Participant's Manual

Signals

Training Documentation for Drivers

Impressum

Editor:
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Solmsstraße 18
60486 Frankfurt am Main

Editorial deadline:
Product number:

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1 The provisions of Germany's Railway Signalling Regulations (ESO) and the meanings of signals

Learning targets

At the end of this building block, participants are to be able to:

- correctly assign the ESO provisions
- assess and apply signals
- distinguish between signal systems

Focus areas

- Layout of the DB Signal Code
- Features of signals
- Signal systems

Layout

6.1 Meanings of signals .

6.2 Features of signals

6.3 Signal systems

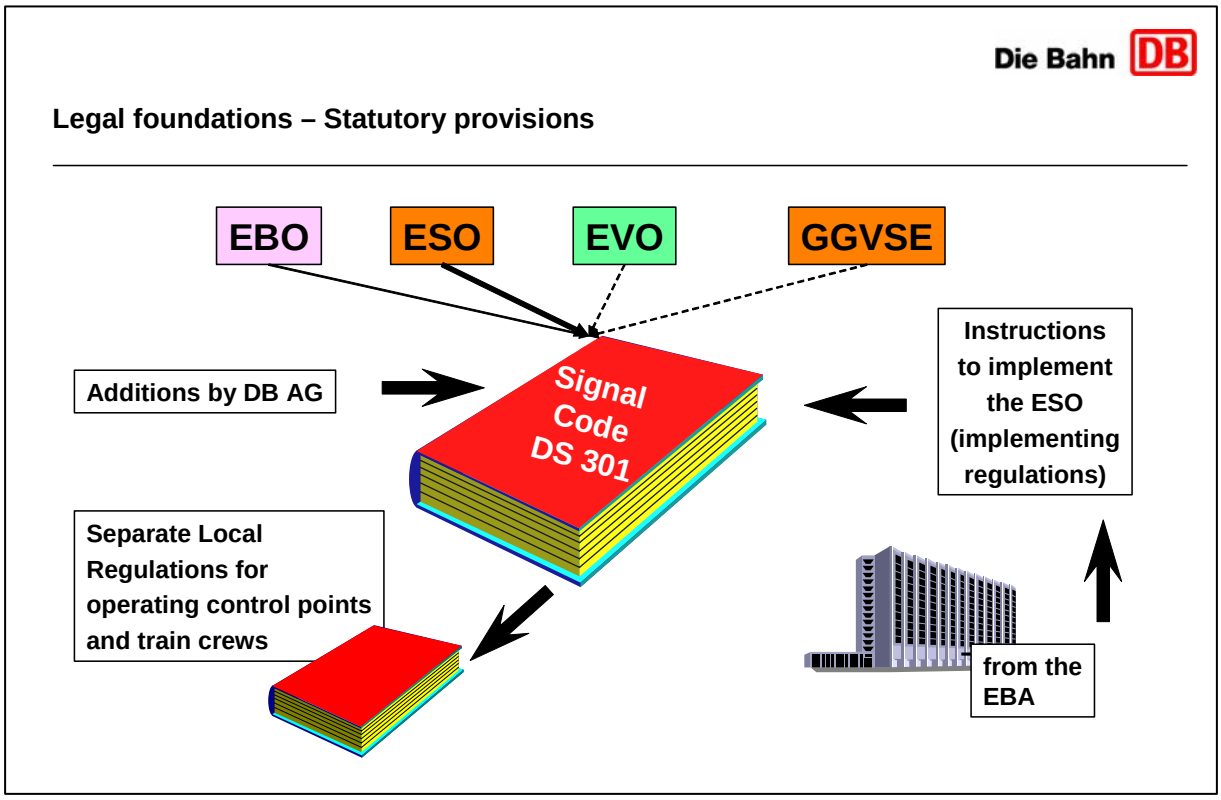
6.4 Positioning of signals

1.1 The meanings of signals

1.1.1 The DB Signal Code

The Signal Code (DS 301, applicable with amendments since 15 December 1959) for what was Deutsche Bundesbahn or DB contains:

- Railway Signalling Regulations (ESO) as statutory provisions and
- the ESO implementing regulations.



The Signal Code (DV 301) for the former Deutsche Reichsbahn or DR (in what was East Germany) entered into force on 1 October 1971. It has continued to be applicable since the Unification Treaty of 31 August 1990 despite extensions being made to the area governed by ESO.

There are currently **3** valid variants of the Signal Code:

- a joint Signal Code, DS/DV 301
- DS 301 for what was Deutsche Bundesbahn (DB) und
- DV 301 for what was Deutsche Reichsbahn (DR).

Layout of DS/DV 301:

Following **Section A** (General) with details of
- area of application
- responsibilities and
- definitions of terms,

signals are divided into groups by function in **Section B**.

