Italian Signals User Manual

Rel 1.0

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1. Initial notes

Italian signals are quite complex. In the railway history, they changed several times with update in technology and logic. The signals created for TSC are only the actual version.

Being not possible to fully simulate the real behavior, also due to limitation on TSC engine function library, the pack will never be a full replication of the real signals.

This guide contains a description of the main function and aspects of the signals and their meaning in TSC,

> This guide does not represent a complete and precise italian signals manual. To have official and exhaustive information, it is necessary to refer to official documentation like the “Regolamento dei segnali italiani” (link) or other web site with more details (i.e. link).

2. Signals

2.1. Overview

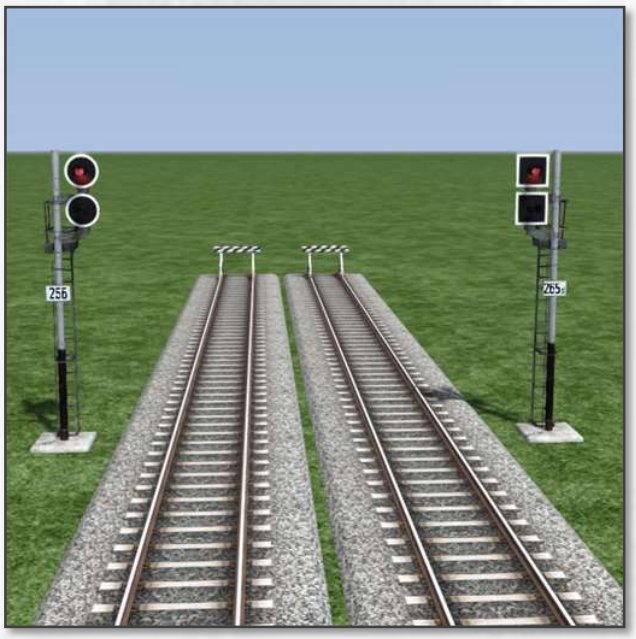
The Italian signals are so called permanently illuminated signals. Light can assume red, yellow and green color, other than switched off.

The combination of colors in a specific moment a signal has, is called “aspect”.

2.2. Signal placement

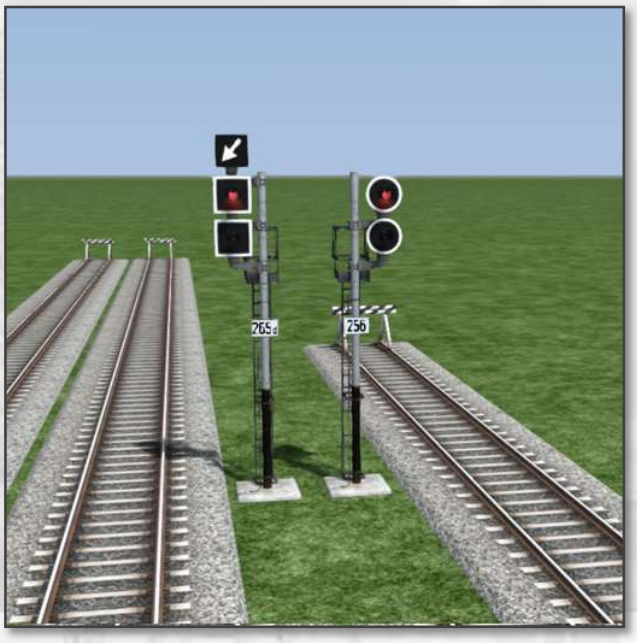
A signal (mounted on pole or on pylon) if is referred to a single-track line or to the left track of a double line track should be placed on the left of the track and is recognizable by a circular black board with white border (called “Vela Tonda”). A left track of a double-line track is called “Legale” or legal in conformity with the english circulation direction. The right one is called “Illegale” because is normally not used for the same direction except in specific cases.

A signal (mounted on pole or on pylon) if is referred to the right track of a double line track should be placed on the right and is recognizable by a square black board with white border (called “Vela Quadra”).



In some stations, in case of multiple parallel tracks, the rule is still the same. Circular shape if placed on left of the track, square shape if placed on the right of the track.

If, especially in stations, a square signal is near to a circular signal, to avoid to confuse the one to look at, the square shape signal has an additional board on top with an illuminated arrow pointing to the correct right track (see image below).



Specific tunnel signals do not have any screen and therefore have the same shape in whichever position they are placed.

2.3. Signal main type

Signals can have up to 3 lights ("Vele") and some additional options depending on case. Some of them are included in the TSC signals, some others not due to engine limitations.

They can be subdivided in 2 main types:

- Category 1 signals.

  They are normally placed to protect junctions, stations, particular points on the line (protection signals) or to handle departure from stations (departure signals).

