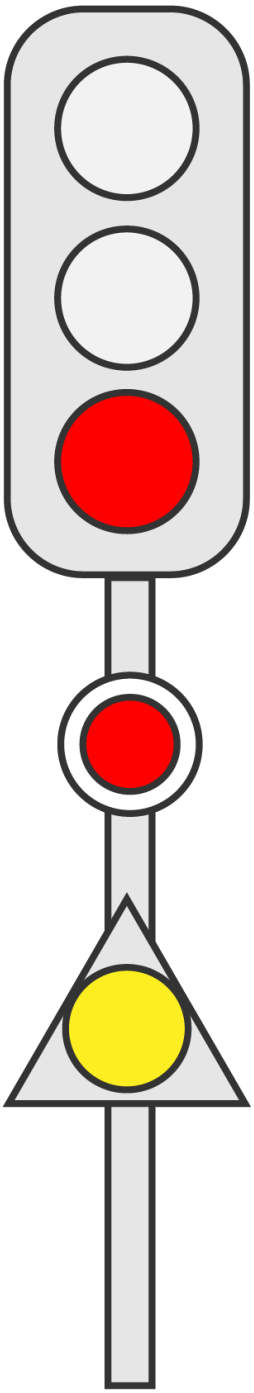
- two position colour light shunting signals
- three position colour light shunting signals
- yellow light low-speed signals on a fixed signal mast.

NOTE

Where specified in S&I diagrams, colour light shunting signals will also be used as directing signals or starting signals.

3.8.2 Low Speed on Starting Signals

When a Low Speed signal is placed on a starting signal mast, the Low Speed indication authorises the movement to the shunting limit board placed beyond the signal only or otherwise specified on S&I diagrams. A train must only proceed on its journey into the section ahead when authorised.



Low Speed on Starting Signals

3.8.3 Colour Light Shunting Signals

When colour light shunting signals control the exit from or entrance to a section of the line, a train or shunt must only be moved to or from the line when the correct fixed signal is exhibited. A train or shunt must not be permitted to stand foul of any other line while waiting for the signal.

3.8.4 Automatic Running Signals For Shunting

When shunting signals are not provided in automatic signalling areas, the automatic running signals must be used for shunting movements.

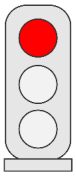
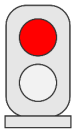
3.8.5 Resuming Line Speed Proceeding to the Main Line

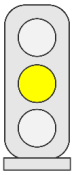
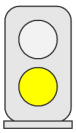
When a colour light shunting signal is designated as a starting signal and shows a clear aspect, the movement may be allowed to resume normal line speed when clear of all points on the route when proceeding to the main line.

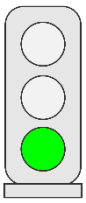
3.8.6 Colour Light Shunting Signals

Table: Colour Light Shunting Signals - Aspects

<table>
<tr><th colspan="2">Name</th><th>Signal call</th><th>Action</th></tr>
<tr><td colspan="2">Stop</td><td rowspan="2">All Red Stop</td><td rowspan="2">Stop

Only pass if authorised by the prescribed verbal or written instruction.</td></tr>
<tr><td>Three position
  </td><td>Two position
  </td></tr>
<tr><td colspan="2">Caution Low Speed</td><td rowspan="2">Yellow on Shunt</td><td rowspan="2">Proceed cautiously at low speed:

• Points are correctly set.
• Prepare to find the track occupied or obstructed.
• Rail may be broken or displaced (three positions only).</td></tr>
<tr><td>Three position
  </td><td>Two position
  </td></tr>
<tr><td colspan="2">Clear Low Speed</td><td rowspan="2">Green on Shunt</td><td rowspan="2">Proceed at low speed:

• Points are correctly set.
• The track is clear but suitable for low speed; the next signal in advance is at caution or clear.</td></tr>
<tr><td colspan="2">Three position
  </td></tr>
</table>

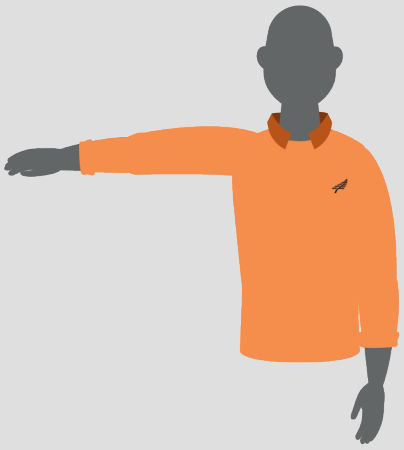
4. Hand Signals

4.1 General

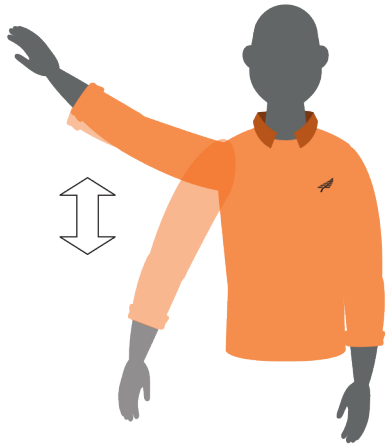
4.1.1 Stop

	
Red Flag	*Both Arms Raised Above the Head*

4.1.2 Clear Proceed

	
A Green Flag Held Steadily	*Only one Arm Held in a Horizontal Position*

4.1.3 Caution Move Slowly



Arm Moved Up and Down

4.2 Hand Signal Indications

4.2.1 Passenger Train Right of Way Signals

The Train Manager indicates to the Operator that the train is ready to proceed by blowing the whistle and exhibiting a hand signal, as in either figure below.

Green Flag - Held Steadily Above the Level of the Head

One Arm Held in a Horizontal Position

4.2.2 Air Brake Test Signals

Both hands brought promptly together above the head.

Apply Brakes for Air Brake Test

Both hands held together above the head and then parted outwards until level with the shoulders.

Release Brakes for Air Brake Test

4.3 Shunting Hand Signals

4.3.1 Stop

- Left Figure: Both arms extend sideways horizontally from the shoulders.
- Centre Figure: Use one arm raised above the level of the head with fingers outstretched (used when Hand Signaller only has one hand free).
- Right Figure: Both arms raised above the level of the head.

		
Stop	*Stop*	*Danger Stop*

4.3.2 Come Slowly Towards the Signal

Only one arm and hand moved in small circles, indicating the direction in the rail vehicle travels

Come Slowly Towards

4.3.3 Come Towards the Signal

Only one arm and hand moved in full circles, indicating the direction the rail vehicle travels.

Come Towards

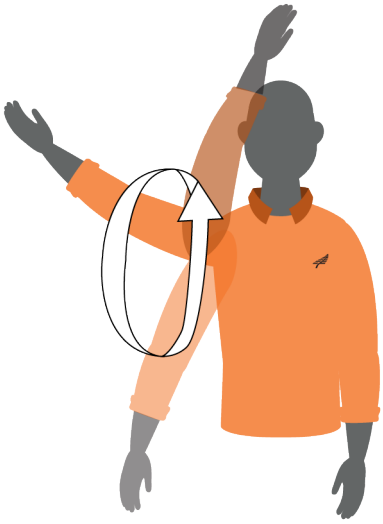
4.3.4 Go Slowly Away From the Signal

Only one arm and hand moved in small circles, indicating the direction the rail vehicle travels.

Go Slowly Away

4.3.5 Go Away from the Signal

Only one arm and hand moved in full circles, indicating the direction the rail vehicle travels.



Go Away

4.3.6 Ease Up

Come slowly towards the signal bringing the buffers together. Hands are brought together as in a clapping movement.

Ease Up

4.3.7 Pull Out and Stop Short

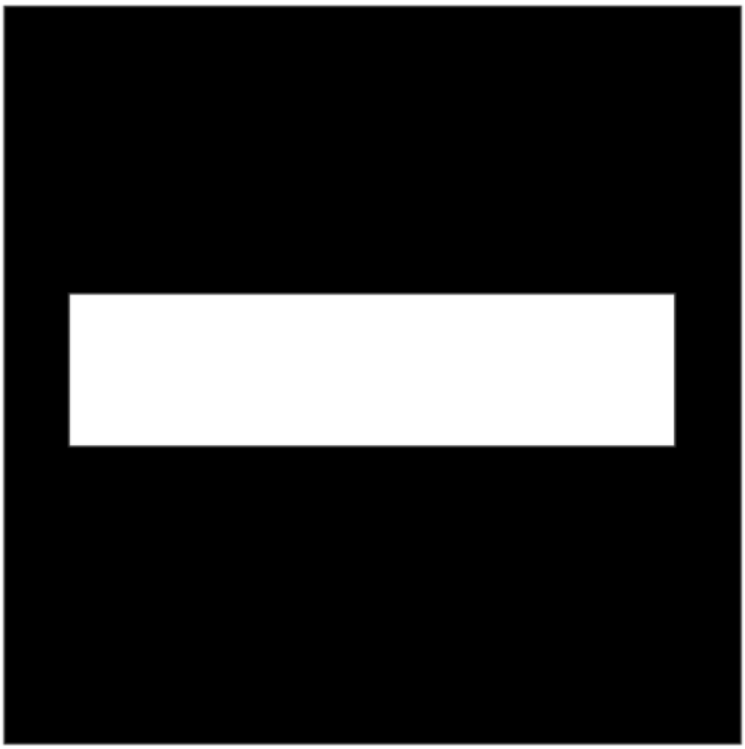
Go away from the signal, being prepared to stop short. Forearms crossed in front of the chest with the hands open.

Pull Out and Stop Short

5. Indicators

5.1 Banner Indicators

Banner indicators supply information about the next signal in advance when there is a restricted sighting distance on this signal.



Banner Indicator

WARNING

A banner indicator is not a signal. When displaying the next signal at stop, there is no requirement to stop at the banner indicator.

5.2 Dynamic Speed Indicators (DSI)

Speed Indicators

Advanced Speed Indicators

Speed Indicators

Fitted above the top signal unit on each mast and when illuminated, will display a steady white speed in km/h.

Unless an ETCS equipped train indicates a higher speed, all trains passing that signal must not exceed the displayed speed until the next signal in advance is reached.

Operators on trains equipped with ETCS must be guided by and comply with the speed indicated by ETCS.

Advanced Speed Indicators

Fitted above the top signal unit on each mast. When illuminated, it will display a flashing white speed in km/h that the train must not exceed at the next signal in advance.

5.3 Trap Points Indicators

A trap point indicator is connected to and works in conjunction with trap points:

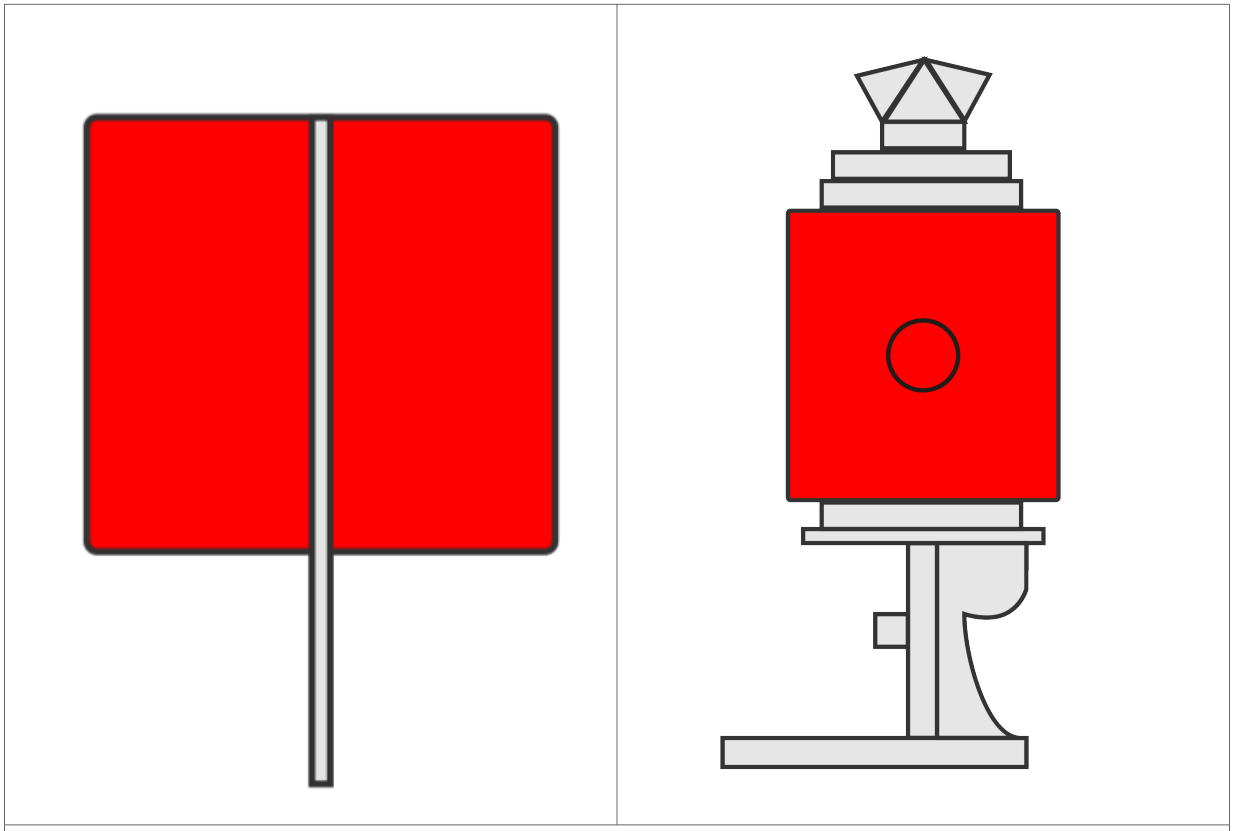
- a red square target by day and red light by night indicate that the points are in the derailing position
- a purple square target by day and a purple light by night indicate that the points are reversed
- trap point indicators at night may display a red reflectorised disc and a purple reflectorised disc in place of a red or purple light, as the case may be

- where movement over trap points is authorised by colour light shunting or colour light signals, trap point indicators are not provided.

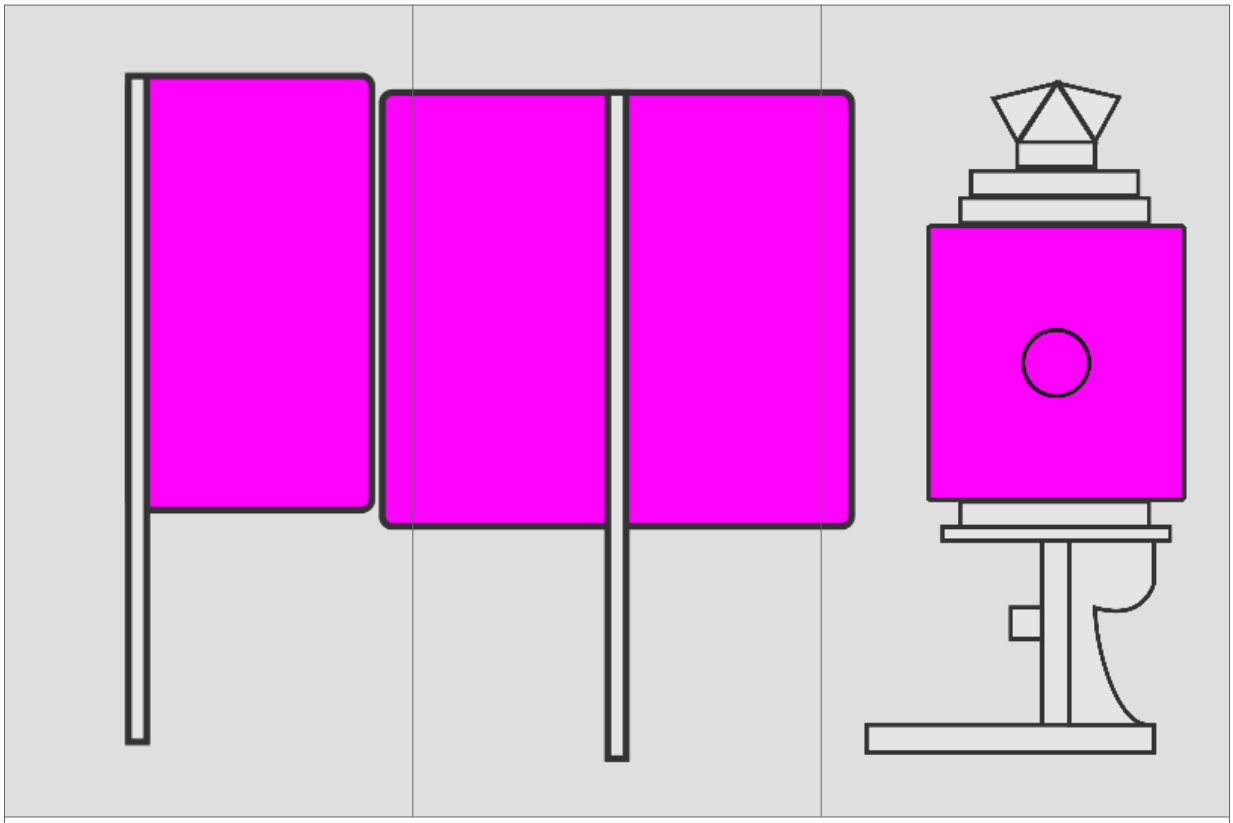
CAUTION
The indicators referred to above indicate which way points are set. The Train Crew must observe the indication of the indicators before a rail vehicle movement passes over the points.

