

**ERTMS UNIT****ETCS DRIVER MACHINE INTERFACE****Reference:** ERA\_ERTMS\_015560**Document type:****Version :** 2.3**Date :** 14/04/09

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## 1. AMENDMENT RECORD

Version	Date	Section number	Modification/description	Author(s)
0.1	12/11/07	-	First Draft	OG
0.2	03/12/07	6.2, 7.2.1.1, 7.2.1.6	Main changes concern Supervision status, Speed dial and Release Speed sections	OG
0.3	17/01/08	6.2.4, 7.3.8, 5	Section 6.2.4 deleted, 7.3.8 "Geo Pos" updated, section 5 deletion of non requirements	OG
0.4	24/01/08	5. 6.2 6.1.3 7.2.3.1 7.2.3.2	Updated according to meeting review Updated according to meeting review 6.1.3 "use of areas" updated Override in B7 and not in C1 Description improved and rule for STM abbreviation added	OG
0.5	31/01/08	5. 6.2 5. to 7.2.2	Revision marks accepted up to 5.3.3 Revision marks accepted, supervision status for RSM updated Updated according to meeting review	OG
0.6	07/02/08	5. to 7.2.2 7.2.2 to 7.5	Revision marks accepted Updated according to meeting review	OG
0.7	12/02/08	All	Revision marks accepted	OG
0.8	07/03/08	All 11	Updated according to review comments Table of operational texts updated	OG
0.9	20/03/08	All	Sections fully restructured Data Entry section added	OG
0.10	21/03/08	All	Updated according to meeting 19-20/03	OG
0.11	28/03/08	All	See revision marks added during the meeting 28-03-08	OG
0.12	17/04/08	All	See revision marks (mainly based on comments received on v0.10)  numbering of figures, tables and their cross-references updated  Symbols fully renumbered and their cross-references updated  Layout improved: A2 split in A2/A3 and A3 renumbered A4, D1 to D8 extended by 5 cells height, other areas D9 to D14 addapted accordingly  Geo Pos: no more part of planning info, moved from D9 to G12	OG
0.13	19/05/08	All	Updated according to meeting 07-08/05/08	OG

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Version	Date	Section number	Modification/description	Author(s)
0.14	17/06/08	All	See revision marks	OG
0.15	31/07/08	All	Most of the figures updated Chapter 3 "Introduction" added See revision marks (mainly based on comments received on v0.14)	OG
0.16	29/08/08	All	see revision marks based on "action list – 080829.xls"	OG
0.17	30/09/08	All	see revision marks based on "action list – 080930.xls"	OG
1.0	30/09/08	All	version delivered to the CG (revision marks in v0.17 accepted)	OG
1.1	04/11/08	All	See revision marks based on "action list – 081104.xls" following review meeting on 081031	OG
1.2	28/11/08	All	See revision marks based on "action list – 081128.xls" following review meeting on 081028	OG
2.0	04/12/08	8.2.2.2.7, 8.2.2.4  8.5.1.6, 9.2.2.10, 10.5.2.3.3	Target distance (digital) restored for OS/SR modes  Editorial improvements	OG
2.1	23/02/09	7.3.2.1, 8.3.1.1, tables 25/26  10.1.1.6  10.4.1.3  13	Editorial improvements  missing condition for "Start" and "Shunting" buttons  deleted  "Balise error" changed to "Balise read error"  references moved from "Balise error" to "SH stop order"/"SR stop order"	OG
2.2	23/03/09	All	see revision marks based on "action list – 090320.xls"	OG
2.3	14/04/09	All	see revision marks based on "action list – 090414.xls"	OG

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## **3. INTRODUCTION**

### **3.1 Foreword**

- 3.1.1.1 A clear and consistent definition of the ERTMS/ETCS driver machine interface helps the driver to better understand the tasks he has to perform. This increases the speed and the accuracy of interactions between the driver and the ERTMS/ETCS onboard equipment, hence reducing the probability of human errors in application of the operational rules.
- 3.1.1.2 Moreover, harmonising the presentation of displayed information and the driver's interactions with the equipment contributes to a unified operation of the trains regardless of which suppliers products they are fitted with. This reduces further the potential for human errors, reduces the driver training requirement and facilitates cross-acceptance of equipment.
- 3.1.1.3 The CENELEC Technical Specification CLC/TS 50459: 2005 prepared by SC 9XA, Communication, signalling and processing systems, of Technical Committee CENELEC TC 9X, Electrical and electronic applications for railways has been taken into account as a starting point for the present specification.

### **3.2 Scope and Field of Application**

- 3.2.1.1 This document defines the interface between the driver and the ERTMS/ETCS onboard by detailing:
- a) information to be displayed to the driver in response to operational situations. This includes visual information in the form of symbols and text messages and their position as well as audible information.
  - b) the interactions between the driver and the ERTMS/ETCS onboard. This includes the dialogue sequences used during data entry.
- 3.2.1.2 The interfaces between the ERTMS/ETCS DMI and the EVC, , between the driver and the ERTMS/GSM-R and between the driver and any other non ERTMS/ETCS application, are outside of the scope of this specification.
- 3.2.1.3 The main part of the interface between the driver and the STM is outside of the scope of this specification. Only a limited number of requirements are specified in the present document (see chapters 8 & 10).
- 3.2.1.4 Cab integration issues (e.g. which screen(s) is/are used for the interface between the driver and the ERTMS/ETCS onboard, the position of this/these screens inside the driver's cab, as well as which non ERTMS/ETCS applications are integrated with the ERTMS/ETCS DMI) are also outside of the scope of this specification.
- 3.2.1.5 Even though this specification allows two possible technologies, namely touch screen or soft keys, the specific hardware solutions (e.g. the number of screens, the size of hard keys,...) used to achieve the ERTMS/ETCS DMI are outside of the scope of this specification.



### **3.3 Document Description**

- 3.3.1.1 This specification describes two possible technologies for implementing the ERTMS/ETCS DMI, namely touch screen or soft keys.
- 3.3.1.2 Any other technology shall be precluded.
- 3.3.1.3 Combining both technologies with the full freedom is not permitted by this specification.
- 3.3.1.4 However, this specification allows to design a hybrid solution by adding sensitive areas / buttons on a soft key based layout.
- 3.3.1.5 Should this hybrid solution be retained, the added sensitive areas or buttons shall comply with the corresponding requirements specified for the touch screen technology. However, all requirements for the soft key technology shall still be fulfilled including the dimensions of the areas.
- 3.3.1.6 Chapter 5 defines general ergonomic principles used throughout the document.
- 3.3.1.7 Chapter 6 details the various areas of the ERTMS/ETCS DMI for both technologies. The following chapters extensively refer to these areas when defining the displayed objects.
- 3.3.1.8 Chapter 7 introduces the supervision status with regards to the braking curves. Some objects (e.g. speed pointer, circular speed gauge) will refer to them when defining their displayed colour(s).
- 3.3.1.9 Chapter 8 details the objects forming the default window.
- 3.3.1.10 Chapter 9 describes general (graphical) requirements for the sub-level windows.
- 3.3.1.11 Chapter 10 details the ERTMS/ETCS sub-level windows using the general requirements of chapter 9.
- 3.3.1.12 Chapter 11 details all symbols used throughout the document.
- 3.3.1.13 Chapter 12 details the sounds used throughout the document.
- 3.3.1.14 Chapter 13 details the texts to be displayed in some operational situations.
- 3.3.1.15 Throughout the document, when a specific technology is not explicitly mentioned, then the concerned requirement shall apply to both technologies.

## **4. REFERENCES, TERMS AND ABBREVIATIONS**

### **4.1 Reference documents**

Table 1 : reference documents

Ref. N°	Document Reference	Title
[1]	ERA/ERTMS/003204	ERTMS/ETCS Functional Requirement Specification
[2]	SUBSET-023	Glossary of Terms and Abbreviations
[3]	SUBSET-026	System Requirements Specification
[4]	SUBSET-108	Interoperability-related consolidation on TSI annex A documents

### **4.2 Terms & abbreviations**

4.2.1.1 For general terms, definitions and abbreviations refer to document [2]. New terms and abbreviations used in this document are specified here.

Table 2 : Terms

<b>Term</b>	<b>Definition</b>
Border	frame surrounding objects in order to create 3 dimensional impression on the total image display area
Button	object shown to the driver through which a driver action is possible to give input to the ERTMS/ETCS onboard. The object is identified by a label.  When using a touch screen technology, the driver action is done via the associated sensitive area on the display area.  When using a soft key technology, the driver action is done via the hard key adjacent to the label
Cell	basic unit to define the shape of DMI objects and the proportions of areas. Depending on the resolution of the total image display area, a cell can consist of one or more pixels.
Dialogue Sequence	is a mechanism by which the DMI guides the driver through a set of windows in order to fulfil a specific task.
Disabled	means the related button cannot go to the “pressed” state. A disabled button does not respond to any driver actions.
Display area	zone displaying a piece of visual information and defined by a size (in cells) and a position relative to the positions of the other display areas. It is more commonly named “area” in this specification.
Enabled	means the related button can go to the “pressed” state. An enabled button does respond to a driver action.
ERTMS/ETCS	ETCS part of ERTMS

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Table 2 : Terms

<b>Term</b>	<b>Definition</b>
ERTMS/ETCS DMI	the full interface between the driver and the ERTMS/ETCS onboard containing all inputs and outputs (e.g. visual, audible, keys, buttons,...)
Grid array	area grid pattern on the total image display area consisting of cells which results in a visual appearance of information in certain proportions
Hard key	physical key not part of the total image display area. This key can also have a text label or symbol
Input field	object shown to the driver to echo a data. It is composed of a label part giving the topic of the data and of a data part showing the data itself.
Label	symbol or text indication on a button or associated to an input field
Layer	groups all areas with the same impression of depth using the border technique
Pressed	means a driver action on the button is ongoing.
Sensitive area	area on which a driver can make a physical action to give input to the ERTMS/ETCS onboard
Soft key	context-dependent key which consists of a hard key with an associated label on the total image display area
Symbol	presentation of information in graphical form instead of using text
Total image display area	Image formed by the contribution of all individual display areas
Touch screen	Using the display area for driver's inputs by means of programmable sensitive areas
Window	is a presentation of objects, text messages, input fields and/or buttons related to a single topic.

Table 3 : Abbreviations

<b>Abbreviation</b>	<b>Definition</b>
ACK	acknowledgement
AIIS	All Status
CSG	Circular Speed Gauge
CSM	Ceiling Speed Monitoring
DMI	Driver Machine Interface
EOA	End of Authority
ERTMS	European Traffic Management System
ETCS	European Train Control System
EVC	European Vital Computer

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Table 3 : Abbreviations

Abbreviation	Definition
FLOI	First Line Of Intervention
FS	Full Supervision
IF	Input Field
IndS	Indication Status
IntS	Intervention Status
LOA	Limit of Authority
MRSP	Most Restrictive Speed Profile
NL	Non Leading
NoS	Normal Status
OS	On Sight
OvS	Over-speed Status
PASP	Planning Area Speed Profile
PIM	Pre-Indication Monitoring
PreS	Pre-Indication Status
PT	Post Trip
RSM	Release Speed Monitoring
RV	Reversing
SB	Stand By
SH	Shunting
SN	STM National
SR	Staff Responsible
STM	Specific Transmission Module
Tint	Time before intervention
TR	Trip
TSM	Target Speed Monitoring
UN	Unfitted
Vind	Indication speed
Vint	Intervention speed
Vperm	Permitted speed
Vrelease	Release speed
Vtarget	Target speed
Vtrain	Current speed of the train
Vwarning	Warning speed
WaS	Warning Status

## 5. GENERAL ERGONOMIC PRINCIPLES

### 5.1 Principles for presentation

#### 5.1.1 Presentation techniques

##### 5.1.1.1 Borders

5.1.1.1.1 To structure the presentation of the different objects, a three dimensional impression is created by surrounding areas, buttons and input fields with a border.

5.1.1.1.2 The border of an area shall be drawn as follows to give the impression of depth:

- a) Left and top lines of the area: 1 cell width, black colour
- b) Right and bottom lines of the area: 1 cell width, shadow colour

5.1.1.1.3 Unless stated otherwise, the border of a button (touch screen technology) or the border of the label part of a button (soft keys technology) shall be drawn as follows to give the impression it is lifted:

- a) Left and top outer lines of the button: 1 cell width, black colour
- b) Left and top inner lines of the button (adjacent to the outer line): 1 cell width, shadow colour
- c) Right and bottom outer lines of the button: 1 cell width, shadow colour
- d) Right and bottom inner lines of the button (adjacent to the outer line): 1 cell width, black colour

5.1.1.1.4 The border of an input field shall be drawn as follows to delimit the concerned input field from the other ones:

- a) Left/Top/Right/Bottom lines of the area: 1 cell width, medium grey colour

##### 5.1.1.2 Layers

5.1.1.2.1 Areas displayed with the same impression of depth shall form a layer (see Figure 1).

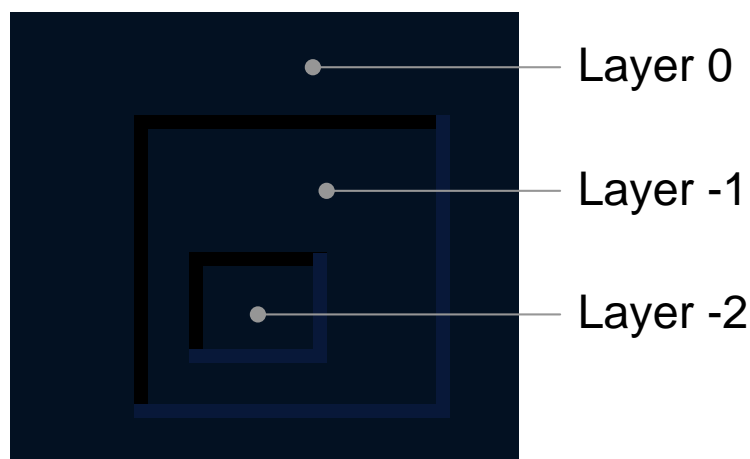


Figure 1 – Layer definition

- 5.1.1.2.2 The areas without border shall form the layer 0.
- 5.1.1.2.3 The areas with a border and inside layer 0 shall form layer -1.
- 5.1.1.2.4 The areas with a border and inside layer -1 shall form layer -2.
- 5.1.1.2.5 When an area is allocated to the layer -1 or layer -2, a border shall be drawn around this area.

#### **5.1.1.3 Frames**

- 5.1.1.3.1 When a flashing frame is required as specified in the following chapters, it shall replace the border of the concerned area/button and it shall be drawn as follows:
  - a) Left/Top/Right/Bottom lines of the area: 2 cells width, yellow
- 5.1.1.3.2 The frame(s) shall flash by changing from visible to not visible (e.g. background colour) with a nominal frequency of 2 Hz with a symmetrical mark space ratio.
- 5.1.1.3.3 The width of a frame shall be 2 cells.

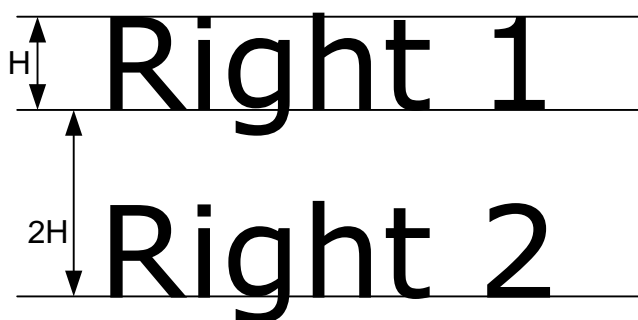
### **5.1.2 Characters**

#### **5.1.2.1 Character type**

- 5.1.2.1.1 The character type shall not use serifs.
- 5.1.2.1.2 The character type shall use a proportionally spaced font.
- 5.1.2.1.3 The character spacing shall be the normal spacing in relation to the chosen font.
- 5.1.2.1.4 Note: Chicago, Helvetica, Swiss or Verdana are recommended fonts.

#### **5.1.2.2 Character height**

- 5.1.2.2.1 The height of the characters (see H in Figure 2) shall refer to the height of the capital characters.



**Figure 2 – Height of characters and line spacing**

- 5.1.2.2.2 Note: The lower case characters and numbers are derived from the chosen font type.
- 5.1.2.2.3 The height of the characters shall be:

- a) speed scale numbers, numbers for numeric/enhanced numeric/alphanumeric keyboards, numbers on F areas for dedicated keyboards (soft key technology): 16 cells,
- b) current speed (digital): 18 cells,
- c) release speed (digital): 17 cells,
- d) numbers for the kilometres part of the geographical position: 12 cells,
- e) numbers for the target distance digital, in the planning information, for the metres part of the geographical position and for the local time for text message, letters for alphanumeric keyboards: 10 cells,
- f) other characters (e.g. used for input fields, text messages, echo texts, etc.): 12 cells

### **5.1.3 Texts**

- 5.1.3.1.1 Unless stated otherwise, texts shall be left aligned inside its allocated area.
- 5.1.3.1.2 Unless stated otherwise, an indent of 3 cells shall be used from the limit of the area when aligning a text.
- 5.1.3.1.3 Unless stated otherwise, texts shall be vertically centred inside its allocated area.
- 5.1.3.1.4 Unless stated otherwise, texts shall be in grey.
- 5.1.3.1.5 Unless stated otherwise, the line spacing of texts shall be 2 times the height of characters (see 2H in Figure 2).

### **5.1.4 Numbers**

- 5.1.4.1 When using numbers, leading zeros shall not be shown (e.g. show 80 km/h not 080 km/h), unless it is essential (e.g. telephone number).

### **5.1.5 Numeric or Alphanumeric data**

- 5.1.5.1 If a data contains more than 5 (alpha)numeric characters on a text line, a single 'space' character shall be introduced to create 2 separate groups of characters when displaying this data. The length of each group of characters shall not exceed 5 characters.
- 5.1.5.2 A 'line break' shall be introduced every 8 characters when displaying this data i.e. not more than 8 characters shall be presented on the same text line.
  - 5.1.5.2.1 Note: the space characters and the line breaks are not part of the data value. They are only used to ease the readability of long data.
  - 5.1.5.2.2 Note: A data for which the range is limited to dedicated values (i.e. with a dedicated keyboard, see 9.3 for more details) is not considered as a numeric or alphanumeric data.

### **5.1.6 Symbols**

- 5.1.6.1 When a symbol is referenced in this specification, it shall be displayed according to the form/shape, colour and size as specified in section 11.

5.1.6.2 The pixels of the bitmap files specified in section 11 shall be understood as cells.

5.1.6.3 Every symbol shall be centred in its area.

### **5.1.7 Sounds**

5.1.7.1 When a sound is referenced in this specification, it shall be played as specified in section 12.

## **5.2 Physical parameters**

### **5.2.1 General parameters**

#### **5.2.1.1 Display size**

5.2.1.1.1 The minimum size of the total image display area shall be 180 mm x 135 mm (w x h).

#### **5.2.1.2 Display resolution**

5.2.1.2.1 The minimum resolution of the total image display area shall be based on a total grid array of 640 x 480 square cells.

5.2.1.2.2 This 640 x 480 ratio shall form the basis for all object proportions independently of the resolution and of the size of the total image display area.

#### **5.2.1.3 Colours**

5.2.1.3.1 The following 24-bit RGB colour values shall be used.

5.2.1.3.2 Any reference in the specification to a colour shall be deemed to be a reference to this Table 4.

5.2.1.3.3 The background colour shall always be the colour #6 "Dark blue (background)".

Nr	Colour name	Red	Green	Blue
1	White	255	255	255
2	Black	0	0	0
3	Grey	195	195	195
4	Medium Grey	150	150	150
5	Dark Grey	85	85	85
6	Dark Blue (background)	3	17	34
7	Shadow	8	24	57
8	Yellow	223	223	0
9	Orange	234	145	0
10	Red	191	0	2
11	PASP Dark	33	49	74
12	PASP Light	41	74	107



**Table 4 - 24-bit RGB colour scheme**

## **5.2.2 Luminance adjustment**

5.2.2.1 It shall be possible for the driver to adjust the luminance.

5.2.2.1.1 Note: Additionally, this adjustment may be done automatically.

5.2.2.2 The last stored luminance shall be used when opening the desk. In case no luminance is stored onboard, the median value of the range shall be used as the default luminance.

5.2.2.3 Note: The range in which the luminance can be adjusted is outside the scope of the present document.

## **5.2.3 Loudspeaker adjustment**

5.2.3.1 It shall be possible for the driver to adjust the volume of the loudspeaker.

5.2.3.2 The last stored volume shall be used when opening the desk. In case no volume is stored onboard, the median value of the range shall be used as the default volume.

5.2.3.3 Note: The range in which the volume can be adjusted is outside the scope of the present document.

## **5.3 Arrangement of information**

### **5.3.1 Windows**

#### **5.3.1.1 General Requirements**

5.3.1.1.1 The presentation of objects, text messages and buttons shall be possible on several levels. Within those levels, they shall be allocated to areas of the ERTMS/ETCS DMI.

5.3.1.1.2 Objects, text messages and buttons presented within the same level shall form a 'window'.

5.3.1.1.3 The default window of the ERTMS/ETCS DMI shall be the total image display area with the allocation of objects, text messages and buttons as described in 8.

5.3.1.1.4 The default window shall not cover any other window.

5.3.1.1.5 While a sub-level window is activated, it shall cover the parent level window. A window shall be covered partially or totally by the sub-level window depending on the size of the sub-level window. The latest sub-level window shall be active meaning that all other windows shall not respond to any driver input.

5.3.1.1.6 A window shall be composed of:

- a) a unique window title giving the topic of the window (e.g. train data) ;
- b) one or several areas for the content of the window e.g. input fields, buttons,.. ;
- c) a [Close] button closing the window and returning to the parent window ;

- d) possibly, a [Next] button: to be used to select the next window related to the same topic ;
- e) possibly, a [Previous] button: to be used to select the previous window related to the same topic.

5.3.1.1.7 Exception: On the default window, 5.3.1.1.6 shall not apply.

5.3.1.1.8 Exception: When using a soft key technology, if there are several windows related to the same topic (e.g. Train Data), the [Close] button shall be replaced by the [Previous] button on the windows following the first one. (see section 9.3.6).

