# German Signal Aspects and Lineside Signs

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## SEMAPHORE SIGNALS
## FORMSIGNALE ("SHAPE SIGNALS")

### Main Signals

The simple semaphore signals can show "clear" or "stop". An additional aspect can show "slow", i.e. 40 km/h. Note that on signals that never show the slow aspect, the lower arm (as well as the amber light) is omitted. The white-red-white marking looks like a main signal post plate but (as opposed to colour light signals) here it is simply a marking to enhance visibility and has no special meaning.

| | | |
|---|---|---|
|  |  |  |
| Hp 1: clear with line speed | Hp 2: slow (40 km/h) | Hp 0: stop |

The signals are also equipped with lanterns that are lit at night, by gas lanterns in the old days, now by solar-driven LED matrices.
These night aspects (see below) were the prototype for the aspects of the Hp colour light signals.
Lower speeds other than 40 km/h may be indicated by the Zusatzsignal (Subsidiary signal) Zs 3 (signal) or Zs 3v (announcer).

### Distant Signals

Distant signals indicate which aspect is to expect at the next main signal. The distant signal carries a yellow disc with a black/white border. If the main signal shows "clear", the disc is flipped edge-on (so it is virtually invisible).
In case that the main signal is capable of showing the "slow" aspect, the distant signal additionally bears a yellow arrow-shaped arm with a white/black border.
DR distant signals are a little different from DB signals:
The arm (where present) may be white with a red border.
Also the distant signal aspects Vr 1 and Vr 0 may display only the upper right light (green or amber), except when the distant signal is mounted at the same post as or close to a main signal.
The aspect Vr 2 has the green and amber lanterns exchanged to avoid confusion with the Hl 3a aspect.

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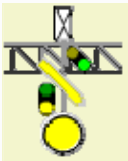
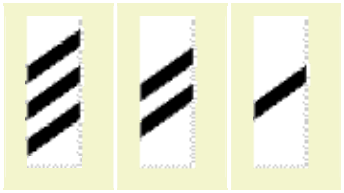
|---|---|---|---|
|  |  |  |  |
| Vr 1: expect clear | Vr 2: expect slow | Vr 0: caution (expect stop) | Vr 2 (DR variant) |

The rectangular sign at the signal's post is the distant signal post plate. indicates its position, so it will be clearly visible when the disc is flipped edge-on.

When the distant signal is mounted overhead, e.g. is suspended from a gantry, the wing is usually mounted above the disc.

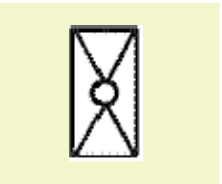


The distant signal is announced by three approach markers (where necessary there may be up to five markers but this is rare).
If the distant signal is located in a reduced distance to the corresponding main signal, on DB lines a small white triangle with a black border pointing downwards is mounted on top of the distant signal sign, and as well on the first (three-stripe) approach marker.
On DR lines there is no triangle but a circle at the "X" intersection in the distant signal board.
See also the section on post plates.
Where needed distant signals may be repeated. These distant signal repeaters are always colour light type even when distant and/or main signal are semaphores. On DB lines this repeater will be of Hp type on DR lines Hl type is used.



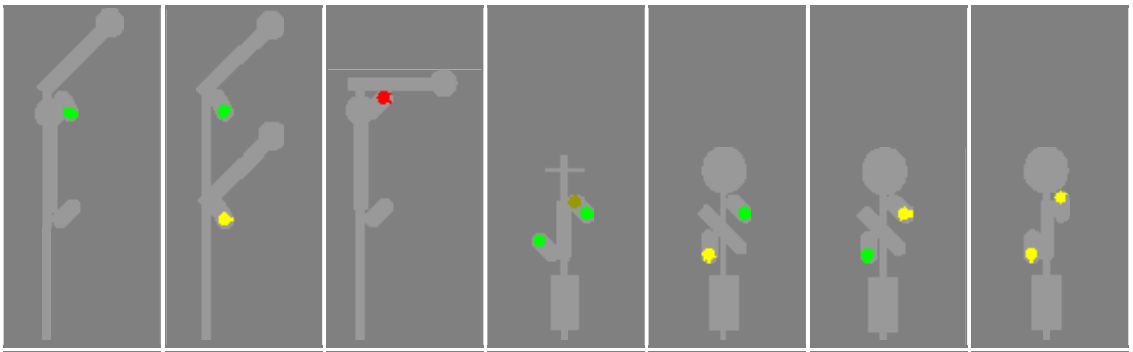
Distant signal approach markers

Distant signal post plate (DB) main signal is at reduced distance



Distant signal post plate (DR) main signal is at reduced distance

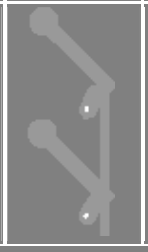
**Night Aspects Of Semaphore Signals**



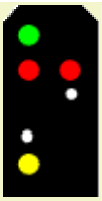
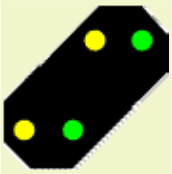
Hp 1 | Hp 2 | Hp 0 | Vr 1 | Vr 2 | Vr 2 (DR) | Vr 0

Note that in former versions of the signal book, there were cases when the night aspects should be visible from rear. This is obsolete now and more and more semaphores (especially when the gas lanterns or bulbs have been replaced by LEDs) are found without rear lights. Where red or hidden lanterns show full white light backwards and green or amber lanterns show a small white light (Sternlicht/star light). Note that on signals that have just one arm, the lower light is omitted (i.e. one small light: clear one full light: stop).

Note also that a distant signal always shows two full lights.

| Hp 1 | Hp 2 | Hp 0 | Vr 1 | Vr 2 | Vr 0 |
|---|---|---|---|---|---|
|  |  |  |  | | |
| Rear aspects | | | Rear aspect | | |

## THE HP SYSTEM

The Hp system was tested by the Deutsche Reichsbahn in 1928 and introduced into the Signalbuch (signal code) in 1935, however few colour light signals were erected before the end of Word War II. The main usage was and is in West Germany.

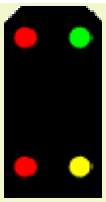
The aspects are the same as the night aspects of the semaphore signals.
Its signals consist of main signals which are at least capable of indicating "stop" and "clear". The main signals (Hauptsignal) may show "line clear with medium speed" as well as some other aspects like "stop, shunting permitted" or give an indication of what speed exactly is allowed (by a speed indicator Zs 3). At 400 m - 1000 m before the main signal, a distant signal (Vorsignal) is showing the aspect the driver has to expect at the main signal.
If the visibility is limited, additional distant signal repeaters (Vorsignalwiederholer) may be used.
If the block length is about 1000 m, the position for the distant signal for the main signal in advance comes close to the position of the main signal in rear. In this case, the distant for the main signal in advance is usually mounted at the post of the main signal in rear, you will find this often with entrance signals.