Where a fixed signal does not control the movement, authority from the Rail Operator/Pilot must first be received before passing over the points.

Where a Signaller controls the trap points, the Rail Operator/Pilot must obtain their permission before authorising the movement.



All Red Stop: Points in the Derailing Position



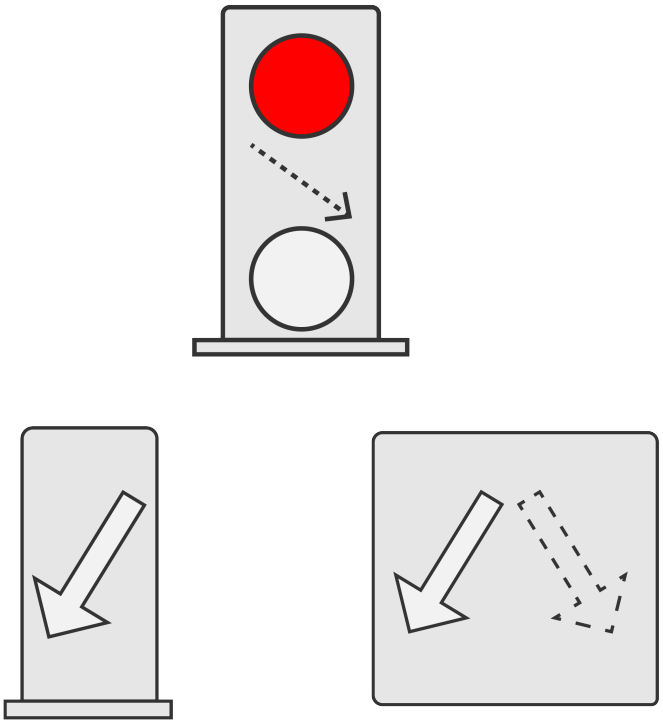
Purple Target: Points Set for the Running Position

5.4 Arrow and Colour Light Indicators

An illuminated arrow indicator (single or with double arrow) and a two position colour light indicator are provided at the facing and trailing end of points. These are the termination points of the interlocking in station yards or other places, as shown on S&I diagrams.

When an arrow indicator exhibits a white arrow light in the facing direction or the corresponding colour light indicator exhibits a yellow light in the trailing direction, the interlocked points are locked in the correct position.

The Rail Operator / Pilot must authorise all movements. When movements are required to move between the non-interlocked and interlocked areas, fixed signals will control them. The light in the arrow indicator will be extinguished, and the colour light indicator will display a stop indication.



Arrow Indicators

Where necessary and when shown on S&I diagrams, an illuminated arrow indicator (single or with double arrow) is used without the associated two position colour light indicator to convey the position of facing points. The Rail Operator / Pilot must control all movement past such indicators.

When arrow or colour light indicators fail to operate, the Rail Operator / Pilot must ascertain from the Signaller that the route is safe and that the points are correctly set for the intended movement. Then tell the Operator of the circumstances before authorising the movement.

If the arrow indicator associated with a departure signal fails to operate, the Signaller or Person in Charge of the movement must communicate with the Train Controller.

The Train Controller must be satisfied that the points are set and secured for the intended movement to the non-interlocked area. Confirm this with the Operator before the Person in Charge of the movement authorises the movement to pass the arrow indicator.

5.5 Route Indicators

Route indicators are installed on or adjacent to signals where required and indicate the route set beyond the signal concerned.

They will display indications as described on S&I diagrams and, where necessary **Local Network Instructions**.

Route Indicator

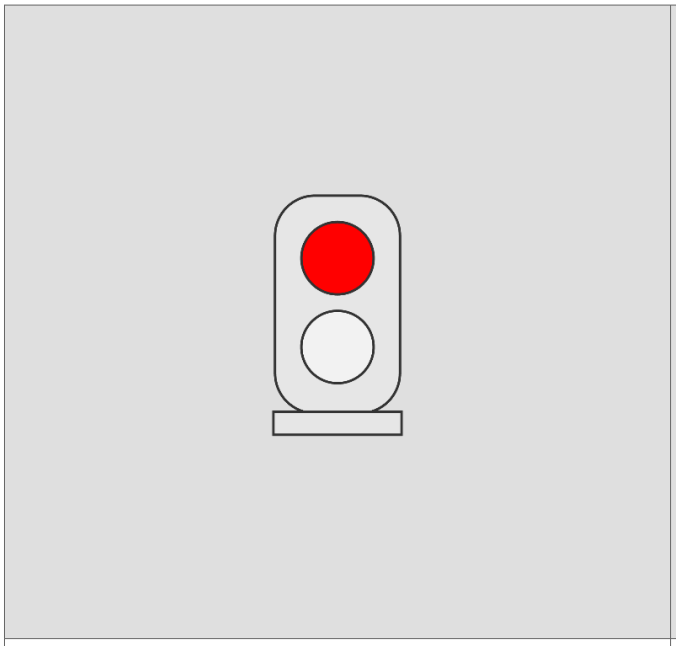
5.6 Aspects Displayed

5.6.1 Arrow Light and Points Indicators

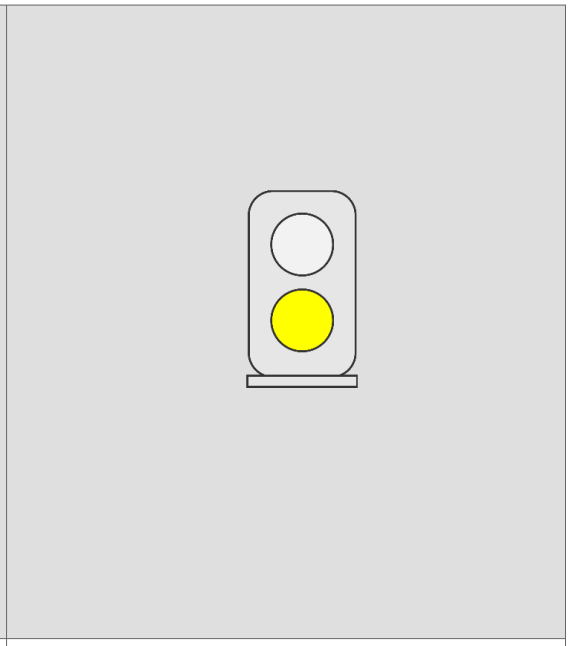
Colour Light Points Indicator

The following instructions are provided:

- Left figure: Stop.
- Right figure: Proceed on receipt of verbal or hand signal from the Person in Charge of the movement.



All Red Stop



Yellow Indicator

Arrow Indicators

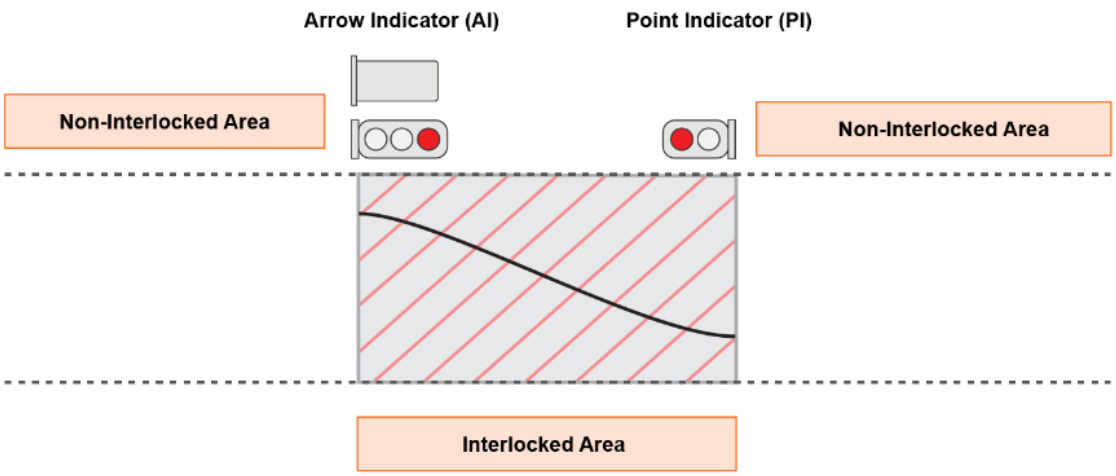
The following instructions are provided:

- Arrow illuminated indicates the points are set for shunting movements controlled by verbal or hand signal from the Person in Charge of the movement

White Arrow

NOTE
Colour light points indicators and arrow indicators are identified by the number of the points they protect, followed by the designator 'PI' and 'AI'.

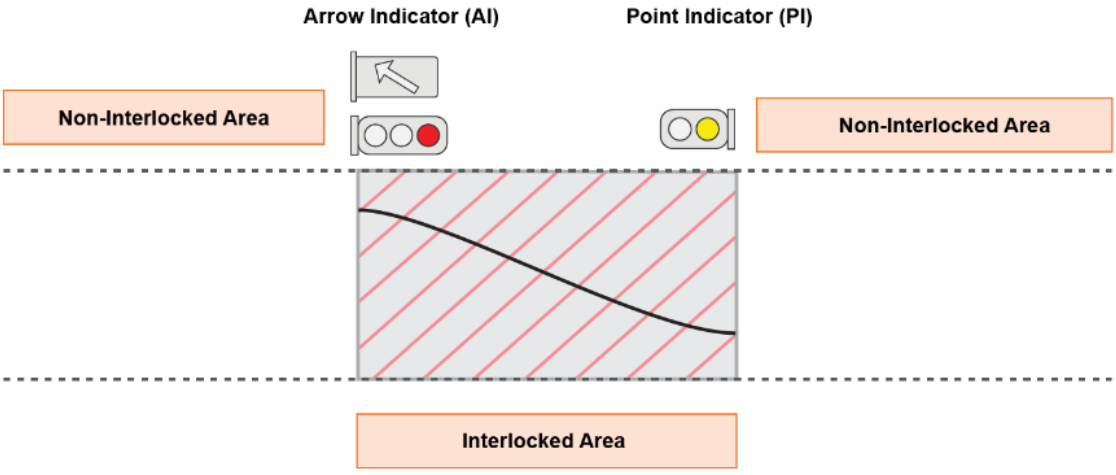
The figure below shows an arrow indicator not illuminated and a points indicator at stop (shunting is prohibited over points at the junction of interlocked and non-interlocked areas). The shaded area represents an interlocked area.



Arrow Indicator Not Illuminated

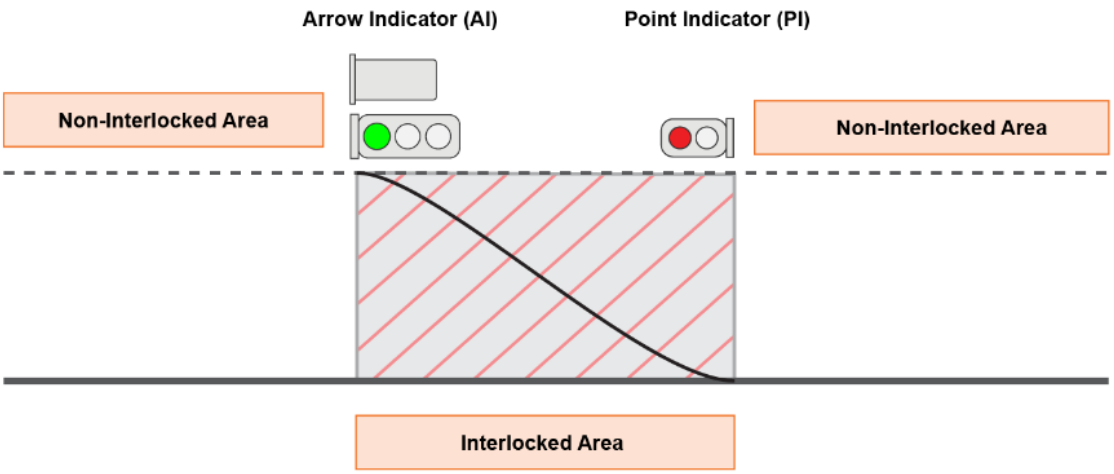
The figure below shows an arrow indicator indicating the setting of points and a points indicator showing a yellow light.

NOTE
Movements over points may proceed on the correct authority from the Person in Charge of the movement.



Arrow Indicator Illuminated

The figure below shows a route set or a movement from a non-interlocked area to an interlocked area (arrow indicator extinguished and points indicator at stop).



Arrow Indicator Not Illuminated

5.6.2 High Column Switch Stand Target Indicators

The following instructions are provided:

- Figure 1: Points in normal - normal speed.
- Figure 2: Points in normal - maximum speed 25 km/h.
- Figure 3: Points in reverse.
- Figure 4: Points in reverse - The sharp point of the white chevron (triangle) indicates the setting of the route.