5.3.1.1.8.1 Note: When using a soft key technology, for this kind of windows, there is not enough keys to present all needed navigation buttons. Consequently, the driver will have to go back to the first window of the topic to find the [Close] button.

5.3.1.1.9 The scrolling between various windows related to the same topic shall not be circular i.e. the first window shall not scroll to the last one and vice-versa.

### **5.3.1.2 Window title**

5.3.1.2.1 A window title area shall meet the following requirements:

- a) the height shall be 24 cells;
- b) the background colour shall be black;
- c) it shall contain a text label identifying the window title;
- d) the text label on the window title area shall be grey;
- e) it shall be positioned at the top of the window;
- f) it shall cover the width of the window, unless stated otherwise for specific windows;
- g) if the number of DMI objects (e.g. buttons, text messages, input data fields) related to the topic of a window cannot fit on the window area(s), the text label on the window title shall include between brackets the sequence number of the current window and the total number of windows related to the same topic separated by a slash e.g. (1/2).

## **5.3.2 Buttons**

### **5.3.2.1 Size of a button**

5.3.2.1.1 When using a touch screen technology, the size of the touch sensitive surface of the button shall be equal to the size of the visible surface of the button, unless stated otherwise for specific buttons.

### **5.3.2.2 Button operation feedback**

5.3.2.2.1 Activation of a button shall be accompanied by feedback:

- a) visual, and
- b) tactile and/or audible.

### **5.3.2.3 Button labels**

- 5.3.2.3.1 The buttons shall be labelled with a language dependent text or with a symbol (see 11).
- 5.3.2.3.2 The text label or the symbol shall be centred on the button, unless stated otherwise for specific buttons.

#### **5.3.2.4 Button colour**

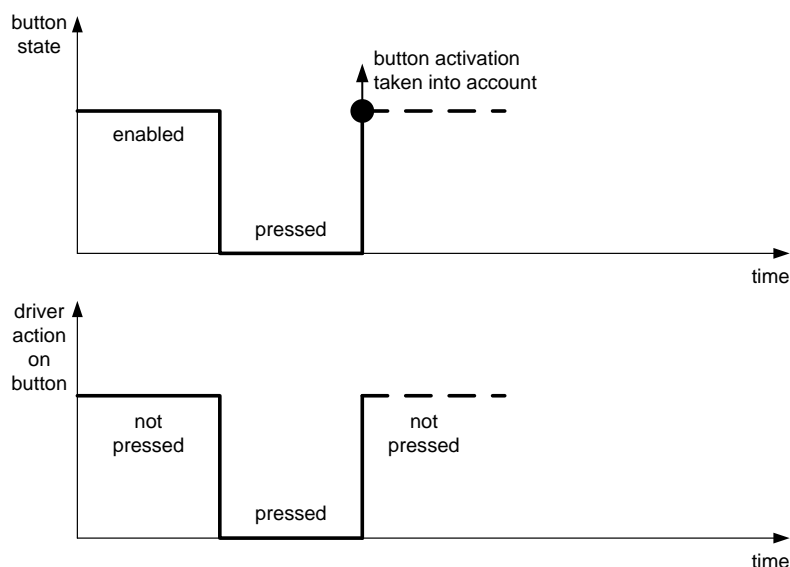
- 5.3.2.4.1 The background colour of a button shall be the Dark Blue (background) colour, unless stated otherwise for specific buttons.

#### **5.3.2.5 Button states**

- 5.3.2.5.1 A button may have three different states: “enabled”, “disabled” and “pressed”.
- 5.3.2.5.2 An “enabled” button shall be shown slightly lifted from the background by displaying a border (see 5.1.1.1.3).
- 5.3.2.5.3 A “pressed” button shall be shown slightly into the background by not displaying its border.
- 5.3.2.5.4 Only one button shall be in the “pressed” state at the same time.
- 5.3.2.5.5 A “disabled” button shall be:
  - a) shown as an “enabled” button with the text label in dark grey or with a specific symbol, or
  - b) not shown at all.
- 5.3.2.5.6 Note: For soft key technology, the border of the button refers to the border around its label part.

#### **5.3.2.6 Button types**

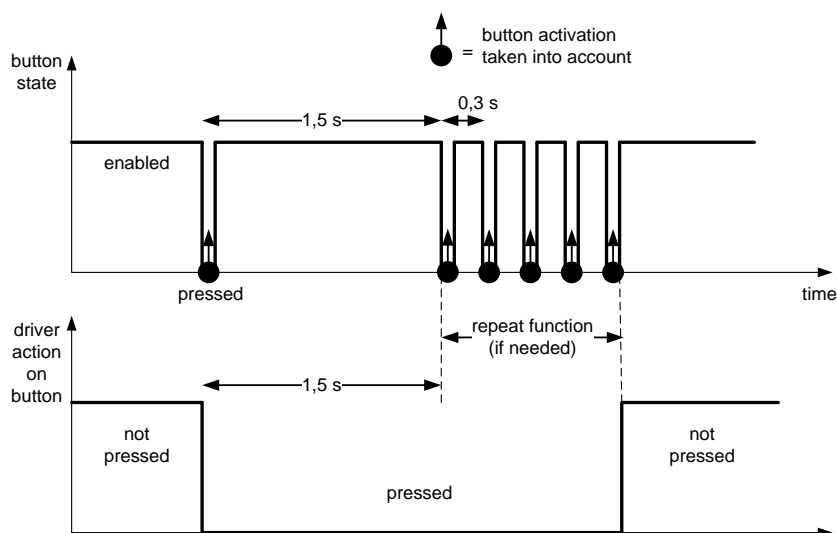
- 5.3.2.6.1 There are three ways in which an “enabled” button can react to driver selections (up, down or delay).
- 5.3.2.6.2 On selection by the driver, the up-type button (see Figure 3) shall change to the “pressed” state and the ‘click’ sound shall be played. As long as the button remains pressed by the driver, the button shall remain in the “pressed” state. After releasing the selection, the button state shall exit the “pressed” state and a valid button activation shall be considered by the onboard (implying that the function associated to the button is initiated).
- 5.3.2.6.3 If, when using touch screen technology, the driver selection continues, but outside the up-type button itself (the finger slides out of the sensitive area of the button) the button shall return to the “enabled” state. When the driver selection moves back to the button (the finger slides back onto the sensitive area of the button) the button shall be shown in the “pressed” state again, but this time without the ‘click’ sound played.



**Figure 3 - up-type button**

5.3.2.6.4 On selection by the driver, the down-type button (see Figure 4) shall alter from "enabled" to "pressed" and immediately back to the "enabled" state. The 'click' sound shall be played and a valid button activation shall be considered by the onboard.

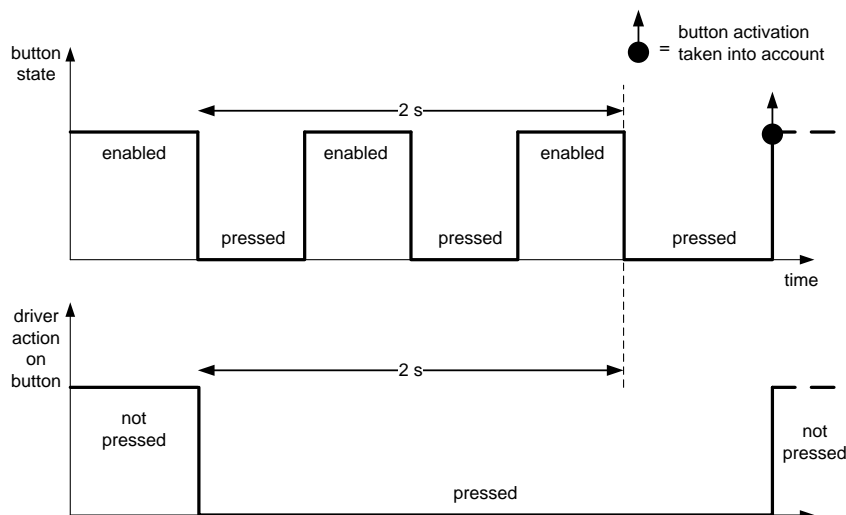
5.3.2.6.5 A down-type button can have a repeat function if the button remains pressed by the driver for longer than 1,5 seconds. After 1,5 seconds, the repeat function shall consider valid button activations each 0,3 sec; the visual and audible indications are as if the driver was pressing on the button every 0,3 sec.



**Figure 4 - Activation of a down-type button**

5.3.2.6.6 The delay-type button is similar to the up-type button but with a delay (see Figure 5). On selection by the driver, the delay-type button shall change to the "pressed" state and the 'click' sound shall be played. The button shall then toggle every 0,5 seconds between the "pressed" and "not pressed" states as long as the button remains pressed by the driver. After 2 seconds, if the button is still pressed by the driver, the button shall change again to the "pressed" state and the procedure according to the up-type button shall be followed.

5.3.2.6.7 If, when using touch screen technology, the driver selection continues, but outside the delay-type button itself (the finger slides out of the sensitive area of the button) the button shall return to the "enabled" state and the procedure with the 2 seconds timer shall be reset. When the driver selection moves back to the delay-type button (the finger slides back onto the sensitive area of the button), the procedure with the 2 seconds timer shall start again but this time without the 'click' sound played.



**Figure 5 - Activation of a delay-type button**

### 5.3.2.7 Navigation buttons

5.3.2.7.1 The following navigation buttons shall be used where appropriate:

- a) [Close] button: to be used for closing a window and returning to the parent window; symbols NA11 of section 11 shall be used.
- b) [Enter] button: to be used to accept the input field data value; the [Enter] button finishes the handling of the current selection; symbol NA20 of section 11 shall be used (soft keys).
- c) [Next] button: to be used to select the next window related to the same topic using the symbol NA17.
- d) [Previous] button: to be used to select the previous window related to the same topic using the symbols NA18.
- e) [Delete] button: to be used to delete the just entered character, symbol NA21 of section 11 shall be used.
- f) [Up] or [Down] button: to be used to scroll respectively up and down in lists; symbols NA13 and NA14 of section 11 shall be used.
- g) [Scale Up] or [Scale Down] button: to be used respectively to shorten/enlarge a distance scale; symbols NA03, NA04 (touch screen) and NA07, NA08 (soft keys) of section 11 shall be used.
- h) [Show] or [Hide] button: to be used to show/hide objects; symbols NA01 (touch screen) and NA02 (soft keys) of section 11 shall be used.

5.3.2.7.2 The [Delete], [Up] and [Down] buttons shall be down-type buttons with a repeat function, all other navigation buttons shall all be up-type buttons.

- 5.3.2.7.3 For the [Up], [Down], [Scale Up], [Scale Down], [Next] and [Previous] buttons, they shall be disabled if their respective function does not lead to any change in the display.
- 5.3.2.7.4 In some situations (see 10.6), the [Close] button shall also be disabled.
- 5.3.2.7.5 If the buttons in “disabled” state are shown (see 5.3.2.5.5), the symbols NA05, NA06, NA09, NA10, NA12, NA15, NA16, NA18.2 and NA19 shall respectively replace the symbols NA03, NA04, NA07, NA08, NA11, NA13, NA14, NA17 and NA18.

## **5.4 Acknowledgements**

- 5.4.1.1 When using touch screen technology, when a driver’s acknowledgement is required, the ERTMS/ETCS DMI shall always offer an acknowledgement (ACK) located on the total image display area itself. In addition, it may offer the following possibility for the acknowledgement (ACK): a button positioned in an ergonomic location on the driver’s desk.
  - 5.4.1.1.1 Note: The location of the acknowledgment button onto the total image display area varies depending on the object to be acknowledged. See §8 for the specific area(s) becoming the acknowledgement button.
- 5.4.1.2 When using soft keys technology, when a driver’s acknowledgement is required, the ERTMS/ETCS DMI shall always offer an acknowledgement (ACK) via the soft key H7 showing the label ‘ACK’ in yellow. In addition, it may offer the following possibility for the acknowledgement (ACK): a button positioned on an ergonomic location on the driver’s desk.
- 5.4.1.3 Only one request for Acknowledgement (ACK) at any given time shall be presented to the driver.
- 5.4.1.4 The ACK-button shall be an up-type button.
- 5.4.1.5 When using touch screen technology, the area displaying the related object or text message shall become the ACK-button.
- 5.4.1.6 When a driver’s acknowledgement is required, a yellow flashing frame shall be used to surround the related object or text message and sound Sinfo (see section 12) shall be played.
- 5.4.1.7 When using soft keys technology, an additional frame around H7 (i.e. the ‘ACK’ label) shall also flash.
  - 5.4.1.7.1 Note: in the soft key technology, 2 flashing frames are displayed when an acknowledgement is required.
- 5.4.1.8 After the ACK action, the ACK-button shall disappear.

## **5.5 Languages**

- 5.5.1.1 The ERTMS/ETCS DMI shall be able to display text in all specified languages.

- 5.5.1.2 In addition to the settings menu allowing access to the language window (see section 10.2.4), the ERTMS/ETCS DMI may offer the following possibility to access it: a button positioned on an ergonomic location on the driver's desk.
- 5.5.1.3 The text labels displayed on buttons, text messages (except plain text messages given from trackside) and text labels for the data entry fields shall be displayed in the selected language.
- 5.5.1.4 The last selected language shall be used when opening the desk.

## 6. ERGONOMIC ARRANGEMENTS OF AREAS OF THE ERTMS/ETCS DMI

### 6.1 Overview

6.1.1.1 Figure 6 and Figure 7 show the naming and the layout of the different areas of the ERTMS/ETCS DMI using the touch screen technology.

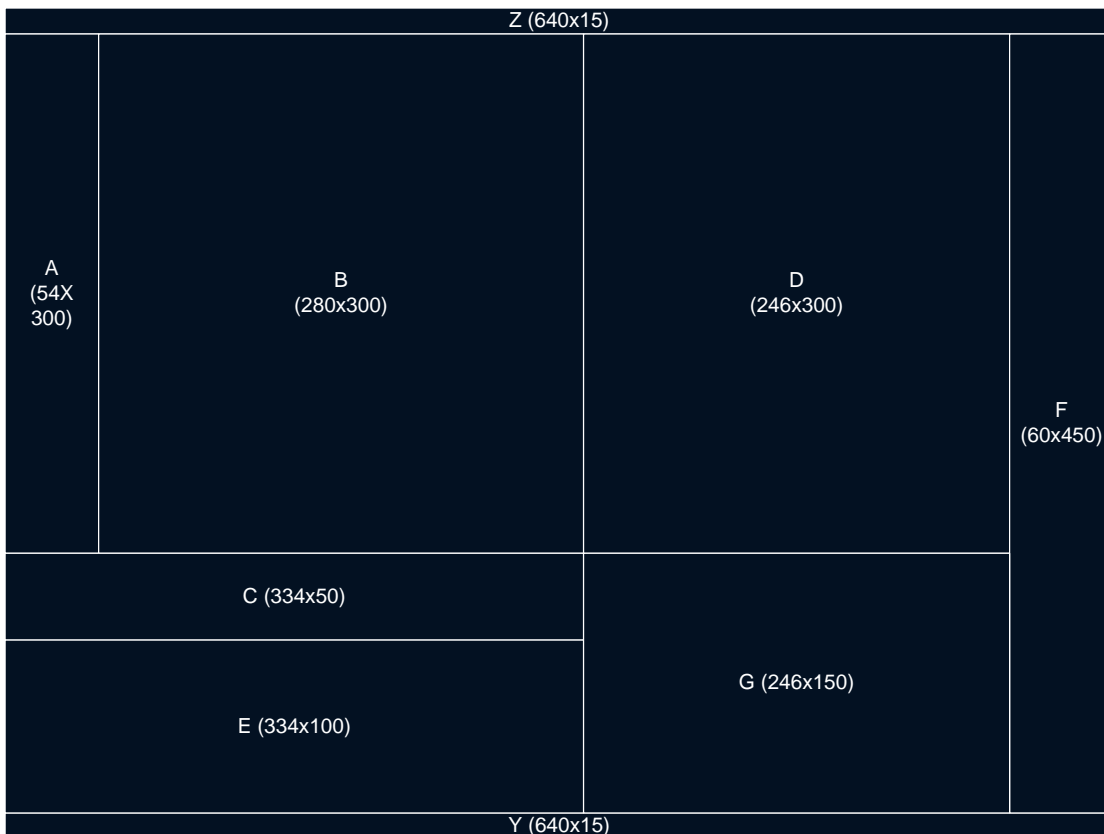
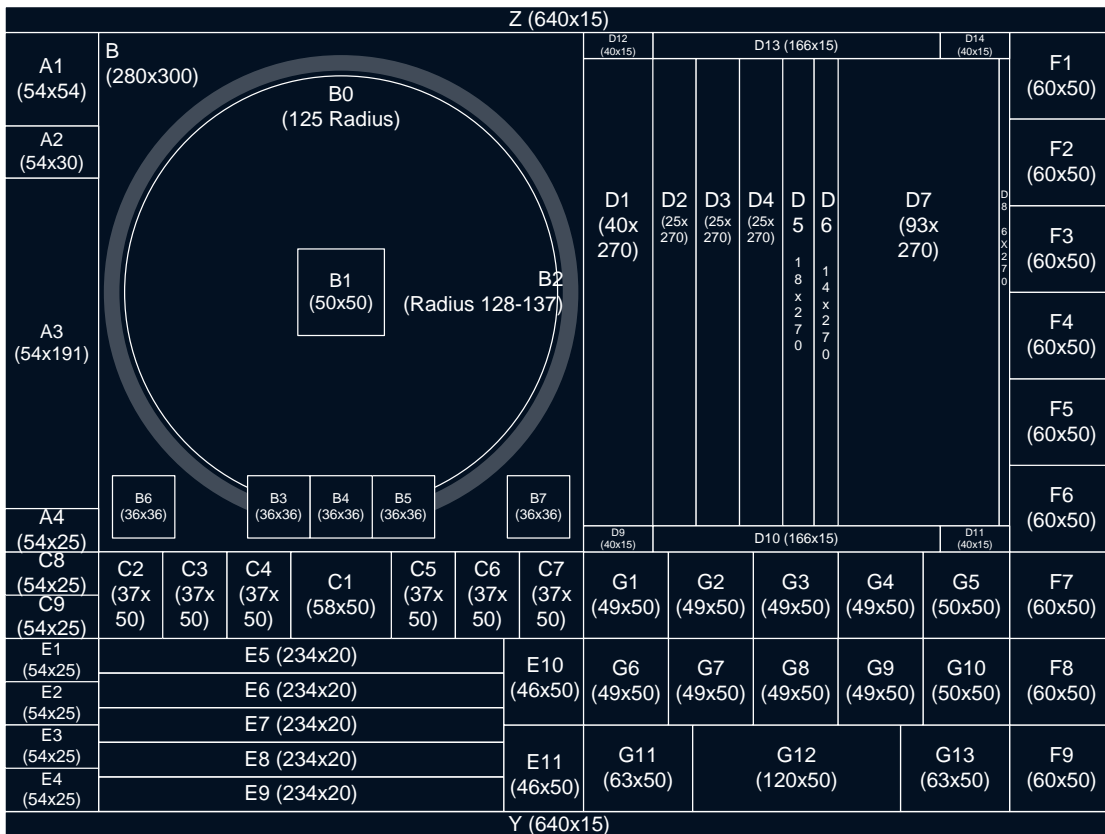


Figure 6 - The main areas of the ERTMS/ETCS DMI (touch screen technology)



