



**BRISTOL SOCIETY OF MODEL &
EXPERIMENTAL ENGINEERS**



**ASHTON COURT ESTATE
MINIATURE RAILWAY**

Signalling Handbook



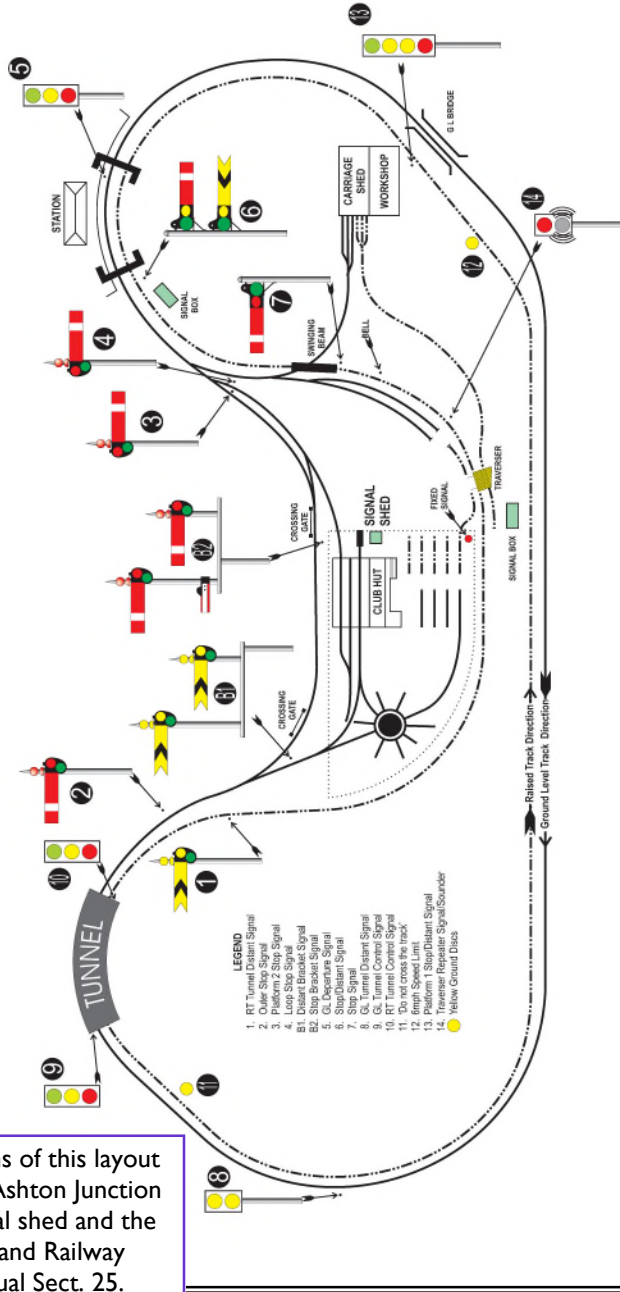
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ASHTON COURT MINIATURE RAILWAY LOCATION OF SIGNALS & SIGNS

Signals are stored in the Signal Shed
Except 6 (which is stored in the Station)
and 5, 9, 10, 13 & 14 (which are fixed in position)



Larger scale versions of this layout are situated in the Ashton Junction signal box, the signal shed and the Duty Manager's and Railway Operator's Manual Sect. 25.

SECTION I

Introduction and definitions

There are two main types of signal to be found at Ashton Court Railway, and indeed on full-size UK railways. The first type is known as a **semaphore** signal. These consist of a movable arm attached to a post. The second type is a **colour light** signal, these consist of one or more lights, arranged vertically and mounted in a box known as a **signal head**. Semaphore signals are further divided into **stop** and **distant** signals.

The position of the arm on a semaphore signal is known as its **indication**, the colour of light or lights displayed by a colour light signal is known as its **aspect**. The indication or aspect of a signal informs the driver of an approaching train how far the line ahead is clear, and thus what action he or she needs to take.

Section 2 describes the meanings of the various signal indications and aspects that can be given by the signals at Ashton Court Railway.

Note!