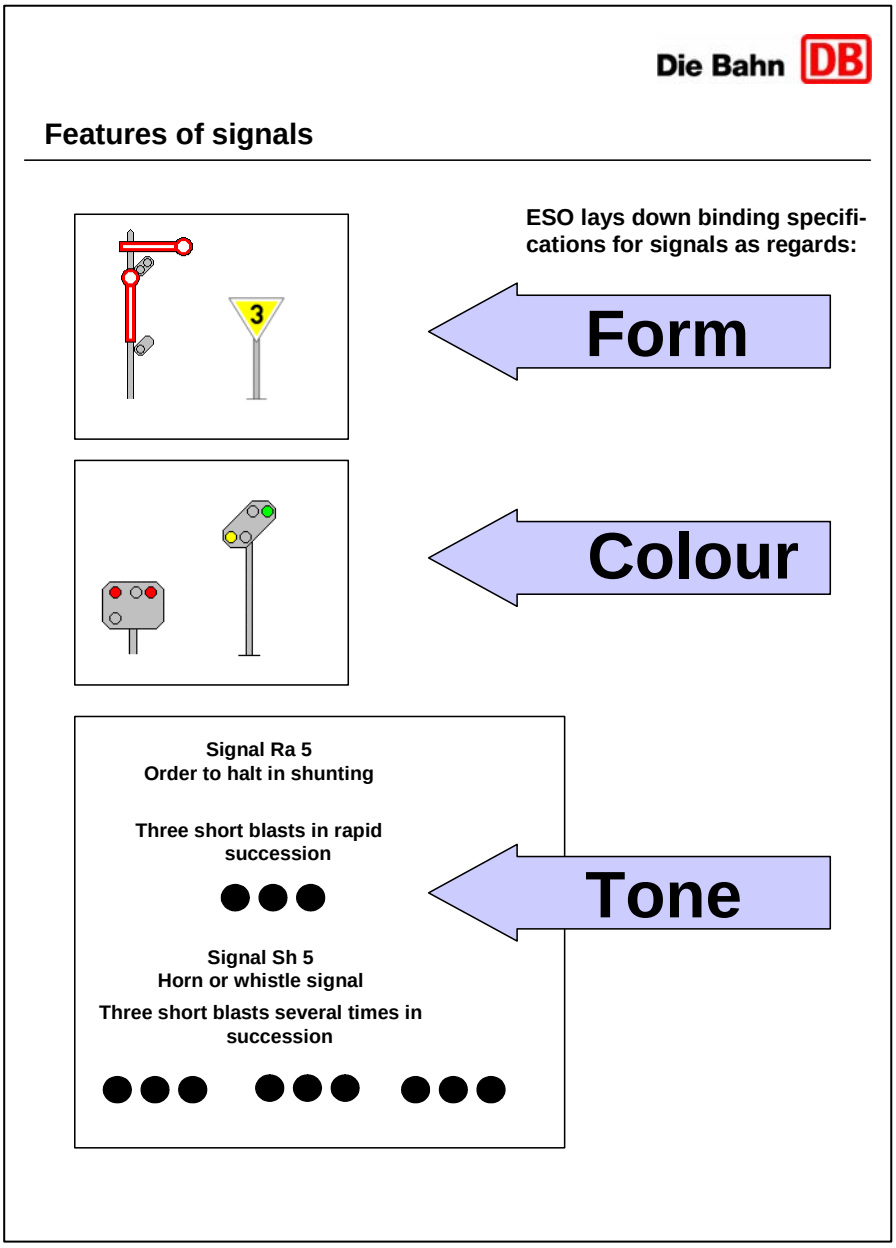
Layout of the Signal Code			
Section		**Section Content**	**Designation**
A		General: Area of Application, Responsibilities, Terms	
B	I	Stop signals	Hp
	II	Distant signals	Vr
	IIa	Combination signals	Ks
	III	Composite distant/stop signals (Berlin S-Bahn)	Sv
	IV	Additional signals	Zs
	V	Signals for banking locomotives and movements over blockaded track	Ts
	V	Temporary speed restriction signals	Lf
	VII	Protecting signals	Sh
	VIII	Signals for shunting duties	Ra
	IX	Points signals	Wn
	X	Signals for train crews	Zp
	XI	Catenary signals	El
	XII	Signals on trains	Zg
	XIII	Signals on individual vehicles	Fz
	XV	Gang warning signals	Ro
	XVI	Subsidiary signals	Ne
	XVII	Signals for level crossings	Bü

1.2 Features of signals

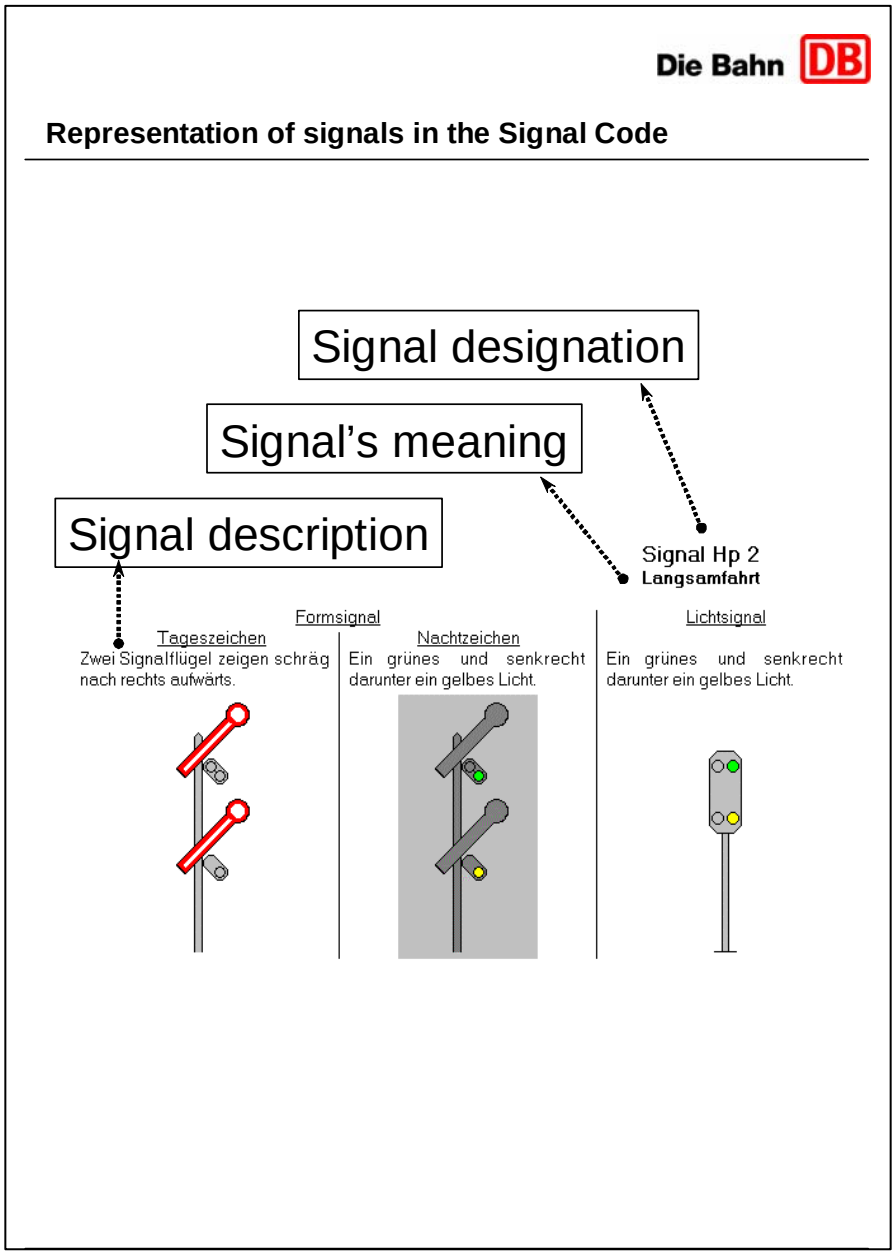
Since the very beginning of the railway age, signals have served as a means of communication and have been key to the safety of the railway.

This is why it expressly states in Paragraph 6 ESO that:

Signals may only be used in the prescribed forms, colours and tonalities and for the envisaged purpose.



Paragraph 7 ESO points out that the description prevails whilst illustrations merely have explanatory status.