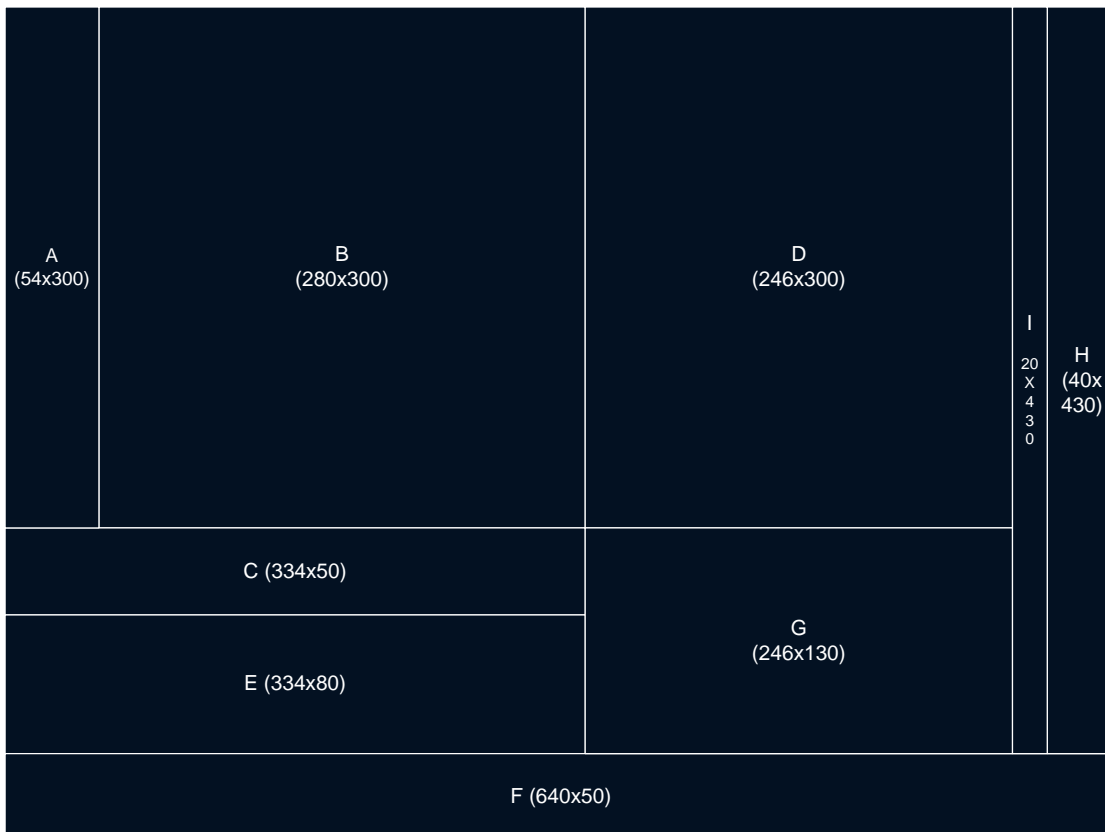
## ERA ERTMS unit

## ETCS Driver Machine Interface

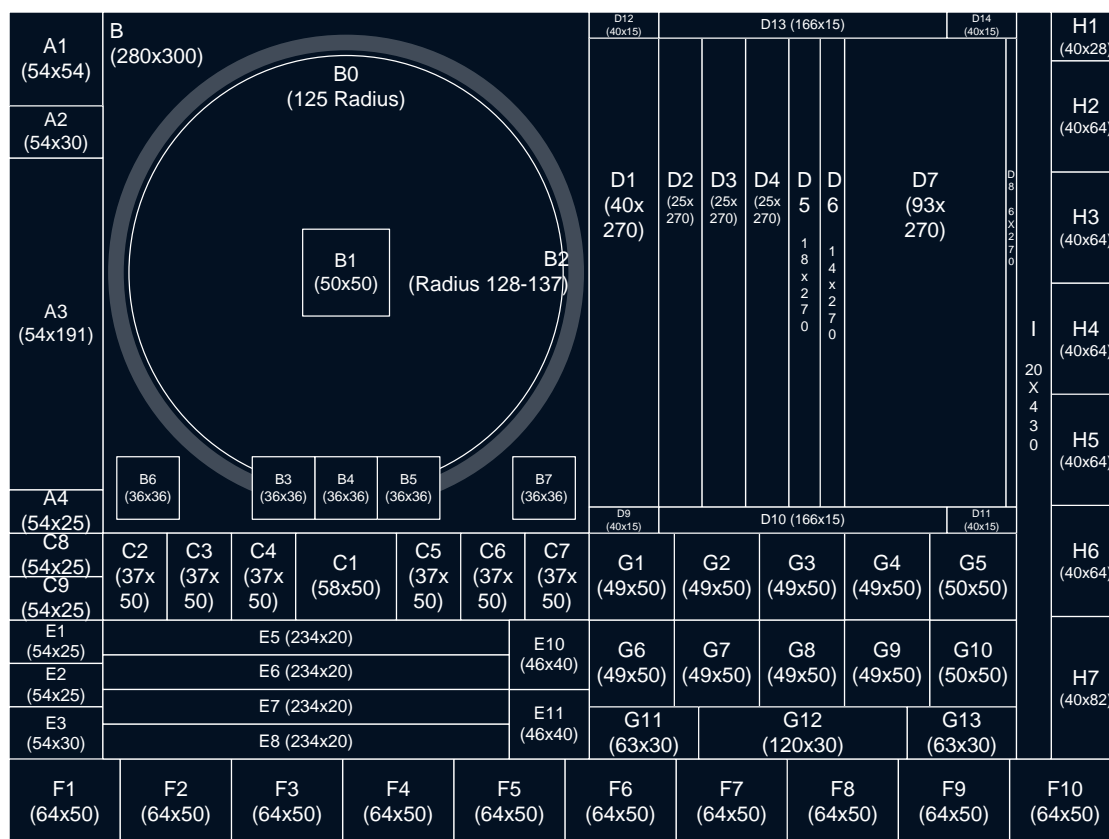


**Figure 7 - The sub areas of the ERTMS/ETCS DMI (touch screen technology)**

6.1.1.2 Figure 8 and Figure 9 show the naming and the layout of the different areas of the ERTMS/ETCS DMI using the soft keys technology.



**Figure 8 - The main areas of the ERTMS/ETCS DMI (soft key technology)**



**Figure 9 - The sub areas of the ERTMS/ETCS DMI (soft key technology)**

## 6.2 Area description

6.2.1.1 Area A (total size: 54 x 300 cells (w x h)) shall be composed of:

- A1 (54x54),
- A2 (54x30),
- A3 (54x191) and
- A4 (54x25).

6.2.1.2 Area B (total size: 280 x 300 cells (w x h)) shall be composed of:

- B0 (circle with a radius of 125 cells centred in B),
- B1 (50 x 50 cells (w x h) centred in B),
- B2 (segment of a ring centred in B with an inner radius of 128 cells, an outer radius of 137 cells and going from -149 degrees to +149 degrees with the zero degree on top),
- B3/4/5 (3x (36x36)) (the center of B4 is positioned 140 cells from the left of B and 26 cells from bottom of B, B3 and B5 are adjacent to B4),
- B6 (36x36) (the center of B6 is positioned 26 cells from the left of B and 26 cells from bottom of B) and
- B7 (36x36) (the center of B7 is positioned 26 cells from the right of B and 26 cells from bottom of B).

- 6.2.1.3 Area C (total size: 334 x 50 cells (w x h)) shall be composed of:
- a) C1 (58x50),
  - b) C2/3/4 (3x (37x50)),
  - c) C5/6/7(3x (37x50)),
  - d) C8 (54x25) and
  - e) C9 (54x25).
- 6.2.1.4 Area D (total size 246 x 300 cells (w x h)) shall be composed of:
- a) D1 (40x270),
  - b) D2/3/4 (3x (25x270)),
  - c) D5 (18x270),
  - d) D6 (14x270),
  - e) D7 (93x270),
  - f) D8 (6x270),
  - g) D9/11/12/14 (4x (40x15)) and
  - h) D10/13 (166x15).
- 6.2.1.5 For touch screen technology:
- Area E (total size 334 x 100 cells (w x h)) shall be composed of:
    - a) E1, E2, E3, E4 (4x (54x25)),
    - b) E5/6/7/8/9 (5x (234x20)) and
    - c) E10/11 (2x (46x50)).
  - Area F (total size: 60 x 450 (w x h)) shall be composed of:
    - a) F1, F2, F3, F4 and F5/6/7/8/9 (9x (60 x 50)).
  - Area G (total size 246 x 150 cells (w x h)) shall be composed of:
    - a) G1/2/3/4/6/7/8/9 (49x50),
    - b) G5/10 (50x50),
    - c) G11 (63x50),
    - d) G12 (120x50) and
    - e) G13 (63x50).
  - Area Y (total size 640 x 15 cells (w x h))
  - Area Z (total size 640 x 15 cells (w x h))
- 6.2.1.6 For soft key technology:
- Area E (total size 334 x 80 cells (w x h)) shall be composed of:
    - a) E1, E2 (2x (54x25)),
    - b) E3 (54x30),
    - c) E5/6/7/8 (4x (280x20))and
    - d) E10/11 (2x (46x40)).
  - Area F (total size 640 x 50 cells (w x h)) shall be composed of:
    - a) F1/2/3/4/5/6/7/8/9/10 (10x (64x50))

- Area G (total size 246 x 130 cells (w x h)) shall be composed of:
  - a) G1/2/3/4/6/7/8/9 (49x50),
  - b) G5/10 (50x50),
  - c) G11 (63x30),
  - d) G12 (120x30) and
  - e) G13 (63x30).
- Area H (total size: 40 x 430 (w x h)) shall be composed of:
  - a) H1 (40x28),
  - b) H2/3/4/5/6 (5x (40x64) and
  - c) H7 (40x82).
- Area I (total size: 20 x 430 (w x h))

6.2.1.6.1 Note: For soft key technology, E4 and E9 are intentionally missing.

6.2.1.7 For soft key technology, when a button in the following chapter refers to area F or H, it shall be understood that this area F or H contains the label part (text or symbol) of the concerned button.

6.2.1.8 The hard keys attached to the soft keys F or H shall have a minimum size of 14 x 14 mm (w x h).

6.2.1.9 The hard keys attached to the soft keys F or H shall be centred with regards to the position of their corresponding label areas.

6.2.1.10 Note: It is recommended that the hard keys are squares except for the hard key attached to H7 for which a rectangle is preferred.

6.2.1.11 When an object, a text message or a button is positioned inside an area by referencing a number of cells, this shall take as origin the limits of the area regardless of whether an area border is drawn or not.

## 7. BRAKING CURVES - SUPERVISION STATUS

### 7.1 Introduction

- 7.1.1.1 All supervision statuses shall refer to the current target. When the target changes, the statuses shall be re-evaluated according to the new target.
- 7.1.1.2 Figure 10 and Figure 11 illustrate the colours in relation to the supervision statuses. These figures only give a general overview, they are not related to any specific object of the default window. The exact colours of each object are defined in section 8.
- 7.1.1.3 The figures are divided in the following sections:
- two ceiling speed monitoring sections (CSM);
  - two pre-indication monitoring sections (PIM);
  - two target speed monitoring sections (TSM) to explain how to manage the colours when two targets are defined, one being an EOA with release speed;
  - one release speed monitoring section (RSM).

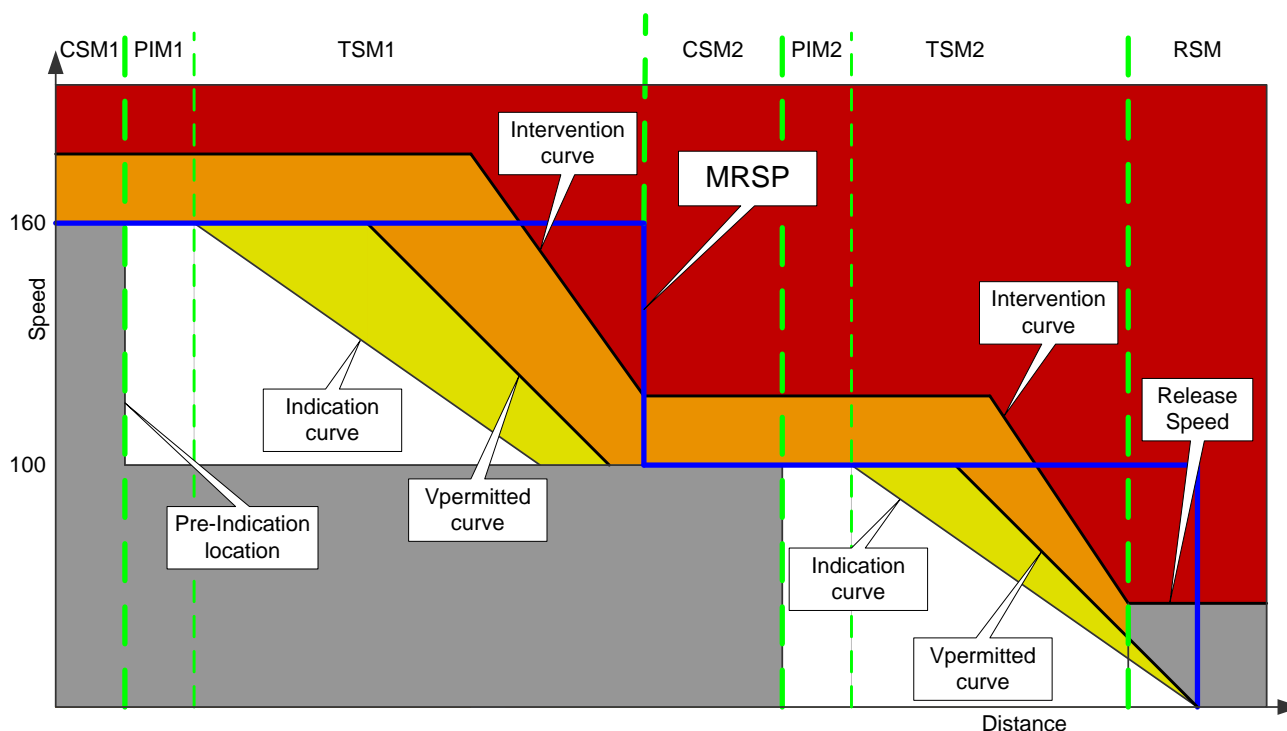
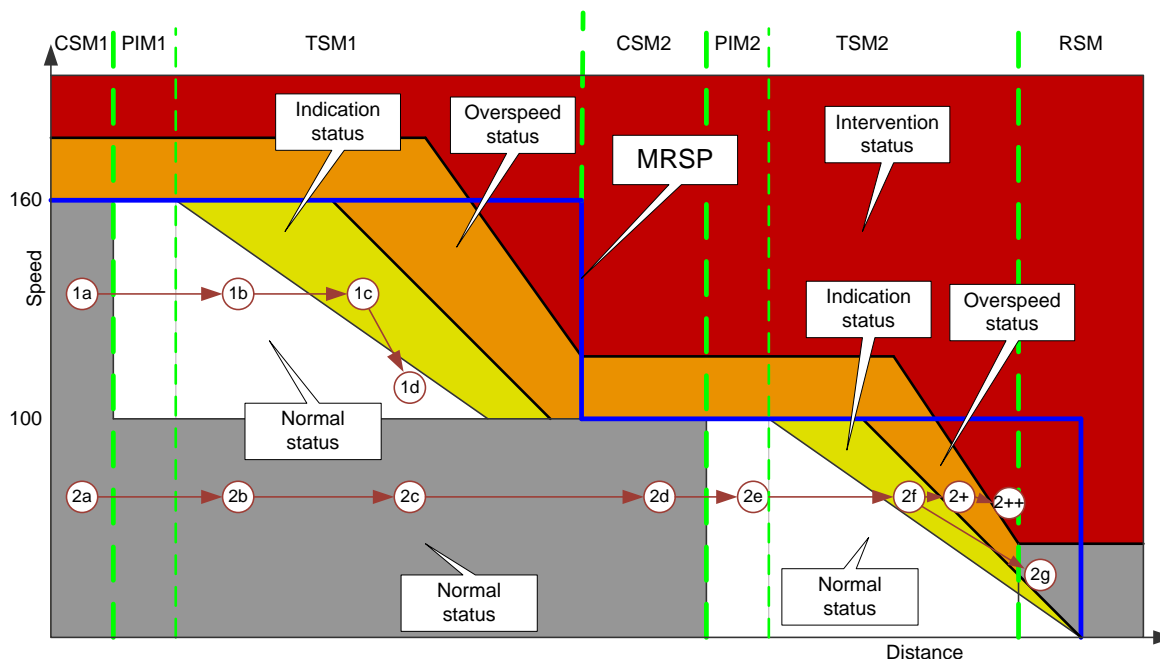


Figure 10 – Colour philosophy and braking curves



**Figure 11 – Colour philosophy depending on supervision status**

- 7.1.1.4 The bubbles including a reference in Figure 11 illustrate three different scenarios. The figures corresponding to these bubbles are detailed in the next sections of this chapter.
- 7.1.1.5 When in PIM/TSM/RSM, Sinfo shall be played when there is a change of the PASP in distance or in speed. When in CSM, Sinfo shall only be played when there is a change of the PASP in speed. (see 8.3.6 for the definition of the PASP)
- 7.1.1.5.1 Note: 7.1.1.5 is to be applied regardless of whether the conditions for display of the planning information are fulfilled or not.

## 7.2 Ceiling speed monitoring (CSM)

### 7.2.1 Normal Status information (NoS)

- 7.2.1.1 The Normal Status information shall be active when the current train speed ( $V_{train}$ ) is below or equal to the Permitted Speed ( $V_{perm}$ ).
- 7.2.1.2 Figure 12, Figure 13 and Figure 14 show respectively the speed and supervision information of bubbles 1a, 2a and 2d.



Figure 12 – Speed and supervision information in CSM / NoS (bubble 1a)



Figure 13 – Speed and supervision information in CSM / NoS (bubble 2a)

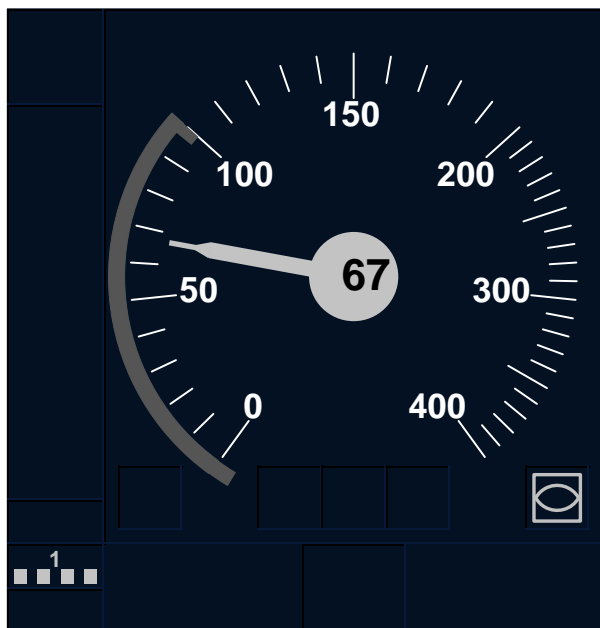


Figure 14 – Speed and supervision information in CSM / NoS (bubble 2d)

### 7.2.2 Over-speed Status information (OvS)

- 7.2.2.1 The Over-speed Status information shall be activated as soon as the current train speed ( $V_{train}$ ) is above the Permitted Speed ( $V_{perm}$ ).
- 7.2.2.2 The Over-speed Status information shall be deactivated as soon as the current train speed ( $V_{train}$ ) is below or at the Permitted Speed ( $V_{perm}$ ).

### 7.2.3 Warning Status information (WaS)

- 7.2.3.1 The Warning Status information shall be activated as soon as the current train speed ( $V_{train}$ ) is above the Warning Speed ( $V_{warning}$ ).
- 7.2.3.2 The Warning Status information shall be deactivated as soon as the current train speed ( $V_{train}$ ) is below or at the Warning Speed ( $V_{warning}$ ).
- 7.2.3.3 While the Warning Status information is active, the audible information S2, see section 12 shall be played.

### 7.2.4 Intervention Status information (IntS)

- 7.2.4.1 The Intervention Status information shall be activated as soon as the current train speed ( $V_{train}$ ) is above the FLOI (first line of intervention) Speed.
- 7.2.4.2 The Intervention Status information shall be deactivated as soon as the (service or emergency) brake command is revoked.
- 7.2.4.2.1 Note: The conditions for brake command revocation are explained in document [3].



## **7.2.5 Order and precedence of Status**

7.2.5.1 Under CSM, the order and precedence of a status on the other ones shall follow the Table 5.

Shall supersede → ↓ Information	Intervention Status	Warning Status	Over-speed Status	Normal Status
Intervention Status	-	yes	yes	Yes
Warning Status	no	-	yes	Yes
Over-speed Status	no	no	-	Yes
Normal Status	no	no	no	-

**Table 5 – Order and precedence of Status information under CSM**

## **7.3 Pre-Indication Monitoring (PIM)**

### **7.3.1 Definition**

7.3.1.1 The onboard shall be in Pre-indication Monitoring (PIM) when the estimated front end of the train is downstream of the pre-indication location and upstream of the indication location (being the intersection of the indication curve and the permitted speed in CSM).

7.3.1.2 When the onboard enters the Pre-Indication monitoring (PIM), the audible information Sinfo (see section 12) shall be played.

### **7.3.2 Supervision Status**

7.3.2.1 The same definition of the supervision status and of the order of precedence as for the CSM shall be applied.

7.3.2.2 Figure 15 shows the speed and supervision information of bubble 2e.



Figure 15 – Speed and supervision information in PIM / NoS (bubble 2e)

## 7.4 Target speed monitoring (TSM)

### 7.4.1 Normal Status information (NoS)

- 7.4.1.1 The Normal Status information shall be active when the current train speed ( $V_{train}$ ) is below or equal to the Indication Speed ( $V_{ind}$ ).
- 7.4.1.2 Figure 16, Figure 17 and Figure 18 show respectively the speed and supervision information of bubbles 1b, 2b and 2c.



Figure 16 – Speed and supervision information in TSM / NoS (bubble 1b)

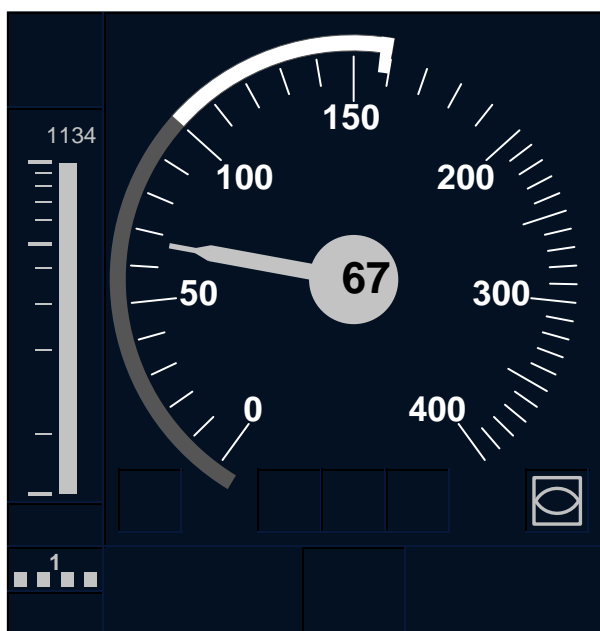


Figure 17 – Speed and supervision information in TSM / NoS (bubble 2b)



Figure 18 – Speed and supervision information in TSM / NoS (bubble 2c)

#### 7.4.2 Indication Status information (IndS)

- 7.4.2.1 The Indication Status shall be activated as soon as the current train speed ( $V_{train}$ ) is above the indication speed ( $V_{ind}$ ).
- 7.4.2.2 The Indication Status shall be deactivated as soon as the current train speed ( $V_{train}$ ) is below or at the Target speed ( $V_{target}$ );
- 7.4.2.3 Figure 19, Figure 20 and Figure 21 show respectively the speed and supervision information of bubbles 1c, 1d and 2f.



Figure 19 – Speed and supervision information in TSM / IndS (bubble 1c)



Figure 20 – Speed and supervision information in TSM / IndS (bubble 1d)



Figure 21 – Speed and supervision information in TSM / IndS (bubble 2f)

#### 7.4.3 Over-speed Status information (OvS)

- 7.4.3.1 The Over-speed Status information shall be activated as soon as the current train speed ( $V_{train}$ ) is above the Permitted Speed ( $V_{perm}$ ).
- 7.4.3.2 The Over-speed Status information shall be deactivated as soon as the current train speed ( $V_{train}$ ) is below or at the Permitted Speed ( $V_{perm}$ ).
- 7.4.3.3 As soon as the Over-speed Status is activated, the audible information S1, see section 12 shall be played.