Signals are an indication system only and it is the responsibility of the driver to make sure the track ahead is clear at all times.

SECTION 2

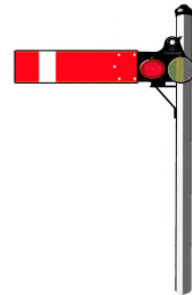
Semaphore Signals

Stop signals

Danger

Indication: Arm horizontal.

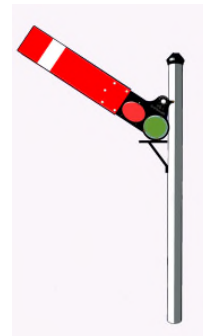
Meaning: Stop before the signal. The next section of track is occupied by a train or obstruction, or the signalman has instructed you to stop.



Clear

Indication: Arm raised or lowered by 45°

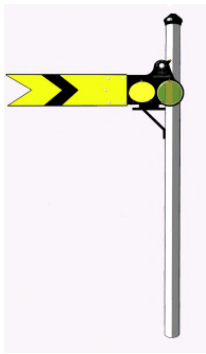
Meaning: Proceed to the next section of track if it is clear.



SECTION 2

Semaphore Signals Cont'd

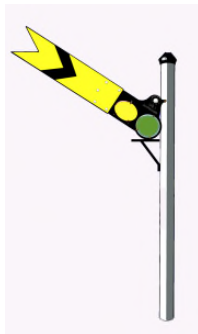
Distant signals



Caution

Indication: Arm horizontal.

Meaning: Proceed if the line is clear, but be prepared to stop at the next signal.



Clear

Indication: Arm raised or lowered by 45°.

Meaning: Proceed if the line is clear, the next stop signal is showing clear.

SECTION 2

Semaphore Signals Cont'd

Calling on signals

Danger

Indication: Arm horizontal.

Meaning: Stop before the signal. The next section of track is occupied by a train or obstruction, or the signalman has instructed you to stop.



Clear

Indication: Arm lowered by 45°

Meaning: There is a train in the next section of track but you may proceed past the signal with caution being prepared to stop short of any obstruction.

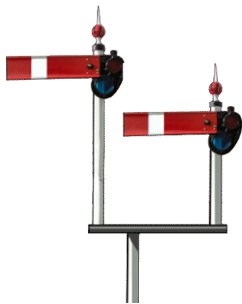


A signal of this type is used on approach to the Ground Level Station Arrivals Platform(s) to allow more than one train in the Station at any one time.

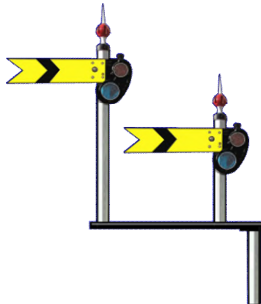
SECTION 2

Semaphore Signals Cont'd

Bracket signals (route indication)

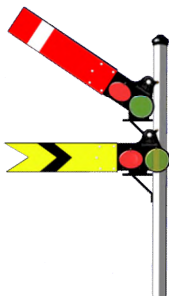


Two signal posts and arms side by side indicate the route selection ahead. The left hand signal arm refers to the left hand track and the right hand arm to the right hand track. The higher of the two arms refers to the main, or straight ahead route.



Signals of this type are used on the approach to the **Ground Level Station**

Two signal arms on one post



Stop and distant signal arms on the same post apply to the same line and indicate the state of the next two sections of track.

Signals of this type are used on the **departure side of the Raised Track Station**

SECTION 3

Colour Light Signals

Red aspect

Danger

Stop



Single yellow aspect

Caution

Proceed if the line is clear, but be prepared to stop



Double yellow aspect

Preliminary Caution

Proceed if the line is clear, but be prepared to stop at the signal after next. The next signal is displaying a yellow aspect but the signal following is at Danger.



Green aspect

Proceed to the next section of track if it is clear.



SECTION 3

Colour Light Signal and Audible Alarms



Flashing red light, bell or siren

Emergency stop.

Stop immediately. An emergency safety system has operated and you are in imminent danger.

SECTION 4

Details of Individual Sections of the Signalling System

For information on the procedures for setting up the signalling system prior to normal public running, please refer to Duty Manager's and Railway Operator's Manual section 6.