- Signal Head Variants
- main signal Aspects
- Distant Signal Aspects
- Additional Aspects
- Related Boards

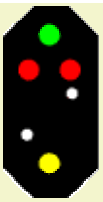
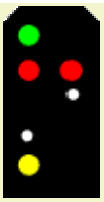
### Signal Heads

There are different signal heads in use, depending on the supplier and/or the aspects that are to be displayed. These heads vary slightly in shape (corners may be angled or not) and in the arrangement of lamps. The signal indication does not depend on where in the head the lamp is placed.
Here I show you some examples:

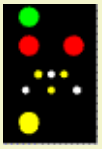
This one can just say 'clear' or 'stop', usually used with block signals



This one can also display 'clear with 40 km/h', the lower red is an emergency red which lights if the 'main' red fails

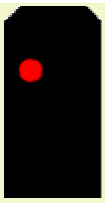
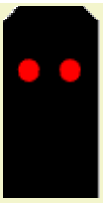
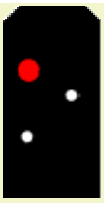



These two can display the (now obsolete) 'double-red' Hp00 as well as 'shunting permitted', this is most probably an exit signal



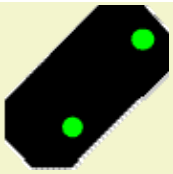
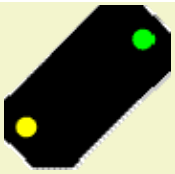
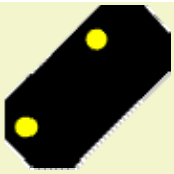
This is a compact head equipped with additional lamps

**Main signal Aspects**

| | | | |
|---|---|---|---|
|  |  |  or  |  |
| Hp 1: line clear (with timetable speed) | Hp 2: line clear with slow speed (40 km/h if not indicated otherwise) | Hp 0: stop* | Hp 0 + Sh 1: stop, shunting permitted** |

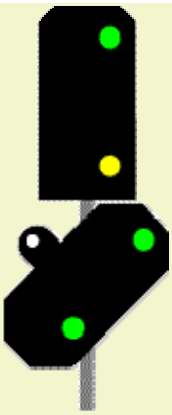
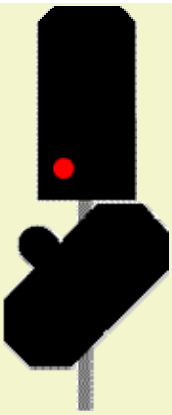
(*) For the double-red aspect, see my peculiarities page. For the rules applying to a signal showing Hp 0-stop or at failed signal see also post plates.
(**) If Hp 0 is displayed in conjunction with Sh 1, Hp 0 is displayed with only one red light.

**Distant Signal Aspects:**

| | | | |
|---|---|---|---|
|  |  |  |  |
| Vr 1: expect clear | Vr 2: expect clear with medium speed | Vr 0: caution, expect stop | distant signal repeater or main signal at reduced distance |

When a distant signal is in a reduced distance to the corresponding main signal, it carries a white light on the upper left edge.
If visibility is poor, e.g. a curved track around an hill, additional distant signal repeaters may be added between the distant signal and the main signal. These repeaters also carry the additional white light, but unlike the initial distant signal have no post plate and are not preceded by approach markers.

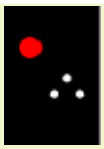
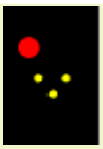
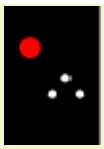
In former DR area, a distant signal that is not mounted in conjunction with a main signal may display only one light. The Vr 2 aspect may have the amber and green lights exchanged to avoid confusion with the Hl 3a aspect. Also, a repeater signal may not have the white light but may be marked with a special post plate.
When a distant signal and a main signal are mounted at one post, the main signal is on the upper position. If that main signal shows "stop", the distant signal is dark:

| | |
|---|---|
|  |  |
| Hp 2: medium speed (40 km/h) (above)<br>Vr 1: expect clear (below)<br>distance to corresponding main is reduced (white light) | Hp 0: stop (above)<br>off (below) |

**Additional Aspects (Subsidiary Signals)**

To allow safe operation on a failed main signal, a main signal may be equipped with subsidiary signals. These subsidiary signals may consist of a small device carrying additional lamps, or, as with the Hp compact heads, they may be placed within the same head.
Please note that a signal may be failed, when either one or more of the lamps are non-functional, or the signal's state cannot be changed from Hp 0 (red) to something else, due to switch box or other technical problems. That is, the aspects below may be displayed with or without the red light.

For the exact meaning of the Zs signals please refer to the Subsidiary Signals page.

| | | | |
|---|---|---|---|
|  |  |  |  |
| Zs 1:<br>May pass this signal. | Zs 7:<br>May pass this signal, proceed on sight | Zs 8:<br>May pass this signal, continue on wrong track | This is not a signal, but the Kennlicht (marker light): Ignore this signal it has been switched off. |

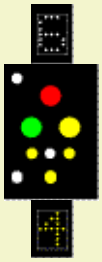
**Related Boards**

With Hp signals (as well as with the other systems' signals) some boards are used. To begin with, there are three (in rare cases up to five) distant signal approach markers (Ne 3: "Vorsignalbaken") that are placed before a distant signal. At the distant and the main signal posts, post plates (Mastschilder) are mounted that indicate the position of the signal. So even in the worst case (all signal lamps failed) the signs indicate that there is a signal. Note that a failed main signal means 'stop' unless a Subsidiary Signal (see previous section) is displayed. For all post plates refer to the Post Plate Page.

| | | | | |
|---|---|---|---|---|
|  |  |  |  |  |
| 1st approach marker 250m before distant | 2nd approach marker 175m before distant | 3rd approach marker: 100m before distant | Ne 2: distant signal post plate | Main signal post plate |

If a distant signal is mounted on one post with main signal, the approach markers and distant signal sign are not used, only the main signal post plate will be at the signal's post.
A signal may also be equipped with a speed indicator.

**THE KS SYSTEM**



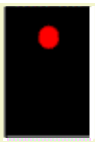
The Ks system (Kombinationssignal, combination signal) was designed to ultimately replace the West German Hp system and the east German Hl System with a single new one, in connection with the installations of new electronic interlockings.

The Ks signals like the Hl signals combine the function of distant and main signals in one single head, that is they indicate the speed after this signal, as well as the speed the next signal will induce.

On top there may be a speed indicator (Zs 3) showing the maximum speed after this signal (in the points zone). Below there may be a speed announcing indicator (Zs 3v) for the maximum speed the next signal will impose.

To indicate clear with maximum speed the Zs 3 or Zs 3v will be dark.

There are four main aspects a Ks signal can display:

| Aspect |  |  |  |  |
|---|---|---|---|---|
| Signal ID | Ks 1 | Ks 1 + Zs 3v | Ks 2 | Hp 0 |
| Main Indication | Line clear* | Line clear* | Line clear* | Stop** |
| Distant Indication | Line clear | Expect reduced speed, which is given by speed announcing indicator Zs 3v below signal (flashing green) | Caution - expect stop | |

(*) Speed may be restricted by Zs 3.
(**) For rule at signal showing Hp 0-stop or at failed signal see also post plates.
Generally speaking, the green light is flashing whenever the speed announcing indicator Zs 3v (the lower sign with the amber number) is lit.
Also note that the speed is the displayed number multiplied by 10 km/h.
On blocks longer than the braking distance, there may be Ks signals which serve only as distant signals (i.e. they cannot show stop nor impose a speed limit), as well as some which only serve as main signals (i.e. they can show stop impose a speed limit but don't indicate the following signal's aspect).
If a Ks is used as main signal (i.e. it is capable of displaying Hp 0-stop) it is identified by a main signal post plate. If is is used as distant-only signal (i.e. it cannot display stop), it is identified by a distant signal post plate. A signal serving both as main and distant indication (a combined signal) has a yellow triangle mounted below the post plate, or it has a white-black-white-black-white post plate.

If a Ks distant signal is closer than braking distance to its main signal, or if it is a distant signal repeater, this is indicated by a small white light. In the case of shorter distance, the white light is to the left *above* the coloured light, a distant signal repeater is indicated by the white light being at the left *below* the coloured light.

Note that this white light is *only* displayed if the driver has to reduce speed (i.e. Ks 1+Zs 3v or Ks 2 is displayed). If the speed stays or increases (Ks 1), a shorter distance or distant signal repeater is not identified (i.e. the white light is off).