  Block signals, which are placed in the so called "Automatic Block Lines" between two stations or points to be protected and that have the purpose of dividing a long section into several shorter sections whose traffic can be handled separately, are also considered 1st category signals.

  When mounted on pole this signal type can be recognized by a pole with a black lower part.

  Category 1 signals can be with or without a coupled warning function (distant feature).

- Warning (distant) signals.

  They are normally placed before a 1st category signal and give information about this following (protection) signal that the train will encounter. Warning signals can never show the red aspect and can therefore always be overpassed.

When mounted on pole, warning signals can be recognized by a pole with a black and white striped lower part.

> The number of lights depends on the aspect the signal can theoretically have
>
> Block and Warning signals cannot have more than 2 lights.

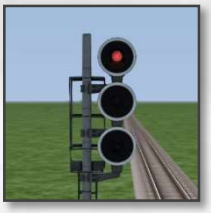
2.4. 1st category signal aspect

> In the following chapter, the mentioned lights have to be intended from the higher mounted to the lower mounted.
>
> Symbol used to define the aspect are R, G and V stating for Red, Yellow and Green in Italian. Gx or Vx, state for flashing Yellow or flashing Green, Gy and Vy state for alternating flashing in comparison with Gx and Vx.

> Whichever combination not included has to be considered in real railway as a malfunction and therefore considered as a full blocking "R" signal.

1st category signal can assume the following aspects:

- Red (R)

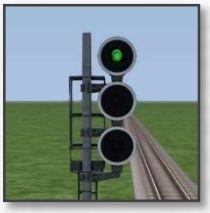


Driver is not allowed to pass the signal. Signal is in the so called "Via Impedita" state (Blocked Path),

In TSC, a red signal can be passed only if allowed by other auxiliary signals or via the PASS TO DANGER request (if obtained)

> In real railway there are few possible cases where a red signal can be passed, subjected to specific authorization and documentation, that are not possible to be simulated due to engine limitations

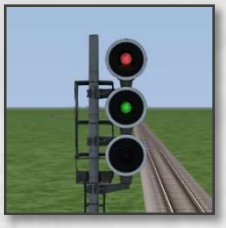
- Green (V)



Driver can proceed at the max speed allowed by the lines without restrictions. Signal is in the so called "Via Libera" state (Free Path).

If the train start from a side track, a maximum speed of 30 km/h has to be maintained over the junctions, unless differently shown on auxiliary signals.

- Red - Green (R-V)



The train can pass the signal but reducing speed to 30, 60 or 100 km/h.

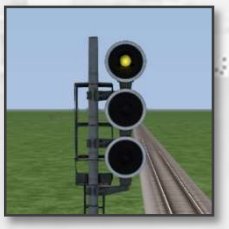
Which speed to respect between the 3 above mentioned is shown in an auxiliary signal called Rappel, that is explained in a specific paragraph.

2.5. First category signal aspect with coupled warning

The aspect descripted until now are also valid for the signal with coupled warning feature and therefore will not be repeated.

This signal type can assume the following aspects:

- Yellow (G)



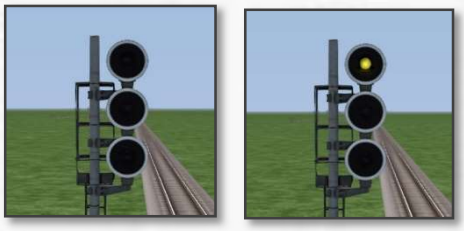
The signal can be passed (Free Path) but warns that the next signal is R (Blocked Path). Normally signal can be passed at the maximum speed allowed by the track.

If the train start from a side track, a maximum speed of 30 km/h has to be maintained over the junctions, unless differently shown on auxiliary signals.

Train should start braking 150-200mt in advance of the Y signal to approach the following R signal to a speed of 30 km/h at 200 mt from it. This is called “Approaching speed”.

In case the signal with Y is preceded by a signal with flashing Y (see next aspect) the train should start even in advance of 200 mt due to the fact that there is less space available.

- Flashing Yellow (Gx)

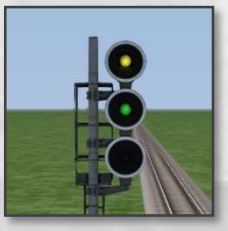


The signal can be passed (Free Path) at the maximum speed allowed by the track and warns that the next signal can also be passed (Free Path) BUT that there is a third signal at a reduced distance (600-900 mt depending on the line type) that is in Blocked Path or Free Path with speed reduction constraint.

A typical sequence is to have G/Gx/R or G/Gx/RV.

> If the train start from a side track, a maximum speed of 30 km/h has to be maintained over the junctions, unless differently shown on auxiliary signals.
>
> Train should start braking even before 200mt in advance of the 2nd Y signal to approach the following R signal to a speed of 30 km/h at 200 mt from it. This is called "Approaching speed".