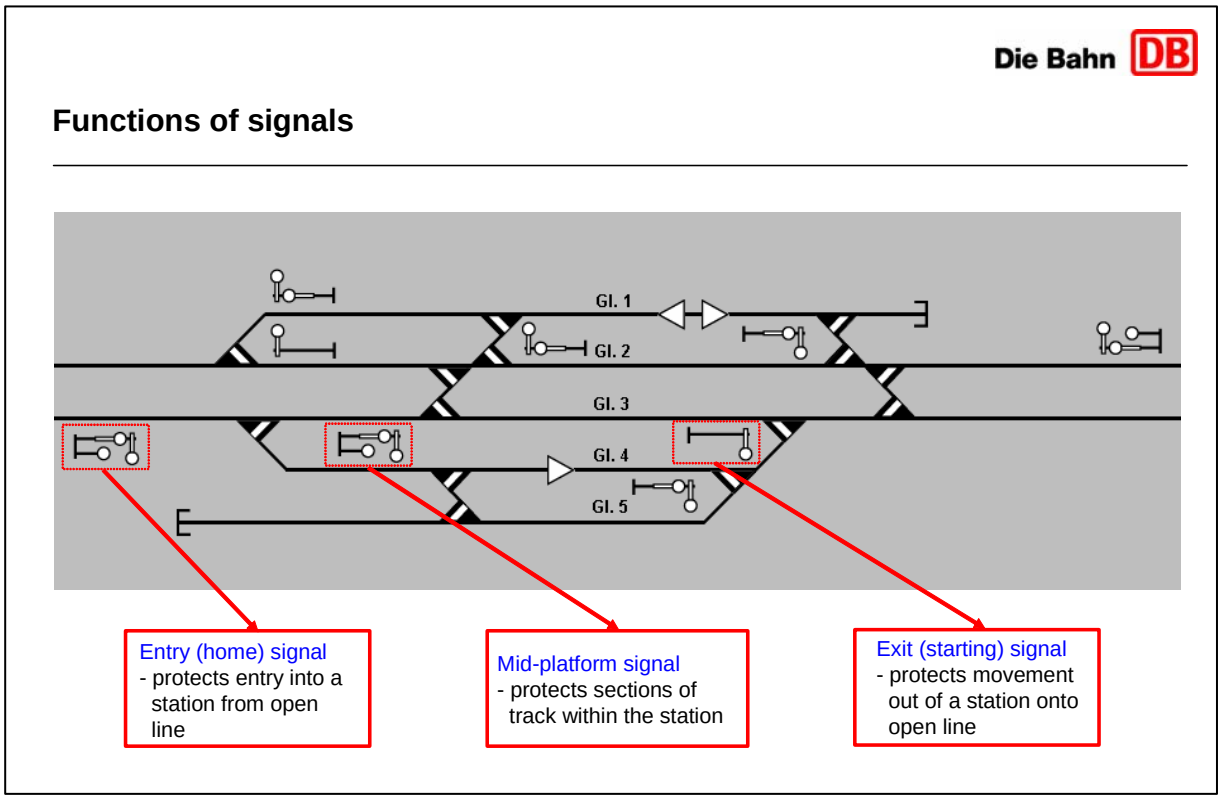
Please note that the designations for and meanings of signals in DS 301 and DV 301 are divergent in some cases.

1.3 Signal systems

1.3.1 Stop and distant signals

Stop signals indicate whether the section of line ahead may be negotiated. Stop signals are used as:

- entry or home signals,
- exit or platform starting signals,
- mid-platform signals,
- block signals.



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Stop signals

single-arm semaphore

double-arm semaphore

colour light signal with one or two lights

Stop signals ensure a section of track can only be entered if it is clear of vehicles.

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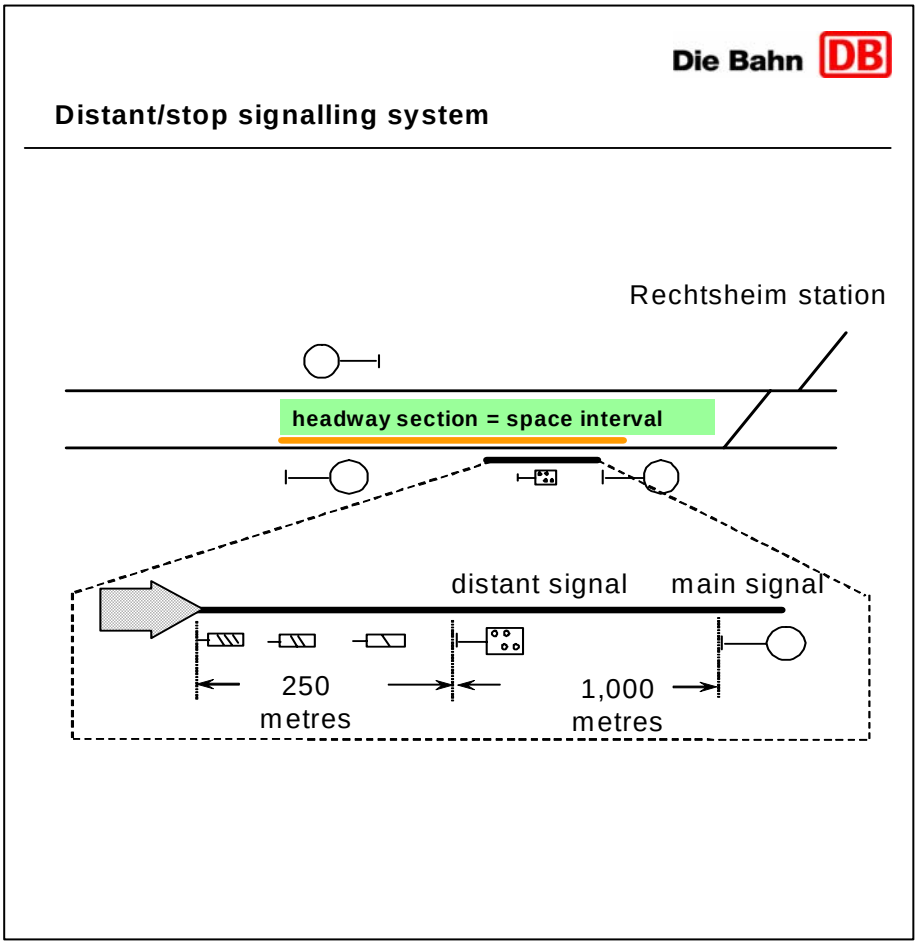
Stop signals

single-arm semaphore

double-arm semaphore

colour light signal with one or two lights



Owing to the comparatively long braking distances of trains it is necessary for drivers to receive advance indication of stop signals in order that they can adjust their mode of driving to prevailing circumstances (e.g. signal at danger) in good time.

Extract from Germany's Railway Construction and Operating Regulations (EBO) Section 39 Train headways (3) The distance between two succeeding trains on railways with a max. permissible speed of more than 30 km/h must not be less than one block section; where there is only one track, this must not be occupied anywhere up to the next passing point by a train travelling in the opposite direction.

