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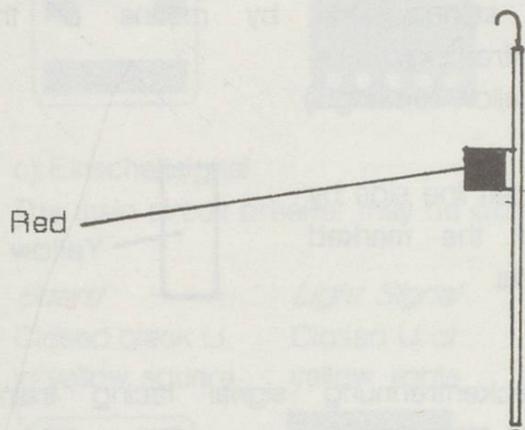
## Signals for Electric Working

by John Jesson

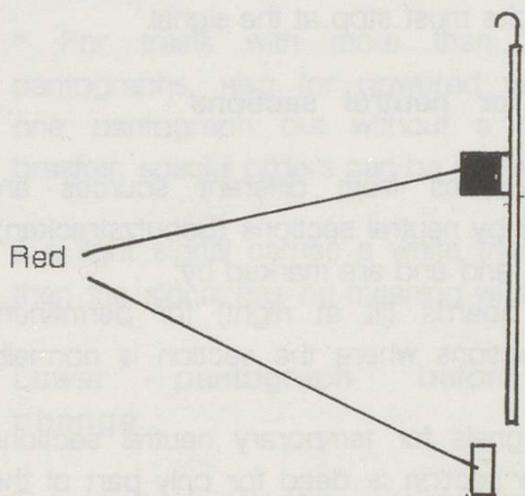
*Continued from page 24 March 1992 Swiss Express*

### Indication of an earthing pole.

An Earthing Pole hung from the overhead wires is marked:



By day with a red flag.

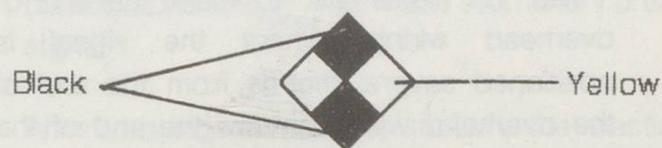


At night by a lantern displaying a red light on both sides.

Powered vehicles with raised pantographs are not permitted in the section of the earthed overhead wires. For other powered vehicles, the red flag or red light acts as a STOP signal, provided that the Earthing Pole is within the loading gauge. On an adjacent blocked track, this signal does not replace the portable STOP sign. (March 1991 Swiss Express, p.12)

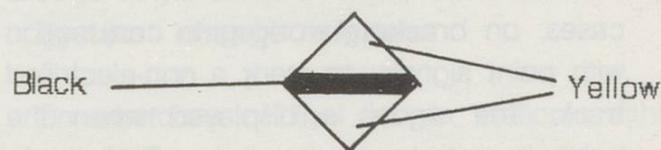
Earthing poles which are clear of the loading gauge, hung from an earthing point connected to the overhead wiring, are similarly indicated by day by a red flag. At night, no special indications are made.

### Overhead wire signals



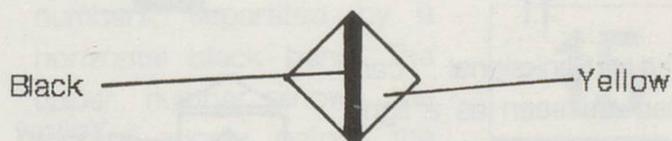
#### Vorsignal

(Diagonally positioned square board with two yellow and black quarters) The pantographs must be lowered by the time the Senksignal is reached.



#### Senksignal

(Horizontal black band on a diagonally-positioned yellow square) Powered vehicles with pantographs are permitted only with pantographs lowered, or must stop.



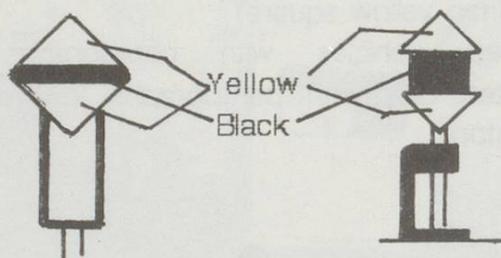
#### Endsignal

(Vertical black band on a diagonally-positioned yellow square) After passing this signal, the pantographs may be raised.