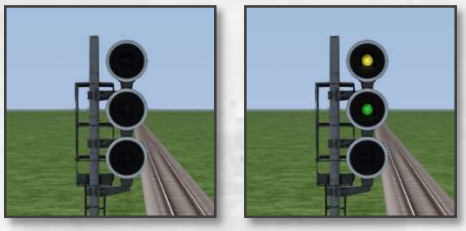
- Yellow - Green (G-V)



The signal can be passed (Free Path) at the maximum speed allowed by the track and warns that the next signal can also be passed (Free Path) BUT at a reduced speed of 30km/h.

> If the train start from a side track, a maximum speed of 30 km/h has to be maintained over the junctions, unless differently shown on auxiliary signals.

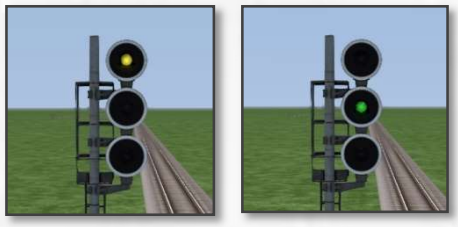
- Flashing Yellow – Flashing Green (Gx-Vx)



The signal can be passed (Free Path) at the maximum speed allowed by the track and warns that the next signal can also be passed (Free Path) BUT at a reduced speed of 60km/h.

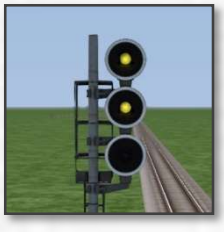
> If the train start from a side track, a maximum speed of 30 km/h has to be maintained over the junctions, unless differently shown on auxiliary signals.

- Flashing Yellow – Alternate Flashing Green (Gx-Vy)



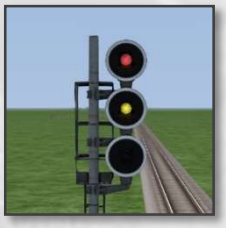
The signal can be passed (Free Path) at the maximum speed allowed by the track and warns that the next signal can also be passed (Free Path) BUT at a reduced speed of 100km/h.

- Yellow - Yellow (G-G)



The signal can be passed (Free Path) and warns that the train is directed to a short track or a track with rolling material or to a signal in R (Blocked Path) placed at an abnormally reduced distance (350-600mt). This signal is always preceded by a yellow signal.

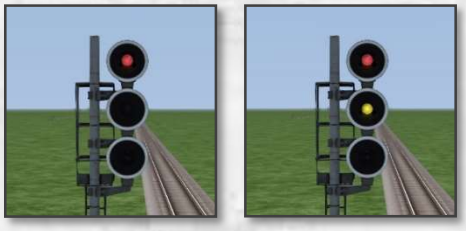
- Red – Yellow (R-G)



The signal can be passed (Free Path) at a reduced speed of 30 or 60 km/h and warns that the next signal is R (Blocked Path).

> Which speed to follow between the 2 above mentioned is shown in an auxiliary signal called Rappel, that is explained in a specific paragraph. For this aspect, 100 km/h reduction limit is not allowed.

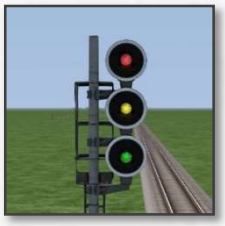
- Red – Flashing yellow (R-Gx)



The signal can be passed (Free Path) at a reduced speed of 30, 60 or 100 km/h and warns that the next signal can also be passed without speed restriction BUT that the 3rd signal encountered is at reduced distance (600-900 mt depending on the line type) and is or in Blocked Path or Free Path with speed restriction.

> Which speed to follow between the 3 above mentioned is shown in an auxiliary signal called Rappel, that is explained in a specific paragraph.

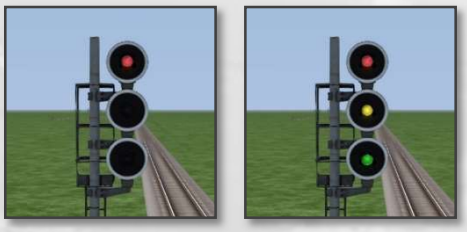
- Red – Yellow - Green (R-G-V)



The signal can be passed (Free Path) at a reduced speed of 30, 60 or 100 km/h and warns that the next signal is also a Free Path BUT with a speed restriction of 30 km/h.

> Which speed to follow between the 3 above mentioned is shown in an auxiliary signal called Rappel, that is explained in a specific paragraph.