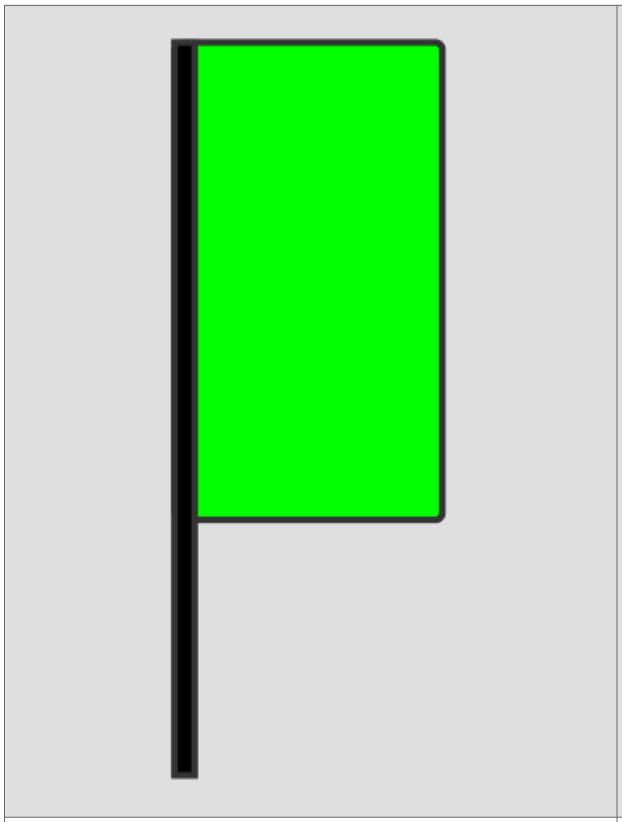


Figure 1: Green Target

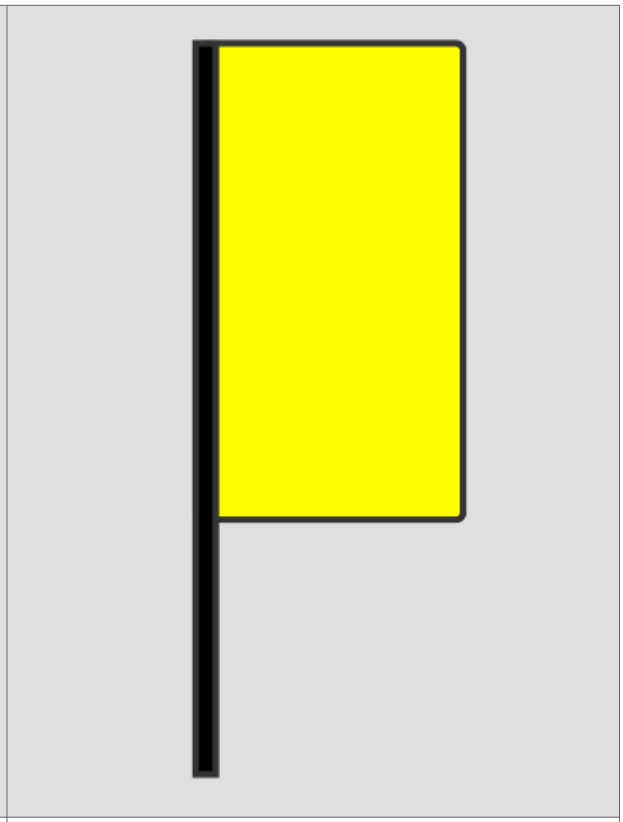


Figure 2: Yellow Target

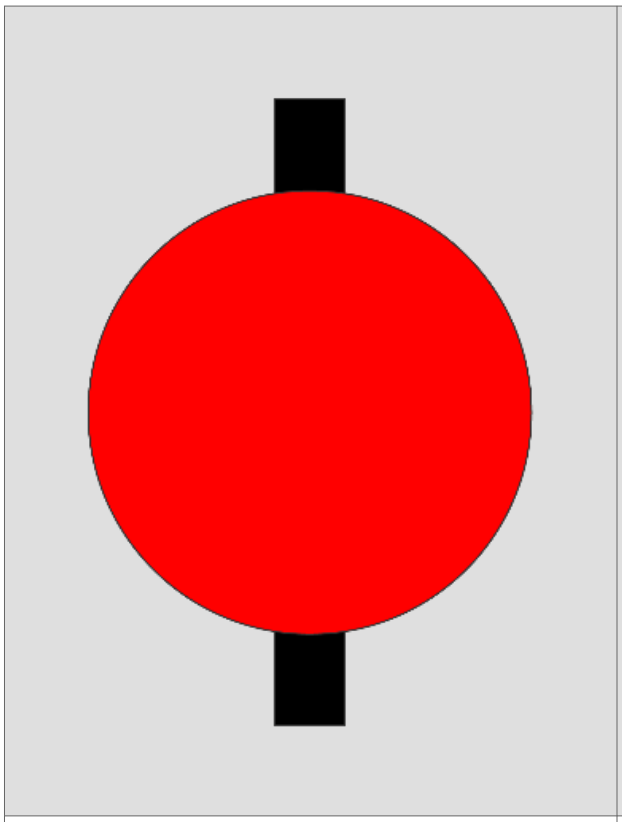


Figure 3: All Red Stop

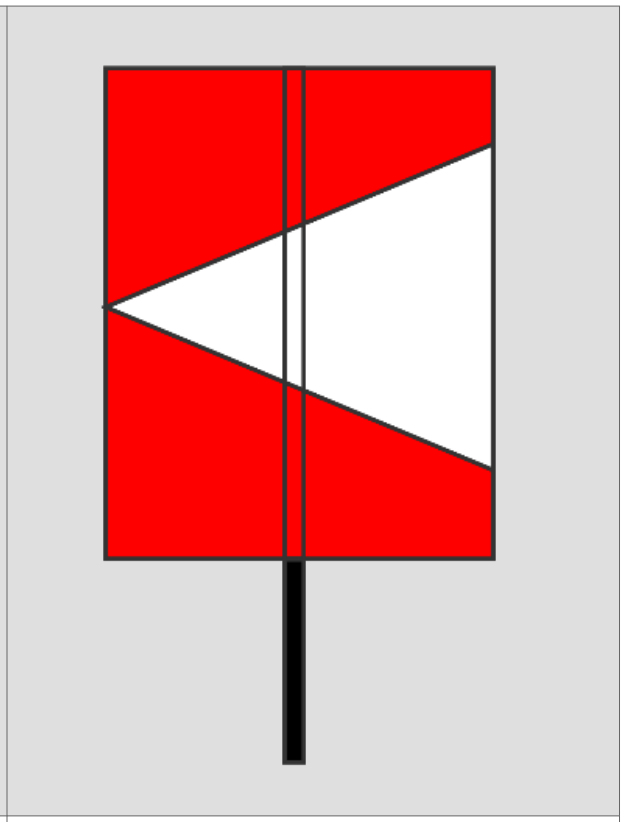


Figure 4: All Red Stop

5.6.3 Switch Stand Target Indicators Non-Interlocked Areas

The following instructions are provided:

- Figure 1: Points set - yellow aspect indicates the direction of the route.
- Figure 2: If both targets display the same colour (red) in the facing direction, the points are mid-stroke and are not correctly set.
- Figure 3: If both targets display the same colour (yellow) in the trailing direction, the points are mid-stroke and are not correctly set.

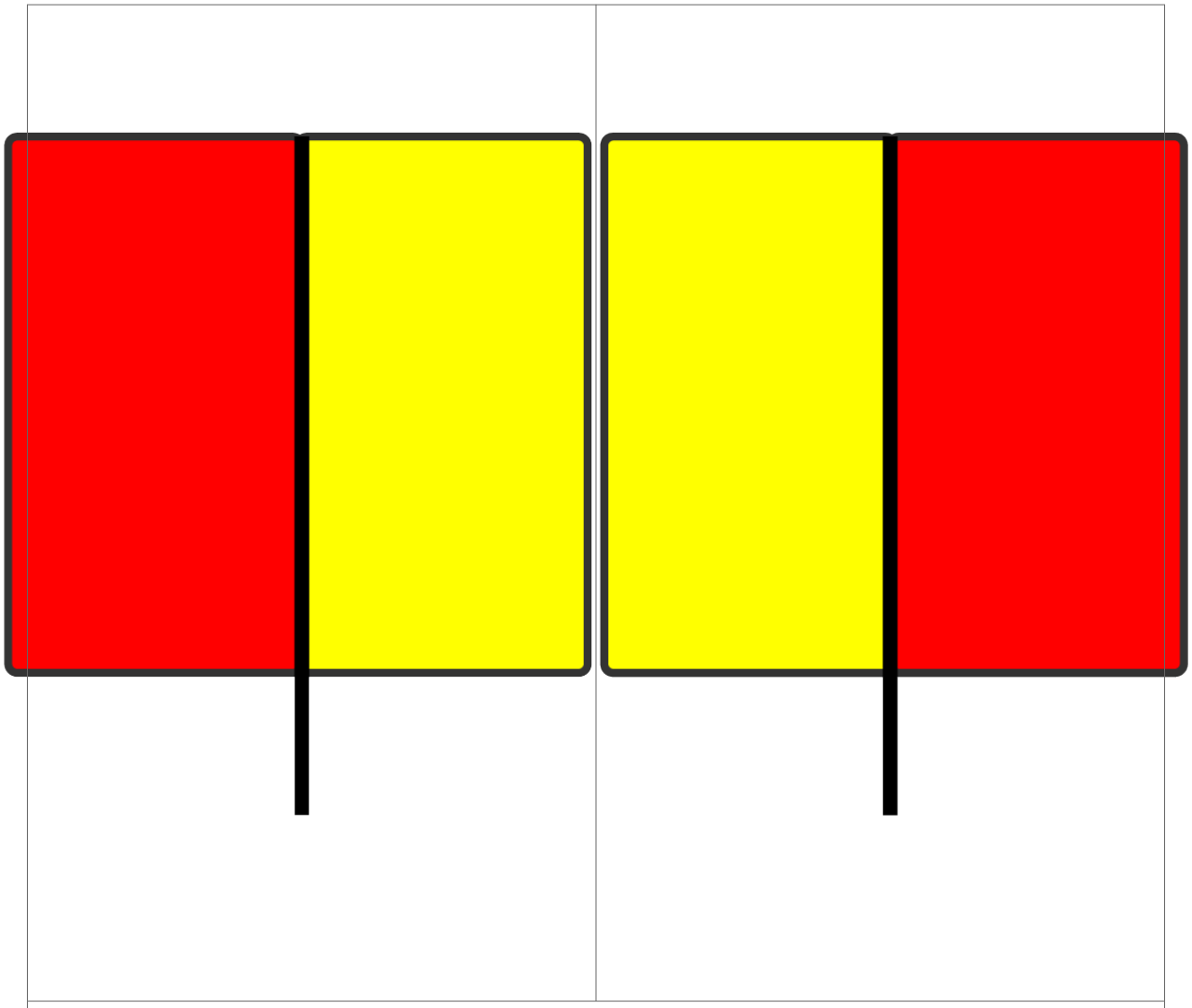


Figure 1: Yellow Target

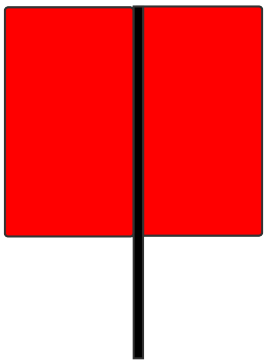


Figure 2: Stop - Imperfectly Displayed Signal

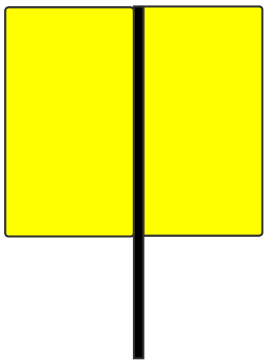


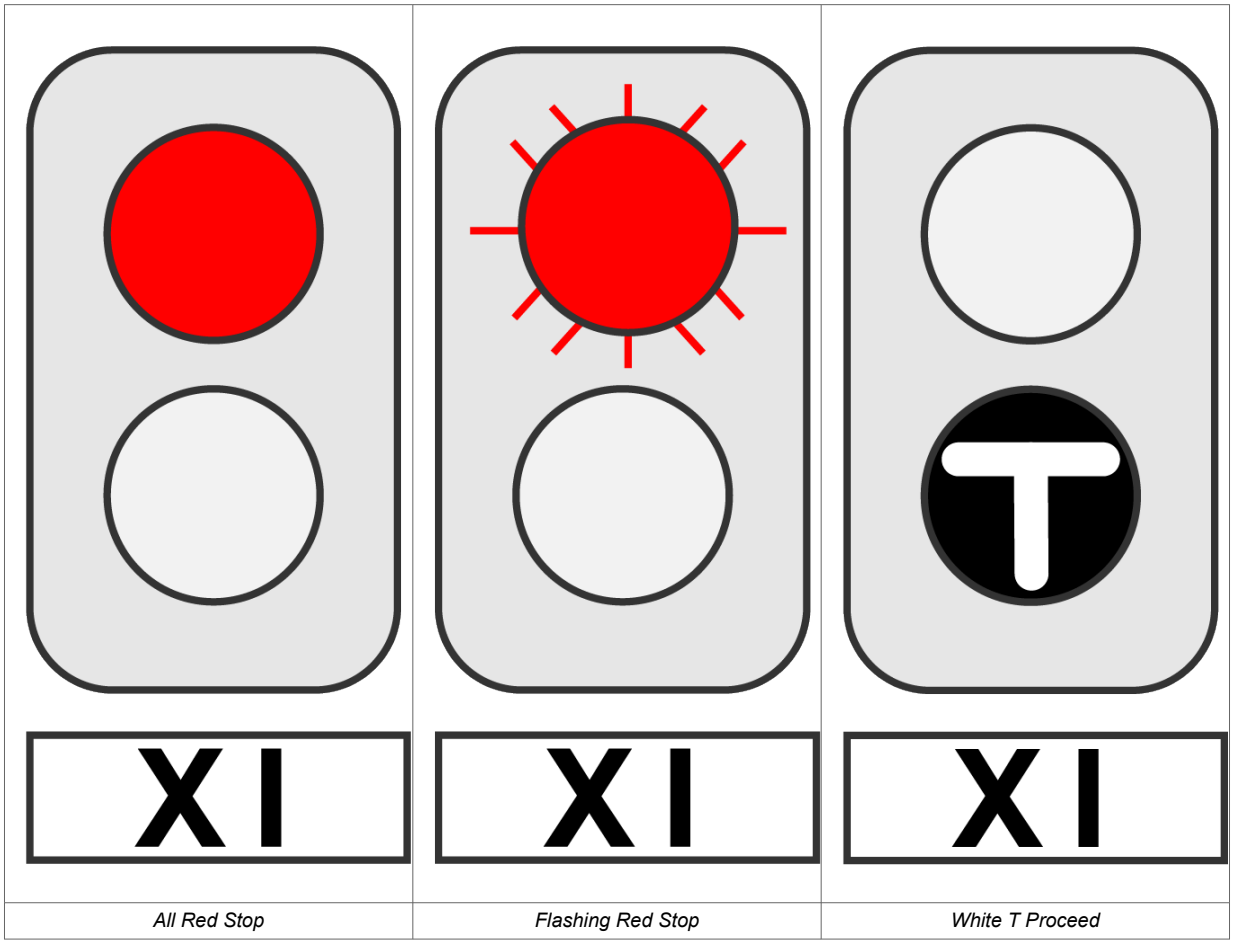
Figure 3: Stop - Imperfectly Displayed Signal

DANGER
Points must not be run through when in the trailing position. Doing so will result in significant damage to infrastructure and rail vehicles.

5.6.4 Level Crossing Indicators

The following instructions are provided:

- Left figure: Stop.
- Centre figure: Stop – Time delay operating. Wait for the White 'T' indication before proceeding.
- Right figure: Proceed – Level crossing alarms are operating.



All Red Stop	*Flashing Red Stop*	*White T Proceed*

If the 'T' light fails to illuminate, the signal may be passed if there is no road / pedestrian traffic at or approaching the crossing. If road / pedestrian traffic is approaching the crossing, shunting personnel must stop the rail vehicles before the rail movement proceeds onto the crossing.

5.6.5 Banner Indicators

Banner indicators:

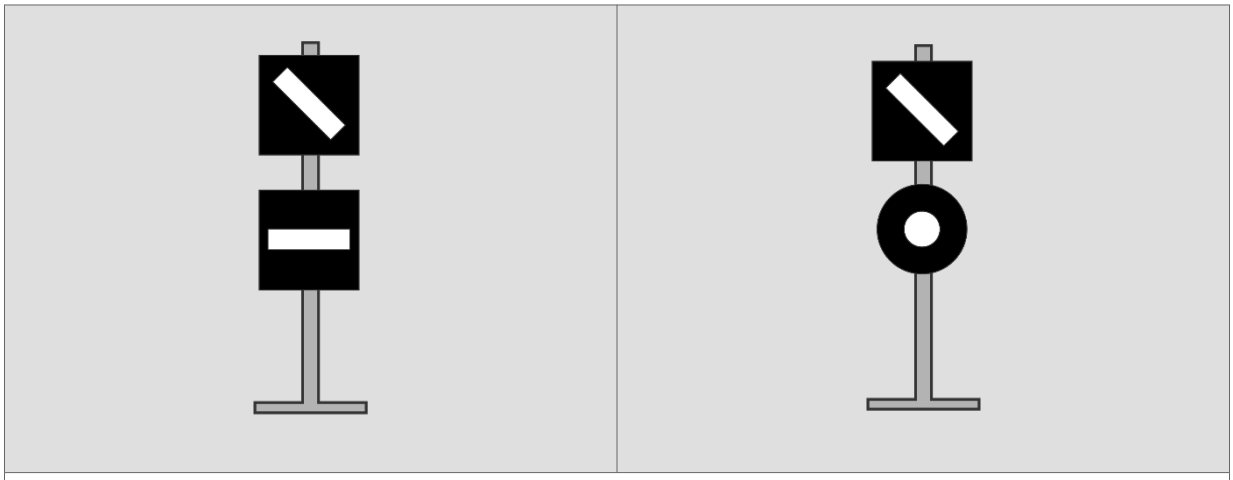
- Supply information about the next signal in advance.
- Are identified by the number of the signal in advance followed by the suffix 'BI'.