4.1 Raised Track Signals

Station Departure: Upper quadrant semaphore stop signal 6 protects the track from the station departure platform, through the swinging beam, to the optical detector, which is located just past signal 7. If the swinging beam is not fully closed, or there is a train on this section of the track the signal shows danger. The signalman can also set it to danger. Upper quadrant distant signal 6 shows caution if signal 7 is set to danger.

Swinging Beam: To prevent unauthorized operation of the swinging beam a non-standard padlock is provided. The padlock key must be in its position in the signal box and selected to the "normal running" position in the signal box to allow signal 6 to be cleared.

Traverser Protection: Upper quadrant stop signal 7 and the full sized upper quadrant stop signal beyond the traverser protect the approach to the traverser. If the traverser is open or being operated both signals show danger. Operation of the traverser is not possible until these signals are set to danger. In the event of a train passing signal 7 when it is set to danger a bell will ring for 16secs.

Traverser Safety Protection: When the traverser is not in the main line position the red beacon 14 will flash. A train on the track immediately preceding the beacon, when the traverser is not in the main line position, will initiate the siren on beacon 14. The siren will sound for 15secs. and will not sound again until the traverser has been closed.

SECTION 4

Details of Individual Sections of the Signalling System

4.1 Raised Track Signals Continued.

Traverser Control: The controls for operating the traverser are located in the Ashton Sidings (traverser) signal box. These take the form of a key operated, two position selector switch and a handheld control box. The position of the selector switch determines whether the protecting signals (7 and the full sized signal) are controlled locally by the handheld controller, or by the signaller in the Ashton Junction signal box.

During public running, the selector switch will normally be set to 'Signaller Control' and its operating key will be held by the signaller. As mentioned above, it is not possible to operate the traverser without the protecting signals being set to danger. With the selector switch set to Signaller Control, it is therefore necessary to request use of the traverser from the signaller.

Before operating the traverser the track must be checked to ensure there are no approaching trains, which could be endangered by movement of the traverser. When the operator is satisfied that it is safe to do so, the protecting signals can be set to danger. If operating in Local Control mode, this is achieved by means of a switch on the hand held controller. If operating in Signaller Control mode, a request to put the signals to danger will need to be sent to the signaller by three rings of the bell. The signaller will then return the bell code and put the full size signal to danger when it is safe to do so.

Once the signals are at danger, the locking bolts can be withdrawn and the traverser moved. When the traverser is in the new position the bolts must then be inserted.

SECTION 4

Details of Individual Sections of the Signalling System

4.1 Raised Track Signals Continued.

Once the traverser moves have been completed, it should be returned to the main line position. The signals can then be cleared. In Local Control mode this is done by using the switch on the handheld controller. In Signaller Control mode, the traverser operator will send two rings to the signaller who will return the bell signal and set the full size signal to clear. It should be noted that signal 7 automatically follows the operation of the full size signal.

Note!

For further details of the operation of the traverser see Duty Manager's and Railway Operator's Manual section 7.

Tunnel: Three aspect colour light signal 10 protects the tunnel. Red indicates a train in the tunnel or within 60ft of the tunnel exit. Yellow indicates train has left the red zone within the last 5 seconds. Green indicates zone is clear. Distant signal 1 indicates caution when tunnel signal is at red. This is provided because of reduced visibility of tunnel signal 10.

Station Approach: Four aspect colour light signal 13 caters for reduced visibility caused by the workshop, and protects the station approach and the station platforms. Red indicates a train on the track behind the workshop. Single yellow indicates train in the station and double yellow indicates no train in the station but departure signal 6 at danger. Green indicates no train in the station and the departure signal 6 is clear.

SECTION 4

Details of Individual Sections of the Signalling System

4.2 Ground Level Signals

Station Departures: Three aspect colour light signal 5 protects the track through the green tunnel. Red indicates a train in the section leading up to the Sumerill Bridge, which then goes to yellow for 5 seconds after the train has left this section. It then reverts to green to indicate the section is clear.