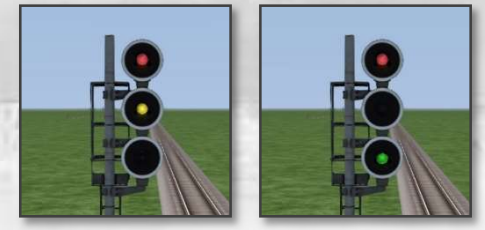
- Red – Flashing Yellow – Flashing Green (R-Gx-Vx)



The signal can be passed (Free Path) at a reduced speed of 30, 60 or 100 km/h and warns that the next signal is also a Free Path BUT with a speed restriction of 60 km/h.

> Which speed to follow between the 3 above mentioned is shown in an auxiliary signal called Rappel, that is explained in a specific paragraph.

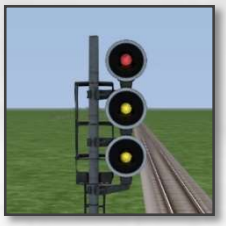
- Red – Fashing Yellow – Alternate Flashing Green (R-Gx-Vy)



The signal can be passed (Free Path) at a reduced speed of 30, 60 or 100 km/h and warns that the next signal is also a Free Path BUT with a speed restriction of 100 km/h.

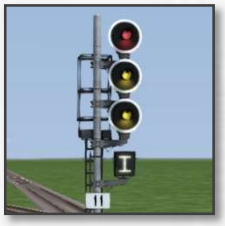
> Which speed to follow between the 3 above mentioned is shown in an auxiliary signal called Rappel, that is explained in a specific paragraph.

- Red – Yellow - Yellow (R-G-G)



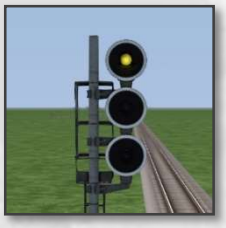
The signal can be passed (Free Path) at a reduced speed of 30 km/h and warns that the next signal is R (Blocked Path) or train is directed toward a short track or with rolling material.

> In case of track occupied by rolling stock, an "I" is displayed in the auxiliary signal.



2.6. Pure warning signal aspect

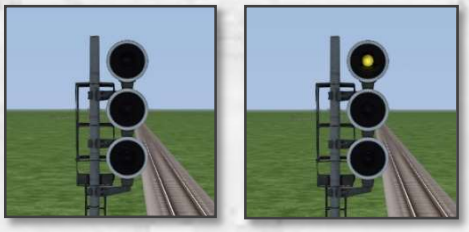
- Yellow (G)



Warns that the next signal is R (Blocked Path).

	Train should start braking 200mt in advance of the Y signal to approach the following R signal to a speed of 30 km/h at 150-200 mt from it. This is called “Approaching speed”.
	In case the signal with Y is preceded by a signal with flashing Y (see next aspect) the train should start in advance of 200 mt due to the fact that there is less space available.

- Flashing Yellow (Gx)

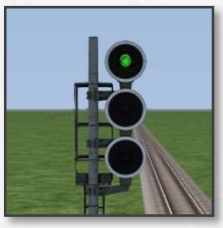


The signal can be passed (Free Path) at the maximum speed allowed by the track and warns that the next signal can also be passed (Free Path) BUT that there is a third signal at a reduced distance (600-900 mt depending on the line type) that is in Blocked Path or Free Path with speed reduction constraint.

A typical sequence is to have G/Gx/R or G/Gx/RV.

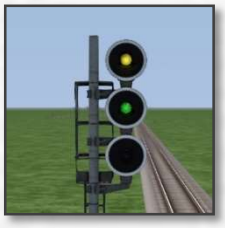
	If the train start from a side track, a maximum speed of 30 km/h has to be maintained over the junctions, unless differently shown on auxiliary signals.
	Train should start braking even before 200mt in advance of the 2nd Y signal to approach the following R signal to a speed of 30 km/h at 200 mt from it. This is called “Approaching speed”.

- Green (V)



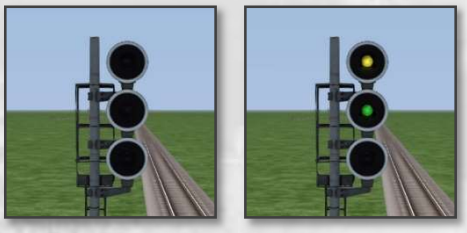
Warn that the next signal is at Free Path without speed restriction.

- Yellow - Green (G-V)



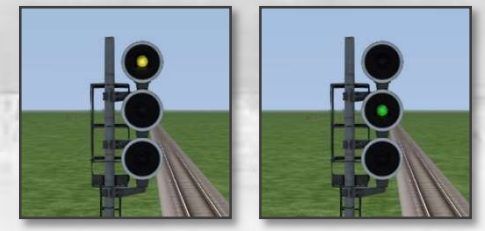
Warns that the next signal is at Free Path with a speed restriction to 30 km/h.

- Flashing Yellow – Flashing Green (Gx-Vx)



Warns that the next signal is at Free Path with a speed restriction to 60 km/h.