The distant/stop signal system comprises:

- warning signs: generally at intervals of 75 m, 75 m and 100 m ahead of the distant signal
- the distant signal is identified by means of a board attached to its post; distance from stop signal depending on braking distance for section; generally 1,000 metres
- the stop signal
- the safety overlap.

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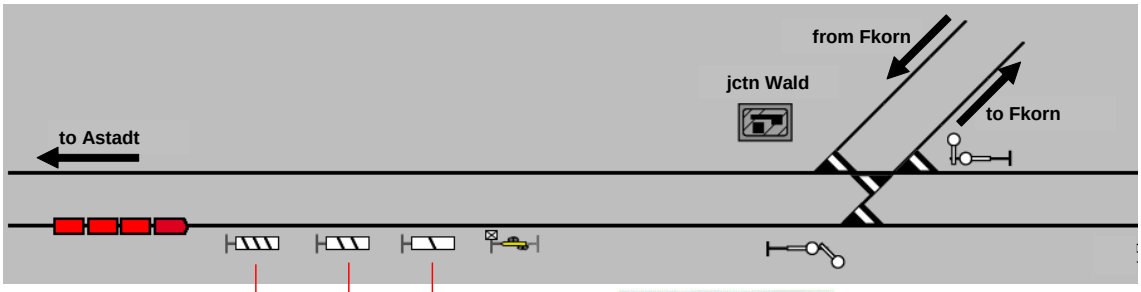
Warning signs and distances between them



Warning signs take the form of a series of rectangular white boards with black stripes that rise diagonally to the right and decrease in number as the distant signal is approached. There are signs at intervals of 75 m, 75 m and 100 m ahead of the distant signal.

Distances from distant to main signal:

400 m, 700 m or 1,000 m

A triangle on top of the warning sign indicates that the distance between distant and stop signal is more than 5 % shorter than the braking distance for the section.

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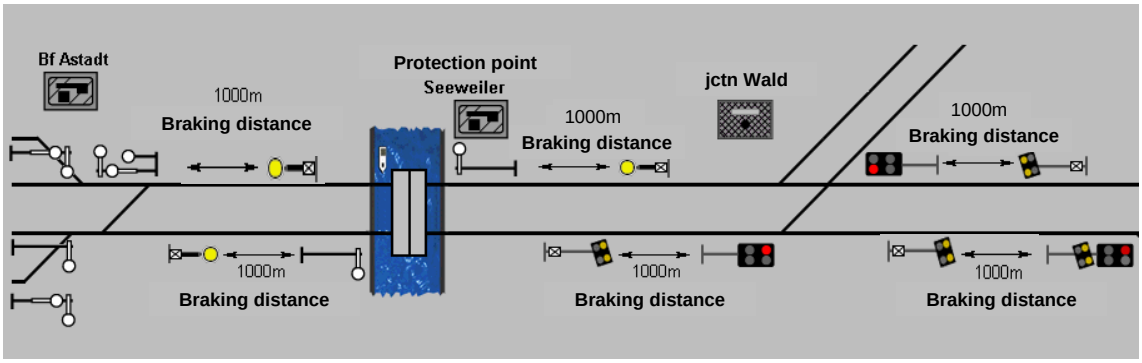
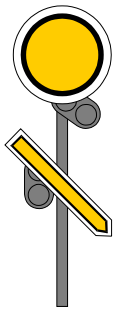
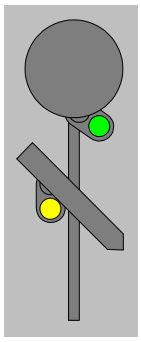
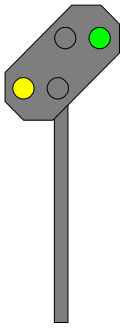
Presignalling distance – protection point



In difficult sighting conditions, a repeater signal may be mounted between the distant and stop signals (for colour light signals only). It is different from the distant signal in that it is not equipped with warning signs and has an additional white light on the signal screen.

Signal Vr 2

Speed restriction ahead

Semaphore signal		Colour light signal
Daytime signalling	Nighttime signalling	
The circular disc is vertical, the arm points diagonally downwards to the right	A yellow light and a green light further up on the right.	
		

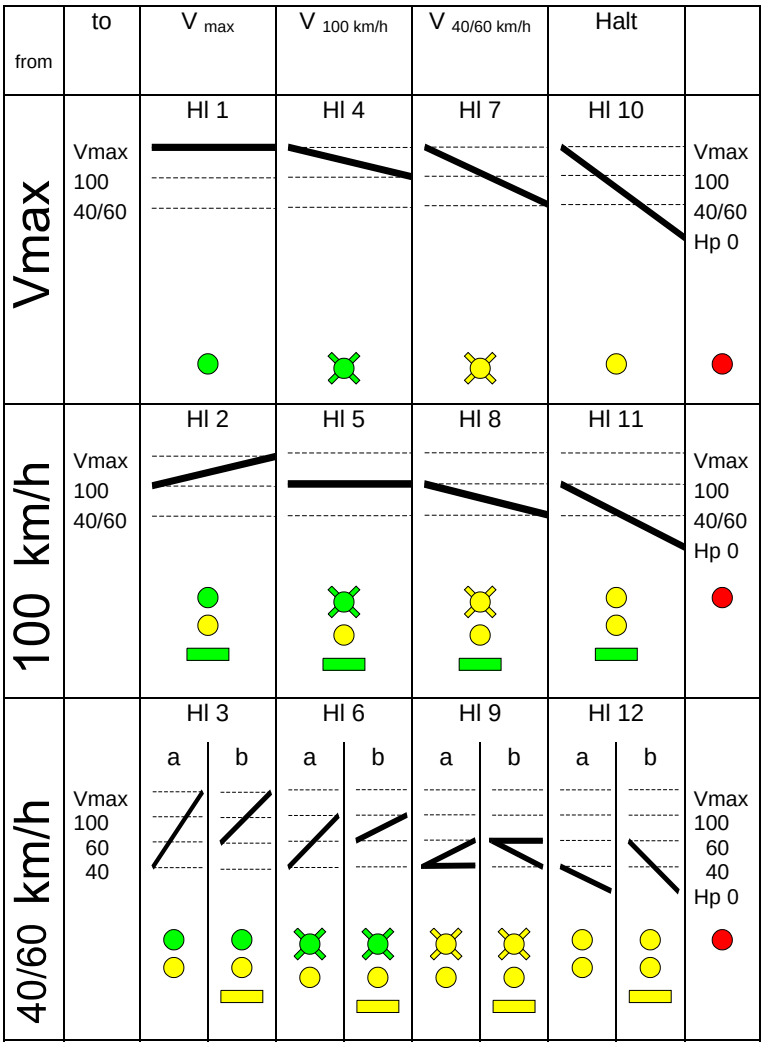
1.3.2 “Hl” signal system

The former Deutsche Reichsbahn in what was East Germany developed the “Hl” signal system to augment its distant/stop signal system.