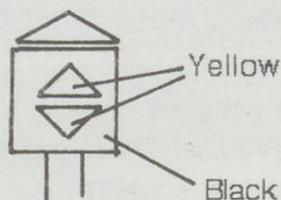
The electrified track section which must be traversed with lowered pantographs will be indicated with the signs shown above. The warning boards appropriate to the situation (September 1991 Swiss Express, pp.24/25) can be positioned at least 300m ahead of the Senksignal.

In addition the Senksignal shown above will be used on its own:

- Portable: to protect as required the safety of groups of tracks against the transit of powered vehicles with raised pantographs.
- Fixed, on masts etc: to mark the end of overhead wiring, where the signal is positioned several metres from the end of the overhead wiring. Where the end of the overhead wiring coincides with the end of the track, the signal is not used.
- Rotatable on masts etc, working in conjunction with the overhead wiring switchgear: as an indication of the position of switching for the overhead wiring. The signal is shown when the overhead wiring is switched off.
- Rotatable on point lanterns or, in special cases, on brackets working in conjunction with point signals: to mark a non-electrified track. The signal is displayed when the point is set to the non-electrified track. When the point is set towards an electrified track, the sign in parallel to the track and has no meaning.



The Senksignal can also be seen as a light signal. It carries a triangular plate, and is in its unlit state, without meaning. It can be used in the circumstances c) or d), above.



If the light signal is not able to be lit, the locomotive personnel must be given verbal instructions of the pantograph is to be lowered, or if a halt must be made at the signal.

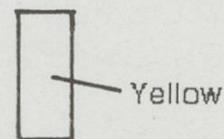
### Signal for sectioning

The beginning of a section break in the overhead wiring is marked:

On the station side by means of the Streckertrennung.

(Vertical yellow rectangle)

On the open line side by means of the marked entry signal.



The Streckentrennung signal facing trains leaving the station means:

When verbal information has been given that the overhead supply on the open line is switched off, powered vehicles with raised pantographs must stop at the signal.

### Signals for neutral sections

Power supplies from different sources are separated by neutral sections (Schutzstrecken).

Beginning and end are marked by:

- Signal boards (lit at night) for permanent neutral sections where the section is normally dead.

- Light signals for temporary neutral sections where the section is dead for only part of the time.

The signals are normally positioned near the contact wire.

A) Vorsignal

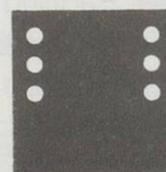
Prepare to operate main circuit breaker.

Board

none

Light signal

Two vertical rows of yellow lights

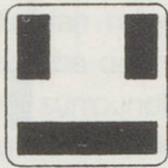


### b) Ausschaltsignal

The main circuit breaker must be opened by the time the signal is passed.

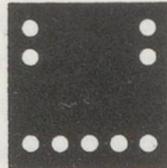
#### Board

Broken black U  
in yellow square



#### Light signal

Broken U of  
yellow lights



### c) Einschaltsignal

The main circuit breaker may be closed again\*

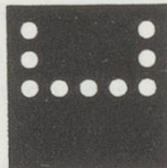
#### Board

Closed black U  
in yellow square



#### Light Signal

Closed U of  
yellow lights



\* For trains with more than two raised pantographs, also for powered vehicles with one pantograph but without a main circuit breaker, special orders can be issued.

If a light signal carries a white triangle above, then the signal has no meaning when unlit.

### Lower pantograph before system change

The start of a system change (between two different current systems) is indicated by a Senksignal (above).

### Zone neutral signals

At stations with switchable zones, the neutral sections at the limits of the zones are marked by neutral section signals (Zonen-Schutzstreckensignale).

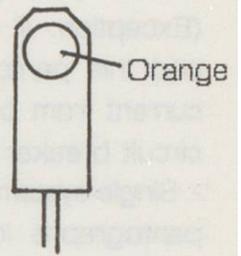
A zone neutral section signal displays an orange light, provided that a route has been set past the signal over a dead neutral section to a

different current system and means:

- Multi-system traction may pass only with lowered pantographs.

(Exception: if only one pantograph is raised, and this pantograph can be used to collect current from both systems, then only the main circuit breaker should be opened.)