- Flashing Yellow – Alternate Flashing Green (Gx-Vy)



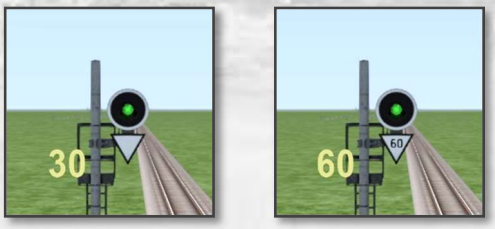
Warns that the next signal is at Free Path with a speed restriction to 100 km/h.

2.7. Variable Speed Limit - Rappel

Is an auxiliary signal integrated when the signal has a speed reduction constraint. Speed can be 30 km/h, when Rappel is switched off, 60 km/h when a horizontal lighted line is visible and 100 km/h when 2 horizontal lighted lines are visible.

2.8. Fixed Speed Limit – Triangle

In departure signal from a side track or in some other case where speed limit should be reduced always to 30 or 60 km/h, signal can be provided by a white triangular board. This limit the speed to 30 km/h or, if a "60" is present in the board, the speed to 60 km/h.

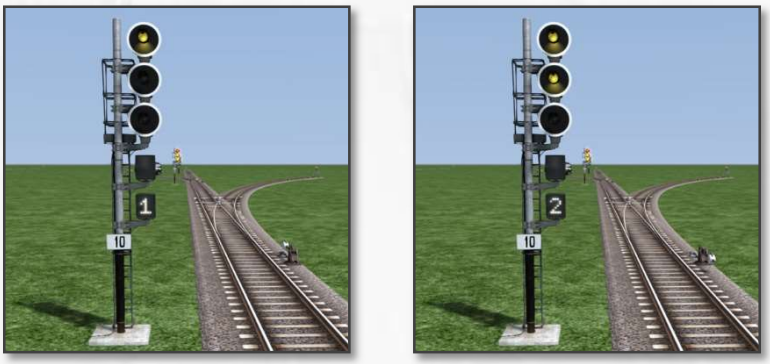


3 light signals, warning signals and block signals cannot have the speed limit board for fixed speed restriction.

2.9. Direction display

When a signal protects more track branch direction, the display indicates the one currently activated.

The instruction is given by a number indicating the possible branch from left to right. If, for example, there are only 2 branches, the left one is indicated by the number 1 and the right one by the number 2, as shown in the below picture where the left one shows the junction switched toward the straight line (1), and the second one shows the situation with the junction switched toward the right branch (2).



The direction display is always switched off when the signal is in Blocked Path condition (R).

2.10. Multiple protection and departure signals

In some stations important and wide it can be installed, to improve the management of all the tracks and junction, a multiple protection or departure signal system.

In the case of multiple protection signal system, signals are identified by a yellow board with a black description. The train arriving encounter first the external protection signal (EST printed) and after the internal protection signal (INT printed). In very rarely case where additional external or internal protection signal are installed, a decreasing

number is used. For example if a station has 1 external protection signal and 2 internal protection signals, the train see in order EXT on the first signal, INT2 in the second signal, INT1 in the third signal, as shown in the pictures below.

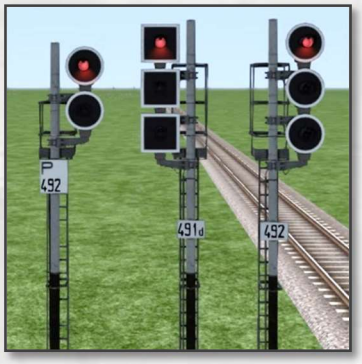
In the case of the multiple departure signal system, the rules are the same in the other way round, but the boards have a white background instead of yellow background.

2.11. Numbering

All departures and block signals have a specific number that is reported in the so called “Fascicolo di linea” that is a sort of manual of the line.

In the case of block signal, number is very often printed together with a P, meaning permissive signals. In the reality P means that the block signals can be passed under certain conditions and authorizations. In TSC the P is printed but the ability to be passed is limited only to the Request Pass to Danger feature.

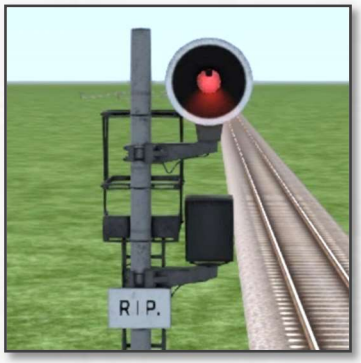
Protection signals and warning signals do not have a number and are not included in the “Fascicolo di Linea” and therefore the 3d model do not have any white boards.



2.12. Departure Repeater Signal

In some station can happen that the train start from a remote track in respect to the station main tracks.