#### 7.4.4 Warning Status information (WaS)

- 7.4.4.1 The Warning Status information shall be activated as soon as the current train speed ( $V_{train}$ ) is above the Warning Speed ( $V_{warning}$ ).
- 7.4.4.2 The Warning Status information shall be deactivated as soon as the current train speed ( $V_{train}$ ) is below or at the Warning Speed ( $V_{warning}$ );
- 7.4.4.3 While the Warning Status is active, the audible information S2, see section 12 shall be played.
- 7.4.4.4 Figure 22 shows the speed and supervision information of bubble 2+.



Figure 22 – Speed and supervision information in TSM / WaS (bubble 2+)

#### 7.4.5 Intervention Status information (IntS)

- 7.4.5.1 The Intervention Status information shall be activated as soon as the current train speed ( $V_{train}$ ) is above the FLOI (first line of intervention) Speed.
- 7.4.5.2 The Intervention Status information shall be deactivated as soon as the (service or emergency) brake command is revoked.
  - 7.4.5.2.1 Note: The conditions for brake command revocation are explained in document [3].
- 7.4.5.3 Figure 23 shows the speed and supervision information of bubble 2++.



Figure 23 – Speed and supervision information in TSM / IntS (bubble 2++)

## **7.4.6 Order and precedence of Status**

7.4.6.1 Under TSM, the order and precedence of a status on the other ones shall follow the Table 6.

Shall supersede → ↓ Information	Intervention Status	Warning Status	Over-speed Status	Indication Status	Normal Status
Intervention Status	-	yes	yes	yes	yes
Warning Status	no	-	yes	yes	yes
Over-speed Status	no	no	-	yes	yes
Indication Status	no	no	no	-	yes
Normal Status	no	no	no	no	-

**Table 6 – Order and precedence of Status information under TSM**

## **7.5 Release speed monitoring (RSM)**

### **7.5.1 Normal Status information (NoS)**

7.5.1.1 The Normal Status information shall be active when the current train speed ( $V_{train}$ ) is below or equal to the Indication Speed ( $V_{ind}$ ).

### **7.5.2 Indication Status information (IndS)**

7.5.2.1 The Indication Status shall be activated as soon as the current train ( $V_{train}$ ) speed is above the indication speed ( $V_{ind}$ ).

7.5.2.2 Note: In RSM, once the Indication Status is activated, it is never deactivated since the Target speed ( $V_{target}$ ) is equal to zero.

7.5.2.3 Figure 24 shows the speed and supervision information of bubble 2g.



Figure 24 – Speed and supervision information in RSM / IndS (bubble 2g)

### 7.5.3 Intervention Status information (IntS)

- 7.5.3.1 The Intervention Status information shall be activated as soon as the current train speed (Vtrain) is above the Release Speed.
- 7.5.3.2 The Intervention Status information shall be deactivated as soon as the (service or emergency) brake command is revoked.
- 7.5.3.2.1 Note: The conditions for brake command revocation are explained in document [3].

### 7.5.4 Order and precedence of Status Indication

- 7.5.4.1 Under RSM, the order and precedence of a status on the other ones shall follow the Table 7.

Shall supersede → ↓ Information	Intervention Status	Indication Status	Normal Status
Intervention Status	-	yes	yes
Indication Status	no	-	yes
Normal Status	no	no	-

Table 7 – Order and precedence of Status information under RSM



## 8. ERTMS/ETCS INFORMATION SHOWN ON THE DEFAULT WINDOW

### 8.1 Introduction

8.1.1.1 This chapter is only applicable for ERTMS/ETCS levels 0/1/2/3.

8.1.1.2 For level STM, the default window is outside of the scope of this document. The only requirement is that the objects/functions in document [3] §4.7.2, mode SN shall be displayed as far as they concern the default window, i.e. the appearance shall be as specified in this document but the location of the objects/functions is not specified.

8.1.1.3 The figures in this section show the objects/functions allocated to the ERTMS/ETCS DMI areas to form the default window. The figures showing the areas (e.g. Figure 25) concerned by an object/function presents the touch screen layout on the left hand side and the soft key layout on the right hand side.

8.1.1.4 The layers on the default window shall be as follows:

- a) Layer 0: C2, C3, C4, C5, C6, C7, E10, E11, F, H (soft key technology), I (soft key technology), G1, G2, G3, G4, G5, G6, G7, G8, G9, G10, Z (touch screen technology), Y (touch screen technology)
- b) Layer -1: A1, A2+A3 (drawn as one area), A4, B (drawn as one area), D (drawn as one area), C1, C8, C9, E1, E2, E3, E4 (touch screen technology), E5-E8 (soft key technology, drawn as one area) or E5-E9 (touch screen technology, drawn as one area), G11, G12, G13
- c) Layer -2: B3, B4, B5, B6, B7

### 8.2 Speed and Supervision information

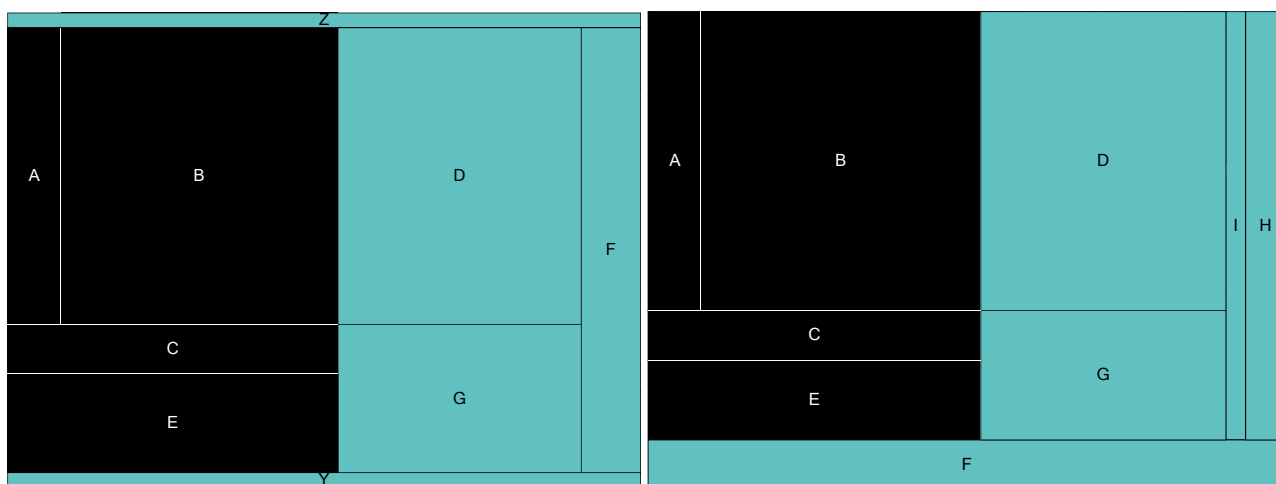


Figure 25 – Areas for speed and supervision information



Figure 26 - Overview of the main elements in the speed and supervision areas

## 8.2.1 Speed Information

### 8.2.1.1 Speed dial

8.2.1.1.1 This DMI object displays the speed dial.

8.2.1.1.2 The speed dial shall be displayed in area B0 (see Figure 27).

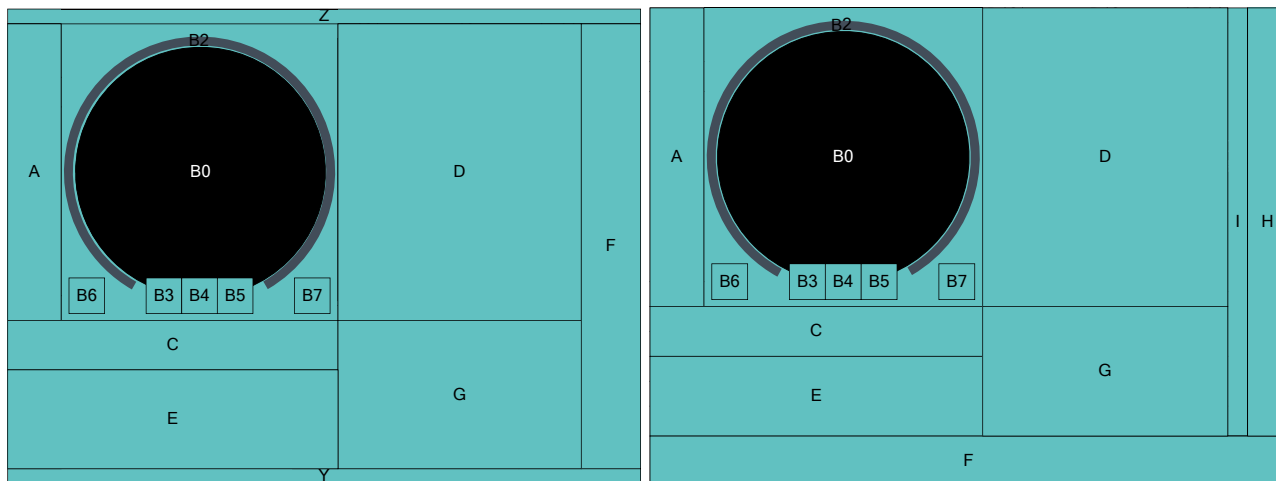


Figure 27 – Area for the speed dial

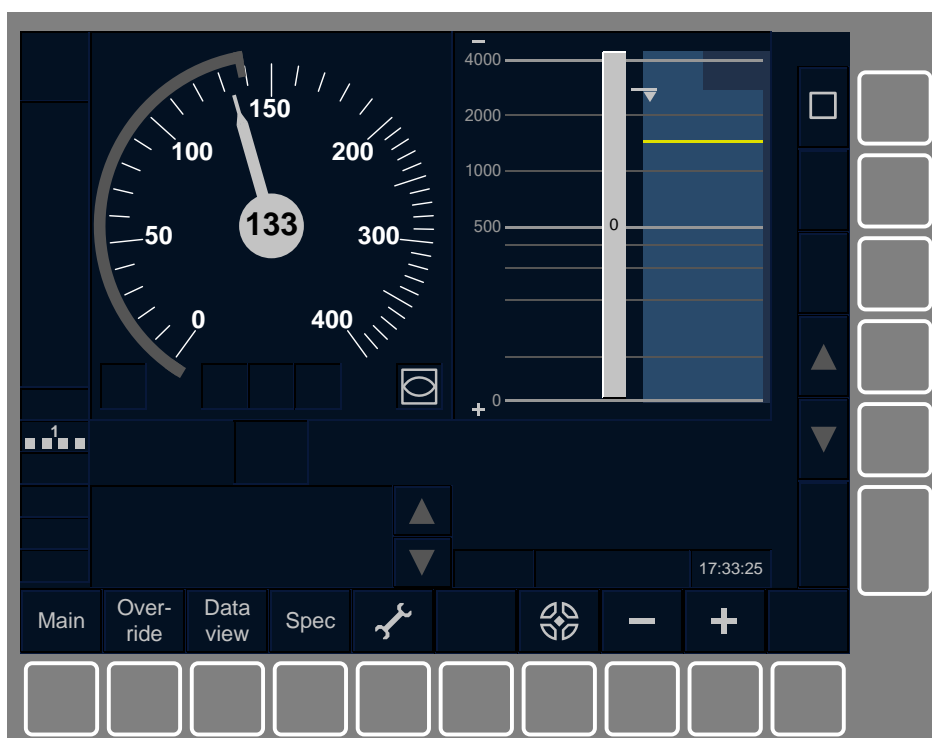
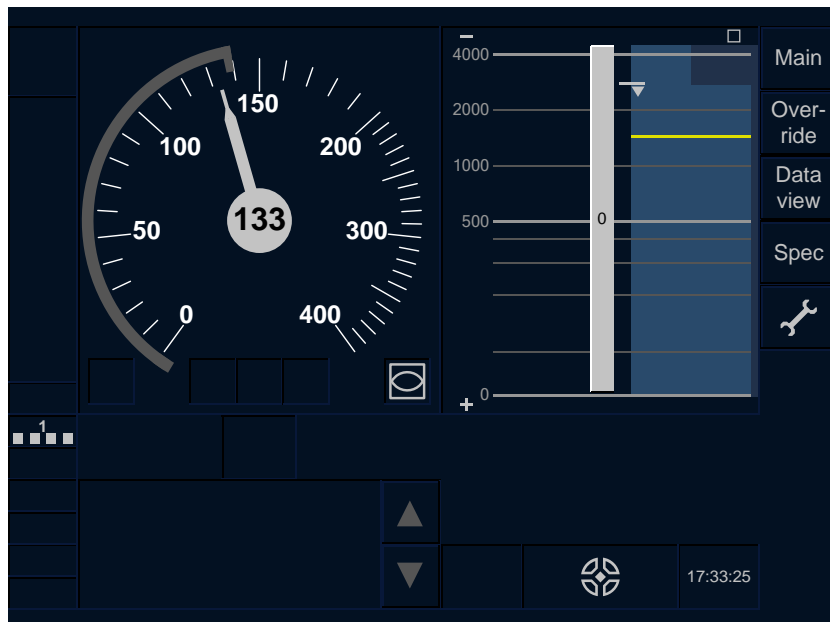
8.2.1.1.3 The range of the speed dial shall be pre-configured onboard to one of the following possibilities:

- a) 0 km/h to 400 km/h
- b) 0 km/h to 250 km/h
- c) 0km/h to 180 km/h
- d) 0km/h to 140 km/h

8.2.1.1.4 The speed dial shall be circular and shall indicate speeds from 0 km/h to the maximum value of the pre-configured onboard range.

8.2.1.1.4.1 The functions displayed in B1 and B2 shall use the mapping described here below for the pre-configured onboard range.

8.2.1.1.5 For the 400 km/h dial (see Figure 28):



**Figure 28 - 400 km/h indication for the speed dial**

8.2.1.1.5.1 Assuming that 0 degrees (corresponding to 150 km/h) is vertically upwards from the centre, 0 km/h shall be shown at an angle of -144 degrees and 400 km/h shall be shown at an angle of +144 degrees, while 200 km/h shall be shown at an angle of +48 degrees.

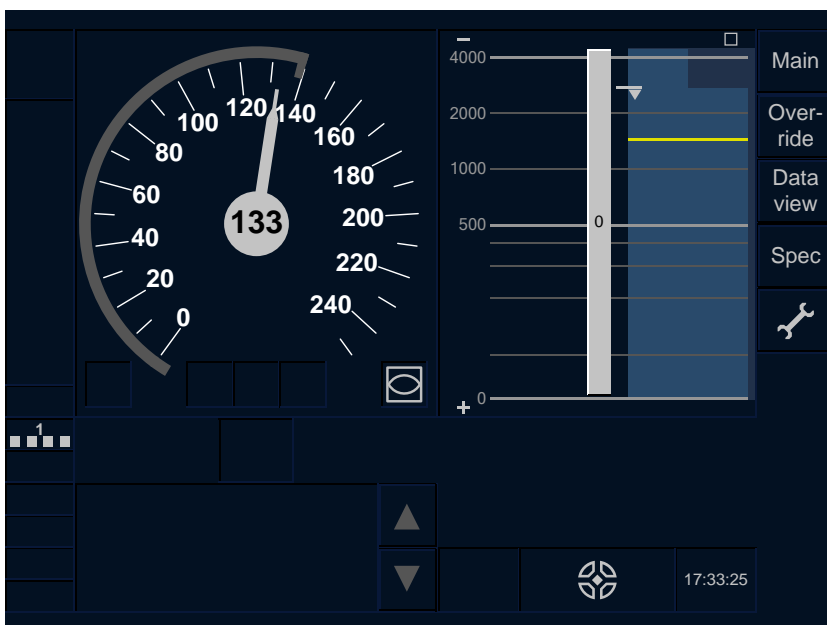
8.2.1.1.5.2 Both segments from 0 km/h to 200 km/h and from 200 km/h to 400 km/h shall have linear mapping between speed and angles.

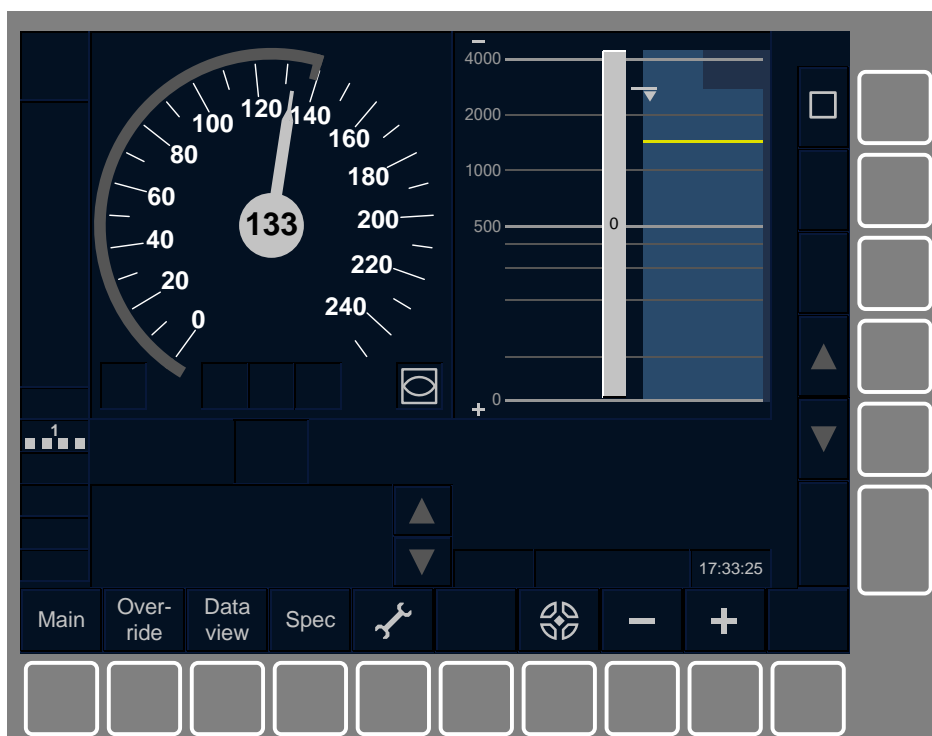
8.2.1.1.5.3 The speed dial with the 400 km/h shall indicate the following numbers: 0, 50, 100, 150, 200, 300 and 400, positioned inside the circle B0 and equally spaced from each other. At each of the following positions 0, 50, 100, 150, 200, 250, 300, 350, and 400, a speed indicator line of 25 cells length shall be drawn radially between the border of the circle and the number. In between these lines, shorter speed indicator lines of 15 cells length shall be drawn evenly spaced by 10 km/h.

8.2.1.1.5.4 Note: This means that in the first segment (from 0 to 200) the distance between the 10 km/h indications is wider (9,6 degrees) than in the second segment (from 200 to 400) (4,8 degrees).