A control box is provided near the entrance barrier to the platform, for station arrivals and movements to the departure platform. This provides pushbuttons to control the point and arrivals signals by the station staff in the absence of a signalman.

Tunnel: Three aspect colour light signal 9 protects the tunnel. Red indicates a train in the tunnel or on the track between the tunnel and the steaming bay point. Yellow shows caution indicating that the steaming bay approach signal 2 is set to danger. Green indicates there is no train in the tunnel or on the approach to the steaming bay point and that signal 2 is clear. Double yellow colour light signal 8 show a single yellow caution when signal 9 is red and double yellow when signal 9 is yellow.

Steaming Bay: Lower quadrant semaphore stop signal 2 indicates danger when the steaming bay point is not set to main line or the steaming bay crossing gate is open. When setting the point to steaming bay check for trains approaching through the tunnel. If a train has passed the tunnel entrance the driver will not be aware of the point position or of a train on the track.

SECTION 4

Details of Individual Sections of the Signalling System

4.2 Ground Level Signals Continued

The signalman can set the signal 2 to danger with a control lever in the signal box. When proceeding into the steaming bay signal 2 may be passed when it is indicating stop as this indication is for the main line route.

Station Arrivals: Lower quadrant semaphore gantry stop signal B2 controls the approach to the arrivals platform and indicates route selection. If the left signal is clear the station entry point is set to give access to the main line platform. If the right signal is clear the point is set to give access to the loop line. Signal B1 is a lower quadrant gantry distant signal, which gives an early warning of the position of the stop signal B2.

Signals B1 and B2 are controlled by the signalman and can be set clear when the point is in the appropriate position, there is no train at the platform, and the crossing gate is closed. The signalman can set them to danger even if the track is clear.

A lower quadrant calling on signal is provided on signal B2, which can be set to clear by the signalman, permits the driver to proceed past the danger signal to the main line station platform but alerts him to a train already at the platform.

The station entry point is controlled from the signal box, however local operation is possible provided the point control lever in the signal box has been left in the midway or vertical position.

SECTION 4

Details of Individual Sections of the Signalling System

4.2 Ground Level Signals Continued

A bell push is provided on the fence adjacent to the signal B2, which operates a bell in the signal box. This can be used if the driver wishes the route to be changed or if there is an apparent undue delay.

To prevent operation of the point when a train is crossing, an interlock is fitted which prevents operation of the point once the train has passed signal B2 until the train has cleared the exit from the point. If the train is not detected this can lock out the signalling system and point control. Operating the signal lever in the signal box to put the gantry signal to danger then releasing, or turning the power off and on will reset the system.

Access to Station Departure Platform: Lower quadrant semaphore stop signals 3 and 4 control the access to the departure platform. They can be cleared from the signal box but automatically go to danger when there is a train on the immediate exit of this section. When operating main line only it is possible to leave signal 3 at clear. The signal will then go to danger when a train has passed but revert to clear once the train has left the exit section. This could be useful when the signal box is unmanned

SECTION 5

General Notes on Power Supply and Failure Mode.

Signal Power Supplies:

The ground level arrival and departure semaphore signals together with the raised track departure signals and signal 7 alarm bell are powered by a supply in the old workshop adjacent to the signal relay cabinet. Tunnel colour light signals are powered by a supply in the old workshop adjacent to the signal relay cabinet.

The colour light signals for ground level station departure and raised track arrivals are powered by a supply in the station building.

The safety siren and flashing light, the traverser signals and controls are powered from the traverser signal box. It should be noted that unless the main signal system in the old workshop is energized signal 7 alarm bell will not operate.

In the event of a system failure the signals will normally go to danger or all colour lights may go out. If such a failure is suspected then drivers must stop. They may then proceed with extreme caution. With one-way operation, no train will be coming in the other direction, but there may be an obstruction or other incident. The appropriate authority shall be informed of the signal failure as soon as possible.

This Handbook has been produced as an aid to Drivers, Duty Managers and Operating Staff and provides a comprehensive overview of the whole signalling system as installed at Ashton Court Miniature Railway. It is intended to be supplementary to, but read in conjunction with, the Ashton Court Miniature Railway Code of Practice