If the distance between the signal position of the remote track and the departure signal is not wide enough to install a standard additional departure signal, it is used a signal called “Ripetitore di Partenza” (Departure Repeater), that is always a 1 light signal with a board with a “RIP.” written in black.



This signal repeat a restricted version of the aspect of the following departure signal with this logic:

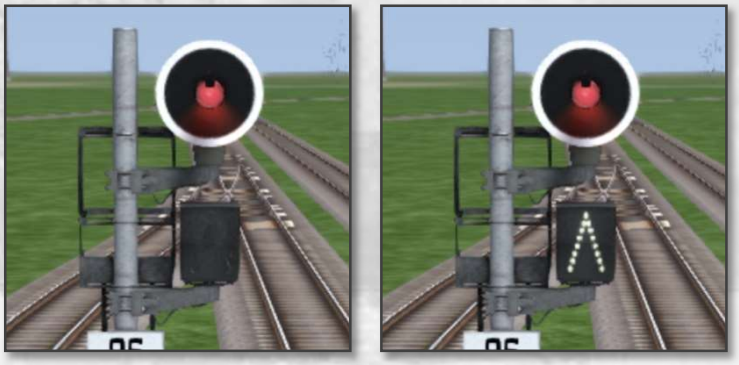
- If departure signal is R (Blocked Path), then also the repeater shows R (Red)
- If departure signal is V (Free Path w/o speed restriction) then also the repeater shows V (Green)

- With any other departure signal aspect, repeater shows G (Yellow)

2.13. Path prosecution indicator

In some stations a departure signal can handle more than one track, and all of them can have a special signal called “subsidiary departure signal”.

This signal is always with one light and the train should always stop if is R (Blocked Path). If on these subsidiary signals the display is showing a flashing Lambda letter, the train can slowly pass it proceeding then to stop at the common departure signal, that is also R (Blocked Path).



3. Other signals

3.1. Tall Departure Signal

The departure signals that are not visible from the normal stop position of a train are normally preceded by this signal.

It has a screen with 2 lights placed vertically normally switched off. When the main departure signal switches to whichever “Free Path” aspect, the 2 lights switch on and the train can start.

> If train is not stopped at station but in transit, the lights of this signal stays switched off.

3.2. Lower Departure Signal

In stations where a departure signal handle 2 or more tracks, can be installed in these tracks the lower departure signal.

Is normally switched off but when switched on and flashing (in the same moment the main departure signal will switch to whichever “Free Path” aspect) allow the train to proceed.

3.3. Shunt Signal

In the shunt tracks can be installed a signal called “Marmotta”. It allow shunting movement when 2 vertical lights are switched on, In the other case, train is not allowed to pass it.

In TSC this signal is used only as a subsidiary signal of the departure signal and placed immediately after it. When the departure signal is " (Blocked Path) for train, but the shunt signal has the 2 vertical lights switched on, then the train can start because is directed to a shunting destination track, not on the main line.

The shunt signal must be placed always at the left of the track is referencing. If for some space reason is installed on the right of the track, a white arrow is included to point to the track handled.

3.4. Low shunt and departure signal

In some case the lower departure signal and the shunt signal are integrated in one signal, called "Marmotta IBP" In respect to these separated signals, the integrated one can block all the trains (2 horizontal lights), allow movement for the shunting operation only (2 vertical fixed light) or allow movement for normal operation to the main line (2 vertical flashing lights).

The IPB signal must be placed always at the left of the track is referencing. If for some space reason is installed on the right of the track, a white arrow is included to point to the track handked

3.5. Crossing Level Signals

In some single track line there are still specific signals that protects one or more CL.

The warning version are indicated by a trapezoidal black plate with yellow border. If it shows 3 horizontal yellow lights then warns that the next CL protection signal is in R (Blocked Path).

If it shows 2 vertical green light, that means the next CL protection signal il in V (Free Path).

The protection version is indicated by a square black plate with yellow border. If it shows 3 horizontal red lights, means that the protected CL is open. If it shows 2 vertical green light, means the protected CL is closed.

These signals are not simulated in TSC, showing always green lights.

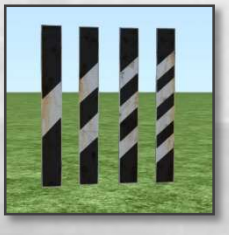
4. Line information boards

4.1. Signal approaching board

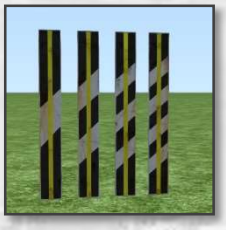
The signal approaching boards are installed to inform the driver that his train is approaching a signal.

They are in total 4 and placed from 400 mt to 100 mt from the signal, every 100mt.