8.2.1.1.5.5 The width of the indicator lines shall be 1 cell.

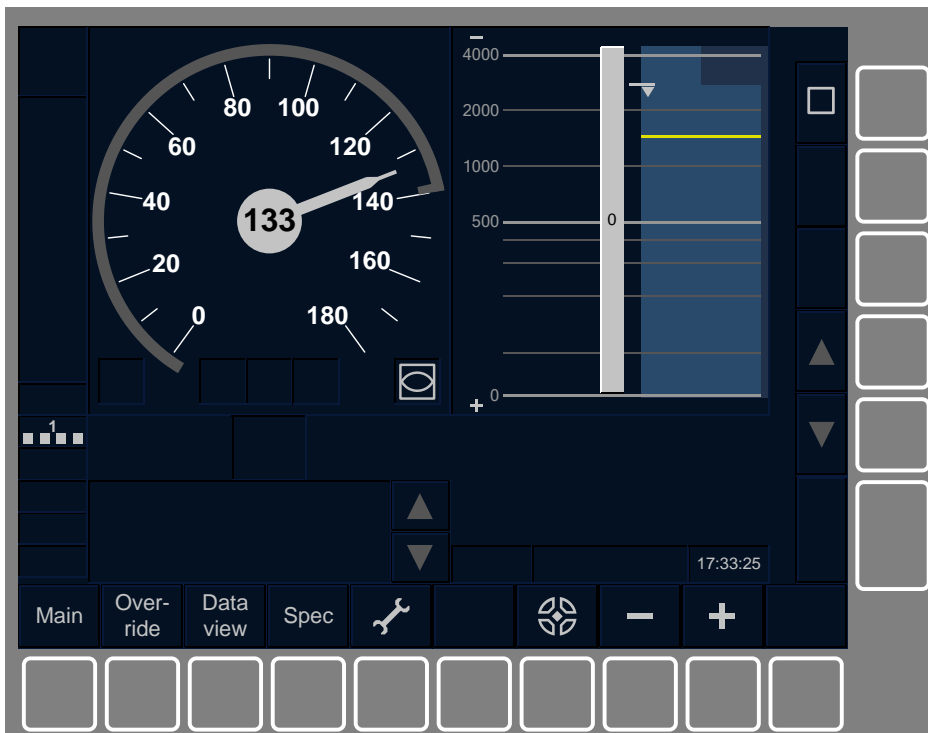
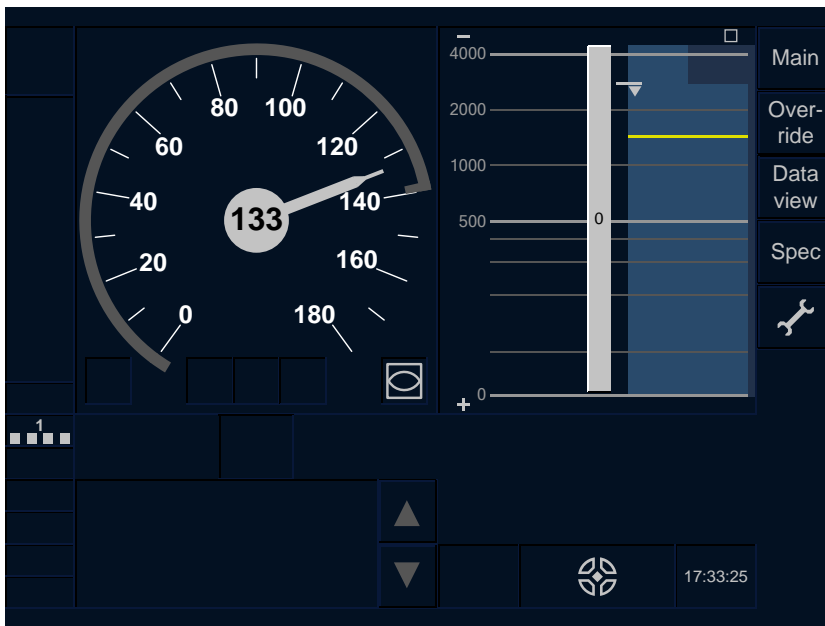
8.2.1.1.6 For the 250 km/h dial (see Figure 29):





**Figure 29 - 250 km/h indication for the speed dial**

- 8.2.1.1.6.1 Assuming that 0 degrees is vertically upwards from the centre, 0 km/h shall be shown at an angle of -144 degrees and 250 km/h is shown at an angle of +144 degrees.
- 8.2.1.1.6.2 The segment from 0 km/h to 250 km/h shall have linear mapping between speed and angles.
- 8.2.1.1.6.3 The speed dial with the 250 km/h shall indicate the following numbers positioned inside the circle B0 and equally spaced from each other: (0, 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 220 and 240). At each of these displayed numbers, a speed indicator line of 25 cells length shall be drawn radially between the border of the circle and the number. In between these lines, shorter speed indicator lines of 15 cells length shall be drawn evenly spaced by 10 km/h
- 8.2.1.1.6.4 The width of the indicator lines shall be 1 cell.
- 8.2.1.1.7 For the 180 km/h dial (see Figure 30):



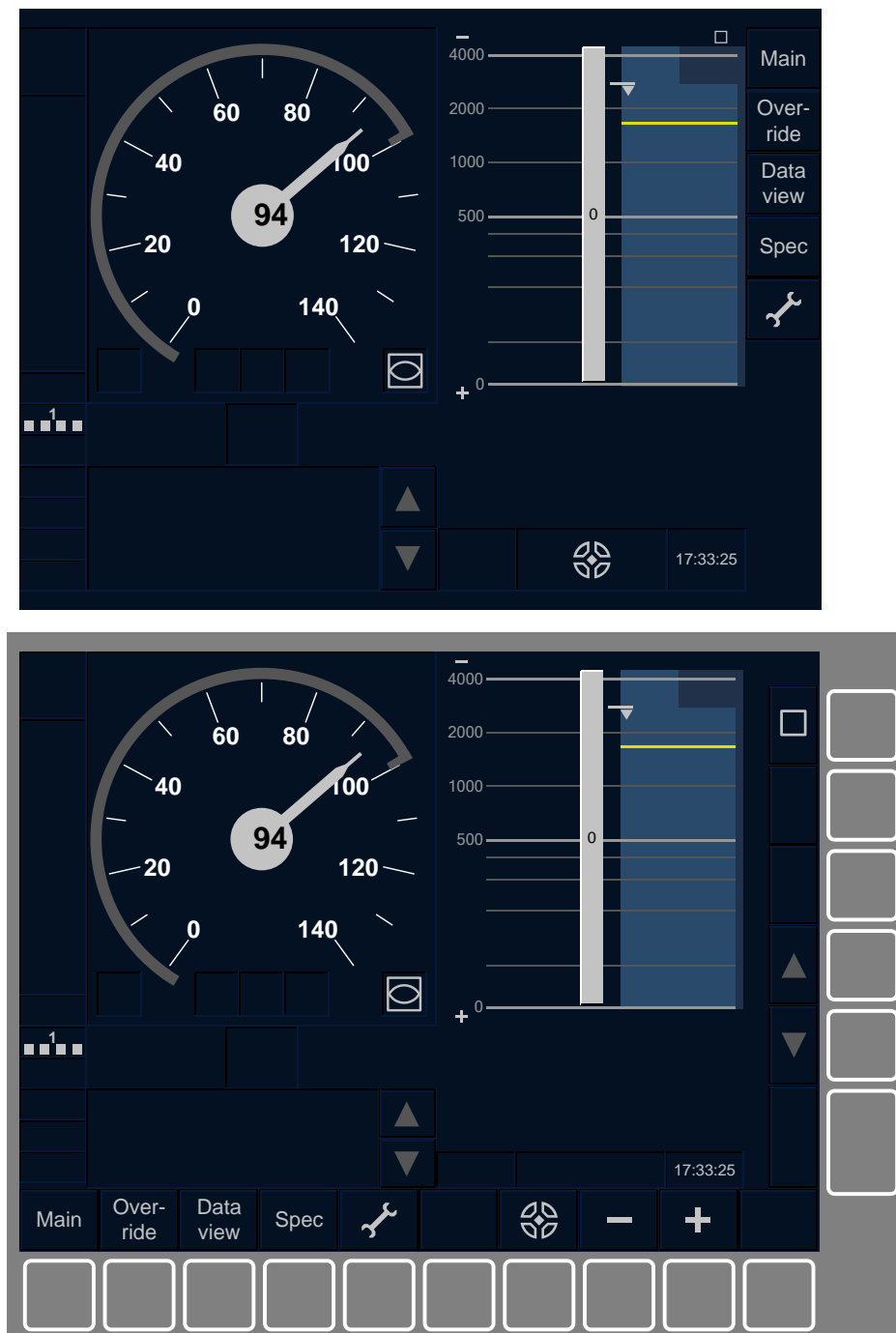
**Figure 30 - 180 km/h indication for the speed dial**

- 8.2.1.1.7.1 Assuming that 0 degrees is vertically upwards from the centre, 0 km/h shall be shown at an angle of -144 degrees and 180 km/h is shown at an angle of +144 degrees.
- 8.2.1.1.7.2 The segment from 0 km/h to 180 km/h shall have linear mapping between speed and angles.
- 8.2.1.1.7.3 The speed dial with the 180 km/h shall indicate the following numbers positioned inside the circle B0 and equally spaced from each other: (0, 20, 40, 60, 80, 100, 120, 140, 160, 180). At each of these displayed numbers, a speed indicator line of 25 cells length shall be drawn radially between the border of the circle and the number. In between

these lines, shorter speed indicator lines of 15 cells length shall be drawn evenly spaced by 10 km/h

8.2.1.1.7.4 The width of the indicator lines shall be 1 cell.

8.2.1.1.8 For the 140 km/h dial (see Figure 31):



**Figure 31 - 140 km/h indication for the speed dial**

8.2.1.1.8.1 Assuming that 0 degrees is vertically upwards from the centre, 0 km/h shall be shown at an angle of -144 degrees and 140 km/h is shown at an angle of +144 degrees.

8.2.1.1.8.2 The segment from 0 km/h to 140 km/h shall have linear mapping between speed and angles.

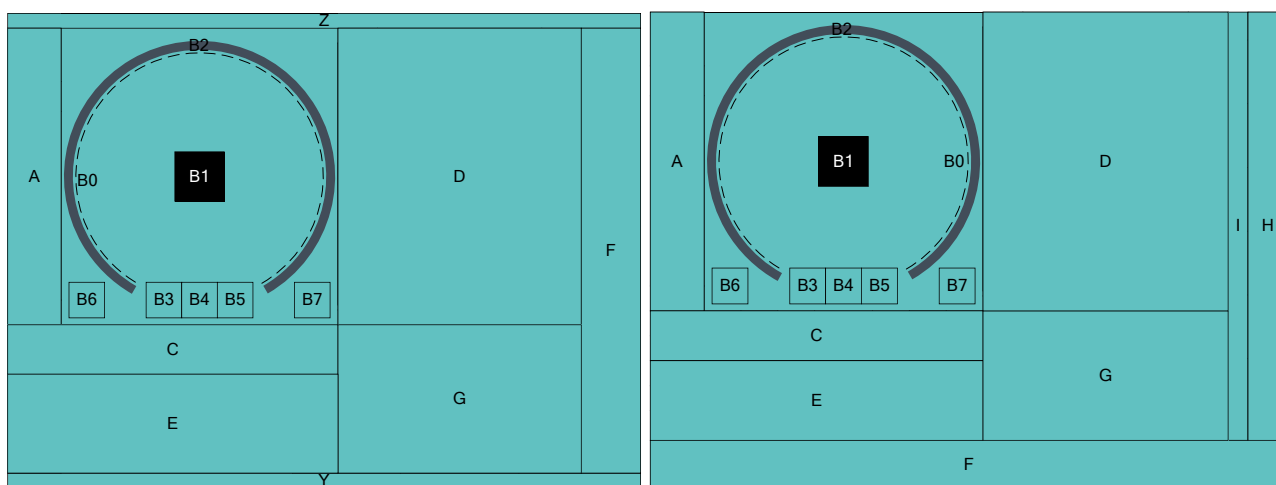
8.2.1.1.8.3 The speed dial with the 140 km/h shall indicate the following numbers positioned inside the circle B0 and equally spaced from each other: (0, 20, 40, 60, 80, 100, 120, 140). At each of these displayed numbers, a speed indicator line of 25 cells length shall be drawn radially between the border of the circle and the number. In between these lines, shorter speed indicator lines of 15 cells length shall be drawn evenly spaced by 10 km/h

8.2.1.1.8.4 The width of the indicator lines shall be 1 cell.

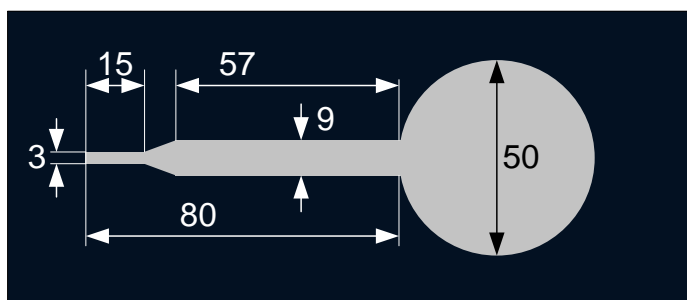
### 8.2.1.2 Current train speed pointer

8.2.1.2.1 This DMI object displays the current speed of the train.

8.2.1.2.2 The current train speed pointer shall be displayed in area B1 (see Figure 32).



**Figure 32 - Area for the current train speed pointer**



**Figure 33 - Size of the current train speed pointer**

8.2.1.2.3 The pointer indicates the current train speed. The pointer shall consist of a needle and a circular part centred in B1. Both parts shall always have the same colour.

8.2.1.2.4 The Figure 33 dimensions shall be used.

8.2.1.2.5 Depending on the mode and the supervision status, the pointer shall follow the DMI colour as specified in Table 8.



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**ETCS Driver Machine Interface**

Mode	Supervision Status		Pointer between 0 km/h – $V_{Perm}$	Pointer between 0 km/h – $V_{release}^{**}$ (when $V_{release}$ exists)	Pointer between 0 km/h – $V_{Target}$	Pointer between $V_{Target} - V_{Perm}$	Pointer above $V_{Perm}$ (in CSM, PIM or TSM) or $V_{release}$ (in RSM)
FS/OS	CSM	NoS	grey	-	-	-	-
		OvS	-	-	-	-	orange
		WaS	-	-	-	-	orange
		IntS	grey	-	-	-	red
	PIM	NoS	-	-	grey	white	-
		OvS	-	-	-	-	orange
		WaS	-	-	-	-	orange
		IntS	-	-	grey	white	red
	TSM	NoS	-	-	grey	white	-
		IndS	-	-	grey	yellow	-
		OvS	-	-	-	-	orange
		WaS	-	-	-	-	orange
		IntS	-	-	grey	yellow	red
	RSM	NoS	-	white	-	-	-
		IndS	-	yellow	-	-	-
		IntS	-	yellow	-	-	red
SR/UN	CSM	NoS	grey	-	-	-	-
		OvS	-	-	-	-	orange
		WaS	-	-	-	-	orange
		IntS	grey	-	-	-	red
	PIM	NoS	-	-	grey	white	-
		OvS	-	-	-	-	orange
		WaS	-	-	-	-	orange
		IntS	-	-	grey	white	red
	TSM	NoS	-	-	grey	white	-
		IndS	-	-	grey	yellow	-
		OvS	-	-	-	-	orange
		WaS	-	-	-	-	orange
SH/RV	CSM	NoS	grey	-	-	-	-
		OvS	-	-	-	-	orange
		WaS	-	-	-	-	orange
		IntS	grey	-	-	-	red
NL/ SB/PT	-	-	grey	-	-	-	-
TR	-	-	-	-	-	-	red

# ERA ERTMS unit

## ETCS Driver Machine Interface

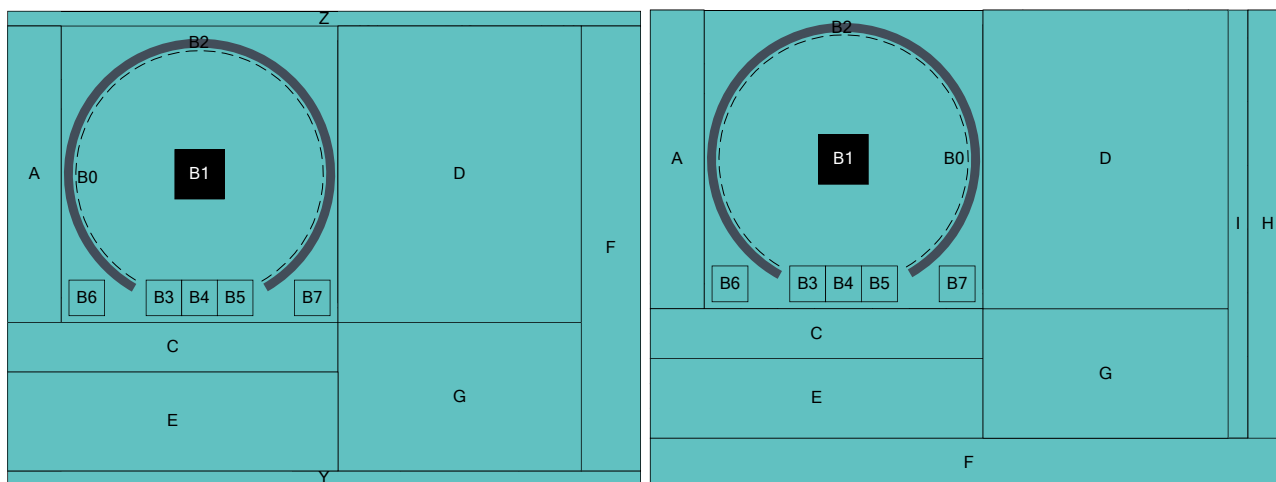
Mode	Supervision Status	Pointer between 0 km/h – $V_{Perm}$	Pointer between 0 km/h – $V_{release}^{**}$ (when $V_{release}$ exists)	Pointer between 0 km/h – $V_{Target}$	Pointer between $V_{Target} - V_{Perm}$	Pointer above $V_{Perm}$ (in CSM, PIM or TSM) or $V_{release}$ (in RSM)
		<p>Hyphen ('-') means: not applicable.</p> <p>For NL, the train speed is considered as always below the permitted speed</p> <p>For TR, the train speed is considered as always above the permitted speed</p> <p>** When <math>V_{release}</math> exists, the target is an EOA and <math>V_{target}</math> is therefore equal to zero</p> <p>For NL/SB/PT modes, there is no speed monitoring, the speed pointer is therefore considered as being always below <math>V_{perm}</math></p> <p>For TR mode, the emergency brake command is applied, the speed pointer is therefore considered as being always above <math>V_{perm}</math></p>				

**Table 8 – Conditions for display and colour of the current train speed pointer**

### 8.2.1.3 Current train speed digital

8.2.1.3.1 The current speed of the train shall be displayed digitally.

8.2.1.3.2 The current train speed digital shall be displayed in area B1 (see Figure 34) i.e. inside the circular part of the pointer.



**Figure 34 – Area for the current train speed digital**

8.2.1.3.3 Area B1 shall be divided along its width into three equally sized sub areas. Every digit of the current train speed shall be placed in such a sub area and aligned to the right of the concerned sub area. In this way, the digits will not change location depending on the different widths of the 10 possible used digits.

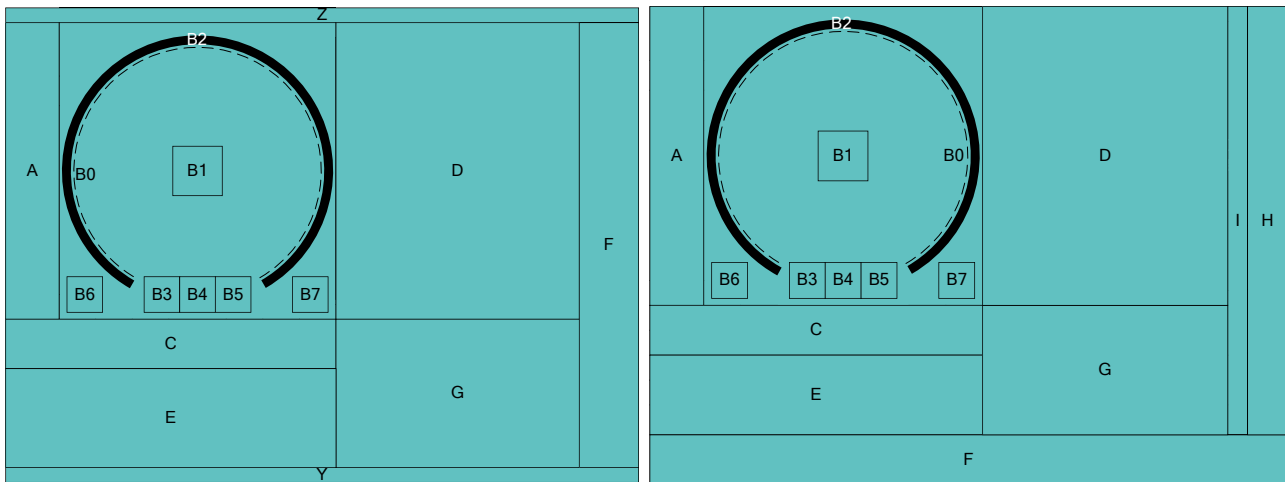
8.2.1.3.4 When the speed is composed of less than 3 digits to be displayed, the right most sub area(s) shall be used.

8.2.1.3.5 The digital numbers shall be black, except if the speed pointer has the red colour. In that case, the digital numbers shall be white.

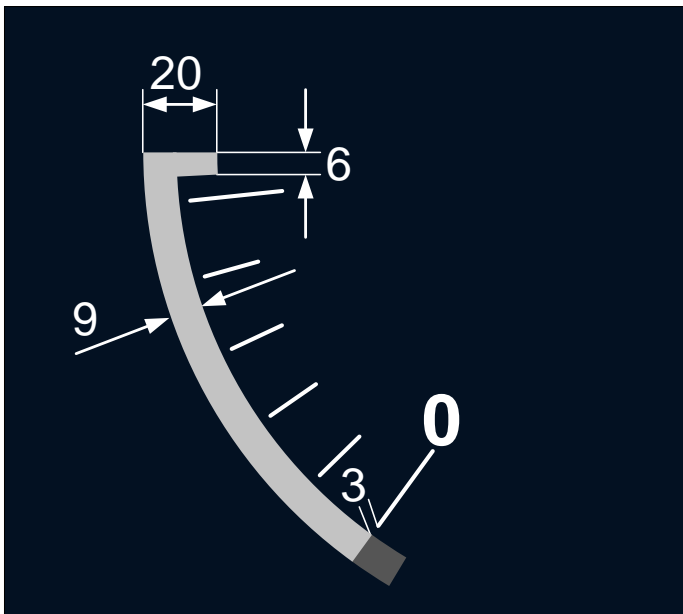
### 8.2.1.4 Circular Speed Gauge (CSG)

8.2.1.4.1 The Circular Speed Gauge (CSG) shall display, around the speed dial, the Vperm, Vtarget, Vint and Vrelease information depending on the supervision status.