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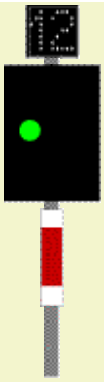
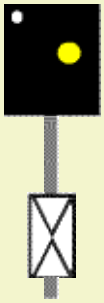
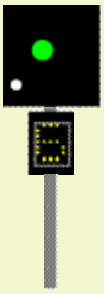
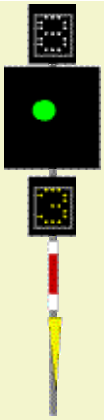
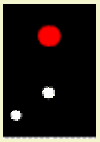
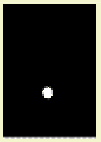
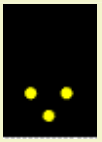
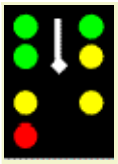
|---|---|---|---|
|  |  |  |  |
| Ks distant signal only: Ks 1+Zs 3v: expect 60 km/h (flashing green) | Ks main signal only: Ks1+Zs 3:clear with 120 km/h in points zone | Ks distant signal at caution (expect stop) in reduced distance to main signal: Ks 2 | Ks distant signal repeater: expect clear with 60 km/h (flashing green) |
|  | Zusatzsignale (Subsidiary signal) that may be displayed at a Ks signal head (follow links for a detailed description) | | |
| |  |  |  |
| Ks combined signal: clear with 80 km/h in points zone, expect 30 km/h (flashing green) | Hp 0+Sh 1<br>Stop, shunting permitted | Zs 1:<br>May pass failed signal (flashing white) | Zs 7:<br>May pass failed signal, proceed on sight |

## Sv System



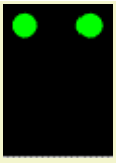
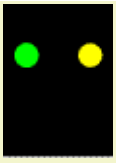
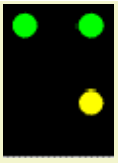
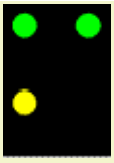
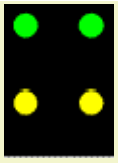
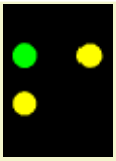
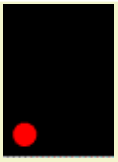
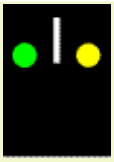
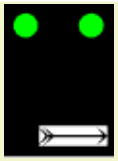
The Sv system (Signalverbindung, Signal Combination) was created in 1928 as the first German colour light signalling system for the urban railways of Berlin and Hamburg, where it is still used. As with the Hl system and the Ks system, main and distant signal aspects are displayed in a single head.

The main signal aspect is shown on the left half, while the right half indicates the aspect the signal in advance will show.

Note that some signals are searchlight type, i.e. instead of a number of differently coloured lamps, rotating colour blends are used to change colours from amber to green; so a signal head may be equipped with just two or three lights, or the red light may be at the low centre. Also the shape of the signal head may vary, sometimes the lower corners are cut off angular.

If the next signal is closer than the usual distance, a white vertical arrow is displayed. On newer signal heads the white arrow may be represented as a dot-matrix bar.

These are the aspects an Sv signal may display:

| | | | | |
|---|---|---|---|---|
|  |  |  |  |  |
| Sv 1: clear, expect clear | Sv 2: clear, expect stop | Sv 3: clear, expect slow | Sv 4: slow, expect clear | Sv 5: slow, expect slow |
|  |  |  |  |  |
| Sv 6: slow, expect stop | Sv 0: stop, then proceed on sight | Hp 0: (absolute) stop<br>See also post plates | Sv 2, next signal is closer than braking distance | Sv 1, signal positioned to left of track |

Some signals are capable of showing Hp 0-stop as their most restrictive indication, while others may just be able to indicate Sv 0-proceed on sight.
The rule for a signal showing Hp 0-stop or at a failed signal is determined by the signal's post plate.

**LZB - LINIENZUGBEEINFLUSSUNG (LINEAR TRAIN CONTROL)**

- Introduction
- Parameters
- The Cab Display
- LZB & Signals
- CIR-ELKE (Computer Integrated Railroading)
- FZB (Funk-Zugbeeinflussung)

## Introduction

At first I want to explain what the lengthy word means (you know, German is full of famous words like Eisenbahnschaffnerfahrkartenlocherzange [email me for a translation and win a prize]) and why LZB is used.
**L**inien**z**ug**b**eeinflussung literally means *Linear Train Control*, as opposed to using fixed signals (which would be called *Punktförmige Zugbeeinflussung* [*Spot wise Train Control*], since communication to the train takes place only at certain spots, i.e. the signal locations). That would be the Indusi system.
Technically, cable loops are placed between the rails. These cables serve as antennae to send signals to the train. The train's position is still determined by block occupancy check (i.e. it is known which block a train occupies, but not where it is within that block). A more advanced technique uses radio transmission that would be called FZB - *Funk-Zugbeeinflussung* (*Radio Train Control*).
At traditional signalling the maximum speed is limited to 160 km/h, since at that speed the brake distance is about 1 km. At larger speeds the distance between distant and main signal would have to be increased, which would make blocks longer thus lowering line capacity (apart from the investments in moving signalling equipment around).
LZB in turn monitors several blocks ahead (7000 m for a maximum speed of 200 km/h, 9900 m for a maximum speed of 250 km/h) and gives advance notice of a signal's indication.
The signalling and signal box equipment is unchanged, since LZB just overlays the block signalling system. On an LZB-line all signals show their normal aspects even when an LZB-enabled train passes through (*NOTE: on newer installations this is different in some cases. See below*).

## Parameters

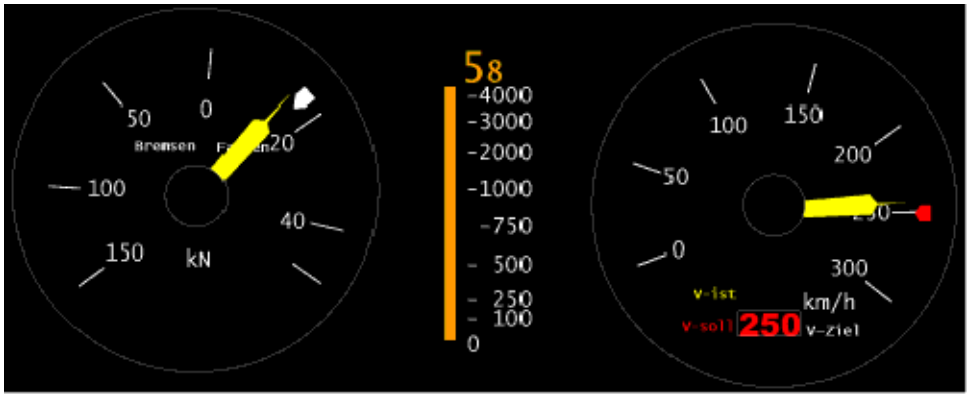
The LZB monitors that signal's indications and calculates the current *maximal speed*. If a signal in advance (the *target*) would show a lower speed or even stop (the *target speed*), the maximal speed would be lowered as to ensure that the train will be able to meet the target speed at the target.