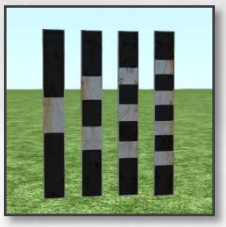
If the signal is a first category signal the boards shows a black background with oblique white strips. Number of strips indicate the remaining distance to the signal (1 strip = 100 mt, 2 strips = 200 mt,...)



A particular case of the above situation is when the next first category signal is the last one before a protection signal of a station or a particular important point of the line. In this case the board include also a vertical yellow line to inform the driver,



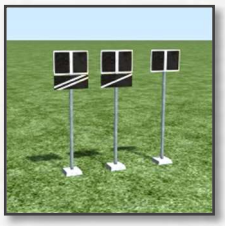
In the case of a warning signal, boards show a black background with horizontal white stripes with the same positioning rule and number of stripe concept.



4.2. Unprotected station

Small stations are often without a protection and departure signal system. To inform a driver that he is approaching this station type, a series of 3 boards are installed in the line.

The first board with a double oblique stripe in the bottom part is installed normally between 800mt to 1.200mt from the end of the station's platform, depending by the track speed. The second board with a single oblique stripe in the bottom, is placed 200 mt after the first. The last one is placed at the end of the station's platform.



5. Signals for scenario

5.1. Important

The signals in this chapter are useful only if used in the scenario editor, not in the route editor.

- Due to a problem with TSC management of the modification of a scenario by inserting the destination signal, for which a solution has not yet been found, **you must not in any way**, after having saved the scenario (and possibly tried) **return to the editor**.
- By doing so and trying to exit the editor or to return to the main menu or to replay the scenario, TSC requires **saving the route**, which leads to the unwanted modification of the same, suffering the saving times that in some cases can be very long, with the risk of finally corrupting the route in the event of saving without a successful outcome.
- It is therefore mandatory, once the scenario has been saved and possibly tested, to exit directly to the main menu and then re-enter. In this way, saving is no longer required unless a new signal is placed.

5.2. PlaySound

The signal called C_SegFS – PlaySound is a single-link signal that, with certain settings, triggers the playback of a specific audio file.

The audio file is audible at any position of the train, so it must be carefully set to avoid playing at inappropriate times or when AI trains pass.

The signal is placed in the usual way, while its position within the track depends on the desired result or the creator's preferences. The signal itself is not visible in the game and appears as in the image below only in the editor:

The settings must be entered in the box in the following format:

/Trigger Type/Delay/Additional Delay/Audio File

All settings must always be entered, otherwise the signal will not play anything.

Trigger Type is a string that defines whether the trigger is driven by time or generated by the passage of a train on link 0.

If it is temporal, the string to enter is "TT,"

if it is generated by the passage of a train, "TP."

The Delay and Additional Delay strings have two different meanings depending on the trigger, specifically:

If the trigger is "TT," then; Delay is the time of the day at which playback begins, expressed in the form HHMMSS.

Additional Delay is useless and can be left at 0.

If the trigger is "TP," then:

Delay is the time of the day within which you have to be sure that the first train to pass the signal is the one that should trigger the sound. This delay must be set carefully to prevent a train preceding the one that should trigger the sound from starting playback at the wrong time. The format is the same.

Additional delay is a specific delay that delays the playback of the signal when link 0 is passed and is expressed in seconds.

Sound is the name of the audio file without extensions that must be placed in an "En" or "It" subfolder of the scenario folder.

For example, if you wanted to play the sound Annuncio.wav 5 minutes and 40 seconds after the start of the scenario, the string to enter would be:

/TT/000540/0/Annuncio

If you wanted to start the sound when the signal is passed by the train, with the requirement that it could not be started for 20 minutes from the scenario starting time and with a further delay of 10 seconds from the passage on link 0, the string would be:

/TP/002000/10/Annuncio

5.3. Leopolder

The signal called C_SegFS – Leopolder is a single-link signal that, with certain settings, plays the typical Leopolder sound.

The audio file is audible from any position of the train, so it must be set carefully to avoid playing at inappropriate times or when AI trains pass.

The signal is placed in the usual way, while its position within the track depends on the desired result. The signal itself is not visible in the game and appears as shown in the image below only in the editor:

The simple setting must be entered in the box in the following format:

/Repetitions

The setting must always be entered, otherwise the signal will not play anything.

Repetitions is the number of times the signal will repeat the sound, meaning the number of trains that will trigger playback when they pass over link 0. This is useful if a train stop for along time in a station and one or more trains arrive from the same track (remember, the sound is typically played in small stations when the train is 1-2 minutes away from arriving).