8.2.1.4.2 The CSG shall be displayed in area B2 (see Figure 35).



**Figure 35 – Area of the Circular Speed Gauge (CSG)**



**Figure 36 – Size in cells of the Circular Speed Gauge (CSG)**

8.2.1.4.3 Figure 37 shows the CSG in PIM with NoS status. Figure 38 shows the CSG in TSM with OvS status.

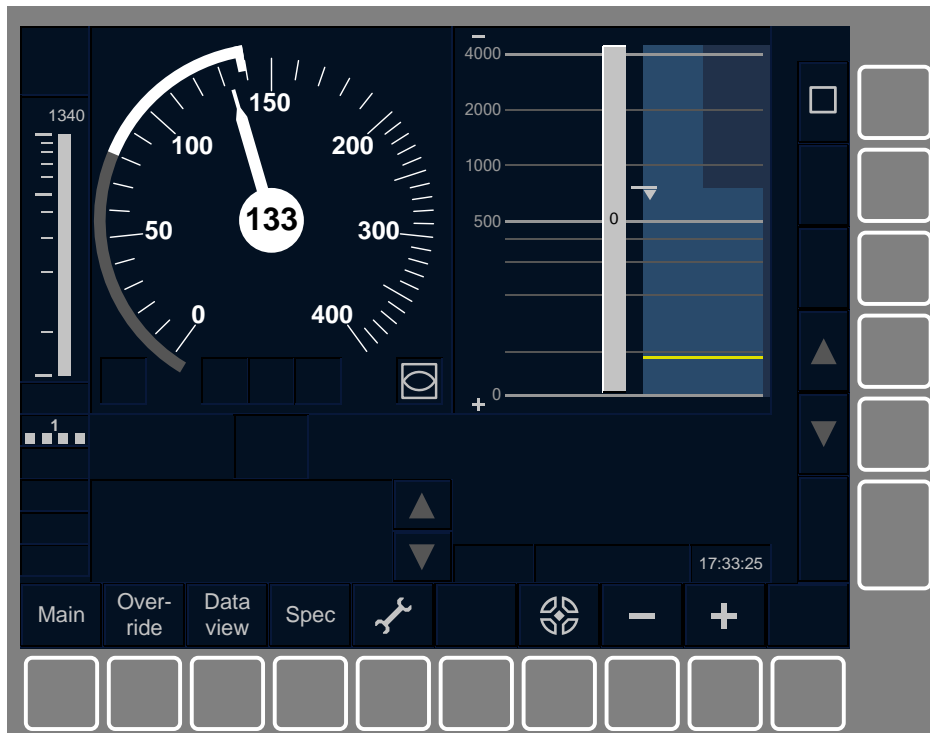
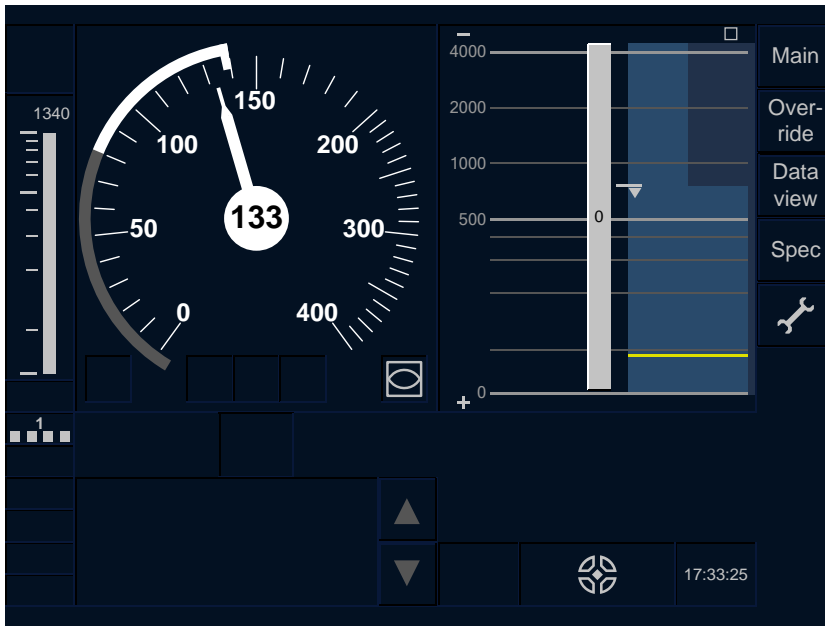
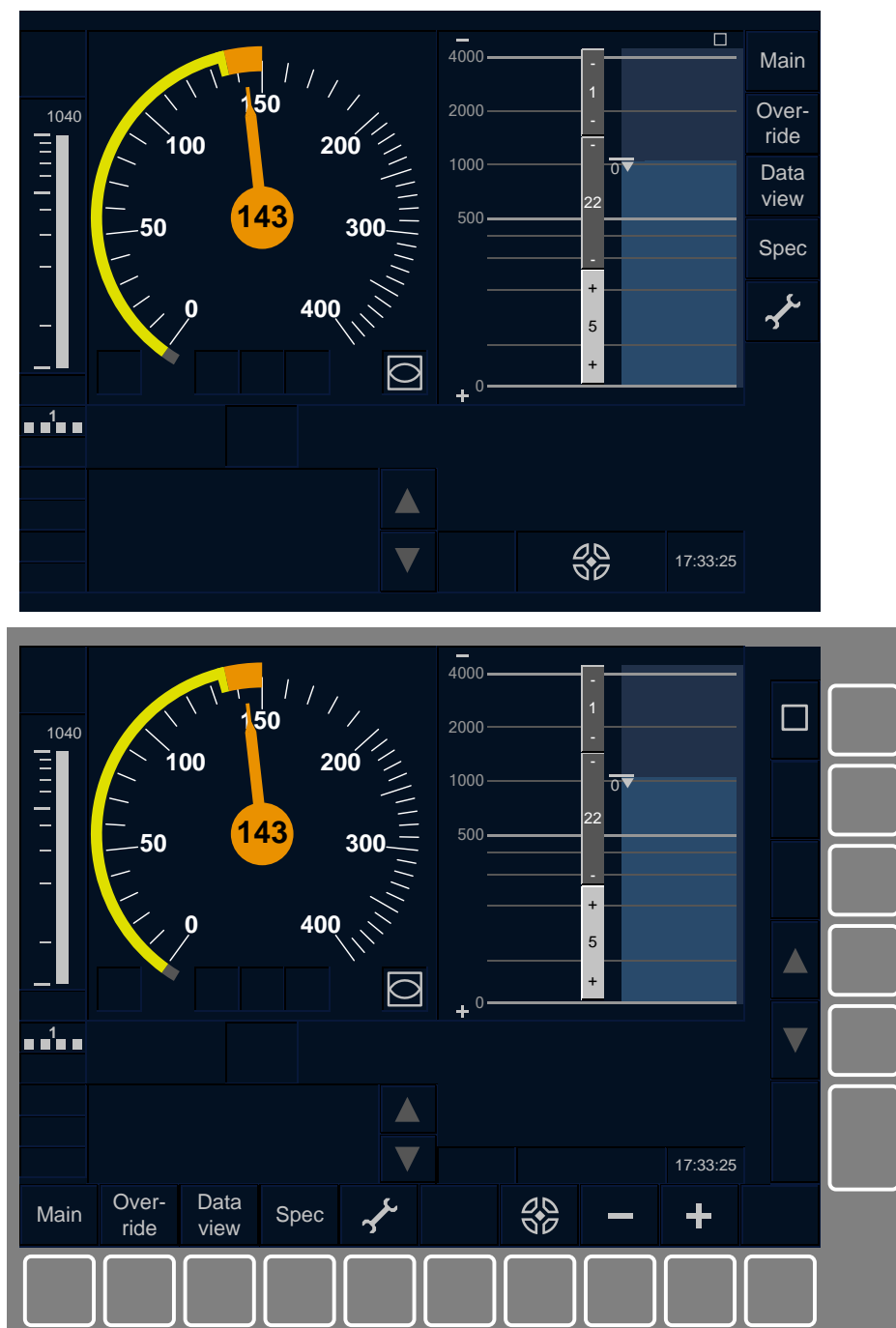


Figure 37 – Circular Speed Gauge (CSG), in PIM with NoS status



**Figure 38 – Circular Speed Gauge (CSG), in TSM with OvS status**

- 8.2.1.4.4 Assuming that 0 degrees is vertically upwards from the centre of the speed dial, the CSG shall be placed along the outside border of the speed dial, but from –149 degrees to +144 degrees.
- 8.2.1.4.5 When the CSG is shown, the part of the CSG from –149 degrees to -144 degrees (i.e. 0 km/h) shall always be displayed with dark grey.
- 8.2.1.4.6 The width of the CSG shall be 9 cells from zero up to the hook as shown in Figure 36.

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8.2.1.4.7 At Vperm, the CSG shall display a 'hook' covering the outer border of the speed dial. The size of the hook shall be 6x20 cells (see Figure 36) and the upper limit of the hook shall be at Vperm.

8.2.1.4.8 While the Over-speed, the Warning or the Intervention Status is active, the CSG between the 'hook' (Vperm) and Vint shall have the same width as the 'hook' (see Figure 38).

8.2.1.4.9 The CSG shall follow the DMI colour as defined in Table 9.

Mode	Supervision Status		CSG between 0 km/h – V <sub>perm</sub>	CSG between 0 km/h – V <sub>release</sub> * (when V <sub>release</sub> exists)	CSG between 0 km/h – V <sub>target</sub>	CSG between V <sub>target</sub> – V <sub>perm</sub>	CSG between V <sub>perm</sub> – V <sub>int</sub>
FS	CSM	NoS	dark grey	-	-	-	-
		OvS	dark grey	-	-	-	orange
		WaS	dark grey	-	-	-	orange
		IntS	dark grey	-	-	-	red
	PIM	NoS	-	medium grey	dark grey	white	-
		OvS	-	medium grey	dark grey	white	orange
		WaS	-	medium grey	dark grey	white	orange
		IntS	-	medium grey	dark grey	white	red
	TSM	NoS	-	medium grey	dark grey	white	-
		IndS	-	medium grey	dark grey	yellow	-
		OvS	-	medium grey	dark grey	yellow	orange
		WaS	-	medium grey	dark grey	yellow	orange
		IntS	-	medium grey	dark grey	yellow	red
	RSM	NoS	-	medium grey	-	white	-
		IndS	-	medium grey	-	yellow	-
		IntS	-	medium grey	-	yellow	-
SB / OS / SR / SH / UN / RV / TR / PT / NL	-	AllS	-	-	-	-	-

Hyphen ('-') means: not applicable

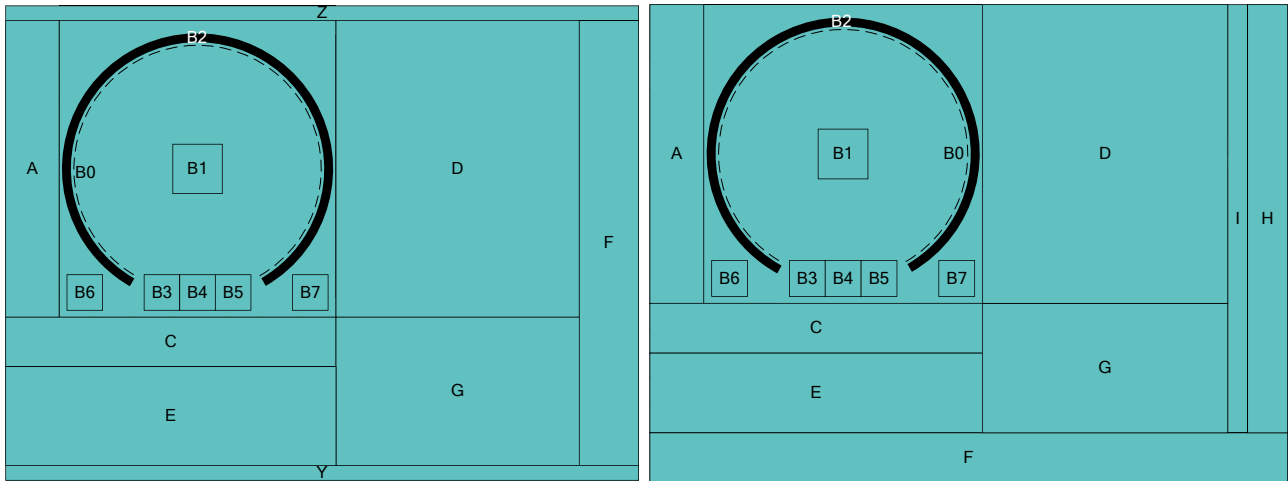
\* When V<sub>release</sub> exists, the target is an EOA and V<sub>target</sub> is therefore equal to zero

**Table 9 – Conditions for display and colour of the circular speed gauge**

### 8.2.1.5 Speed indication for partial supervision

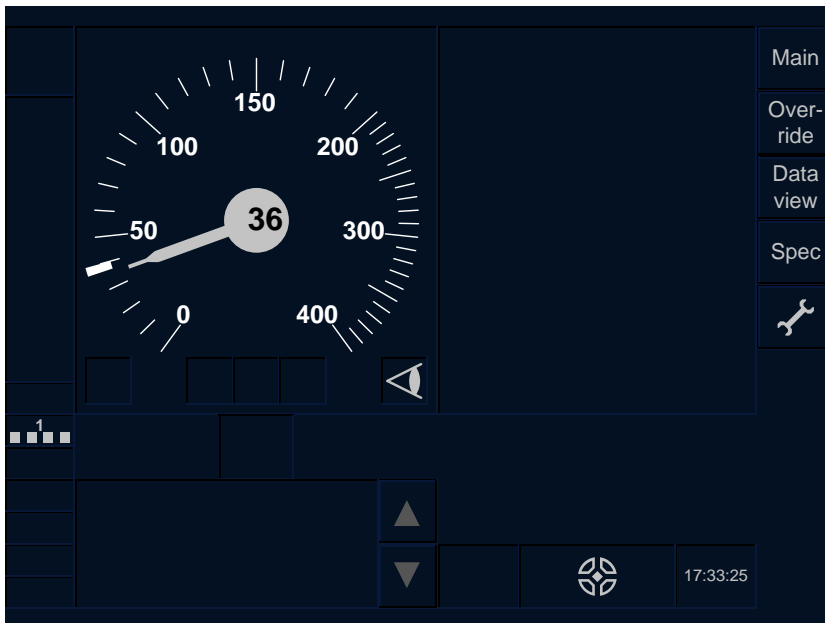
8.2.1.5.1 The Speed indication for partial supervision shall display, around the speed dial, the Vperm and Vtarget information depending on the supervision status.

8.2.1.5.2 The Speed indication for partial supervision shall be displayed in area B2 (see Figure 39).



**Figure 39 – location of the maximum supervised speed indication**

8.2.1.5.3 Examples of Speed indication for partial supervision are given in Figure 40, Figure 41, Figure 42 and Figure 43.



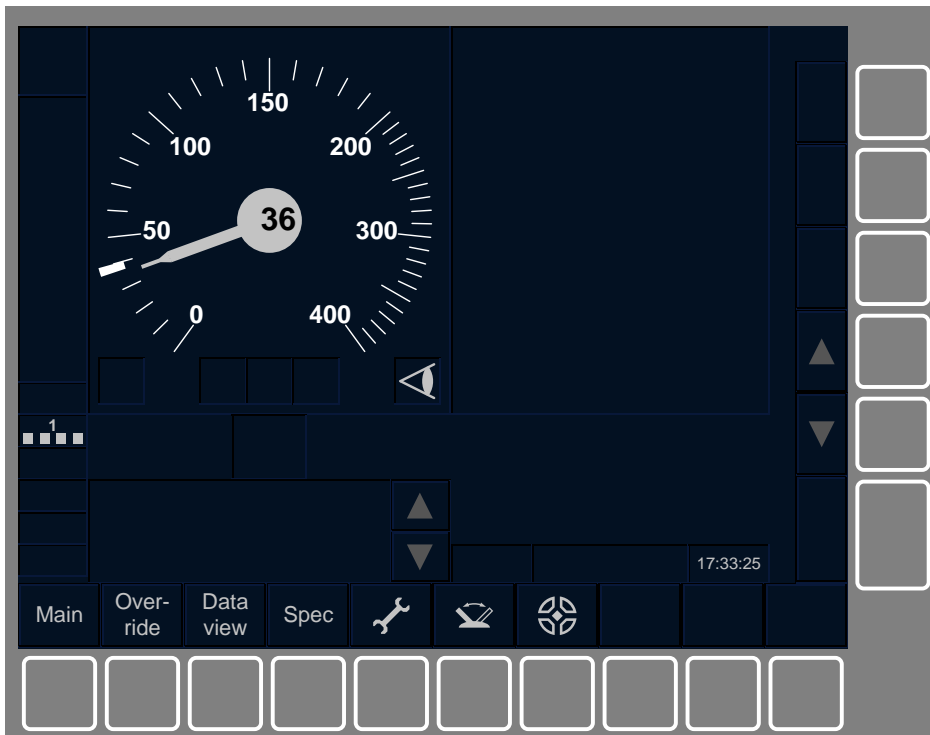
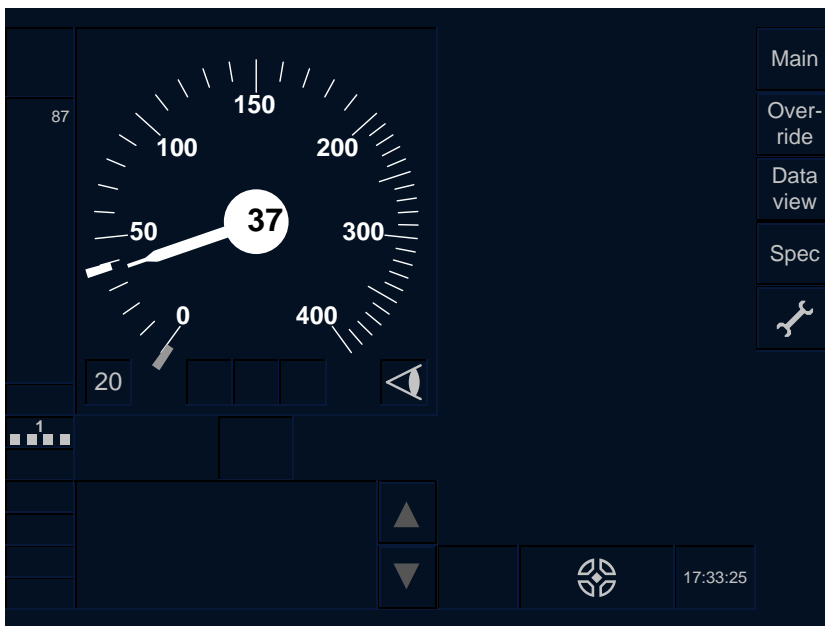


Figure 40 –Speed indication for partial supervision, OS mode in CSM/NoS





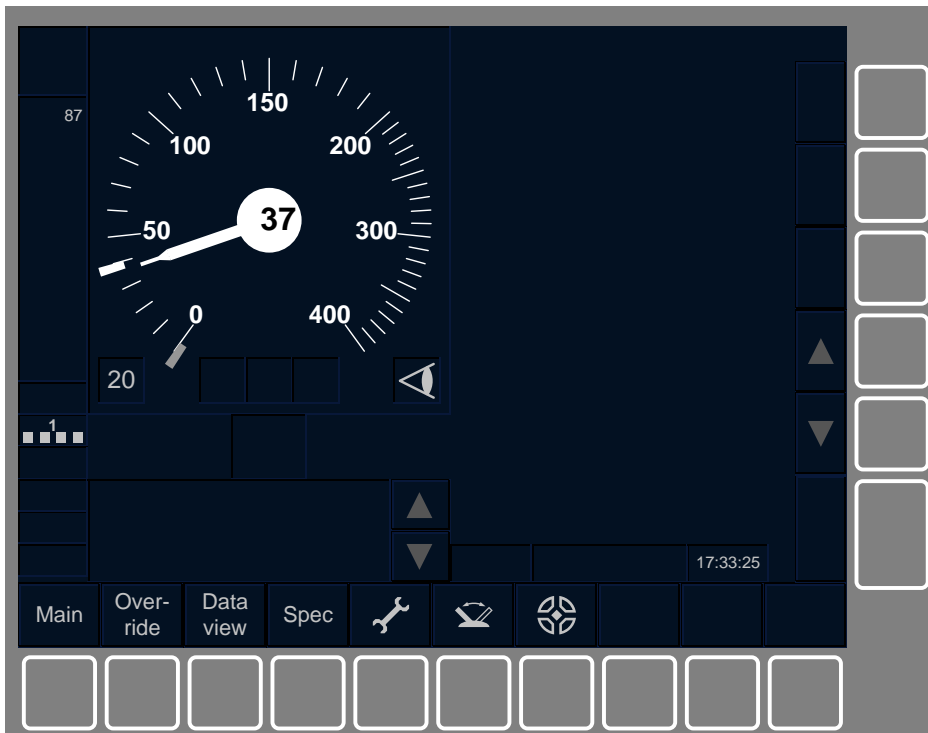
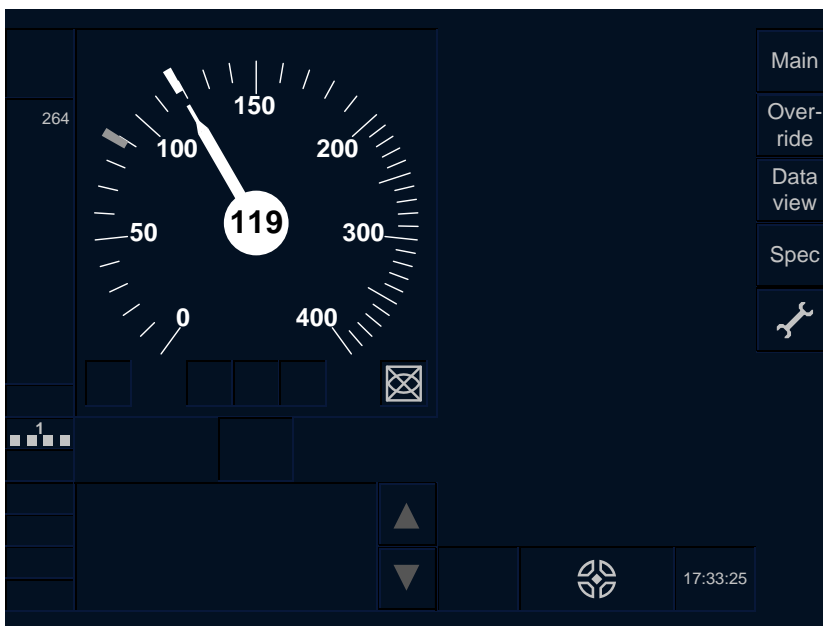
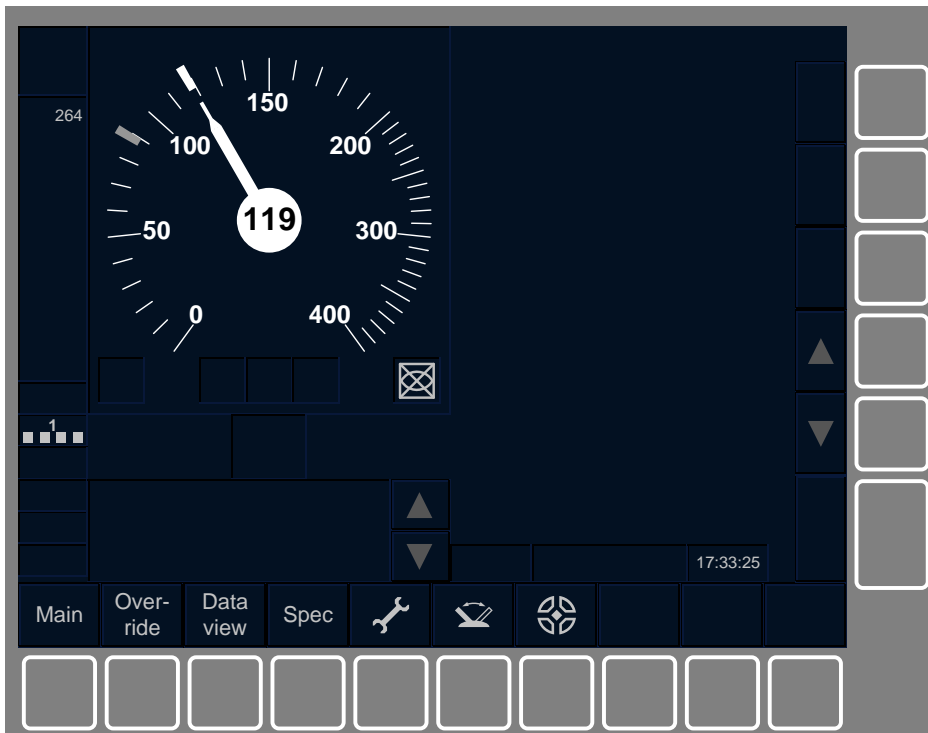
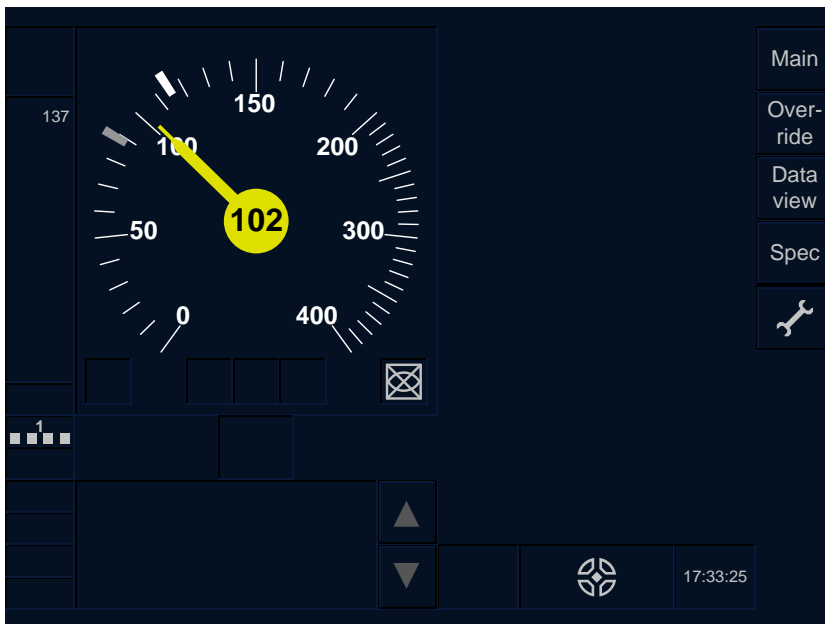