Each banner indicator light head can display a band of white light orientated as detailed in Table 19.

Table 19:Banner Indicator Information

Banner indicator	Information supplied
Horizontal	Repeats a red aspect
Orientated at 45 degrees sloping down to the right-hand side	Repeats a yellow aspect
Vertical	Repeats a green aspect
The bottom unit may be a white marker light or disc.	

Stop at Next Signal - Next Signal at Stop or Low Speed



Caution Next Signal

Next Signal at Caution and Prepare to Stop

IMPORTANT

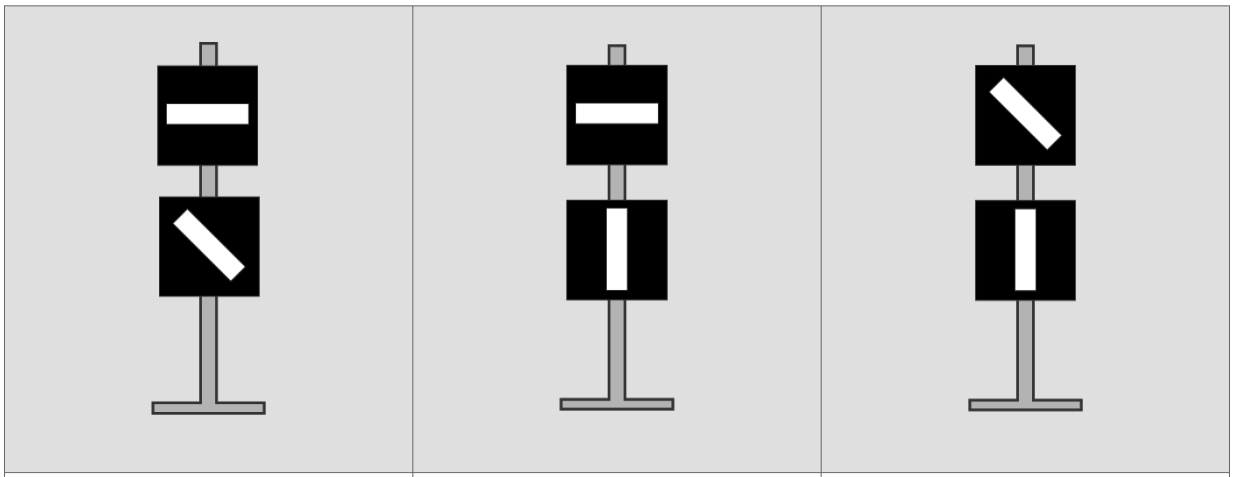
When the top unit flashes, the next signal has a flashing top unit, meaning advance caution at normal speed.

Normal Clear Next Signal

Next Signal at Normal Clear Speed

The following instructions are provided:

- Left figure: Next signal showing medium speed. Prepare to stop.
- Centre figure: Next signal showing clear medium speed.
- Right figure: Next signal at caution, reduce to medium speed.



Medium to Stop Next Signal

Medium Clear Next Signal

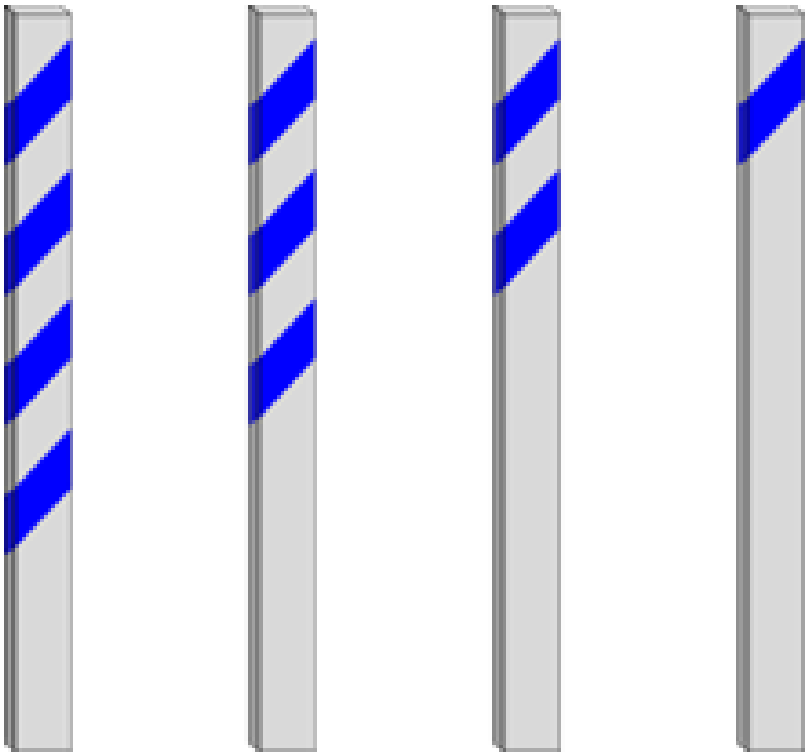
Reduce to Medium Next Signal

IMPORTANT
When the top unit flashes, the next signal has a flashing top unit, meaning advance caution at normal speed.

5.6.6 Advance Signal Warning Marker Posts

Advance Signal Warning marker posts provide advance warning of the distance to the next signal or board in some locations where visibility is limited or restricted.

They assist Locomotive Engineers to identify critical stopping distances remaining to the next signal or board.



400m marker post (four diagonal reflectorised blue strips)

300m marker post (three diagonal reflectorised blue strips)

200m marker post (two diagonal reflectorised blue strips)

100m marker post (one diagonal reflectorised blue strip)

The location of Advance Signal Warning marker posts in the network will be detailed in the relevant Local Network Instructions.

IMPORTANT
Advance Signal Warning marker posts are not permitted in Metro areas.

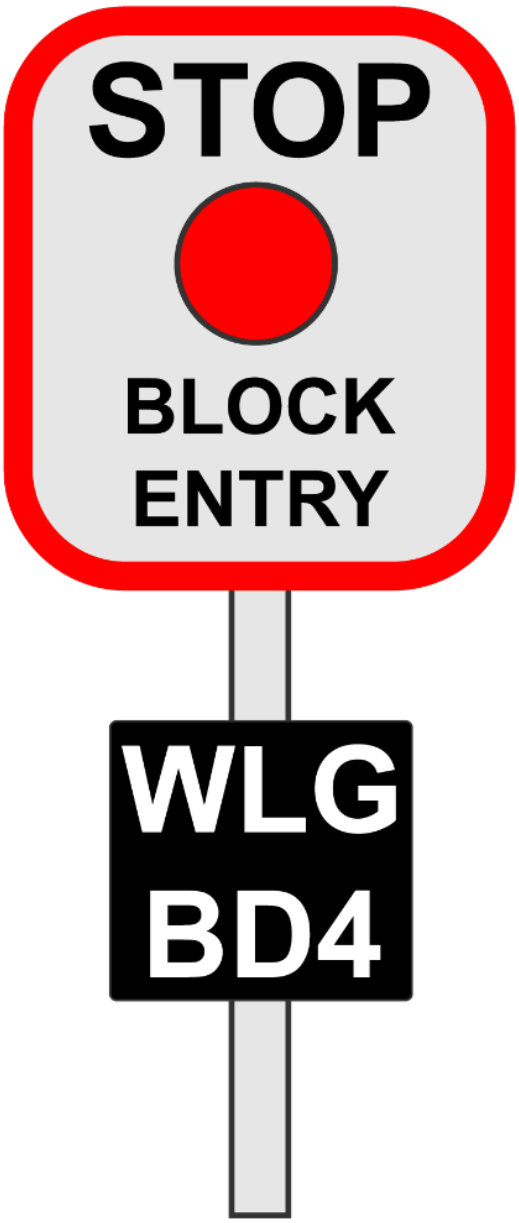
NOTE
A description of Interceptor marker posts can be found in **Network Signals, Indicators and Boards Manual, 8.6 Interceptor Marker Posts.**

6. Boards

6.1 Entry Boards

6.1.1 Block Entry Boards

Block entry boards are provided in multi-line areas where a signal is unavailable and defines a boundary for entry into a block section. These boards are absolute and may only be passed with the appropriate written authority from the Train Controller.



Block Entry Board

6.1.2 Block Section Entry Signal Identification

Boards are provided in multi-line areas to identify the type of signal governing entry into a block section.

- Departure signals will be identified by the word 'DEPART' on a blue background.

- Starting signals will be identified by the word 'START' on a black background.

	
Departure Signal Board	*Starting Signal Board*

6.1.3 Station Entry Boards

Station entry boards are provided in multi-line areas where a signal is unavailable and defines a boundary for entry into an interlocked station for wrong line running.

Station entry boards are absolute and may only be passed with verbal authority from the Signaller.

Station Entry Board

NOTE
Wrong line running boards are no longer used except at Woburn; see **L4 Local Network Instructions** and Ava – Waterloo S&I diagram.

6.2 All Trains Stop Boards

All trains stop boards are provided to control rail vehicle movements when a signal is unavailable.

WARNING
All trains stop boards may also be provided in a territory not governed by automatic running signals.

All rail movements must stop before the All Trains Stop board unless permission to pass has been received from the person responsible for movements. Operators may only ask for permission when they can sight the boards. These boards define where rail vehicles must stop for safety reasons.

Their positions are shown on S&I diagrams in interlocked areas. The reason for the All Trains Stop board varies between installations, and the conditions that must be met before a particular All Trains Stop board is passed also differ. Instructions for passing All Trains Stop boards are in the **Local Network Instructions** or **Local Operating Instructions**.

CAUTION
All movements must approach the boards being prepared to stop.

All Trains Stop Board

6.3 Shunting Limit Boards

Shunting Limit boards mark the limits for shunting purposes in accordance with details defined on S&I diagrams or **Local Network Instructions**.

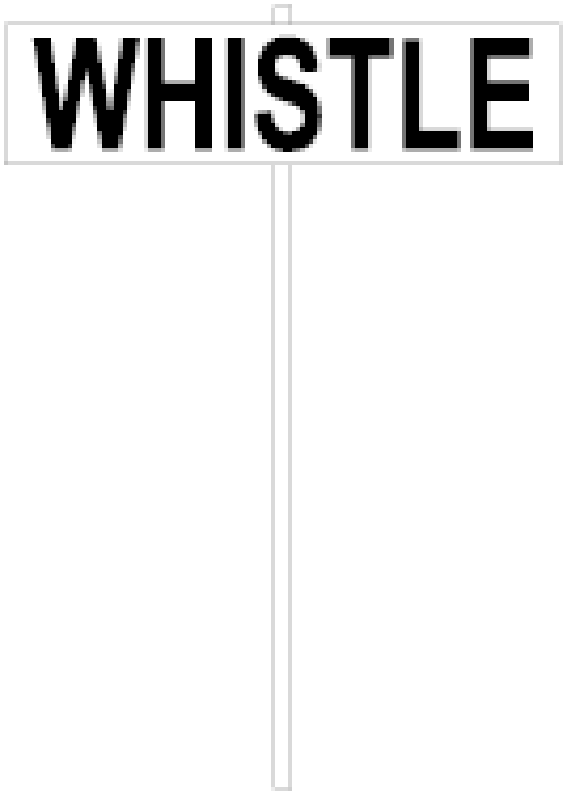
Shunting Limit Board

6.4 Whistle Boards

Whistle boards are erected in selected localities where a special warning of the approach of rail vehicles is necessary or where the horn must be sounded for a specific reason.

The erection of whistle boards will be notified by **Local Network Instructions** or bulletin.

IMPORTANT
Unless instructions provide otherwise, the motive power horn must be sounded when approaching or passing whistle boards.



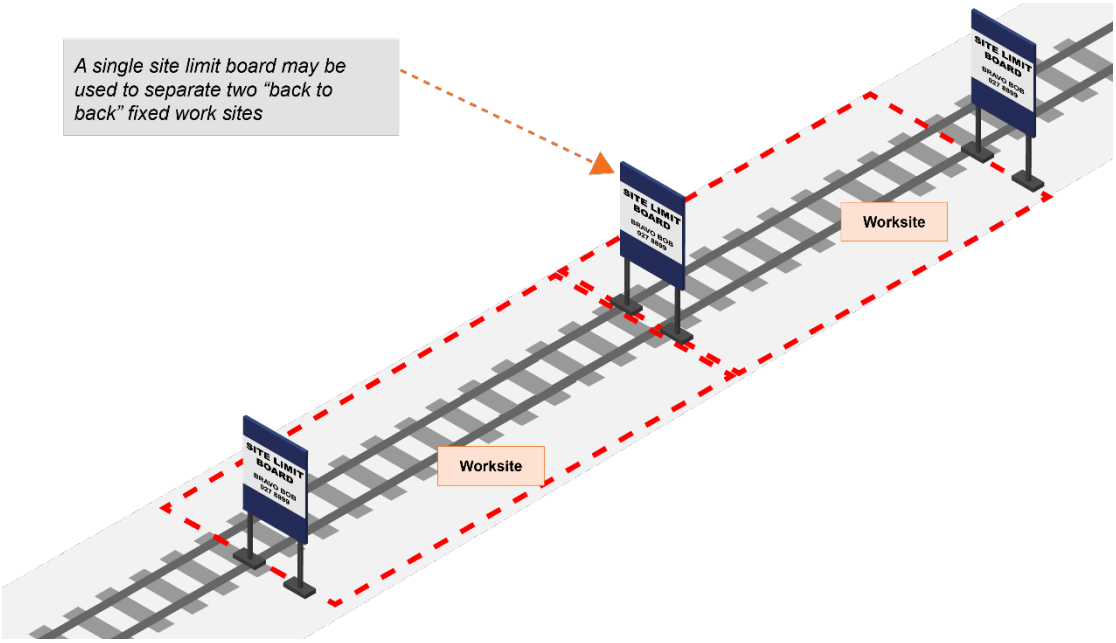
Whistle Board

6.5 Worksite Boards

Site limit boards must define fixed worksite limits.

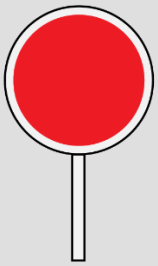
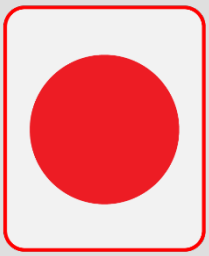
Entering Fixed Worksite Board

Exiting Fixed Worksite Board



Positioning of Site Limit Boards

6.6 Danger Stop Signal Boards

		
A Circular Disc - Painted Red with a White Border	*Reflectorised Plate - Red Dot, White Background, and Red Border*	*Reflectorised - Red Flashing Light (secured to the rail head)*

6.7 Compulsory Stop Protection Boards

The following instructions are provided:

- Figure 1: Caution, prepare to stop at the compulsory stop board ahead.
- Figure 2: Sound whistle, prepare to stop at the compulsory stop board.
- Figure 3: Stop, obtain authority from Rail Protection Officer to pass the compulsory stop board and sound the motive power horn before proceeding.
- Figure 4: Indicates the boundary between a work area and its safety buffer zone.