This system is set out in Signal Code DV 301 as well as in the joint Signal Code.
All “Hl” signals are proceed aspects. The “Hp 0” signal is used as the stop position. Differing speeds to be adopted are signalled using three items of signalling information.

The following Table provides an overview of the meanings of “Hl” signals.

Overview of Hl 1/Hl 12 colour light signals



V/max. = max. permissible speed

flashing light flashing light strip of light strip of light

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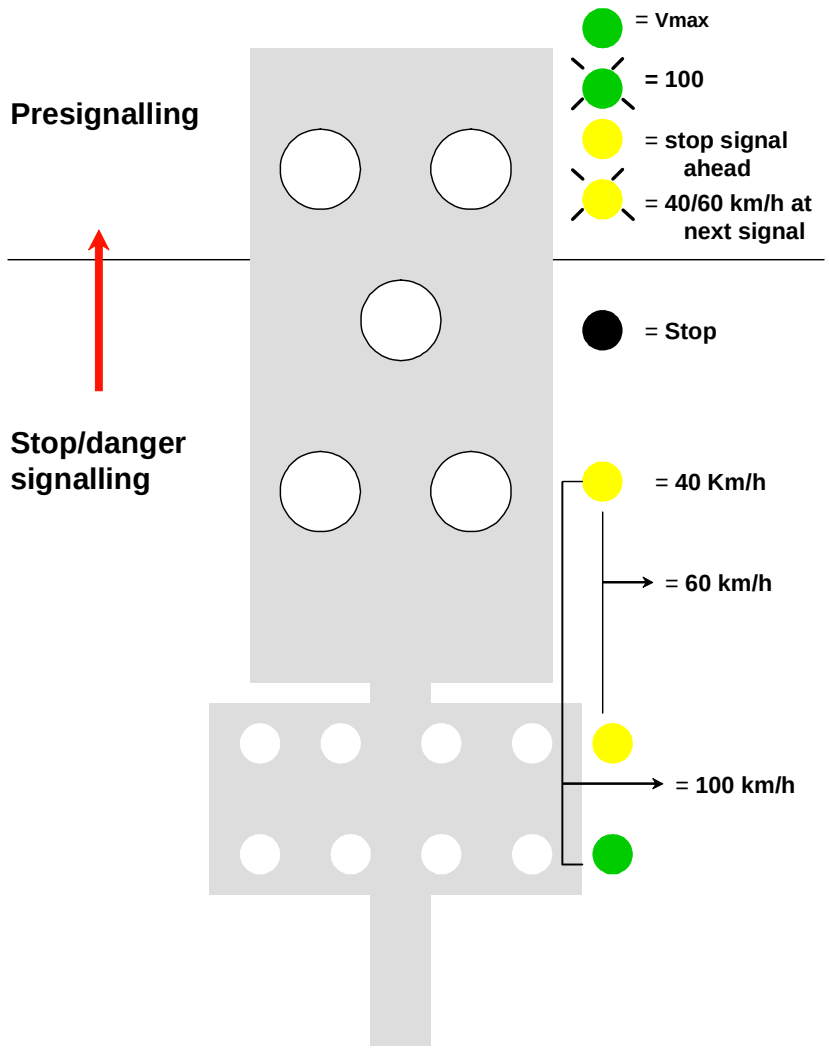
Configuration of an “Hl” signal



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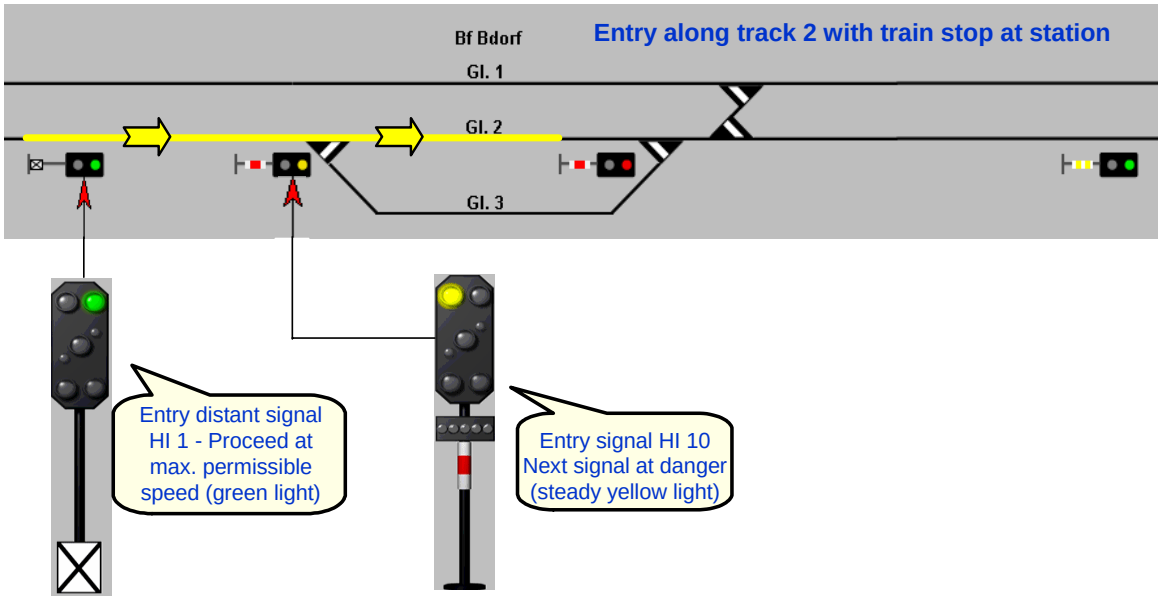
Stop and distant colour light signals (former DR)