- Single-system traction may pass only with all pantographs lowered or must stop short of the signal.



After passing the neutral section, the traction can be set up for the different current system and current can again be taken from the overhead wires.

If the signal is unlit, it has no meaning. However, it carries no white triangle.

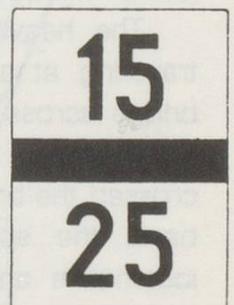
If the signal cannot be lit because of a failure, the driver of a train must be informed verbally before reaching the neutral section.

### System change signals

On stretches of line and in stations without switchable zones, the neutral section between two systems is marked by system change signals. These are positioned near the overhead wires. On single-track lines, the change of supply signal (Umschaltsignal) is normally to the left of the line, and the end of changeover signal (Endsignal) to the right. The signals are lit at night.

#### a) Umschaltsignal:

Yellow board with two numbers, separated by a horizontal black band. The upper number shows the current supply before the neutral section, the lower number the current supply after the neutral section. The numbers have the same meaning as on the zone signal (below).



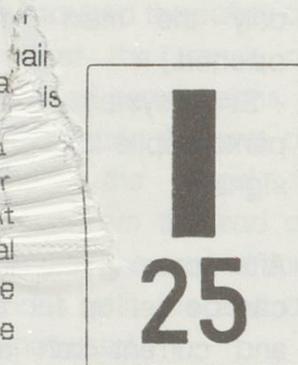
- Multi-system traction may pass only with lowered pantographs.

(Exception: if only one pantograph is raised, and this pantograph can be used to collect current from both systems, then only the main circuit breaker should be opened.)

- Single-system traction may pass only with all pantographs lowered, or must stop short of the signal.

b) Endsignal:

Yellow board with vertical black band above number. The number indicates the current system after the neutral section, and has the same meaning as on the zone signal (below).

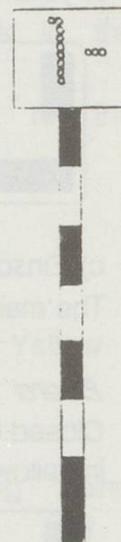


## Zone signals

Zone signals of this type display, for the information of personnel, which current is in use in a switchable section.

The numbers indicate:

Number	Current system
0	Current turned off
11	11,000 Volts, 16 2/3 Hz
15	15,000 Volts, 16 2/3 Hz
25	25,000 Volts, 50 Hz
3-	3,000 Volts, direct current
1-	1,500 Volts, direct current



- Multi-system traction, after setting up to receive the current system displayed on the Endsignal, may again take power from the overhead wires.

*Next instalment: RhB, FO & MOB*

## The Worst Railway Accident in Switzerland

**On 14 June 1891**, on the Basel-Delémont line of the Jura-Simplon Railway, the worst rail accident in Switzerland occurred.

It was a fine Sunday and many people had visited a music festival in Münchenstein. Such was the demand for seats that the 14:15 from Basel was strengthened by a further two coaches which in turn meant that the steam-hauled train had to be double headed. The train consisted of two B3/4 locomotives, a luggage van, a postal van, an express freight van and a further ten coaches, totalling some 324t.

The heavily loaded train set off and was travelling at around 50 km/h approaching the bridge across the River Birs, where speed was reduced to 35 km/h. The first locomotive crossed the bridge, but as it reached the further bank, the spans collapsed and the second locomotive and the first two coaches fell into the river. Five more coaches followed them into the gap, leaving the eighth coach perched

precariously on the edge. The remaining two passenger coaches and the vans remained on the tracks.

Such was the force of the impact that the seven coaches in the river were reduced from 85m to as little as 20m. There were 210 people in that part of the train, of these 73 lost their lives, but some 60 were rescued from the wreckage with hardly any injuries.

Clearing the tangled mass from the river took a considerable time and to speed the task, night working was carried out with the aid of the Gotthard generator coach, which can now be seen in the Transport Museum at Luzern.

The subsequent enquiry found that the bridge had been damaged by flooding in 1881 and had not been properly repaired. To add to this, it was strengthened in 1880 to enable heavier locomotives of the Jura Simplon to pass across, and this work was not properly carried out as well!

**Richard Pinner**