Simply speaking: suppose a train going at 250 km/h and some signal in advance would show stop (target speed=0), then, taking the train's braking characteristics into account, the train must lower its speed far before the distant signal at caution becomes visible, so its permitted speed will be lowered continuously.
The driver does not rely on the fixed signals (in fact they are not valid to him) but on a cab display. This display essentially shows four parameters:

| | | |
|---|---|---|
| • | V-ist | Actual Train Speed |
| • | V-soll | Maximal Train Speed |
| • | V-Ziel | Target Speed |
| • | Zielentfernung | Target Distance |

The *permitted speed* usually equals the *maximal train speed*, unless a special order or other circumstances require a lower speed. The *target speed* is the speed that is to be reached at the target point, and the *target distance* is the distance until that point is reached.

**The Cab Display**




To the left you see the acceleration/deceleration meter, to the right you see the speed gauge. The speed gauge shows three speeds:

- The yellow hand shows the actual train speed (v-ist)
- The red mark shows the maximum train speed (v-soll)
- The red figure is the target speed (v-ziel)
- The target distance is indicated by the central bar. If the target distance is larger than 4000 m, a figure is displayed above the bar (5.8 km in this example)

The 'stop' aspect of traditional signalling would be given by a target speed of 0 and the respective target distance.

**LZB and Signals**

As said above, LZB is an overlay system, i.e. the traditional main & distant signals remain in place. When a non-LZB train passes through, signals operate as usual. When an LZB train passes through, the signals still operate as usual showing their proceed, caution, and stop aspects. The (almost) only difference is, that the train is notified of the signals' aspects way before approaching the distant signal, permitting longer brake distance and thus higher speeds.

Now on some new lines where almost only LZB trains were expected the installation of many signals could be avoided. On these lines signals are only provided at LZB starting and end points, crossings, and as entry and exit signals. The line itself is still divided into blocks (the so-called *LZB blocks*), which are not delimited by signals but marked by the *LZB block markers*.


So on such lines you effectively have two overlaying block systems: the LZB blocks and the blocks delimited by the signals. The latter have to be observed should a non-LZB train pass through.
There is a special case: suppose a non-LZB train has passed a signal, and is on the line already a few LZB blocks away, but still before the next fixed signal. Consequently the signal in rear shows stop. Now an LZB train is scheduled after the first train. Since the second train is governed by LZB and the next LZB block is free, it could safely pass the (red) signal into that unoccupied LZB block.
However DBAG doesn't want to stress their drivers by having them to pass red signals, and so on these lines signals are switched dark when an LZB train approaches.

**CIR-ELKE**

CIR-ELKE is an English/German acronym and stands for "*C*omputer *I*ntegrated *R*ailroading - *E*rhöhung der *L*eistungsfähigkeit im *Ke*rnnetz", the latter part means "Augmenting the Capacity in the Core Net" ("Elke" is also a German female name).
On conventional lines all trains are equipped with LZB and the line itself is divided into very many very short LZB blocks. So the line capacity can be increased because an LZB train does not occupy some 1000 metres or more of line (a standard block) but just a few hundred metres. This is already used with the subways in Munich and Vienna and will be tested on DBAG lines between Basel and Freiburg.

**FZB**

FZB means *Funk-Zugbeeinflussung* (*Radio Train Control*). This is similar to LZB, but the information between train and signal box is not passed by wires on the line but by radio. Also and more important the position of the train is also determined by radio (as opposed to block occupancy detection devices), and the trains run with only braking distance after each other, so blocks (and consequently signals) will vanish completely on those lines. This will be tested between Köln (Cologne) and Frankfurt am Main.

## POST PLATES

Post plates determine the rules that apply when a signal has failed.
Most signals carry a post plate mounted on the signals post below the signal head.

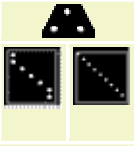
| Main Signal Post Plates | |
|---|---|
|  | Train movements may pass a stop signal at danger or a defective main signal only if aspect Zs 1, Zs 7, or Zs 8 is displayed, or signalman hands over (or dictates) a written permission to do so. If Zs 12 is displayed, a verbal permission by signalman is also ok. Shunting movements may pass it by a verbal permission. Used for entrance, exit, and protecting signals, or automatic block signals covering level crossings or sidings. |
|  | Same procedure as post plate white-red-white. But if driver is unable to communicate with signalman, train may pass the signal and may proceed on sight until next main signal.<br><br>Used for automatic block signals. |
|  | Used only on Berlin and Hamburg urban railway lines for (semi-) automatic block signals. After stopping, train may proceed without permission when at danger or defective. Proceeding on sight applies until next main signal. |
|  | Used in Berlin S-Bahn only: Urban railway lines for some entrance or exit signals on lines with automatic block equipment. Same procedure as post plate white-red-white, but after train has obtained signalman's permission to pass the signal (or after aspect Zs 1 was cleared) train must proceed on sight until next main signal. Shunting movements may pass it by a verbal permission when at danger or defective.<br><br>On the Augsburg-Donauwörth line only:<br>Identifies an Sk main signal. |
|  | Train movements may pass the protecting signal at danger only if signalman hands over or dictates a written permission. Extinct protecting signals are not valid for train movements. |
|  | This is not regarded a post plate but is the subsidiary signal Zs 12. See "M Board" at the subsidiary signals page. |
| Distant Signal Post Plates | |
|  | Supplemental signal Ne 2. Identifies a distant signal. When used with Hp Hl or Ks signals, this identifies a distant-only signal. |
|  | Used only with semaphore distant signals in West Germany (DB): main signal is at reduced distance. |

| | |
|---|---|
|  | Used only with distant signals in East Germany (DR) (semaphore and Hl as well): main signal is at reduced distance. |
|  | East Germany (DR) only: Identifies an Hl distant signal repeater. |
| Other Post Plates | |
|  | [Obsolete]<br>Formerly used to identify a Ks main signal. Now, the white-red-white plate is used instead. |
|  | Used below a white-red-white plate to identify a Ks or Hl combined signal. Was previously also used alone to identify a Ks distant-only signal. Now, in such cases the distant signal plate is used. |

### ZUSATZSIGNALE *SUBSIDIARY SIGNALS*

Subsidiary signals are usually mounted to a colour light or semaphore signal.

| ID | Aspect | Description |
|---|---|---|
| Zs 1 |  | Ersatzsignal / Substitution signal: (Small head below or additional lamps at main signal head.)<br>main signal at danger or defective may be passed. Speed limit 40 km/h applies in points zone |
| |  | Same as above, but only a single blinking light within main signal's head. This is standard in DR area with Hl signals, in DB area used only with Ks signals. |
| Zs 2 |  | Richtungsanzeiger / Destination indicator:<br>Route is set towards station letter shows (usually first letter of next major station's name) |
| Zs 2v |  | Richtungsvoranzeiger / Destination announcing indicator |
| Zs 3 |  | Geschwindigkeitsanzeiger / Speed indicator:<br>Displayed speed limit applies in points zone after indicator.<br><br>Above board, below light signal. The triangle usually points downwards, but may be inverted if mounted as dwarf or on top of a signal.<br>On older installations, the light signal may have a triangular backplane.<br>The number "3" may indicate entry into a dead-end track, while number "1" or "2" are usually used to announce short entry or entry into an occupied track. |
| Zs 3v |  | Geschwindigkeitsvoranzeiger / Speed announcing indicator (Expect a Zs 3).<br><br>Above board below light signal. The triangle usually points downwards, but may be inverted if mounted as dwarf or on top of a signal.<br>On older installations, the light signal may have a triangular backplane.<br>The indications "2" and "3" are usually used to announce short entry or entry into an occupied track. |
| (Zs 4) |  | [Obsolete]<br>Beschleunigungsanzeiger(DB) K-Scheibe(DR) / Acceleration indicator:<br>driver should use maximum timetable speed to shorten driving time.<br><br>Above hand signal (Fahrzeit **k**ürzen/shorten driving time), below light signal. |
| (Zs 5) |  | [Obsolete]<br>Verzögerungsanzeiger(DB) L-Scheibe(DR) / Delay indicator:<br>driver should lower speed by about 30 %.<br><br>Above hand signal (**L**angsam/slow) below light signal. |
| Zs 6 |  | Gegengleisanzeiger / Counter Line Indicator:<br>Proceed aspect for Gleiswechselbetrieb (a route to counter line, on a double line with bi-directional traffic this is usually the left line). Older installations may have a diamond-shaped backplane.<br>Top left: new/DB version, top right: DR version, lower: reflective board |