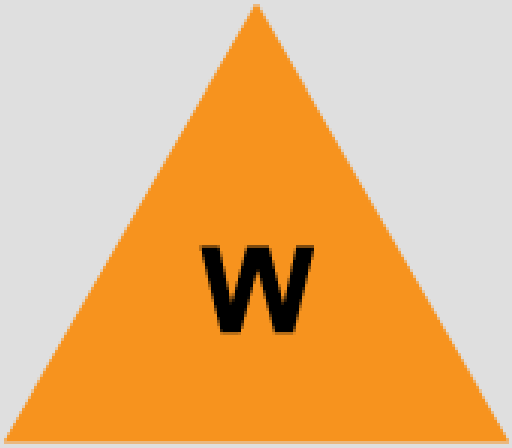
	
Figure 1: Advance Warning Board	*Figure 2: Inner Warning Board*

Figure 3: Compulsory Stop Board

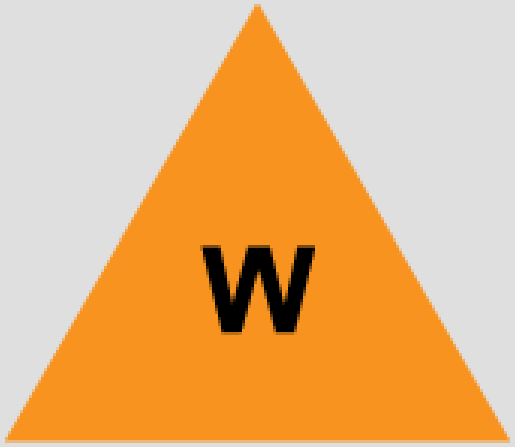


Figure 4: Work Area Begins and Ends Boards

6.8 Permanent Reduction of Line Speed

6.8.1 Permanent Speed Boards

Permanent speed boards are erected to indicate the exceptions to the authorised maximum line speeds affecting all rail vehicles unless ETCS indicates a higher speed.

IMPORTANT

The requirements for displaying these boards do not apply to wagon speed restrictions shown in the **Local Network Instructions** or bulletin.

The boards are erected at or about the beginning of the speed restricted area, where Operators of approaching rail vehicles can obtain a clear and distant view of the boards.

- Where practicable, the boards are erected on the Operator’s side of the line.
- Operators must:
  - reduce the speed of their rail vehicle before it reaches the speed board, and
  - not exceed the indicated speed over the speed restricted area until the last vehicle is clear of the speed restricted area.
- Where the restriction is applied due to the short braking distance between successive signals:
  - The starting point is indicated by the first fixed signal listed.
  - The terminating point is indicated by the last fixed signal listed.
  - Normal speed may be resumed as soon as the leading vehicle has reached the last fixed signal.

Permanent Speed Board

Permanent speed boards are painted white with black lettering and numerals. The minimum side clearance is 2.30 metres from the centre line of the track.

6.8.2 Curve Boards

Curve boards are rectangular and have a white background with black numerals showing the maximum speed in kilometres per hour. They are erected near the entrance of curves where a reduction in the maximum line speed applies.

Where practicable, the boards are erected on the Operator's side of the line.

The indicated speed must only be exceeded once the last vehicle is clear of the curve unless ETCS indicates a higher speed.

Installation of and alteration to locations of curve boards will be advised by the bulletin for the first month of operation.

6.8.3 Curve Warning Boards

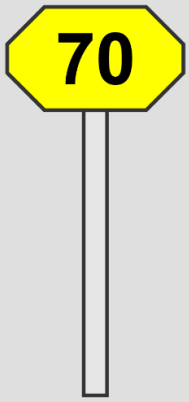
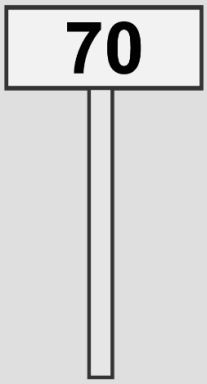
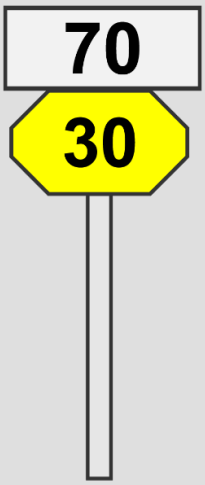
If a reduction in speed of more than 15 km/h is required on the curve ahead, curve warning boards are erected in advance of the curve board. They show the speed for the curve to which they apply in kilometres per hour.

Curve warning boards are rectangular and have a yellow background with black numerals. Minimum side clearance to be 2.3 metres from the centre line of the track.

Where practicable, they are erected at least 200 metres from the entrance of the curve to which they apply.

These boards are exhibited either:

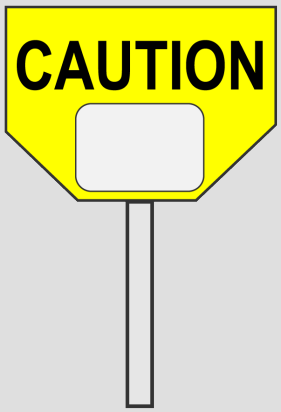
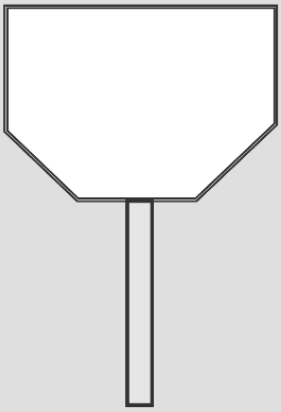
- as a separate board, or
- are placed below the curve board of the preceding curve.

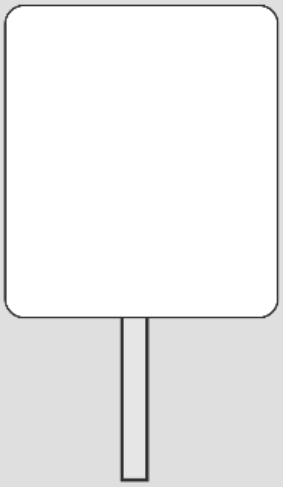
		
Curve Warning Board	*Curve Board*	*Curve Board and Warning Board*

6.9 Description of Speed Boards

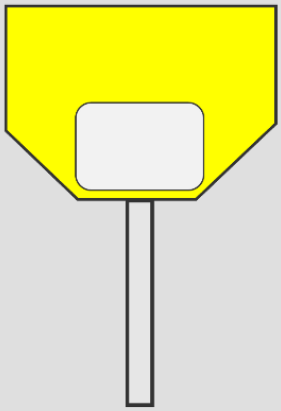
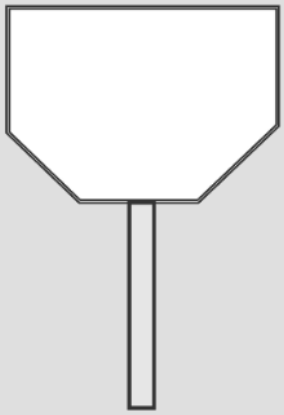
6.9.1 Outer Speed Boards

The outer speed board indicates the maximum speed for the restricted area. The meaning is caution, be prepared to reduce speed as indicated by the board and the maximum speed over defective location indicated by black numerals.

 **Painted yellow with reflectorised border and black numerals on yellow background reflecting material**	 **Painted white with reflectorised border or bare aluminium**
Old Style Front Side	*Old Style Rear Side*

	
Rectangular shape painted black outside, with a reflectorised yellow sign with black numerals	**Painted white with reflectorised border or bare aluminium**
New Style Front Side	*New Style Rear Style*

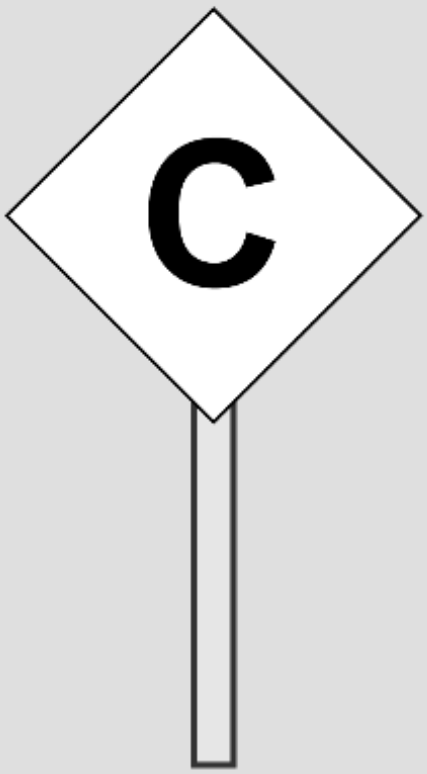
6.9.2 Miniature Outer Speed Boards

	
Reflectorised yellow background with black numerals	**Bare aluminium**
Miniature Outer Speed Boards Front Side	*Miniature Outer Speed Boards Rear Side*

NOTE
Miniature outer speed boards are smaller than full sized boards.

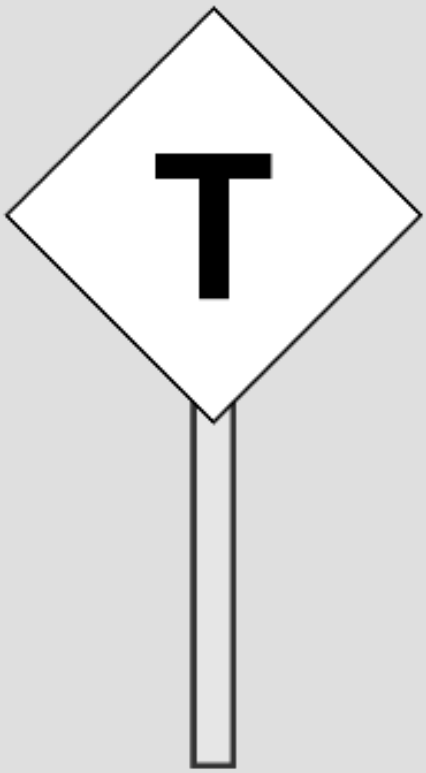
6.9.3 Temporary Inner Speed Boards

The temporary inner speed boards indicate the speed restricted area. The meaning is maintaining the restricted speed between the 'C' and 'T' boards.



Temporary inner diamond shaped speed board lettered 'C' at the commencement of the speed restricted area

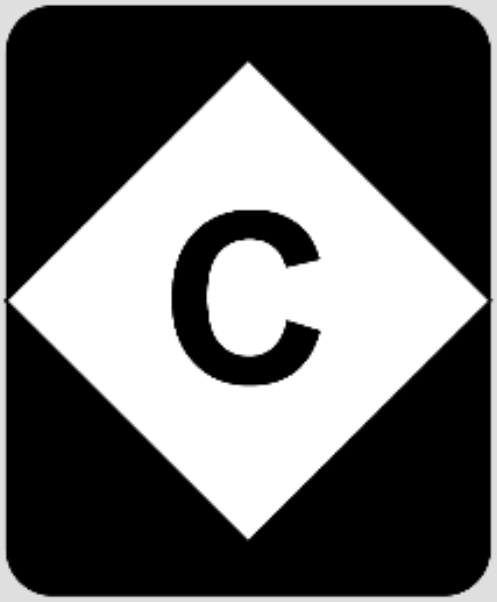
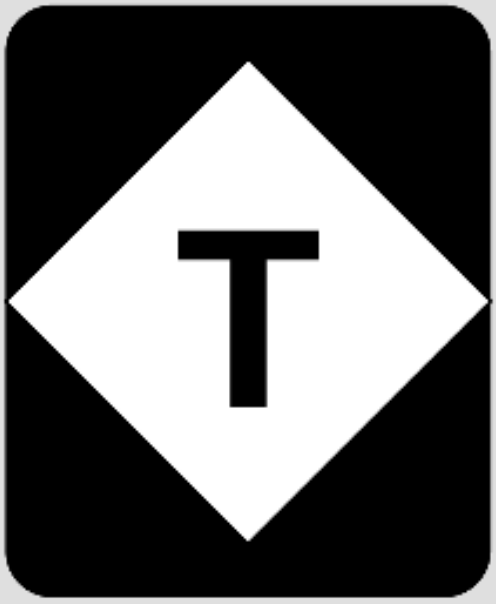
Old Style Front Side



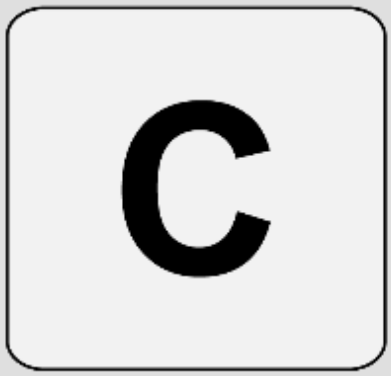
Temporary inner diamond shaped speed board lettered 'T' at the termination of the speed restricted area

Old Style Rear Side

NOTE
A reflectorised plate is used on the 'C' face of some inner speed boards, which may appear rectangular by night.

	
Rectangular shape painted black outside, with reflectorised white diamond-shaped sign with a black letter 'C'	**Temporary inner diamond shaped speed board lettered 'T' at the termination of the speed restricted area**
New Style Front Side	*New Style Rear Style*

6.9.4 Temporary Miniature Inner Speed Boards

	
White reflectorised background with the letter 'C' facing the side at the beginning of the speed restriction area	**White background with the letter 'T' at the termination of the speed restriction area**
Old Style Front Side	*Old Style Rear Side*

NOTE
Miniature outer speed boards are smaller than full sized boards.

6.10 Electric Services Limit Board

Electric Services Limit boards define the operating limit for an electrically powered MPU.

Permanent Electric Services Limit Boards are shown on S&I diagrams.

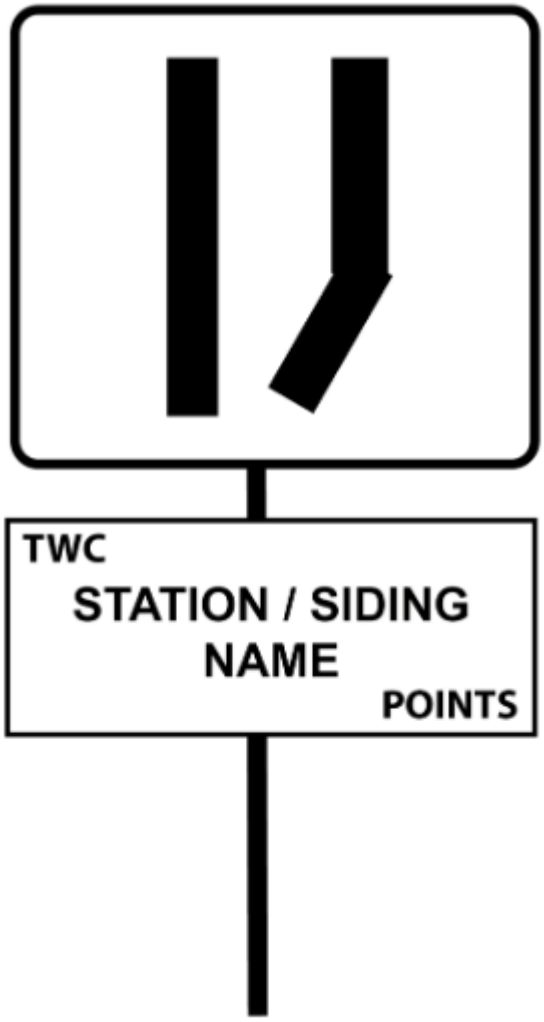
Temporary Electric Services Limit Boards are used during planned work, when required.

Electric Services Limit board

6.11 Track Warrant Boards

6.11.1 Hand Points Boards

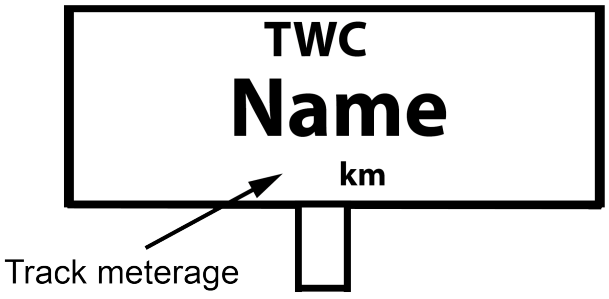
Hand Points boards are provided at warrant stations and sidings, where the main line points are hand points.