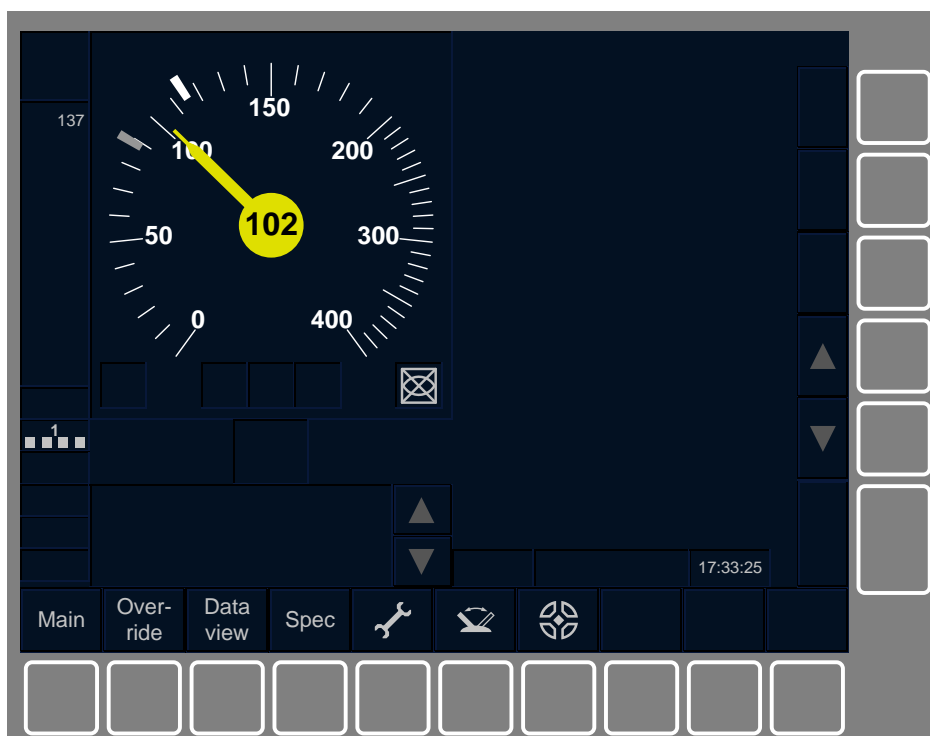
Figure 41 –Speed indication for partial supervision, OS mode in PIM/NoS with a release speed





**Figure 42 –Speed indication for partial supervision, SR mode in PIM/NoS with a speed restriction at 90km/h**





**Figure 43 –Speed indication for partial supervision, SR mode in TSM/IndS with a speed restriction at 90km/h**

- 8.2.1.5.4 At Vperm, a first ‘hook’ shall be displayed overlapping the outer border of the speed dial. The size of the hook shall be 6x20 cells and the upper limit of the hook shall be at Vperm.
- 8.2.1.5.5 At Vtarget, a second ‘hook’ shall be displayed overlapping the outer border of the speed dial. The size of the hook shall be 6x20 cells and the upper limit of the hook shall be at Vtarget.
- 8.2.1.5.6 The Speed indication for partial supervision shall follow the DMI colour as defined in Table 10.

		Speed indication for partial supervision		
Mode	Supervision Status		hook at Vperm	hook at Vtarget
OS / SR*	CSM	AIIS	white	-
	PIM	AIIS	white	medium grey
	TSM	AIIS	white	medium grey
	RSM applicable (not for SR)	AIIS	white	medium grey
SH / RV*	CSM	AIIS	white	-
SB / FS / TR / PT / NL / UN	-	AIIS	-	-

Hyphen ('-') means: not applicable.

\* The speed indication for partial supervision is shown if driver has requested to display it (toggle on) (see section 8.2.2.4 for the toggling function)

Table 10 – Conditions for display and colour of the speed indication for partial supervision

#### 8.2.1.6 Release speed

8.2.1.6.1 The graphical presentation of the release speed shall be displayed in area B2 (see Figure 44).

8.2.1.6.2 The digital presentation of the release speed shall be displayed in area B6 (see Figure 44).

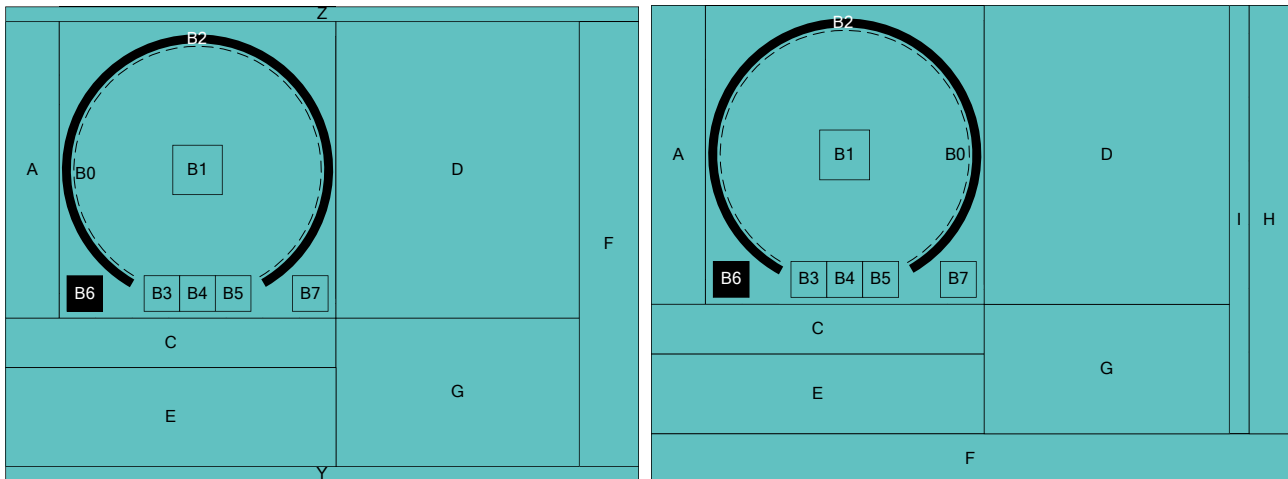
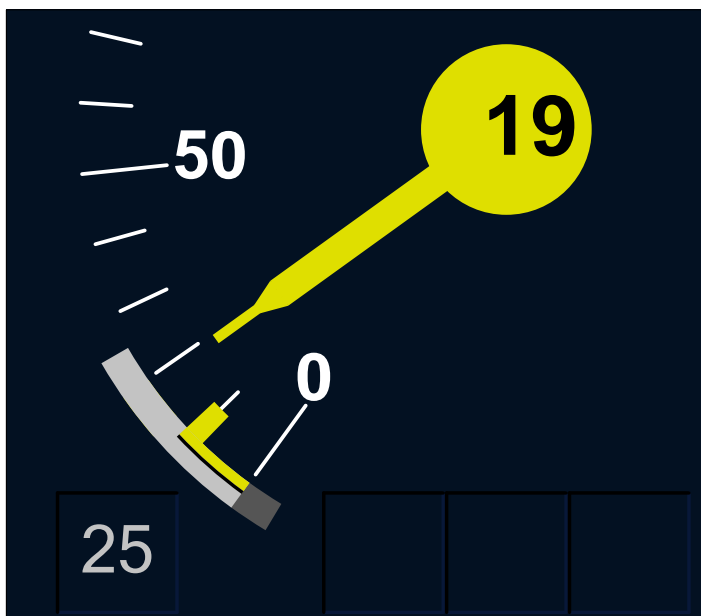


Figure 44 – Areas for the Release speed



Figure 45 – Release speed, when  $V_{perm} > V_{release}$



**Figure 46 – Release speed, when  $V_{perm} < V_{release}$**

- 8.2.1.6.3 When a Release speed exists, its graphical presentation shall be shown on the CSG as specified in Table 9.
- 8.2.1.6.4 When the Release speed is shown on the CSG, it shall be shown at the outer part of the CSG. This Release speed display ( $V_{release}$ ) shall be separated from the permitted speed display ( $V_{perm}$ ) by a thin 1 cell line being in the background colour of area B. The permitted speed display below the Release speed value shall have a width of 3 cells. The width of the Release speed display shall ensure that the total width of the CSG is always kept at 9 cells (see Figure 45 and Figure 46).
- 8.2.1.6.5 When a Release speed exists, its digital presentation shall be displayed with a number in medium grey as specified in Table 11.

Mode	Supervision Status		Release speed digital
FS / OS*	CSM	AIIS	no
	PIM	AIIS	yes
	TSM	AIIS	yes
	RSM	AIIS	yes
SB / SH / UN / PT / TR / NL / SR / RV	-	AIIS	no

\* For OS, the digital presentation of the release speed is shown if driver has requested to display it (toggle on) (see section 8.2.2.4 for the toggling function)

**Table 11 – Conditions for display of the release speed digital**

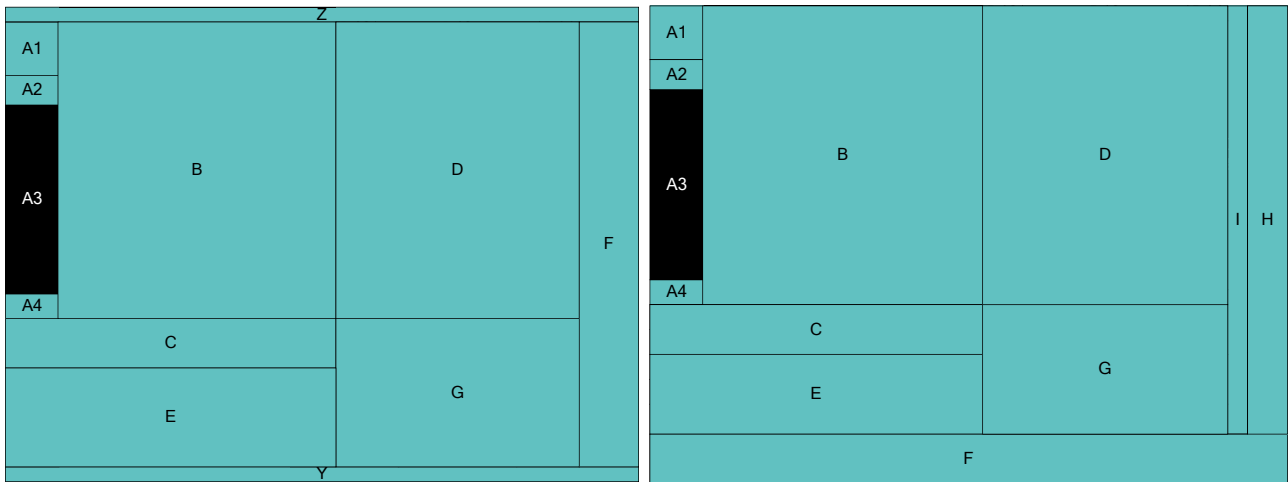
## 8.2.2 Brake Information

### 8.2.2.1 Distance to target bar

- 8.2.2.1.1 This DMI object shows the remaining distance to target bar.

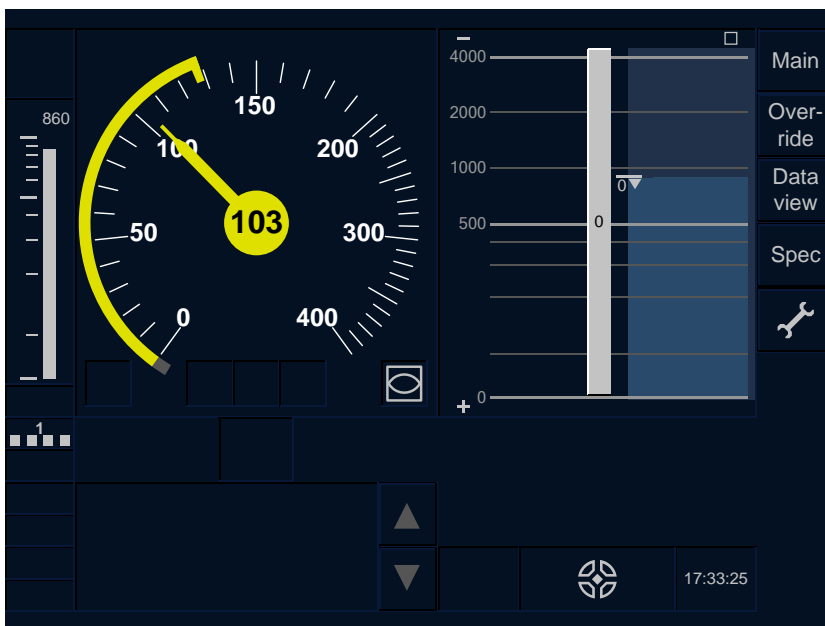
8.2.2.1.2 The colour of the target distance bar shall be grey.

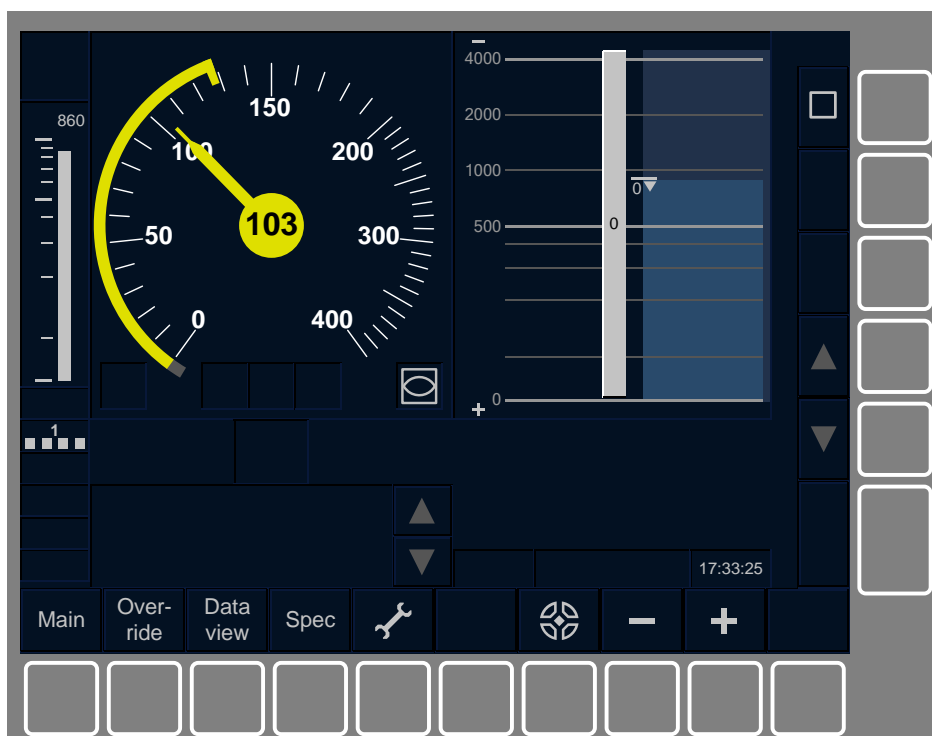
8.2.2.1.3 The distance to target bar shall be displayed in area A3 (see Figure 47).



**Figure 47 – Area for distance to target bar**

8.2.2.1.4 Figure 48 gives an example of the distance to target bar.





**Figure 48 – Distance to target**

- 8.2.2.1.5 A column of 4 x 191 (w x h) cells horizontally centred in area A3 and vertically positioned at the bottom of A3 shall be left empty.
- 8.2.2.1.6 A logarithmic distance scale shall be displayed on the left hand side of the 'empty' cells of the area A3 from 0 to 1000 metres. The interpolation between 0 and 100 m shall be linear. At each of the positions defined in Table 12, a distance indicator line shall be drawn. For 0, 500 and 1000 metres, the distance indicator lines shall be drawn horizontally with a width of 2 cells and a length of 13 cells. The other lines shall be shorter distance indicator lines with a width of 1 cell and a length of 9 cells. The distance indicator lines shall be aligned to the right and shall be grey.

Distance indicator line	position from bottom of A3 in cells
1000	190/191 (2 cells width)
900	184
800	177
700	168
600	158
500	144/145 (2 cells width)
400	131
300	111
200	85

Distance indicator line	position from bottom of A3 in cells
100	38
0	4/5 (2 cells width)

**Table 12 – logarithmic distance scale for the target distance bar**

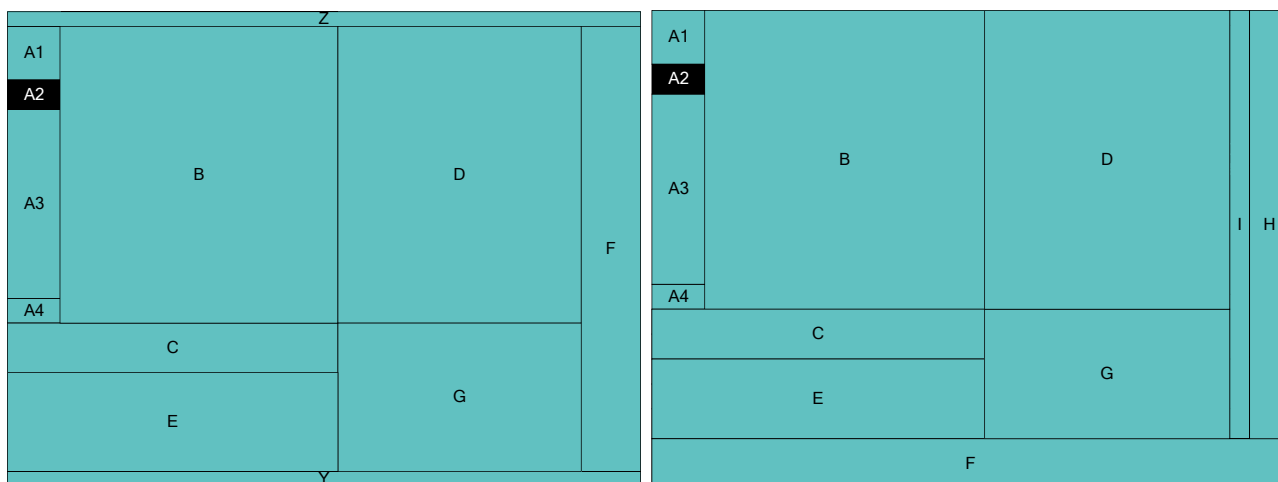
- 8.2.2.1.7 The target distance shall be indicated by a vertical rectangular bar with a width of 10 cells on the right hand side of the ‘empty’ cells of the area A3 indicating the remaining distance to the target. The vertical rectangular bar shall display distances from 0 to maximum 1000 metres as specified by the logarithmic distance scale. For distances above 1000 metres, the vertical rectangular bar shall display 1000 metres.
- 8.2.2.1.8 The distance to target bar and the distance scale shall be shown in A3 as specified in Table 13.

Mode	Supervision Status		Distance to target bar
FS	CSM	AIIS	no
	PIM	AIIS	yes
	TSM	AIIS	yes
	RSM	AIIS	yes
RV	-	AIIS	yes
SB / SH / UN / PT / TR / NL / OS / SR	-	AIIS	no

**Table 13 – Conditions for display of the distance to target bar and of the distance scale**

### 8.2.2.2 Distance to target digital

- 8.2.2.2.1 This DMI object shows the remaining distance to target digital.
- 8.2.2.2.2 The distance to target digital shall be displayed in area A2 (see Figure 49).



**Figure 49 – Area for distance to target digital**

- 8.2.2.2.3 Figure 48 gives an example of the distance to target digital.