| | | |
|---|---|---|
| |  | |
| Zs 7 |  | Vorsichtssignal / Cautiousness signal:<br>main signal at danger or defective may be passed. Proceeding on sight applies towards next main signal.<br>(Note: this one may be a small head that comes in various shapes below the main head, or it is displayed with additional lamps within the main signal head.) |
| Zs 8 |  | Gegengleisfahrt-Ersatzsignal / Counter Line Substitution Signal:<br>main signal at danger or defective may be passed. Route is set to wrong line (on a double line where Falschfahrbetrieb [wrong line operation] is in force, this is the left line). Speed limit 40 km/h applies in points zone, 100 km/h on open line until next station. (See also note for Zs 7 above) |
| Zs 9 |  | Bahnübergangstafel (Level crossing board): Is mounted at or close to the post of a main signal with red, white-black-white-black-white, or white-yellow-white-yellow-white post plate covering a level crossing. If that main signal must be passed at danger, train must stop at level crossing and train staff must secure the crossing manually |
| Zs 10 |  | Endesignal ("End Signal") / End of speed limit:<br>Speed limit given by Hp 2 or Zs 3 ends before point area, when train has passed this signal. This signal is valid only for train movements governed by main signals. |
| Zs 12 |  | M-Tafel / "M" board: main signal at danger or defective may be passed also by signalman's verbal permission.<br>(Otherwise a Zs signal or a written order would be needed) |
| Zs 13 |  | Stumpfgleis- und Frühhaltanzeiger / Dead end line and short entry indicator:<br>Entrance route to dead-end-line or short entrance route.<br>Instead of this signal a Zs 3 with indication "2" or "3" may be used. |
| Zs 103 |  | Rautentafel ("Diamond Board"): Stop aspect (Hp 0) is not valid for shunting movements:<br>Shunting movements may ignore stop aspect.<br>Mounted below post plate of some Hl main signals or at semaphore main signals |

**SIGNALS FOR SPEED RESTRICTIONS**
**LANGSAMFAHRSIGNALE**

I will use the following abbreviations here: PSR for permanent speed restrictions and TSR for temporary speed restrictions.

- In West Germany there are different speed signals for main and branch lines. The speed is shown in units of 10 km/h (i.e. the number "8" means 80 km/h).
- In East Germany the speed for PSR is shown in km/h (i.e. for 80 km/h "80" appears in the board) for TSR as in West Germany.
- As speed numbers (i.e. 10m km/h units), the indications 1 through 15 are used, the Lf 1, Lf 1/2, Lf 4(DB) may also show 0,5 (i.e. 5 km/h)

Speed in points area may be restricted also by the proceed aspects of main signals, or with Zs 3, which you will find in the section "Subsidiary Signals". When the triangles are mounted as dwarfs they may also point upwards.
Please read also the next page to understand the meaning of the signals and to learn why there are so many of them.

| ID | Aspect | Description |
|---|---|---|
| Lf 1 |  | Langsamfahrscheibe / temporary speed limit warning board:<br>Announcement of TSR (3=30 km/h). The triangle may also point upwards. At night, two yellow lights are mounted at the board's post, or, if space is limited, up to 15 m in front of the post. If the board is retroreflective, the lights may be omitted. |
| Lf 1/2 |  | Langsamfahrbeginnscheibe / TSR commencement board. This board is used in DR area when a speed reduction does not need to be announced by a Lf 1. |
| Lf 2 |  | Anfangscheibe / TSR commencement board:<br>Speed announced by Lf 1 must be met from here. (A: "Anfang"-Begin) |
| Lf 3 |  | Endscheibe / TSR Termination Board:<br>TSR ends here timetable speed applies. (E: "Ende"-End) |
| Lf 4 (DB) |  | (Only used on secondary lines, being replaced by Lf 6)<br>Geschwindigkeitstafel / On branch lines: permanent speed limit warning board |
| Lf 5 (DB) |  | (Only used on secondary lines, being replaced by Lf 7)<br>Anfangtafel / On branch lines: PSR commencement board |
| Lf 4 (DR) |  | [Obsolete: being replaced by Lf 6]<br>Geschwindigkeitstafel / PSR warning board<br>May show a "0" speed limit if posted before an unsecured level crossing where train has to stop before proceeding. In this case the Lf 5 shows the place where train has to stop. |
| Lf 5 (DR) |  | [obsolete: being replaced by Lf 7]<br>Eckentafel("Corner Board") / PSR commencement Board |
| Lf 6 |  | Geschwindigkeits-Ankündesignal / mainline PSR warning board |

| | | |
|---|---|---|
| Lf 7 |  | Geschwindigkeitssignal / PSR commencement board. If there is a board with the letters "BÜ" (Bahnübergang) below, the line speed can be resumes as soon as the first car (or loco) has reached the centre of the level crossing. |
| Zs 3 |  | Speed indicator: Displayed speed limit applies within the points zone after indicator.<br>(This is not a "Speed Signal" but a Subsidiary Signal, which is mounted to a colour light or semaphore signal). |

**PROTECTION SIGNALS**
**SCHUTZSIGNALE**

| ID | Aspect | Description |
|---|---|---|
| Hp 0 | Colour light  | Stop for train and shunting movements, see also colour light signal aspects |
| Sh 0 | Mechanical  Front Rear | Halt! Fahrverbot! / Stop! No passing!<br>A sign looking like the mechanical Sh 0 is also displayed on (almost) every buffer, see also Sh 2.<br><br>See also special rules. |
| Sh 1 (DB)<br>Ra 12 (DR) | Colour light  Mechanical  Front Rear | Fahrverbot aufgehoben / Shunting permitted.<br>If used in conjunction with an Hp 0 indicates that the stop aspect is void for shunting movements.<br>If used at a derailer indicated that the derailer is off, but gives no permission to proceed.<br>Is valid only for the first shunting movement, i.e. permission to proceed is given only when the driver sees the signal *changing* from Sh 0 to Sh 1.<br>If used in conjunction with a "W" board, always wait for permission by points operator |
| Ra 12<br>(at a<br>Ra 11) |  Ra 12 are the lit two white lamps mounted to a Ra 11 | Rangierfahrtsignal / Shunting permitted. *Order* to proceed.<br><br>see also special rules and DR's Ra 11 |
| Sh 2 |  | Schutzhalt / Protective stop:<br>stop (buffer at dead entry lines, drawbridges, turntables, closed gates, engineering works, etc.).<br>At night equipped with a single red lantern.<br>Usually used at dead-end tracks if this track is a direct entry line or entered by regular train movements (e.g. at a terminal station) |
| Vr 0<br>[was Sh 3] |  | Wärtervorsignal / Expect an Sh 2 board.<br>At night equipped with two amber lanterns. This is a mobile board placed by staff when there is a need to announce an Sh 2 board. Since the aspect and meaning are the same as (semaphore) distant signal announcing halt, the signal has been renamed to Vr 0. |
| Sh 3 |  | Kreissignal ("Circle Signal") / Stop immediately.<br>This signal is given by swinging a white-red-white flag or a red lantern in a circular manner.<br>The signal can also be given by swinging any object, your arm, or any light in a circular manner. |
| Sh 5 | ooo ooo ooo | Horn- und Pfeifsignal ("Horn and Whistle Signal") / Stop immediately.<br>Three short tones repeated multiple times. |