Hand Points Board

6.11.2 Intermediate Boards

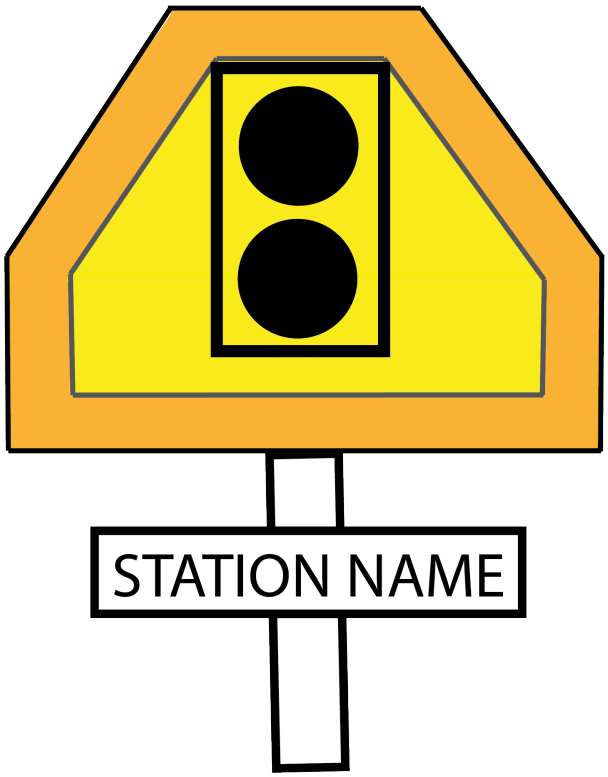
Intermediate boards are a notice board, provided between warrant stations or sidings to identify a location which may be used to designate a limit for a track warrant.



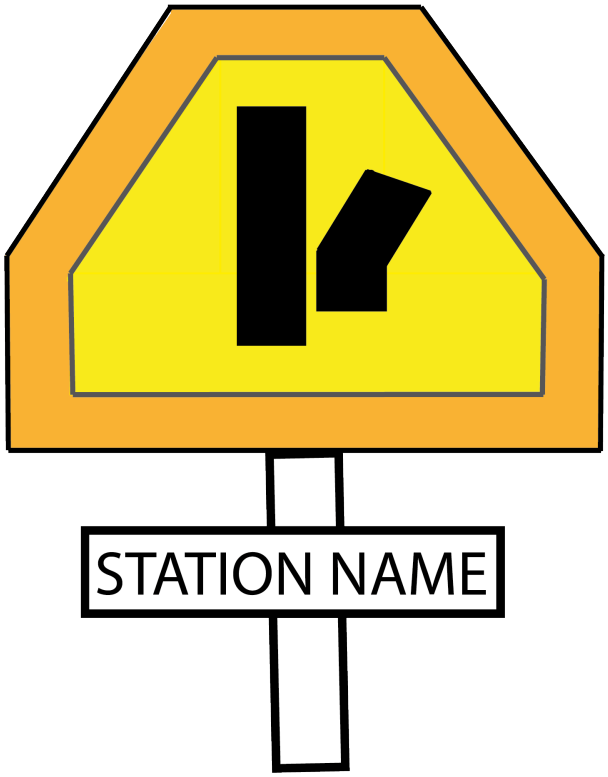
Intermediate Board

6.11.3 Station Warning Boards

Station Warning boards are a notice board, provided in the absence of an intermediate or distant signal, to warn of the approach to station limits at a warrant station or the end of TWC territory.



Station Warning board for a warrant station equipped with points indicators or arrival signals



Station Warning board for a station at the end of TWC territory or a warrant station without points indicators or arrival signals

6.12 Radio Channel Change Board

Boards placed line side as a reminder to radio users when radio channels change.

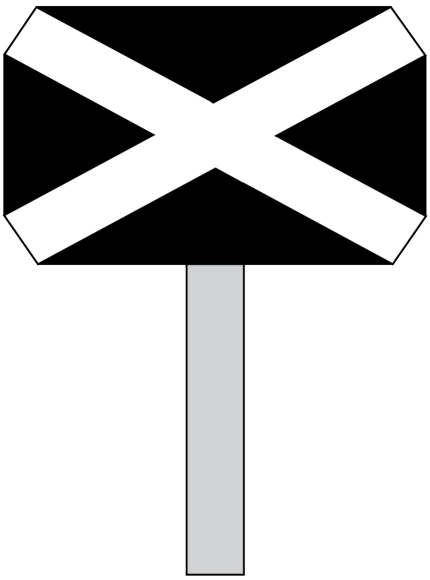
Example of a radio channel change board

6.13 Miniature St Andrews Board

Installed in circumstances where an Operator's visibility of a level crossing is limited on approach e.g., cuttings, curves or areas susceptible to fog.

The provision of a miniature St Andrews sign will provide Operators advanced warning to be alert for crossing users.

An audible warning may be used at or past this sign.



Miniature St Andrews Board

7. Points

7.1 Catch Points

Catch points are placed on main lines to intercept runaway rail vehicles.

Catch Points

7.2 Trap Points

Are single-blade derailing switches provided for the protection of the main line, crossing loop, or other places, as shown on S&I diagrams. Except where instructions are provided, they must stand in the derailing position when not used for passing rail movements.

Trap Points

7.3 Safety Points

Safety points are placed on crossing loops and sidings to prevent vehicles from entering or fouling the main line. Safety points are also placed on the main line, shown on S&I diagrams.

Safety Points

7.3.1 Normal Setting for Catch Points or Safety Points

The normal setting for catch points or safety points will be a backshunt/run-off siding, usually protected by a signal or notice board as detailed on S&I diagrams.

- Signals cannot be cleared for run-off sidings.
- Movements are not to be authorised past the points in normal.

NOTE
Some installations have a track circuit interrupter (orange in colour) attached to a rail in the run-off siding. When tripped by a rail vehicle fouling the run off-road, level crossing alarms may activate and will revert signals to stop in the surrounding area. Normal signalling operation can only be resumed once the Signals Maintenance Representative resets the interrupter.

7.4 Switch Lock Points

Turnouts within station limits may be fitted with electric switch locks that secure the points. The Signaller will give the electrical release of such switch lock points as described in S&I diagrams.

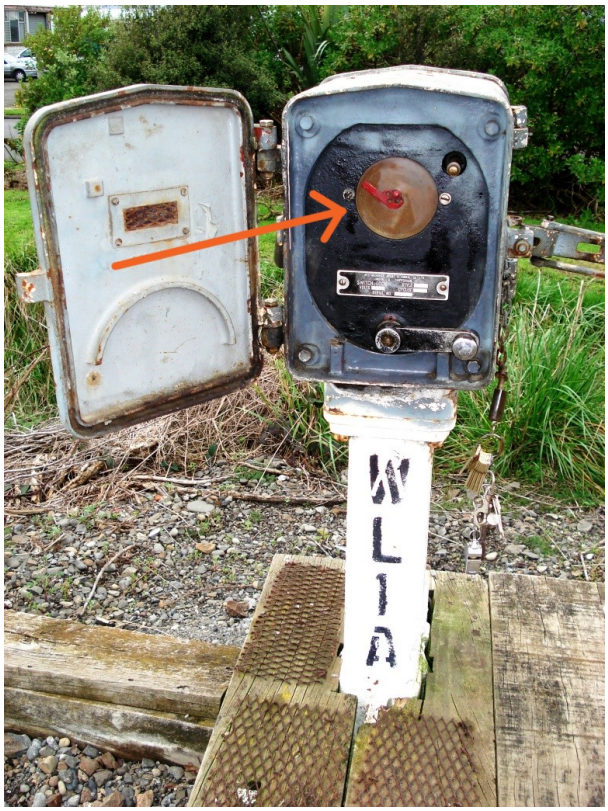
Switch locks may be of two types:

- pedestal, and
- ground-mounted electric lock operated in accordance with **Local Network Instructions**.

7.4.1 Indicator

Points are electrically locked when the indicator arm is horizontal. The points are free when the arm is raised.

Sometimes, the indicator arm may be replaced with an indicator light. When the light is extinguished, the points are locked, and when illuminated, the points are free.



Indicator Arm

7.4.2 B Lever

The lever must be turned over to free the points.

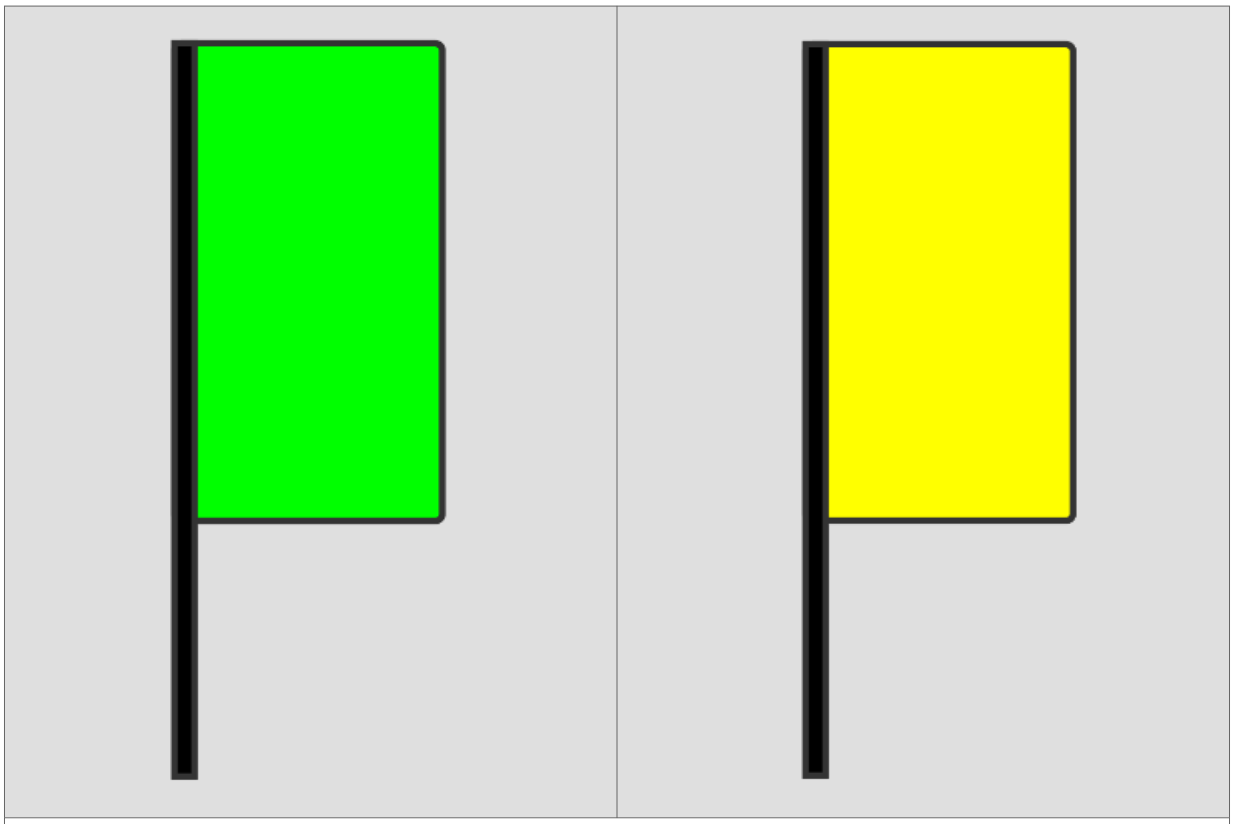
B Lever

7.5 High Column Switch Stands

High-column switch stands are provided at the main line to loop and loop to siding points as shown on an S&I diagram or as detailed on a bulletin. These switch stands incorporate coloured target indicators and a points operating mechanism.

7.5.1 Target Indicators

Will display a green and red or yellow and red reflectorised target to indicate the position of the associated points.

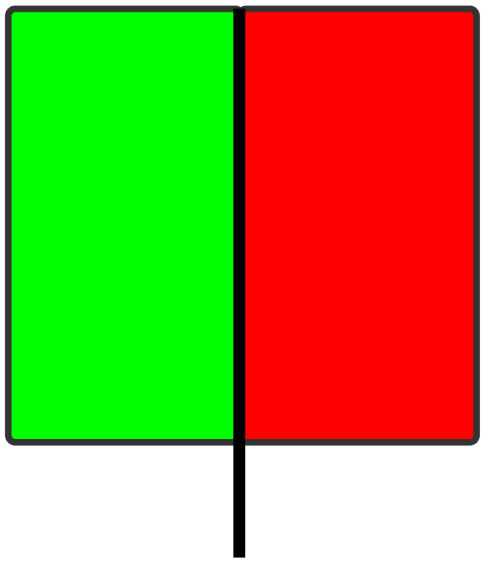


Target Indicators

7.5.2 Green and Red Target Type

Located on the main line in signalled or track warrant areas. The points are locked with either the signalling system or a track warrant padlock. Special padlocks that operate in conjunction with track warrant padlocks are provided in some cases.

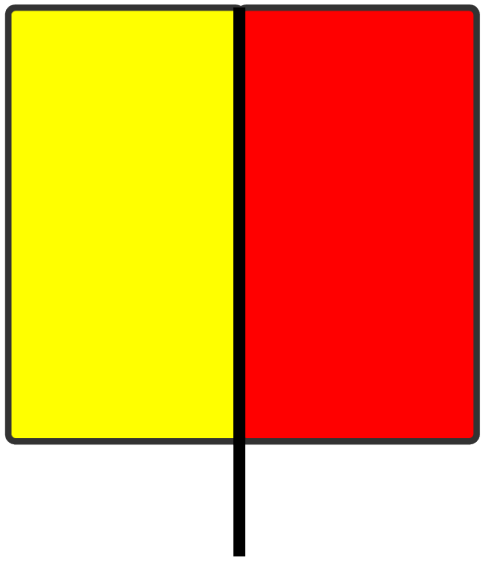
Operating instructions are shown in **Local Network Instructions** or on S&I diagrams.



Green and Red Target Type

7.5.3 Yellow and Red Target Type

Yellow and red target types are located on secondary main lines crossing loops and sidings. The points are provided with modified locking equipment and locked with an automatic signalling padlock.



Yellow and Red Target Type

7.5.4 Red Disc

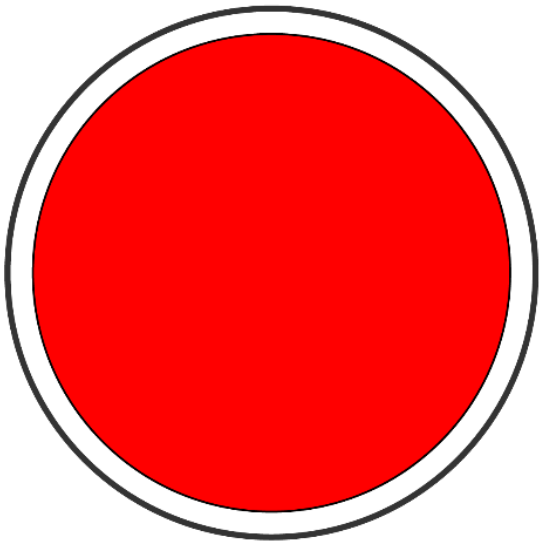
When a red disc is displayed, this indicates that the points are not in normal:

- The movement must be stopped
- The route must be checked to ensure it is secure for the intended movement
- After establishing there are no conflicting movement, the points can then be reset to normal for the movement to proceed

At a crossing station on the Midland Line, the following provides authority for the rail vehicle to proceed into the crossing loop without stopping:

- the high column switch stand is located at main line points, and
- the 'L' light on the arrival signal is illuminated, indicating the points are set in reverse.

NOTE
In certain situations, the target indicators may also display lettering for a specific route as detailed in **Local Network Instructions** or bulletins.