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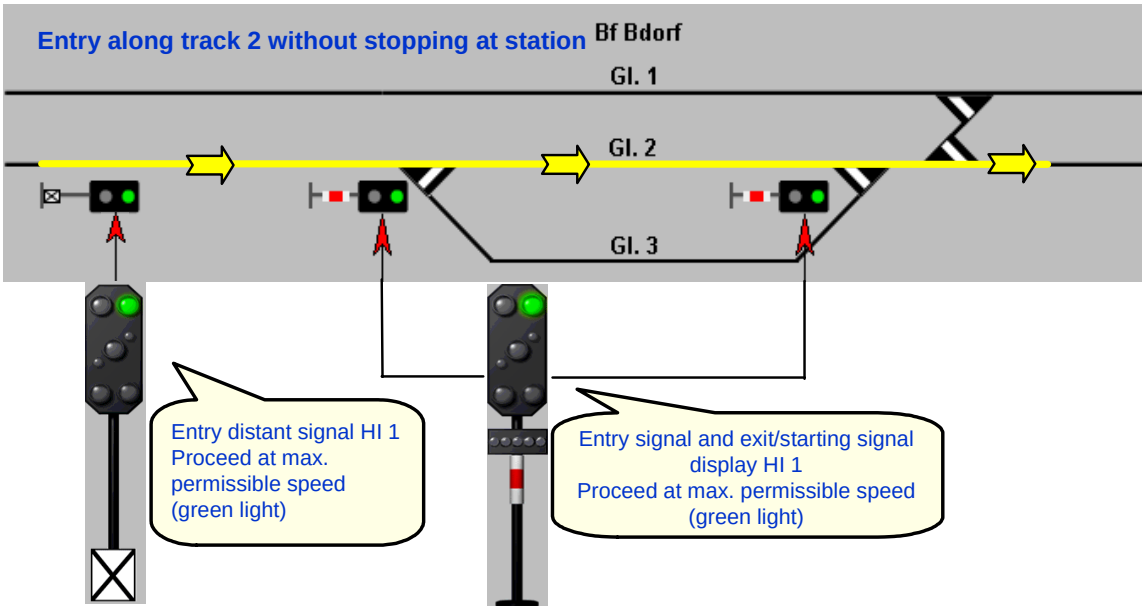
Stop and distant colour light signals (former DR)



1.3.3 Ks signal system (combination signal system)

The principal reasons behind developing the Ks signal system were as follows:

- With commercial speeds steadily increasing, it was becoming more and more difficult for drivers to register the wealth of lights on and information provided by stop/distant signals.
- Harmonisation of the signal systems adopted by Deutsche Bundesbahn and the former DR.
- Recommendation by the International Union of Railways (UIC) to adopt straightforward and manageable signalling principles.

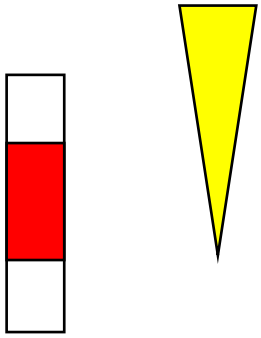
Key features of Ks signals are:

- Signal Hp 0 is used as the stop aspect
- Ks signals display all proceed aspects with <u>one</u> signal light

Ks signals can act as
- stop signals or
- distant signals or
- both.

Ks signals acting as stop and distant signals are identified by means of a sign depicting a yellow triangle on its head fitted to the signal post.

They are additionally indicated by means of the standard AB 4 signalpost sign provided for in the Signal Code.



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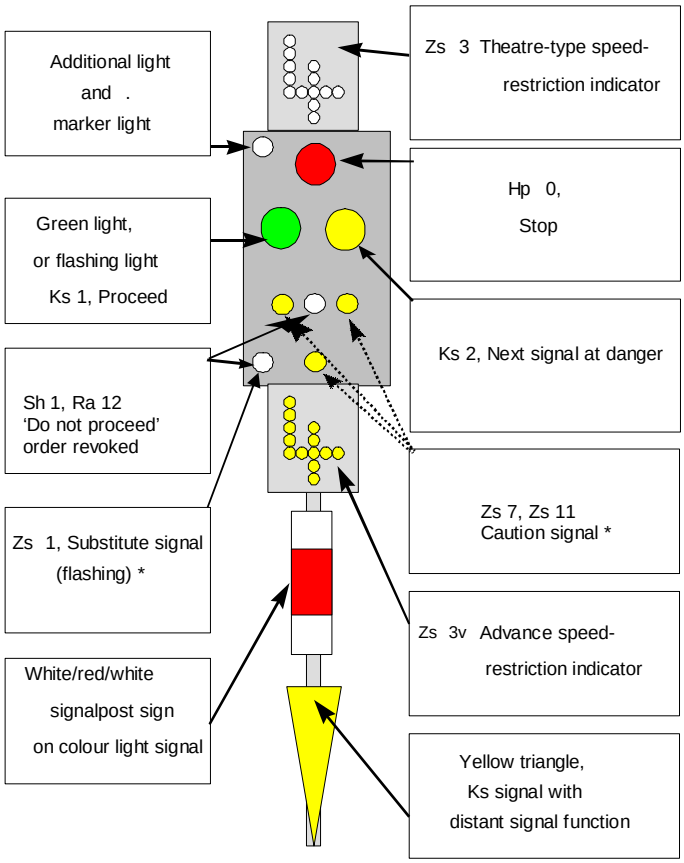
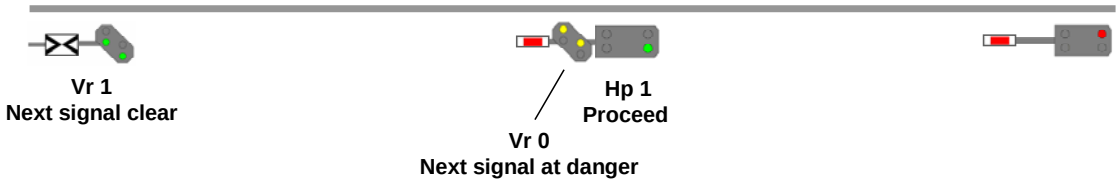
Ks signals, meanings and description of lamps and signal components



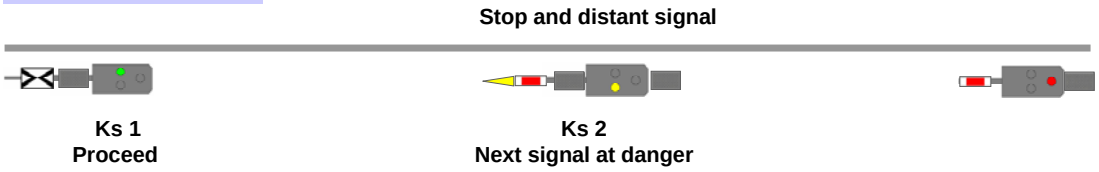
* Zs1 and Zs 7/Zs 11 only as alternatives on signal screen

Juxtaposition of distant/stop and Ks signalling (1)