**Some special rules for track blocking signals:**

For shunting movements usually an indication of a clear track *permits* proceeding but does not *order* to proceed (for an explanation of this subtle difference see the signalling basics page). The reason for the signals not being a proceed order is that it is sometimes forgotten to reset a manually operated line-close signal to stop after is was passed by a shunting movement. To minimise the dangers involved with that a movement must not proceed a clear signal unless ordered to do so by additional signal or order.

| | | |
|---|---|---|
| DB |  | [Obsolete]<br>Raute ("Diamond"): Could be mounted to Sh 0/Sh 1 mechanical signals. An Sh 1 mechanical signal was a permission to proceed but not an order, i.e. unaccompanied shunting movements might proceed only if ordered to do so, e.g. by Ra 1 or verbal order. If the signal was equipped with the diamond, the Sh 1 is to be interpreted as a proceed order.<br>In the 1999 edition of the Signal Book the Diamond Board has disappeared, now a mechanical signal is never an order, just permission. |
| DR |  | [Obsolete]<br>Kreisscheibe ("Circle Board"): A Ra 12 or Gsp 1 (mechanical Sh 1) is a proceed order. Rule abandoned as of 2006 edition of the Signal Book. |

On DR lines instead of the Sh 0/1 colour light signal you will often see a box like the one below:

| | |
|---|---|
|  | This is a device combining a Ra 11 Waiting board a Ra 12 light signal and often a Kreisscheibe (Circle Board). The white box at the lower right contains the signal's number. The "W" is transparently illuminated. If the two white lights are off it means 'stopping for shunting movements', see also Ra 11. If they are on, they are an order to proceed (without the Kreisscheibe it would be just a permission). |

**SHUNTING AND HUMP YARD SIGNALS, SIGNALS FOR LOCOS ASSISTING IN REAR**
**SIGNALE FÜR DEN RANGIERDIENST, SIGNALE FÜR SCHIEBELOKOMOTIVEN**

- Shunting and Hump yard Signals
- Signals for Locos Assisting in Rear

| Shunting and hump yard signals | | |
|---|---|---|
| ID | Aspect | Description |
| Ra 1 | =======<br> | Wegfahren / Move away from hand signal.<br>A very long tone or move a hand up and down multiple times. |
| Ra 2 | === ===<br> | Herkommen / Move towards hand signal.<br>Two long tones or move a hand horizontally multiple times |
| Ra 3 | o o<br> | Aufdrücken / Push vehicles together to enable uncoupling. Stop after pushing.<br>Two short tones or move hands together multiple times. At night hold a lantern in *one* hand. |
| Ra 4 | === === o<br> | Abstoßen / Push up vehicles for loose shunting.<br>Two long and one short tone, or move hand outward horizontally twice, then rapidly down. |
| Ra 5 | o o o<br> | Rangierhalt / Stop.<br>Three short tones. A white lantern is swung in a circular manner. |
| Ra 6 |  <br>Semaphore<br>  <br>light signal | Halt! Abdrücken untersagt! / Stop! Hump shunting forbidden! |
| Ra 7 |  <br>  | Langsam abdrücken / Propel slowly |
| Ra 8 |  | Mäßig schnell abdrücken / Propel moderate fast |

| | | |
|---|---|---|
| |  | |
| Ra 9 |  | Zurückziehen / Reverse |
| Ra 10 |  | Rangierhalttafel / Limit of shunting movement's board:<br>no shunting movements beyond this signal. This board is usually mounted to the left of the track and may be without inscription (usually in former DR area) |
| Ra 11 (DB)<br>Ra 11a (DR) |  | Wartezeichen / Waiting Board:<br>stop for shunting movements (until permitted to proceed e.g. by Sh 1 (DB) or Ra 12 (DR)). |
| Ra 11b (DR) |  | Same as above, but not equipped with the two white lights. (So e.g. a Ra 2 given by a shunter would be needed to proceed) |
| Ra 12 (DB)<br>So 12 (DR) |  | Grenzzeichen / Clear-of-points marker:<br>Placed between converging tracks. Halting trains must do so before the marker (halting closer to points would obstruct other line). |
| Ra 13 |  | Isolierzeichen / Insulated Block Joint or Track Contact Marker |
| Signals for locos assisting in rear | | |
| Ts 1 |  | Nachschieben einstellen / Stop pushing |
| Ts 2 |  | Halt für zurückkehrende Schiebelokomotiven und Sperrfahrten / Stop for returning locos assisting in rear. This signal is placed to the left of the track before entry to station, when there is no main or line-close signal. |
| Ts 3 |  | Weiterfahrt für zurückkehrende Schiebelokomotiven und Sperrfahrten / Returning locos assisting in rear may proceed. This signal is placed to the left of the track before entry to station, when there is no main or line-close signal. |

**POINTS SIGNALS**
**WEICHENSIGNALE**

There are different kinds of points:

- Normale Weiche / Normal points have a straight and a curved track
- Innenbogenweiche ("inward curved points") / Curved points have two tracks that are curved to the same side, one stronger and one lesser curved.
- Außenbogenweiche ("outward curved points") / Y points have two tracks curved into opposite directions.
- Einfache Kreuzungsweiche ("simple cross-points") / Single Slip Points are X-shaped points where you can go straight or curved from one track.
- Doppelte Kreuzungsweiche ("double cross-points") / Double Slip Points are X-shaped points where you can go straight or curved from either track.
- Rückfallweiche ("fall-back points") / Spring-loaded points can be travelled from either one of the converging tracks, regardless of it's setting. These are used on some DR small gauge tracks only.

See also:

- Colours of lever weights.
- Also, the signal "derailer is off" is regarded as a points signal

The points position indicators are small boxes which can rotate about 90° about their vertical axis. They are either transparently illuminated or equipped with reflectors. The indicators for diamond points do not rotate, instead the white fields are covered by black blinds that hide or uncover the respective fields, or reflective arms are moved appropriately.
Recently light point signals were invented, these are also shown here. At light Wn signals, at least one light (on Federal railways, two lights) are flashing while the points are moving or when points are defective.

| Einfache Weichen und Innenbogenweichen Normal *and curved points* | | |
|---|---|---|
| ID | Aspect | Description |
| Wn 1 |  <br>(Mechanical)<br>  <br>(Light signal) | Gerader Zweig. / Straight track. On a curved point the lesser curved track<br>The light signal may also have its lights on the right side. |
| Wn 2 |  <br>(Facing points)<br>  <br>(Trailing points)<br>  <br>(Light signal) | Gebogener Zweig / Curved track left or right. On a curved point the stronger curved track.<br><br>As far as I know the light signals gives no indication whether the turn goes left or right (methinks this is very useful at Y points...) |
| Außenbogenweichen *Y points* | | |

| | | |
|---|---|---|
| Wn 2 |  (Facing points)  (Trailing points) | Curved track left or right. |
| Doppelte Kreuzungsweichen *Double Slip Points* | | |
| Wn 3 |  | Straight from left to right |
| Wn 4 |  | Straight from right to left |
| Wn 5 |  | Curved from left to left |
| Wn 6 |  | Curved from right to right |
| Gleissperren *Derailers* | | |
| Wn 7 |  Mechanical-front  mechanical-rear | Gleissperre ist abgelegt / Derailer is off the track.<br>*This does not constitute permission or an order to proceed.* |
| Rückfallweichen *Spring-loaded points* | | |
| Wn 1<br>Wn 2 | Example:  | Position indicators like the ones for ordinary points, but orange instead of black background |
| So 17 |  | Ankündigungsbake / Announcement board: driver has to check which aspect is displayed by the following So 18 signal |
| So 18a |  | Überwachungssignal einer Rückfallweiche / Protection signal for a spring-loaded point:<br>Point can be traveled facing points. |

| | | |
|---|---|---|
| So 18b |  | Point cannot be traveled facing points.<br>Stop in front of points and make sure that point can be traveled facing points. Before proceeding at pace rate, special rules apply. |