Red Disc

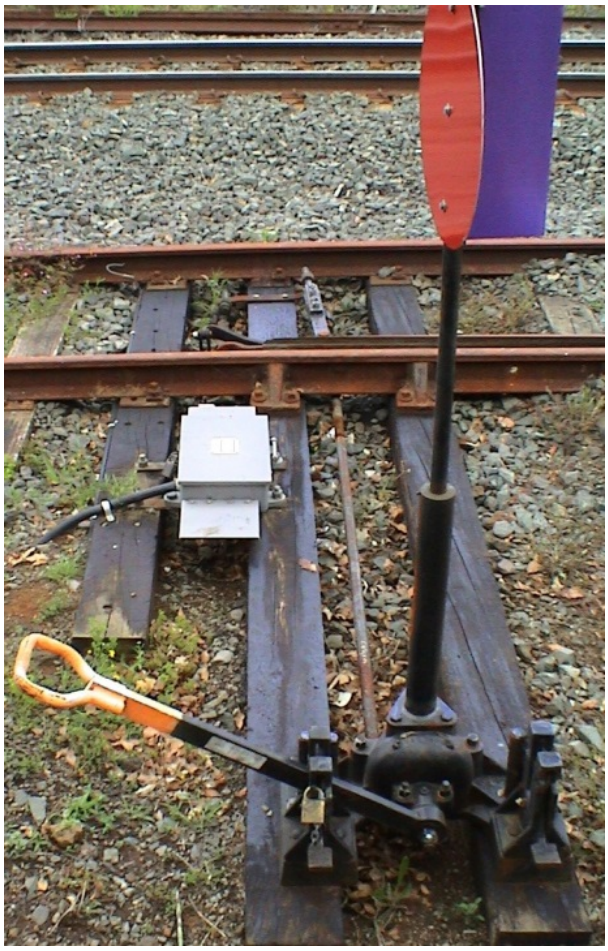
7.5.5 Operating Switch Stands

There are two types of switch stands:

1. **Non-gearbox type** with the operating lever pointing towards the ground. To move the points to the desired setting, the switch stand operating lever must be unlocked and lifted out of the locking notch to the horizontal position, rotated 90 degrees to move the points, and then inserted back into the other locking position.

Non-gearbox Switch Stand

2. **Gearbox type** with operating lever at an angle of about 40 degrees to the ground. To move the points to the desired setting, the switch stand operating lever must be unlocked, the locking notch foot treadle depressed to release the lever, and the lever rotated vertically to the other locking notch to move the points to the desired setting.



Gearbox Switch Stand

IMPORTANT
Switch stands are to be left locked in normal when not in use unless authorised by **Local Network Instructions** or bulletin.

WARNING
The switch stand is not designed to be thrown by a trailing movement through the points.

8. Track Warrant Control Signalling

8.1 Introduction

This section describes the related signals, indicators and boards related to track warrant control areas. It should be noted that these descriptions are not repeated in any other section of this document.

8.2 Arrival Signals

When the 'A' light is extinguished, track warrant control arrival signals become absolute signals.

NOTE

The 'A' light means the signal is under automatic control rather than the station being switched out.

On S&I diagrams, arrival signals are illustrated as a three position signal head. However, at some track warrant control stations, the arrival signal may only be fitted with a two position signal head.

- The arrival signals are equipped with an 'L' light and an 'A' light. At a junction, the 'L' light is omitted from the arrival signal that does not have a route to the branch line.
- The 'L' light illuminated indicates that the points are set for the crossing loop or between the branch and main line but not necessarily that the route is unobstructed.
- The 'A' light illuminated indicates that the motor points are correctly set and secured for either the main line, loop or branch line but not necessarily that the route is unobstructed.
- Track warrant control arrival signals have the marker light vertically below the upper unit with the 'L' light and 'A' light on either side unless specified on the S&I diagram or bulletin.
- Track warrant control arrival signals are under automatic control.

Table 1: Stop - TWC Arrival Signal

Name	Signal Call	Action
Stop	**All Red Stop**	**Stop.** Wait 10 seconds, then proceed cautiously and prepare to stop clear of any obstruction. • Facing points are locked. • Check that points are set for the intended route. • The track may be occupied or obstructed.

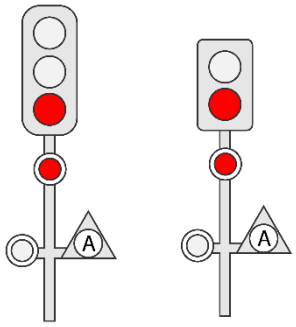
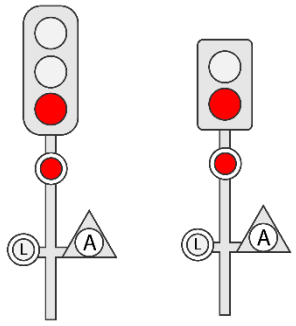
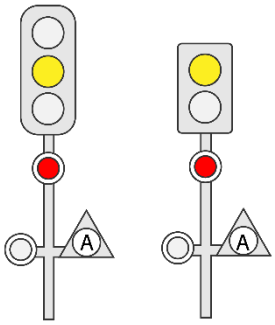
Name	Signal Call	Action
		
Low Speed to Loop	**Low Speed to Loop**	Route set for loop (or diverging route at the junction) • Proceed cautiously at a low speed • Facing points are in reverse • Prepare to find the track occupied or obstructed • Ready to stop short of any obstruction
		

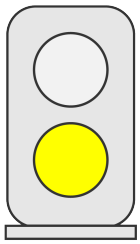
Table 2: Caution - TWC Arrival Signal

Name	Signal Call	Action
Caution Prepare to Stop	**Caution to Stop**	Proceed cautiously, prepared to stop at the next signal, facing points indicator or trailing points indicator.

Name	Signal Call	Action
		

8.3 Two Position Colour Light Indicators

The two position colour light indicators are used exclusively in track warrant control areas.



Two Position Colour Light Indicator

8.4 Two Position Colour Light Points Indicators

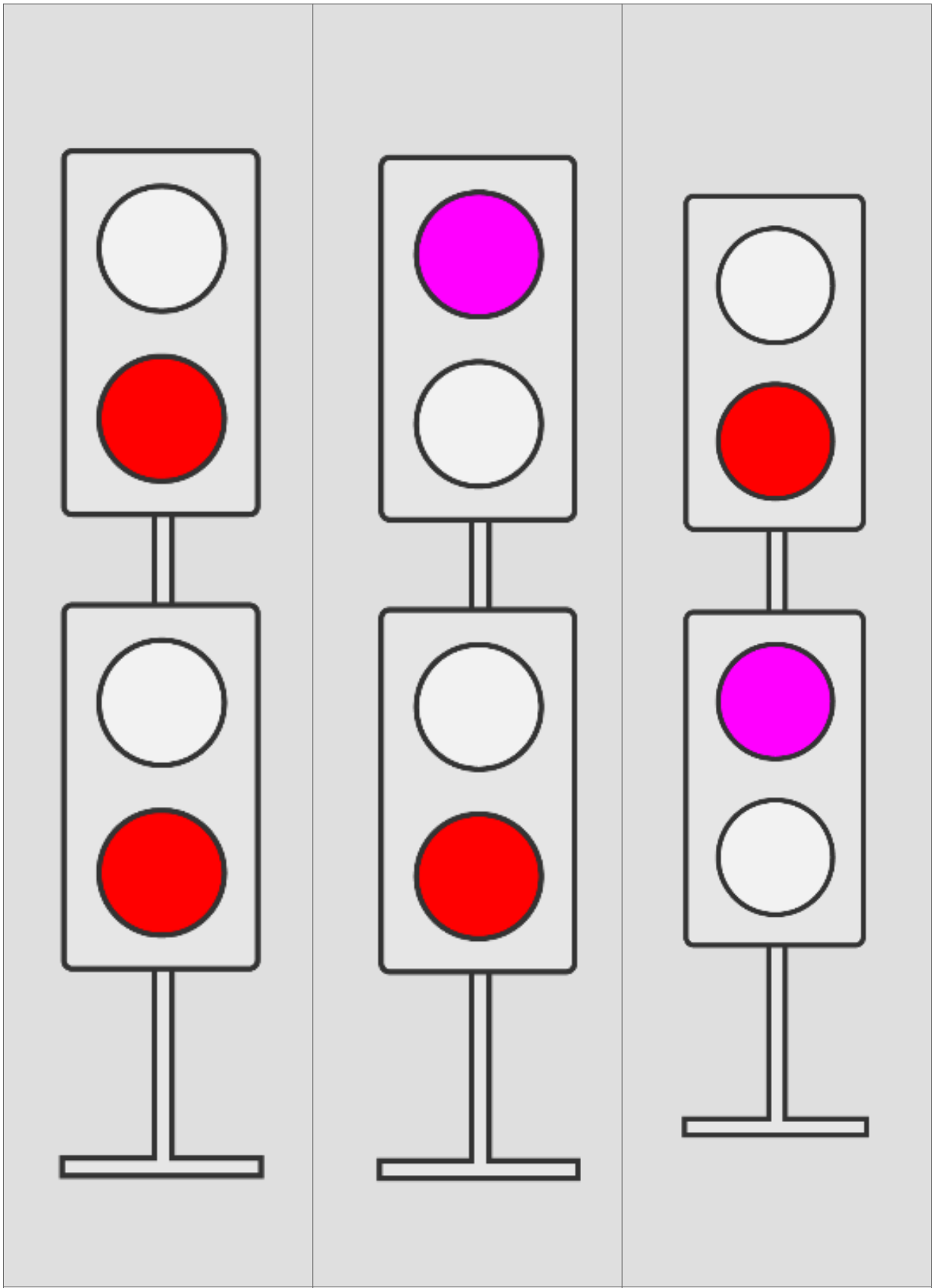
Facing and trailing points indicators are used in track warrant controlled territories only.

Facing Point Indicators

The following instructions are provided:

- Left figure: Stop and do not pass unless authorised by the prescribed written or verbal instruction.
- Centre figure: Points are set for the main or direct route.

- Right figure: Points are set for the loop or other diverging route.

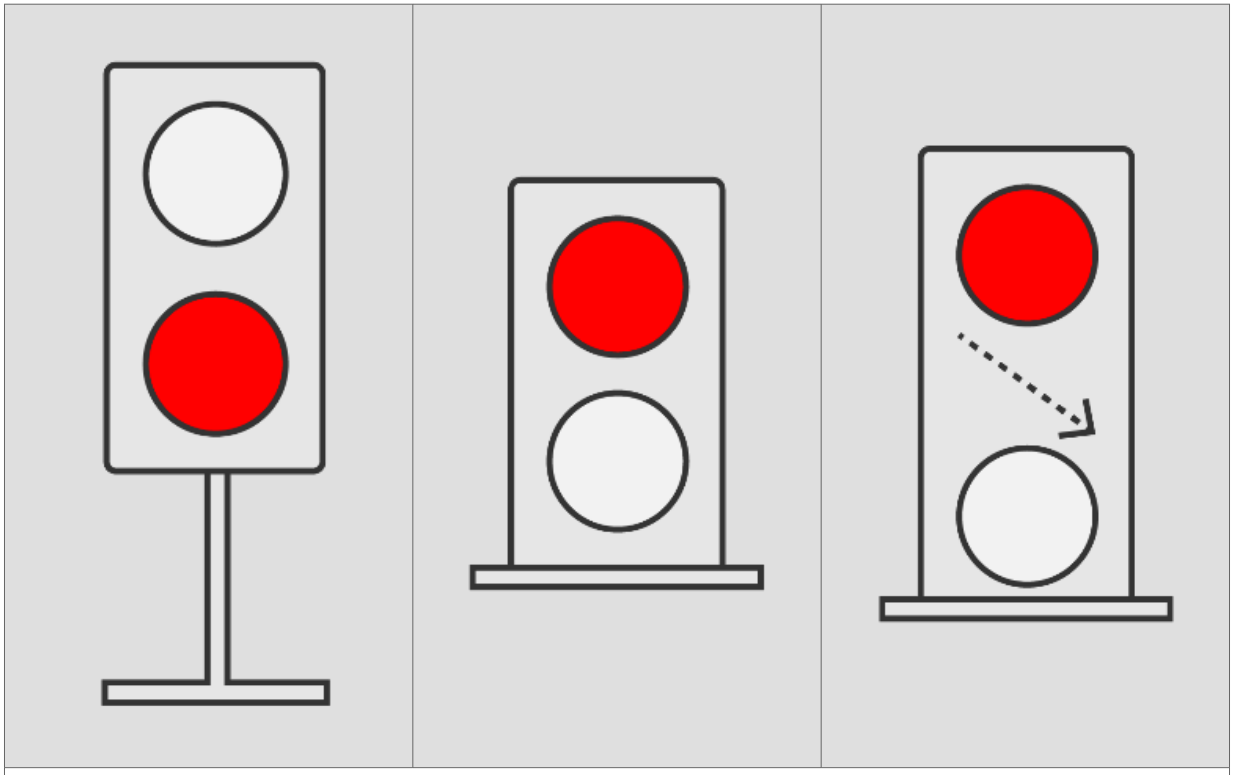


All Red Stop Facing Points Indicators	*Purple over Red Facing Points Indicators*	*Red over Purple Facing Points Indicators*

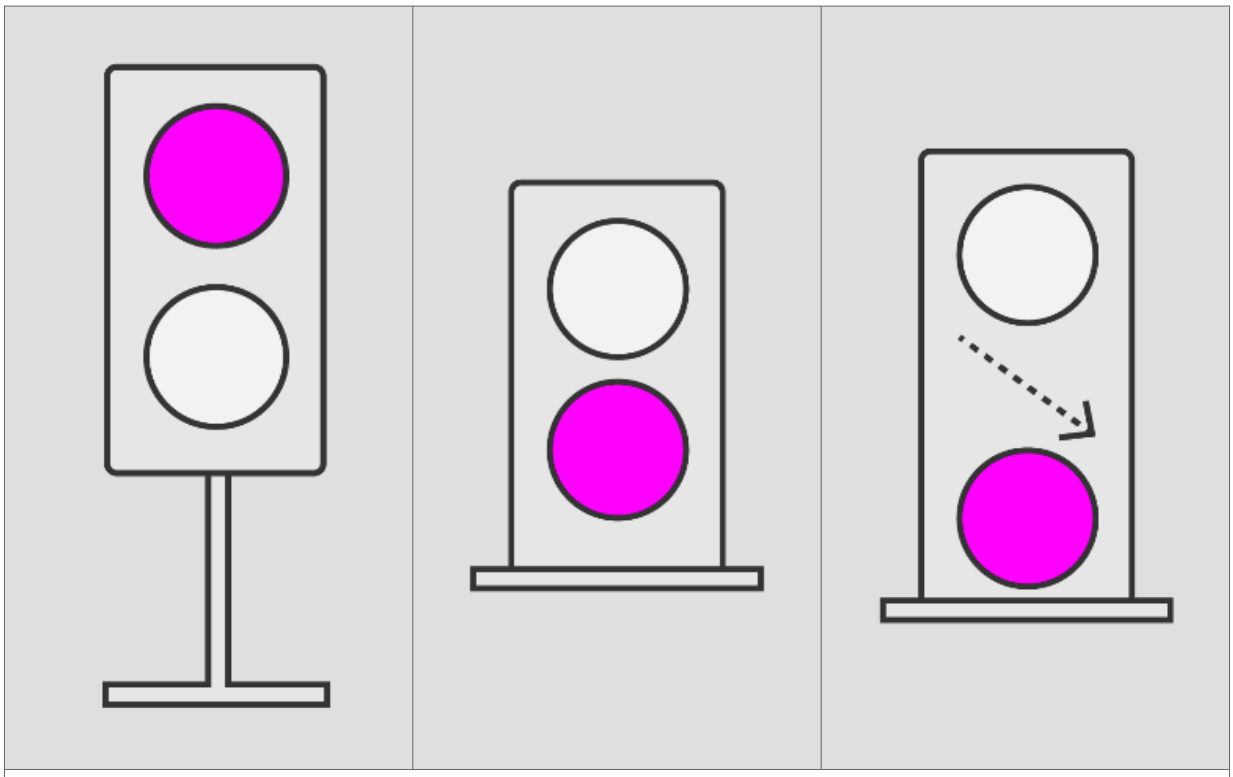
Trailing Points Indicators

The following instructions are provided:

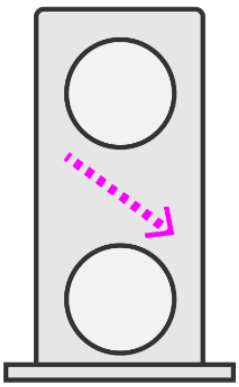
- Left figure: Stop and do not pass unless authorised by the prescribed written or verbal instruction.
- Centre figure: Points are set in the correct position.
- Right figure: Points are set for the backshunt.