Distant/stop signalling system

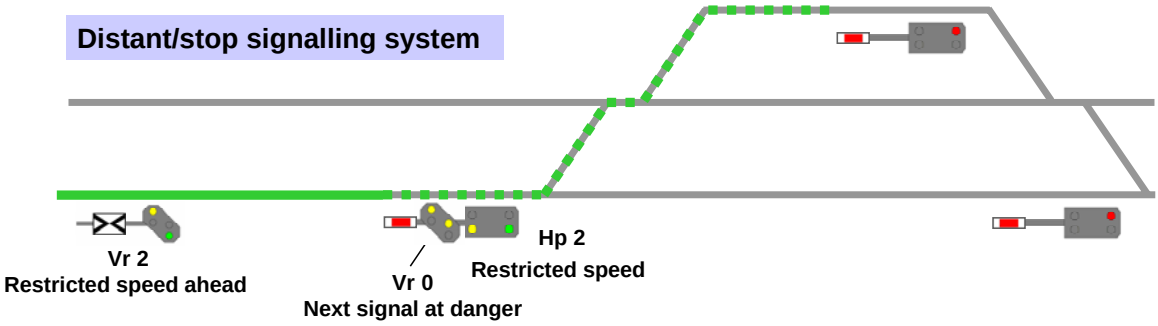


Ks Signal system

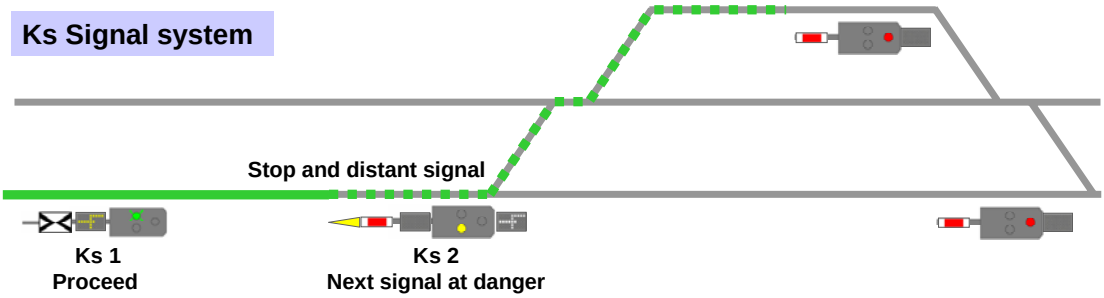


Juxtaposition of distant/stop and Ks signalling (2)