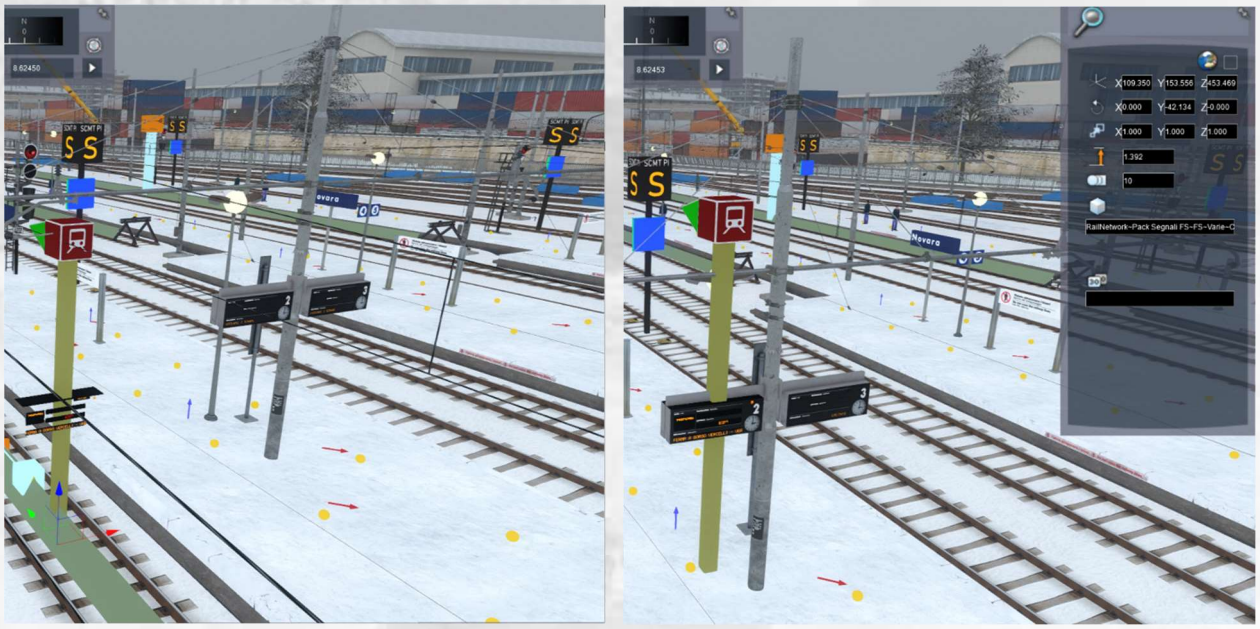
If the creator knows that only one train will arrive, the string is simply /1; if there were three trains, it would therefore be /3.

5.4. Track information

The signal called C_SegFS – InformativaBinario is a single-link signal that, with certain settings, customizes the track information panel for the departing or arriving train.

Unlike the previous signals, it's visible during gameplay as it adds a series of information to the static information panel present on the track. For this reason, its placement is a bit more difficult as the model must be aligned with the one placed by the track creator. Unfortunately, TSC doesn't allow for guided alignment in the scenario editor.

The signal is placed in the usual way: near an information panel and then moved to match. It appears in the editor as in the image below (freshly placed and then aligned). The top of the signal should exactly cover the static one to help on the placement.



The settings must be entered in the following format in the box:

/Logo/Train Number/Destination/Departure/Delay/Information

All settings must always be entered, otherwise the signal will not generate the necessary information.

Logo is the railway operator's logo (visible if the logo patch is installed) and can have the following values:

L1 for Trenitalia

L2 for Frecciarossa

L3 for Italo

L4 for Trenord

L5 for Gte

Train number is the assigned number, up to a maximum of 8 characters.

Destination is the arrival station.

Departure is the estimated departure time in HHMM format.

Delay is any delay the train has accumulated in MMM format.

Information can be any string (usually the list of subsequent stations).

If it is longer than 27 characters, it becomes scrollable.

> If the string is slightly longer than 27 characters (28 or 29), it is recommended to use some abbreviations to fit within the 27 characters.

If it is longer than 27 characters, the script will add automatically some spaces at the end to make the beginning and end of the string more readable.

For example, if you wanted to report the Trenitalia regional train 11372, bound for Chivasso, stopping at Borgo Vercelli, Vercelli, followed by the other stations, starting at 3:05 PM, which has accumulated a delay of 7 minutes, the string to enter is the following:

/L1/R 11372/CHIVASSO/1505/7/FERMA A BORGO VERCELLI - VERCELLI - S. GERMANO V.SE - SANTHIA' - TRONZANO - BIANZE' - LIVORNO FERRARIS - S. ANTONINO D.SALUGGIA - SALUGGIA - TORRAZZA PIEMONTE

To avoid overloading your PC's resources, given that the number of these signals could be quite high, the strategy is as follows:

The panel animates and sets itself ten minutes before the train's scheduled departure.

60 seconds before the scheduled departure time (plus any accumulated delay), the two alternating lights indicating the imminent departure will turn on.

5 minutes after departure (on time or late), the panel stops animating.