All Red Stop



Purple Indicator



Purple Arrow

NOTE
Facing point and trailing point indicators are identified by the number of the points they protect, followed by the designator 'FI' and 'TI'.

8.5 Arrival Signals/Trailing Points Indicators

8.5.1 Meaning of Aspects

Track warrant control stations and junctions equipped with arrival signals and motor points:

Table: Arrival Signals

Arrival Signal Aspect	Meaning (in addition to existing meanings)
Yellow over red 'A' light illuminated. @	• Caution normal speed signal. • Section is clear. • Motor points are locked and set for the main line. • Be prepared to stop before the trailing points indicator.
Red over red 'L' light illuminated. 'A' light illuminated. @ #	• The facing motor points are locked and set for the loop or at a junction between the branch and the main line (either direction). • Proceed into the loop or onto the branch, as the case may be, at low speed. • Check hand points on the route, ensuring they are correctly set before passing them over.

Red over red
'A' light illuminated.
	Stop
	• An arrival signal control box door may be open.
	• The facing motor points are locked and set for either the main line, loop or branch line.
	• If correctly set for the intended route:
	  • Proceed in accordance with **SO08 Track Warrant Control**.
	  • If entering the main line or loop - check all hand points ensuring they are correctly set before passing over them.
	• Train berthed on main or loop and arrival signal control operated for a run around/shunt movement.

Arrival signal
Red over red.
'A' light not illuminated.
	Stop
	The motor points may be incorrectly set, or a stop push button may have been operated.
	• Operate the push button in accordance with **RP02 Using Track Warrant Control**.
	• If the required aspect fails to display:
	  • Tell the Train Controller of the fault.
	  • Secure the motor points, for the intended movement, before passing over them.
	  • Check track warrant limits before proceeding.

NOTE

At Kai Iwi the 'L' light illuminated also indicates that the loop to sidings points are set for the loop.

NOTE

@ If an 'A' light is extinguished when either a caution normal speed or 'L' light indication is displayed, the points are still correctly locked and set for the intended route. The defective 'A' light must be reported to the Train Controller for repair.

NOTE

If two opposing trains are closely approaching the station simultaneously, both main line arrival signals will display red over red with the 'A' light illuminated. At a junction, this includes a branch/main line situation.

NOTE
A main line arrival signal will revert from caution normal speed to stop if a second train occupies the track circuit approaching the other end of the station.

Table: Trailing Points Indicators

Trailing Points Indicator	Meaning
Trailing points indicator aspect red	**Stop** • The motor points may be incorrectly set, or • Level crossing alarms may not be working, or • A stop pushbutton may have been operated, Operate the push button in accordance with **RP02 Using Track Warrant Control**. If the required aspect fails to display: • Tell the Train Controller of the fault. • Secure the motor points, for the intended movement, before passing over them. • Check track warrant limits before proceeding. • Check if level crossing alarms/warning devices are working, and if not, proceed at 10 km/h until the train is occupying the crossing.

8.6 Interceptor Marker Posts

Interceptor marker posts are provided to align with Interceptor speed check waypoints of 1,000m and 500m outside track warrant stations and main line sidings, as detailed in **Interceptor Manual, 3. Speed Check Waypoints**.

1,000m Interceptor Marker Post (one thick diagonal reflectorised blue strip)

500m Interceptor Marker Post (five thin diagonal reflectorised blue strips)

9. Signal Calling

9.1 Meaning

Meaning of aspects displayed by automatic running signals and indicators.

Table: Signal Calling

Signal Call – Role	Requirement
Operators	Calling to themselves for local situational awareness.
Second Person in the cab	Calling signals to the Operator.
Rail Personnel outside the cab environment	When relaying signal indications to an Operator.
	Exception: When piloting on the main line, the Pilot may call the colours of the signal displayed instead of the normal call. **Note:** The Pilot must agree with the Operator on which method of signal calling is to be applied before the movement occurs.

9.2 Calling Main Line Signal Colours

Calling Main Line Signal Colours from outside of Locomotive Cab

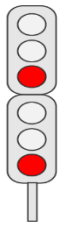
When piloting on the main line, the Pilot may call the colours of the signal displayed instead of the signal calls.

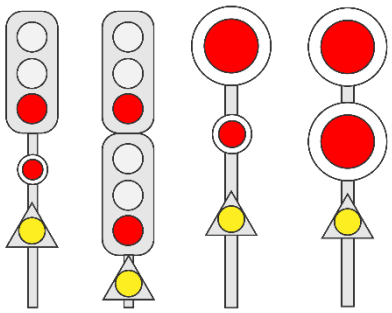
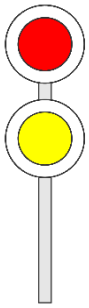
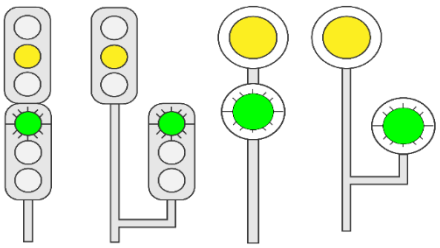
All main line signals have two aspects to call.

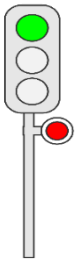
- A signal showing two red lights is called all red.
- Call the non-red colour first and its position in relation to the other light unit.
- No red colour is displayed; call from top to bottom and say what you see.

The table below shows good practice when calling colours on main line signals.

Table: Calling Colours

Signal Displays	Call
	**All Red**

Signal Displays	Call
	**Low Speed**
	**Yellow bottom, red top**
	**Yellow over Green Flashing**

Signal Displays	Call
	**Green over Red**

10. Signalling and Interlocking Diagrams

S&I diagrams are printed plans of the layout of a station showing the signalling arrangements and the types and relative positions of the various facilities connected with signalling. S&I diagrams are produced for all stations with points, signals and points indicators that are interlocked.

Books containing up to date copies of all S&I diagrams covering sections worked must be maintained and available at each location for Locomotive Running Personnel, Rail Personnel certified in shunting duties, and Rail Personnel certified in HRV operation.

The Manager of the relevant Rail Personnel is responsible for ensuring the new diagrams and amendments are placed in station order in the book.

Relevant S&I diagrams will be held at Train Control and Signal Boxes/Panels for all locations under their control.

S&I diagrams are not drawn to scale, although distances in metres between various points are shown. The S&I diagram does not indicate gradients and curvature of the track, and all lines (mains, loops and sidings) are shown as straight track.

Whenever signalling or interlocking is installed, or alterations are carried out to existing signals, the changes are advised to Rail Personnel by bulletin pending the reprinting of the S&I diagram.

For major alterations, the diagram is reprinted and brought into operation by a bulletin at a given time and date. When Rail Personnel read the relevant bulletins, they must ensure they become familiar with the S&I diagram changes.

Signal symbols on S&I diagrams display their normal indications when no rail vehicles are present, and any controlling levers are normal.

In practice, this will mean that:

- All signals controlled by a Signaller are shown at stop (Signal Boxes assumed to be normally switched in).
- Any automatic signal that requires track circuit activation before showing a proceed indication.
- Track warrant control arrival signals and trailing indicators are shown normally at stop.
- ASR block section sectional block intermediate signals that allow following moves will normally be shown at stop.
- Midland Line departure signals are shown at stop, and arrival signals are shown at caution.
- The remaining intermediate signals will be shown at clear, advance caution or caution depending on their position relative to a signal normally at stop.

The advantages of the above system are:

- It gives a simple, consistent instruction that all Rail Personnel may easily understand.
- It allows sectional block section intermediate signals and those automatic signals with hidden control (e.g. delay clearing after track occupied) to be separately identified.

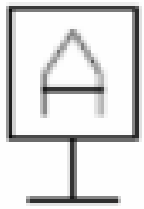
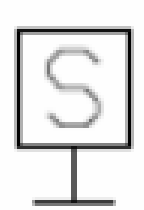
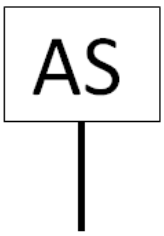
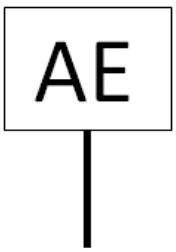
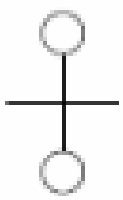
NOTE
Current S&I diagrams are stored electronically on KiwiRail's intranet.

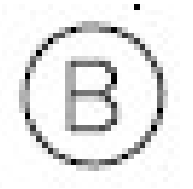
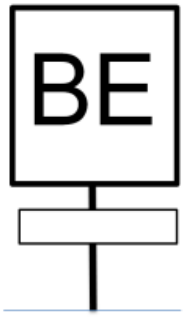
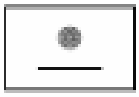
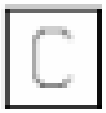
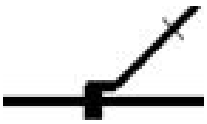
10.1 List of Symbols

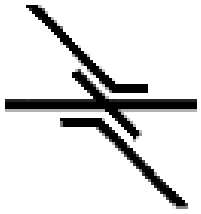
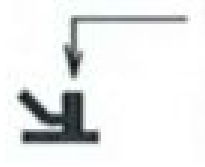
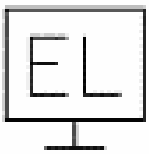
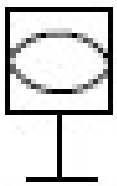
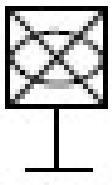
Table 26 provides a list of symbols illustrated on various S&I diagrams.

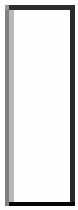
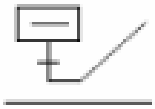
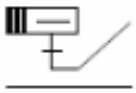
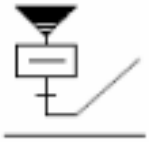
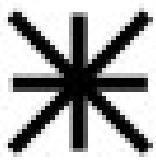
Only symbols indicating something unusual are detailed on the actual S&I diagram.

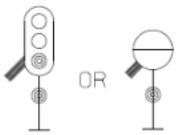
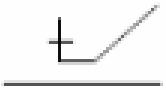
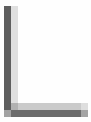
Table 26: S&I Diagram Symbols

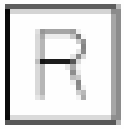
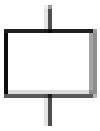
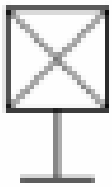
Symbol	Meaning
	**Advanced Speed Indicator** It will display a flashing white speed in km/h, as shown on S&I diagrams
	**Alarms Start Here Board**
	**All Trains Stop Board**
	**Automatic Signalling Begins**
	**Automatic Signalling Ends**
	**Axle Counter**

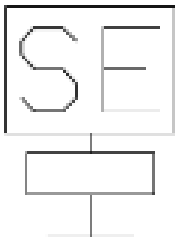
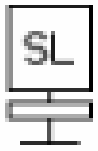
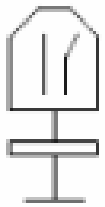
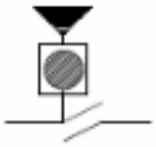
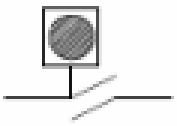
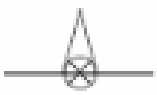
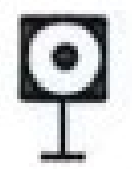
Symbol	Meaning
	**Banner Indicator**
	**Barrier Manual Control**
	**Block Entry Board (BEB)** With identification nameplate underneath showing either up or down BEB
	**Bridge** Shown where signal positions are affected
	**Chain Locked Points**
	Controlled Network
	**Control Panel** To which control is transferred from a Signal Box periodically
	**Crank Handle**
	**CTS2 Points**
	**Derailer** AS padlocked unless otherwise specified

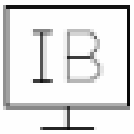
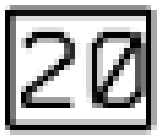
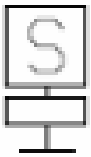
Symbol	Meaning
	**Double Slip Points**
	**Dual Control Points Machine** Located within the sleeper-like case and shows the side where manual control is obtained.
	**Electrically Detected Hand Points**
	**Electrified Tracks**
	**Electrified Road**
	**Electric Points Lock** On Wynn Williams type points
	**Electric Services Limit Board** Previously known as electric loco limit board or electric limit board
	**Entry to ETCS Notice Board**
	**Exit from ETCS Notice Board**

Symbol	Meaning
	**Express Freight speed board** “slow XX”
	**Fouling Board**
	**Frame Lever Points** Fitted with facing points lock
	**Frame Lever Points** Fitted with facing points lock, TW lever lock and, when on the main line a padlock (with AS shown)
	**Frame Lever Points** Fitted with switch lock and facing points lock
	**High Column Switch Stand and Switch lock**
	**High Column Switch Stand** Equipped with TW lock red/green indicator and locked with an AS padlock
	**High Column Switch Stand** As shown as 'AS' padlocked unless otherwise specified
	**HRV On/Off Tracking Location** In axle counter areas

Symbol	Meaning
	**Jointly Controlled Signal** The number in brackets refers to the signal number in Train Control
	**Level Crossing Alarm Control**
	**Level Crossing Indicator** It will be shown as XI on the S&I diagram, followed by either 'L' or 'R' depending on the side of the crossing located.
	**Lever Points** Fitted with facing points lock
	**Limit of Track Circuiting** In signalled area
	**Lockout Zone** Number denotes zone
	**Medium Speed Board** With “slow XX” Note: XX is equivalent to the km/h shown on the board
	**Motor Points (crank handle)**
	**Motor Points (dual control)**
	Operator Controlled Territory
	**Pedestrian Gate Fitted**

Symbol	Meaning
	**Permanent Speed Board slow XX**
	**Releasing Switch**
	**Request for Signal**
	**Restricted Speed Signal**
	**Route Indicator**
	**Shunting Limit Board**
	**Signal Box**
	**Signal Control** The suffix indicates signal/points number controlled
	**Single Slip Points**

Symbol	Meaning
	**Station Entry Board**
	**Station Limit Board (SLB)** With identification nameplate underneath showing either up or down SLB
	**Station Warning Board (TWC)** With identification nameplate underneath
	**Switch Stand** Fitted with a switch lock, points indicator and is locked with AS padlock
	**Switch Stand** Fitted with points indicator and locked with AS padlock
	**Track Warrant Hand Points Sign**
	**Train Stop**
	**Trap Point Indicator**
	**Tunnel** Shown where signal positions are affected

Symbol	Meaning
	**TWC Begins Board**
	**TWC Ends Board**
	**TWC Intermediate Board**
	**Warner or Speed Indicator** It will display a steady white speed in km/h, as shown on S&I diagrams
	**Woods Sleeper Locked Points** (A-key pattern) (x) spring where applicable
	**Wrong Line Running Limit Board** Upper board – standard All Trains Stop board. The lower board shows the short station name (3 letter name), e.g., Taihape shows as TPE and board number (even for up and odd for down)