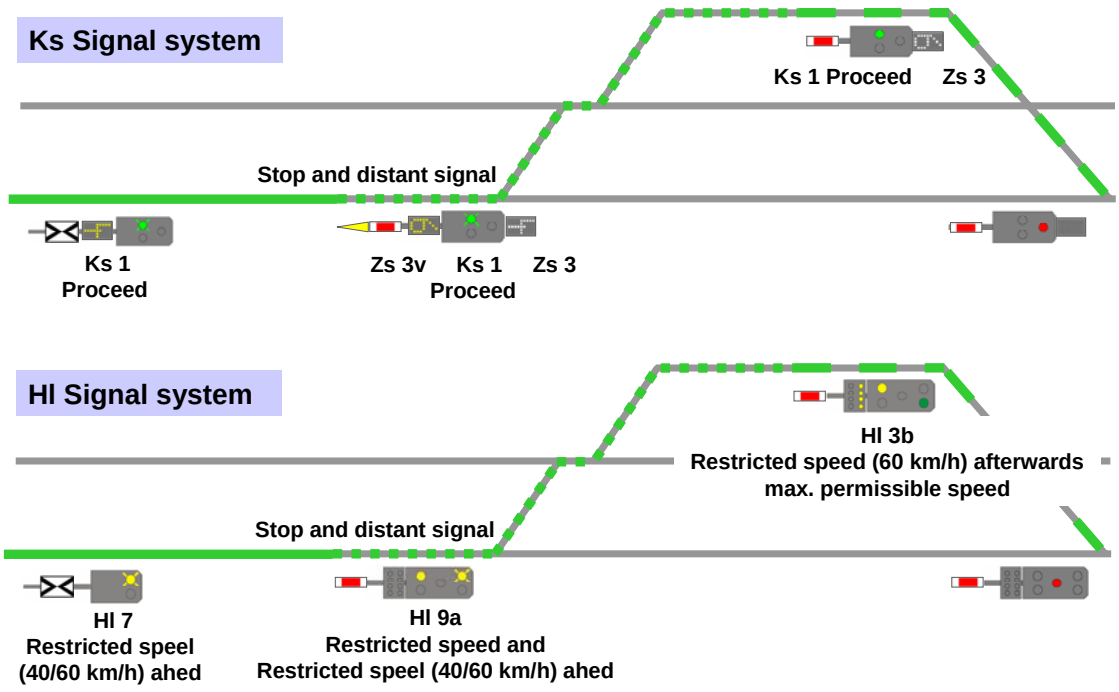
Distant/stop signalling system



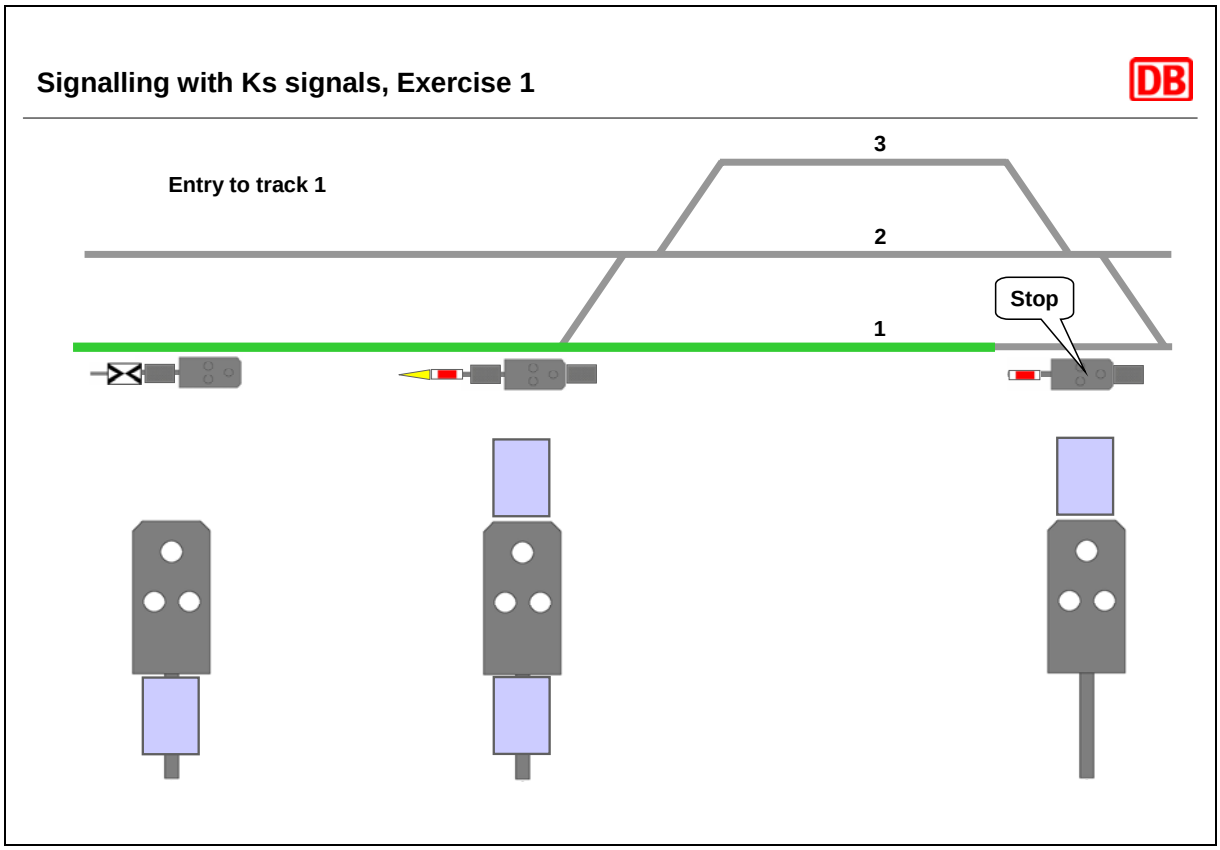
Ks Signal system



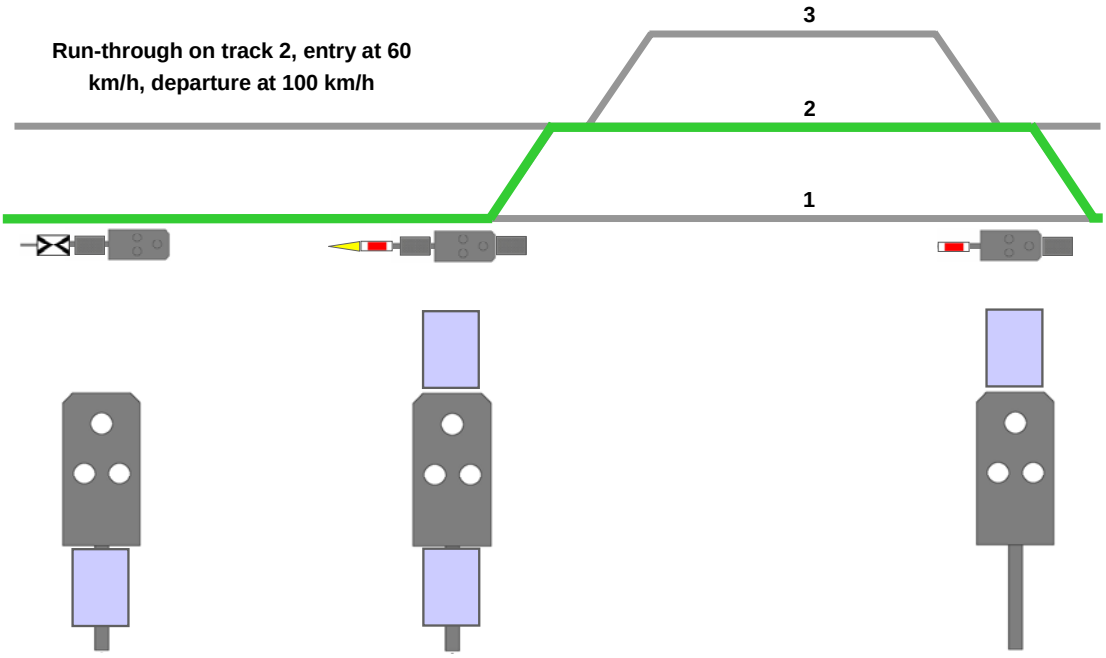
Juxtaposition of Ks signalling and Hl signalling



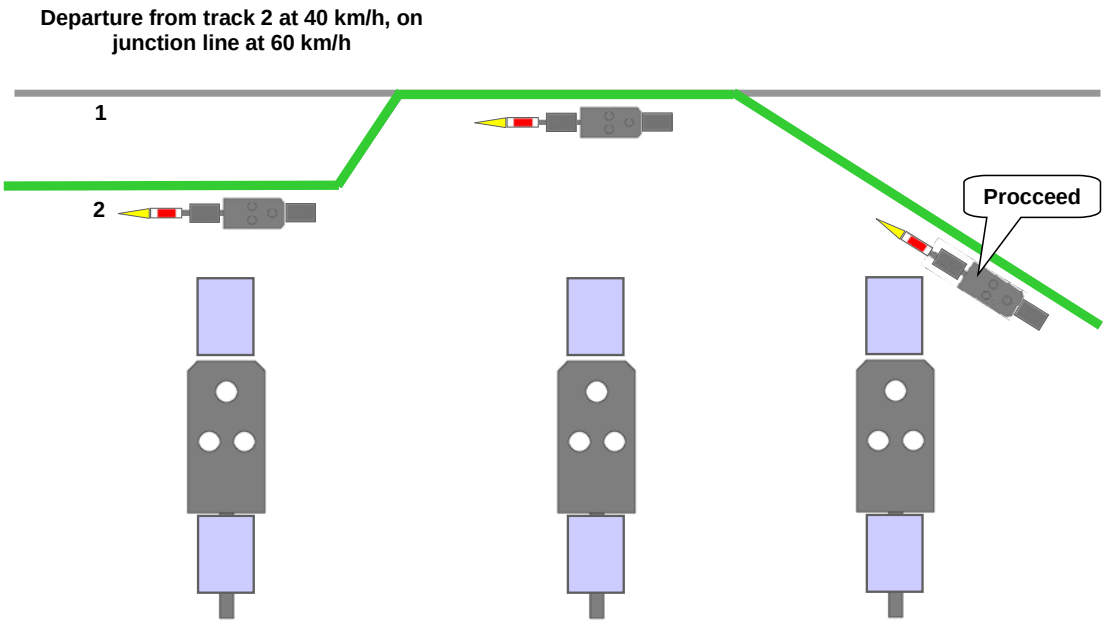
In the following exercises, assign the appropriate colours to the various signals.



Signalling with Ks signals, Exercise 2



Signalling with Ks signals, Exercise 3



- and hence to the left of the opposite track

1.4 Positioning of signals

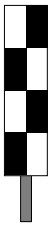
Signals are generally located to the right of or above the track to which they relate - though to the left in the case of wrong-side running.

Exceptions are indicated
- in the Local Regulations supplementing DS/DV 408,
- in the digest of “temporary speed restrictions, sections subject to special traffic regulation and other special points” (La) or in notices of works in progress where engineering is involved.

Fixed signals used for wrong-side running are located to the left of the relevant track.

Permanent exceptions are indicated in the Local Regulations.

Chequered board



Signal Ne 4/So 2

The stop signal is not located directly to the right of or above the track

The stop signal is located elsewhere than specified in the rules