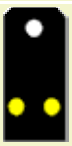
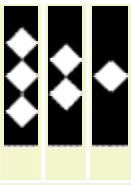
At manually operated points, the lever weights are marked with colours giving certain information:

| Weight colouring | Indication |
|---|---|
|  | Base position: black half downwards ("Dreck zu Dreck" - "dirt facing dirt") |
|   | Operate only with permission of signalman |
|  | No default position |
|  | Spring-loaded points |
|  | Points without locking device |

**LEVEL CROSSING SIGNALS**
**SIGNALE FÜR BAHNÜBERGÄNGE**

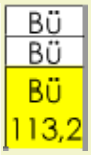
- Railway Signals
- Additional Signs
- Signals for street traffic

## Signals

| ID | Aspect | Description |
|---|---|---|
| Bü 0 |  | Stop before level crossing and proceed when secured. |
| |  | On top DB, below DR variant. |
| Bü 1 |  | Level crossing may be passed. On branch lines, the amber light may be missing. |
| |  | On top DB, below DR variant. |
| Note that the DR signals are being introduced as alternative styles in DB area, probably because the blinking white light may be confused with a Zs 1 at a Ks signal.<br>On newer signals, the amber light(s) are replaced by retro-reflective dot(s). | | |
| Bü 2 |  | (DB only)<br>Rautentafel (Diamond board): expect level crossing signal. Also marks the activation point for the level crossing's road signals<br>Note: don't confuse this with the DR Zs 103 mounted to a main signal.<br>If the level crossing is at reduced distance, there may be a white triangle atop the diamond board. |
| |  | (DB only)<br>Optionally a Bü 2 can be followed by usually up to three diamond boards with decreasing number of diamonds. In that case, the distance between the boards is 75m, the distance between the last board and the level crossing signal is 100m. |
| Bü 3 |  | DB area:<br>Merktafel. Marks the point where flashing lights or light signal with remote supervision are turned on. |

| | | |
|---|---|---|
| So 15 |  | DR area:<br>Warntafel (Warning board): Observe level crossing signal. Driver must check now whether So 16 displays steady white light (aspect So 16a). If no So 14 is present also marks contact point where street signals will be turned on. |
| Bü 4 |  | Pfeiftafel (Whistle board): sound whistle (**p**feifen = whistle) for approx. three seconds. In DR area two whistle boards may be mounted above each other. This is signal Pf 2 which means: Whistle twice. The board may also have its colours reversed. |
| |  | There is a regular stop between the whistle board and the level crossing, and this whistle board is valid only for trains not stopping before the level crossing. For halting trains, another whistle board will be placed after the halt. |
| Bü 5 |  | Läutetafel (Bell board): ring bell (**l**äuten = ring) until train head has passed the level crossing.<br>As with the whistle board the board with the two black stripes may be used. |
| So 14 |  | DR area<br>Note: this is a black-and-white painted pole and is used only if no So 15 signal is used.<br>Merkpfahl (Attention pole): Marks the contact point where level crossing street signals will be turned on. |
| Zs 9 |  | See explanation at subsidiary signals page. |

**Additional level crossing signs**

| | |
|---|---|
|  | Post plate for a level crossing signal.. |
|  | Distance between signal and level crossing is closer than usual. In this case also the Bü 2 is marked with this triangle |
|  | (DB signals only) Mounted below post plate (like above instead of the triangle) or below Bü announcement board:<br>Marks a repeater signal or repeated announcement board. |
|  | Bü-Ankündetafel (Level crossing announcement board):<br>In DB area is placed at the switch-on point for the street signals at crossing.<br>In DR area is placed together with the So 15 warning board.<br>Note that this board is facultative. The number is the km-position of the level crossing. |
|  | Bü announcer when the switch-on contact governs more than one level crossing that is densely spaced. |

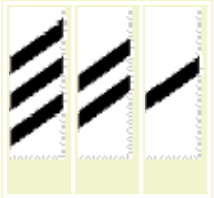
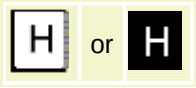
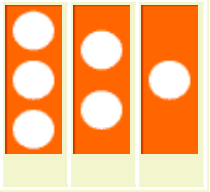
| | |
|---|---|
|  | Bü-Kennzeichentafel (Level crossing marker board):<br>If a Bü announcer is present, then this board is placed immediately at the level crossing. If the signals at the level crossing in advance are governed by the same contact as the ones for the crossing in rear, the Bü announcer for the next crossing is mounted below this Bü marker. |
|  | Marks the location of the automatic auxiliary activation device for level crossing signals. If approaching a level crossing when the signals have failed to turned on automatically, approach this location at pace rate and verify whether signals are turning on. |
|  | Marks the location of the manual auxiliary activation device for level crossing signals. If approaching a level crossing when the signals have failed to turned on automatically, stop here and activate signals manually. |
|  | Marks the location of the automatic activation device for level crossing signals. When approaching a level crossing, signals should turn on when passing this board. |
|  | Marks the location of the manual activation device for level crossing signals. When approaching a level crossing, stop here and activate signals manually. |

**Signals for Street Traffic**

| | |
|---|---|
|  | Andreaskreuz (St. Andrew's Cross):<br>Yield to railway traffic. This sign is used at all level crossings regardless whether they are equipped with or without lights and/or barriers. |
|  | Older type signal: When light is off the level crossing may be passed when flashing: stop.<br>On newer installations a traffic light with red and amber light is used |
|  | Newer type signal |
| | |

**SUPPLEMENTAL SIGNALS**
**NEBENSIGNALE**

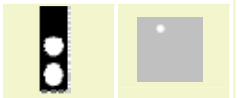
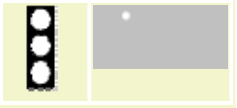
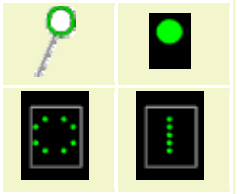
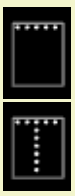
| ID | Aspect | Description |
|---|---|---|
| Ne 1 |  | Trapeztafel (Trapeze board): Facultative stop board replacing an entry signal on branch lines. For meeting trains special rules apply. |
| Ne 2 |  | Vorsignal-Mastschild. Distant signal post plate.<br>On branch lines may be used without distant signal to announce a main signal.<br>If the signal is above the track (e.g. on a gantry) the post plate may be mounted above the signal.<br>In ex-DR area, colour light distant signals may be indicated by the yellow triangle post plate, see there. |
| Ne 2 (variants) |  | As above for a semaphore distant signal capable of showing three aspects (i.e. can display Vr 2) |
| |  | Ne 2 for a distant signal which is at reduced distance to main signal |
| |  | Same as above, DR variant |
| |  | Semaphore distant signal capable of showing three aspects (i.e. can display Vr 2) at reduced distance. |
| So 106 |  | Kreuztafel / Cross Board<br>Used only on branch lines (instead of a distant signal) to announce a main signal or a Ne 1.<br>Being replaced by Ne 2/So 3a |

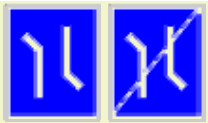
| | | |
|---|---|---|
| Ne 3 |  | Vorsignalbaken (Distant signal approaching markers): Marking approach of distant signal at 250 m, 175 m, and 100 m before the distant signal |
| Ne 4 |  | Schachbrett-Tafel (Chequerboard sign): The signal is not on its usual position (i.e. the signal may be to the left of the track, farther right than usual, or somewhere else) |
| Ne 5 |   | Haltetafel (Stopping Marker Board): halting trains stop here (H=Halt) |
| |  | Bedarfshaltesignal: passenger-operated stop-on-demand. |
| |   | Zustandsmelder (state indicator) for 2000 Hz Indusi magnet. If H board is secured with an Indusi magnet, a blue light may indicate whether the magnet is active (steady blue light) or inactive (flashing blue light). |
| Ne 6 |  | Haltepunkttafel: Expect a halt. This board is placed only on special need, e.g. limited visibility |
| So 19 |  | Hauptsignalbaken (main signal approach marker): Used only on special need to announce entry and block signals, placed at 100 m, 175 m and 250 m before the signal. |
| So 20 |  | Zuordnungstafel (Assignment board): Indicates which track a signal board (e.g. So 4) is intended for. Used only on special need. |
| Ne 7a |  | Schneepflugtafel (Snow plough board): Raise snowplough. DR uses also a yellow sign. |
| Ne 7b |  | Lower snow plough. DR uses also a yellow sign. |
| So 1 |  | Endtafel (End board) At Berlin urban railway only: Permission to drive on sight past a red or failed main signal that was given by red post plate ends here. |

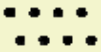
## MISCELLANEOUS SIGNALS

- Signale für das Zugpersonal Signal for the train personnel
- Fahrleitungssignale Catenary signals
- Signale an Zügen Signals at trains
- Signale an einzelnen Fahrzeugen Signals at single vehicles
- Rottenwarnsignale Gang Warning Signals

**Signale für das Zugpersonal / Signals for the Train Personnel**

| ID | Aspect | Description |
|---|---|---|
| Zp 1 | === | Achtungssignal/Attention signal: a long tone:<br>Call attention, acknowledge a signal, warn before level crossings etc. |
| Zp 2 | o | Fasten hand brakes lightly. A short tone. |
| Zp 3 | o o o | Fasten hand brakes strongly. Three short tones. |
| Zp 4 | === === | Loosen hand brakes. Two long tones. |
| Zp 5 | o o o o o o o o o | Notsignal/Emergency signal: Three tones quickly repeated multiple times:<br>Something extraordinary has happened. Stop and help. |
| Zp 6 |  | Apply brake. Left light signal. Right night hand signal.<br>At daylight: raise both hands and slap them together above the head.<br>At night: raise light in a semi-circle and move down quickly |
| Zp 7 |  | Release brake. Hand signal is: Move hand (at night a white light) in a semi-circle above the head multiple times. |
| Zp 8 |  | Brake ok. At daylight: hold both hands raised,<br>at night, moves white light in the manner of a tilted '8' multiple times. |
| Zp 9 |  | Abfahren / Starting Order Signal.<br>May be given also by hand, verbal order, or lantern. The signal with the green vertical bar is obsolete. |
| Zp 10 |  | Türen schließen / Close doors<br>The "T" symbol is only used at S-Bahn urban railways |
| Zp 11 | === o === | Kommen / Come! Used to call in trains into stations without entry signal or to call personnel. A long tone a short and a long tone. |
| Zp 12 | o o === o | Grenzzeichenfrei / Train stands clear of points. See also signal Ra 12. |

| Fahrleitungssignale / Catenary Signals | | |
|---|---|---|
| El 1v |  | Signal El 1 erwarten (Expect an El 1):<br>This signal is shown only where necessary. It is then usually mounted at half braking distance before an El 1. |
| El 1 |  | Ausschaltsignal (Switch-off signal): Main switch must be off when passing this signal. |
| El 1/2 |  | Schaltsignal für verkürzte Schutzstrecken (Switch signal for short protection tracks): Main switch must be off when passing this signal. It may be turned on after passing the signal when catenary voltage has returned |
| El 2 |  | Einschaltsignal (Switch-on signal): Main switch may be turned on after this signal |
| El 3 |  | "Bügel Ab"-Ankündesignal (Lower pantograph announcement signal): Expect El 4.<br>Placed at least 250 m before El 4. |
| El 4 |  | "Bügel ab"-Signal (Lower pantograph signal): Panto must be completely down when passing this signal |
| El 5 |  | "Bügel an"-Signal (Raise pantograph signal): Panto may be raised after this signal |
| El 6 |  | Halt für Fahrzeuge mit gehobenen Stromabnehmern (Stop for vehicles with raised pantographs): Usually announces end of catenary. |
| [El 7] |  | [Obsolete]<br>(Berlin urban railway only) Interrupt Power by releasing the drive switch. |
| |  | Zuordnungstafel (assignment board)<br>At points used above an El signal to indicate which line the El signal is intended for.<br>If the El signals is valid either for both ways, or there are more points in short distance after another, two arrows may be used. |
| |  | Supplemental boards that may be placed below an El 2 or El 5 at boundary between power systems (at border crossings):<br>Power must not be turned on / panto must not be raised unless loco has been adjusted to posted power system. (15kV AC or DC in these examples) |
| |  | Used at ICE high-speed lines after an El 5 to indicate that the rear engine has now passed the El 5, so that both front and rear pantographs may be raised. |
| |  | Elektrische Streckentrennung - Anfang / Ende<br>Electric Line Section - begin / end<br>Marks the section area where trains must not stop with pantographs raised. |

| | | |
|---|---|---|
| **Signale an Zügen / Signals at Trains** | | |
| Zg 1/<br>Zg 1a |  | Spitzensignal / Headlights<br>If first vehicle is neither loco nor control car the signal Zg 1b is used.<br>Locos assisting in rear also use the Zg 1 if they are not coupled to the train. |
| Zg 1b |  | Spitzensignal / Headlights for leading vehicles which are neither loco nor control car, or where the upper light cannot be mounted. |
| Zg 2 |  | Schlußsignal / Tail signals. On some instances, one red light may be used. The red light(s) may be flashing, although this is uncommon. |
| |  | On some instances, especially freight trains, these boards are used instead of rear lights. If train is equipped with lights, then these must be used. The board can also be yellow/red. German boards are white/red, but this ruling allows the use of French or Danish boards |
| [Zg 102] |  | [Obsolete, deleted from the Signal Book]<br>Vereinfachtes Schlußsignal / Simplified Tail Signal. A red disc with white border, usually hung at the rear coupling. |
| **Signale an einzelnen Fahrzeugen / Signals at Single Vehicles** | | |
| Fz 1 |  | Rangierlokomotivsignal / Signal for shunting loco<br>One light front and rear. If unsecured level crossings are travelled, signal Zg 1a has to be used instead. |
| Fz 2 |  | Gelbe Fahne / Yellow Flag<br>Marks occupied staff cars that are not part of a train. At night the cars must be visibly illuminated from inside. |
| **Rottenwarnsignale / Gang Warning Signals** | | |
| Ro 1 |  | Caution! Vehicles approaching in the track next to the working track.<br>A long two-frequency tone |
| Ro 2 |  | Clear working track.<br>Two long tones with different frequency |
| Ro 3 |  | Clear working track immediately!<br>Two short tones with different frequency, repeated at least five times. |
| Ro 4 |  | Flag Board.<br>Marks the side of the track where to leave to in case of signals Ro 2 or Ro 3. |