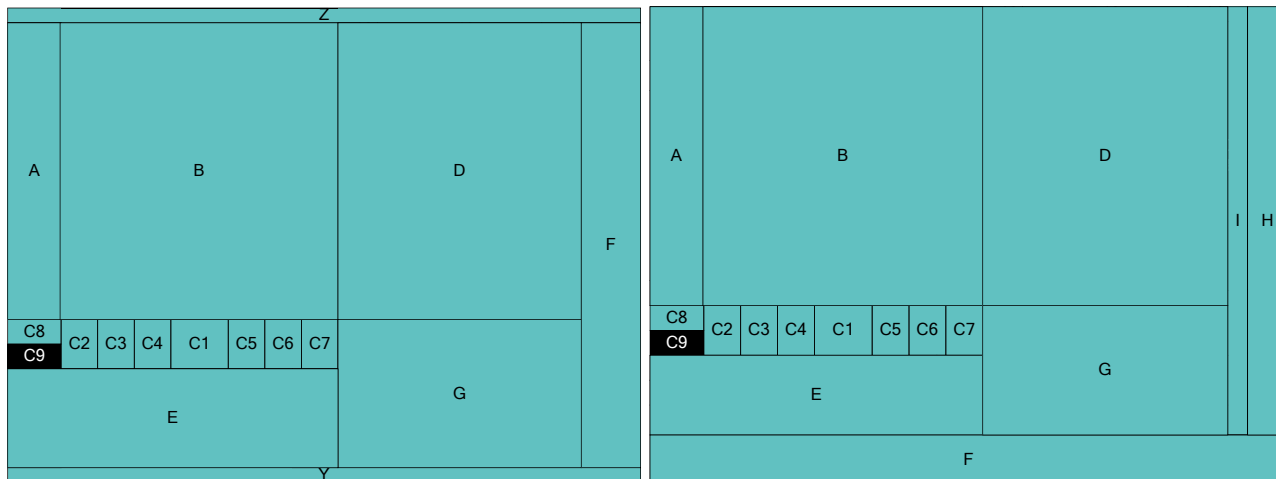
- 8.2.2.2.4 The distance to target digital shall be able to show up to 5 digits. These numbers shall be right aligned with an indent of 10 cells.
- 8.2.2.2.5 This digital representation shall be vertically centred in A2.
- 8.2.2.2.6 It shall show a number in grey to the nearest unit of 10 (rounding).
- 8.2.2.2.7 The distance to target digital shall be shown in A2 as specified in Table 14.

Mode	Supervision Status		Distance to target digital
FS / OS / SR*	CSM	AIIS	no
	PIM	AIIS	yes
	TSM	AIIS	yes
	RSM (not applicable for SR)	AIIS	yes
RV	-	AIIS	yes
SB / SH / UN / PT / TR / NL	-	AIIS	no
* for OS/SR, the target distance is shown if driver has requested to display it (toggle on) (see section 8.2.2.4 for the toggling function)			

**Table 14 – Conditions for display of the distance to target digital**

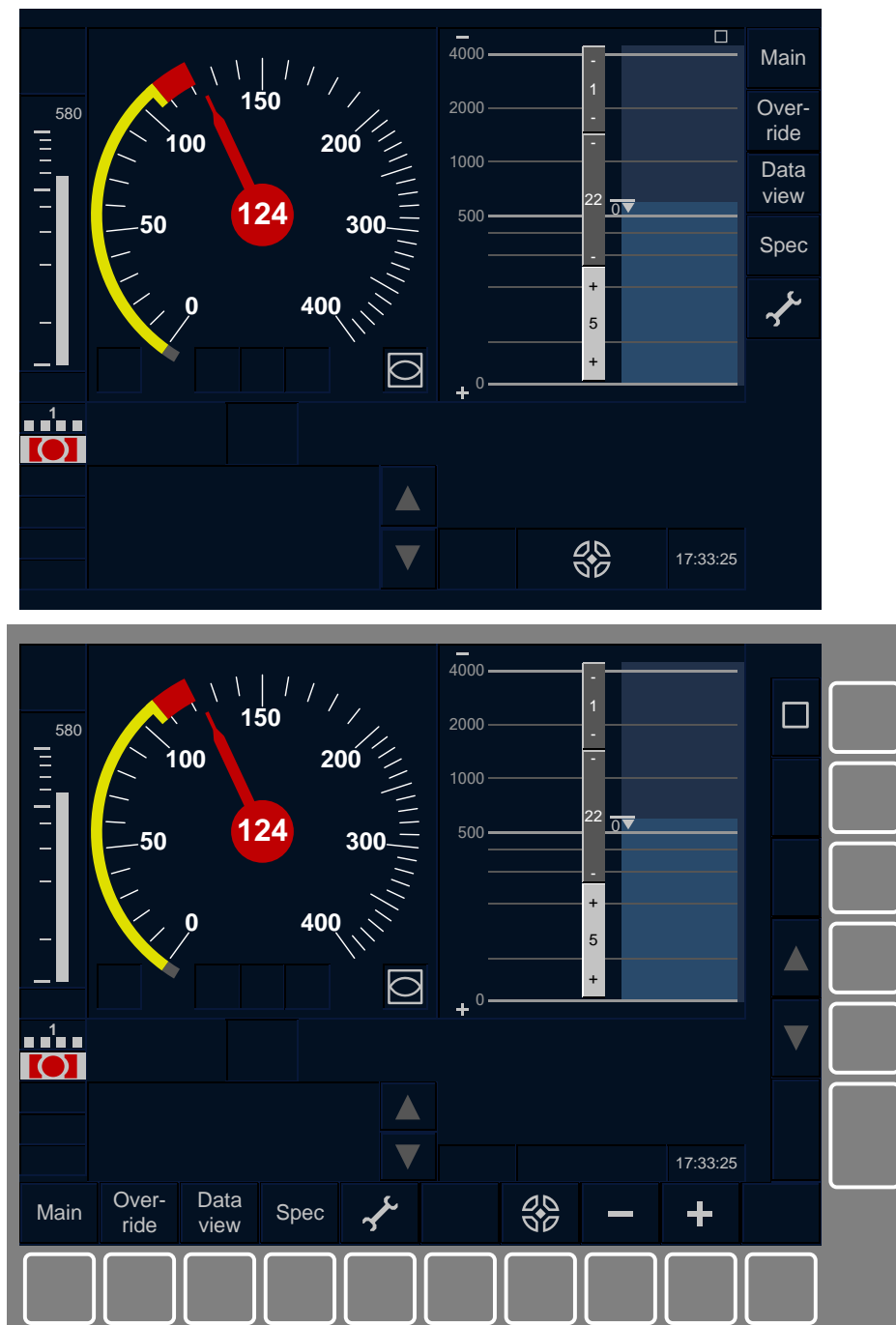
### 8.2.2.3 Emergency/Service Brake Intervention

- 8.2.2.3.1 This DMI object shows that ERTMS/ETCS is commanding the brakes.
- 8.2.2.3.2 The emergency/service brake intervention shall be displayed in area C9 (Figure 50).



**Figure 50 – Area for brake intervention symbol**

- 8.2.2.3.3 The symbol ST01, see section 11, shall be used.

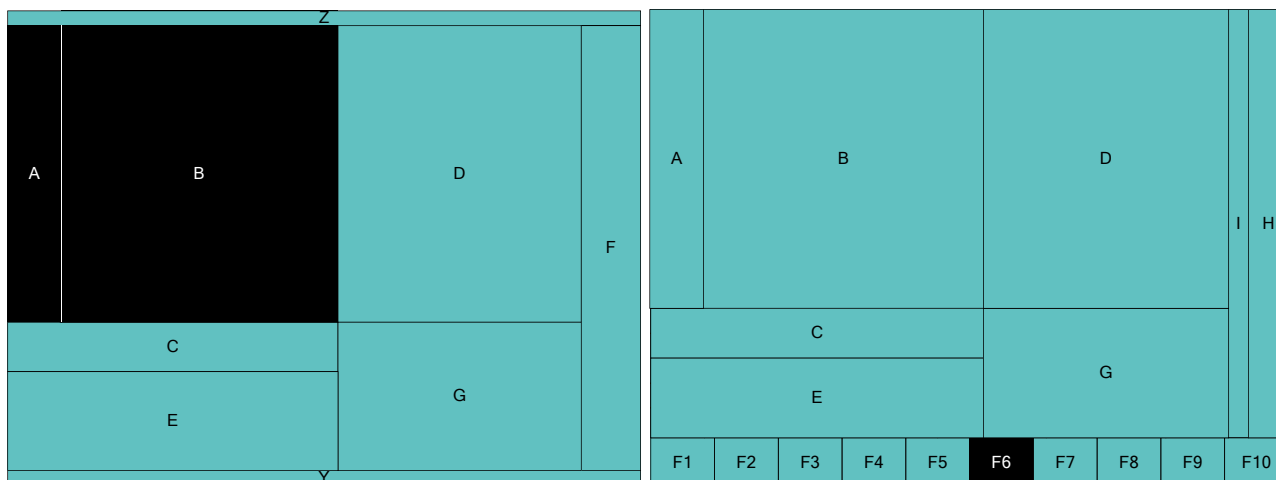


**Figure 51 – Brake intervention**

- 8.2.2.3.4 If the release of the intervention is to be acknowledged by the driver, the requirements specified in 5.4 shall apply for the symbol ST01.
- 8.2.2.3.5 When using the touch screen technology, the sensitive area of C9 shall be extended to the C8 and E1 areas. The frame shall only surround the C9 area.
- 8.2.2.3.6 When the brake intervention is automatically released, sound Sinfo shall be executed.
- 8.2.2.3.6.1 Note: when a driver's acknowledgement is required to release the brake, Sinfo is already played (see section 5.4) to draw the driver's attention to this acknowledgement.

#### **8.2.2.4 Toggling function for speed information**

- 8.2.2.4.1 These DMI objects allow the driver to toggle on and off speed information displayed in areas A and B. The toggling function is located respectively in A/B (touch screen technology) and F6 (soft key technology) (see Figure 52).



**Figure 52 – Areas for toggling function of speed/distance information**

- 8.2.2.4.2 When using touch screen technology: If the onboard is in one of the modes identified in the Table 15, the areas A and B shall become sensitive to allow the driver to toggle on and off the display of all concerned objects (see Table 15) for that mode.
- 8.2.2.4.3 When using soft keys technology: If the onboard is in one of the modes identified in the Table 15, F6 shall be an enabled up-type button showing the symbol DR01 to allow the driver to toggle on and off the display of all concerned objects (see Table 15) for that mode.
- 8.2.2.4.4 In all other modes (not mentioned in Table 15), the toggling function shall be inactive. For touch screen, the A/B areas shall not be sensitive and for the soft key technology, no button shall exist in F6 for the toggling function.

Mode	Concerned Object
OS	Speed indication for partial supervision
	Release speed digital
	Distance to target (digital)
SR	Speed indication for partial supervision
	Distance to target (digital)
SR / SH / RV	Speed indication for partial supervision

**Table 15 – Objects concerned by the toggling function**

- 8.2.2.4.5 When the onboard enters one of the modes identified in Table 15, the display of the concerned objects shall be automatically toggled off.

## 8.2.3 Supplementary Driving Information

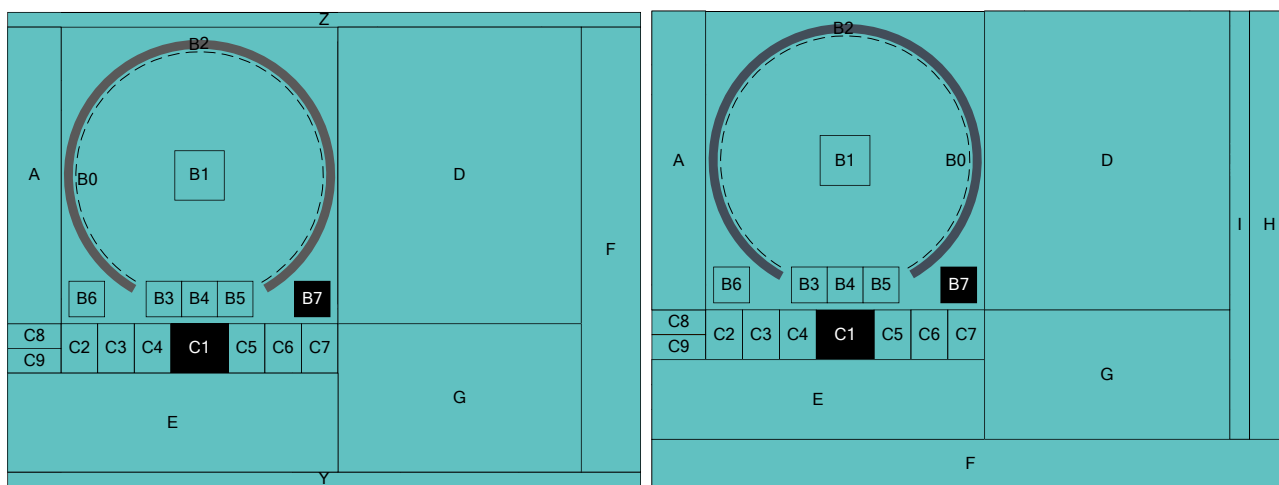
### 8.2.3.1 Mode information

8.2.3.1.1 Mode information consists of three elements:

- a) the ERTMS/ETCS current mode;
- b) a mode acknowledgement is requested;
- c) the override symbol is displayed, to inform the driver that the override function is active.

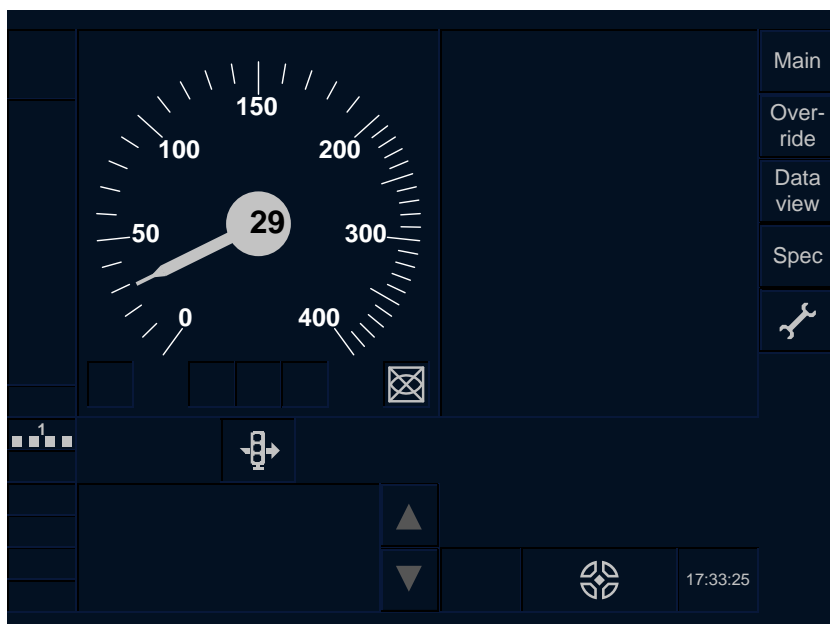
8.2.3.1.2 The current ERTMS/ETCS active modes shall be displayed in B7 (see Figure 53) by using the following symbols defined in section 11: symbols MO01, MO04, MO06, MO07, MO09, MO11, MO12, MO13, MO14, MO16 or MO18.

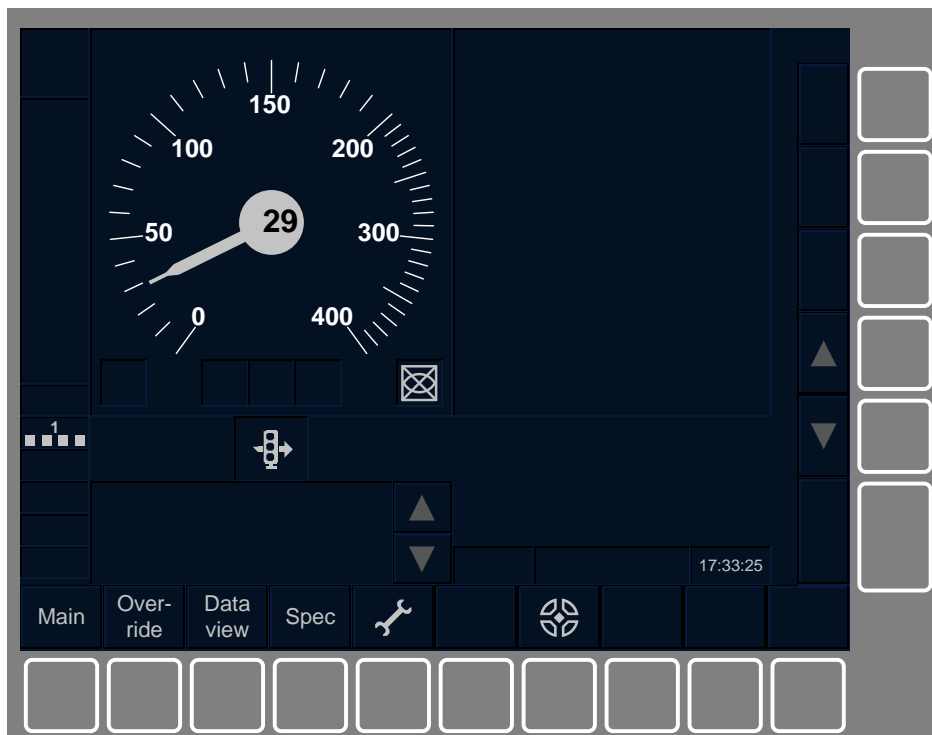
8.2.3.1.3 The mode acknowledgement and the override symbol shall be displayed in area C1 (see Figure 53) by using the following symbols defined in section 11: symbols MO02, MO03 (override), MO05, MO08, MO10, MO15, MO17 or MO20.



**Figure 53 – Areas for mode information (active and acknowledgment)**

8.2.3.1.4 Figure 54 shows an example of an active mode symbol in B7 and the override symbol in C1.





**Figure 54 – Mode information**

8.2.3.1.5 For the symbols displayed in C1 showing a mode to be acknowledged (i.e. all symbols except MO03), the requirements specified in 5.4 shall apply.

8.2.3.1.6 Symbol MO03 (active override) shall always be shown as long as the override function is activated.

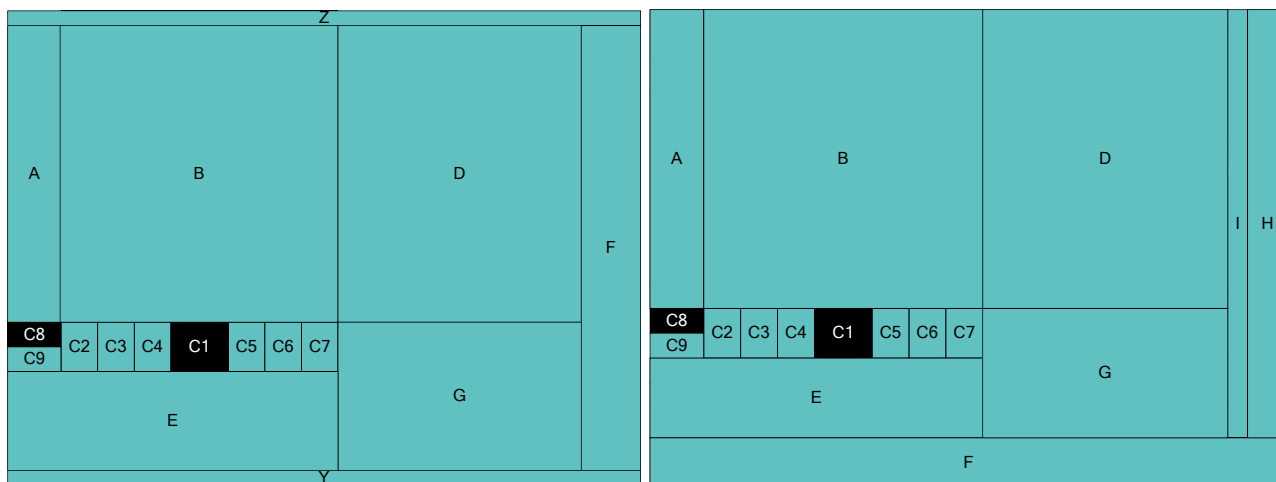
### **8.2.3.2 Level information**

8.2.3.2.1 Level information consists of three elements:

- a) the current ERTMS/ETCS level ;
- b) an ERTMS/ETCS level announcement with acknowledgement;
- c) an ERTMS/ETCS level announcement.

8.2.3.2.2 When the current ERTMS/ETCS level is valid and equal to 0, 1, 2 or 3, it shall be displayed in area C8 (see Figure 55).

8.2.3.2.3 If the current ERTMS/ETCS level is unknown or invalid, no DMI object shall be displayed in area C8.



**Figure 55 – Areas for level information**

- 8.2.3.2.4 The symbol LE01, LE03, LE04, LE05 shall be used (see section 11), depending on the current ERTMS/ETCS level.
- 8.2.3.2.5 An ERTMS/ETCS level announcement and an ERTMS/ETCS level announcement with acknowledgement shall be displayed in area C1 (see Figure 55).
- 8.2.3.2.6 If no acknowledgement is required for the ERTMS/ETCS level announcement, the symbol LE06, LE08, LE10, LE12 or LE14 (see section 11) shall be used, depending on the ERTMS/ETCS level announcement.
- 8.2.3.2.7 If an acknowledgement is required for the ERTMS/ETCS level announcement, the symbol LE07, LE09, LE11, LE13, LE15 (see section 11) shall be used, depending on the next ERTMS/ETCS level announcement. For these symbols, the requirements specified in 5.4 shall apply. Once the ERTMS/ETCS level announcement has been acknowledged, the symbol LE06, LE08, LE10, LE12 or LE14 (see section 11) shall replace respectively LE07, LE09, LE11, LE13, LE15.
- 8.2.3.2.8 For STM level, the distinct abbreviation of the corresponding STM (e.g. KVB, PZB, ASFA etc.) shall be displayed instead of the text “STM” as shown in symbol LE02, LE08, LE09.
- 8.2.3.2.9 The space used for characters of the STM abbreviation shall not exceed an area of 48 x 19 (w x h) cells in the C8 and shall comply with the minimum size of characters as defined in 5.1.2.

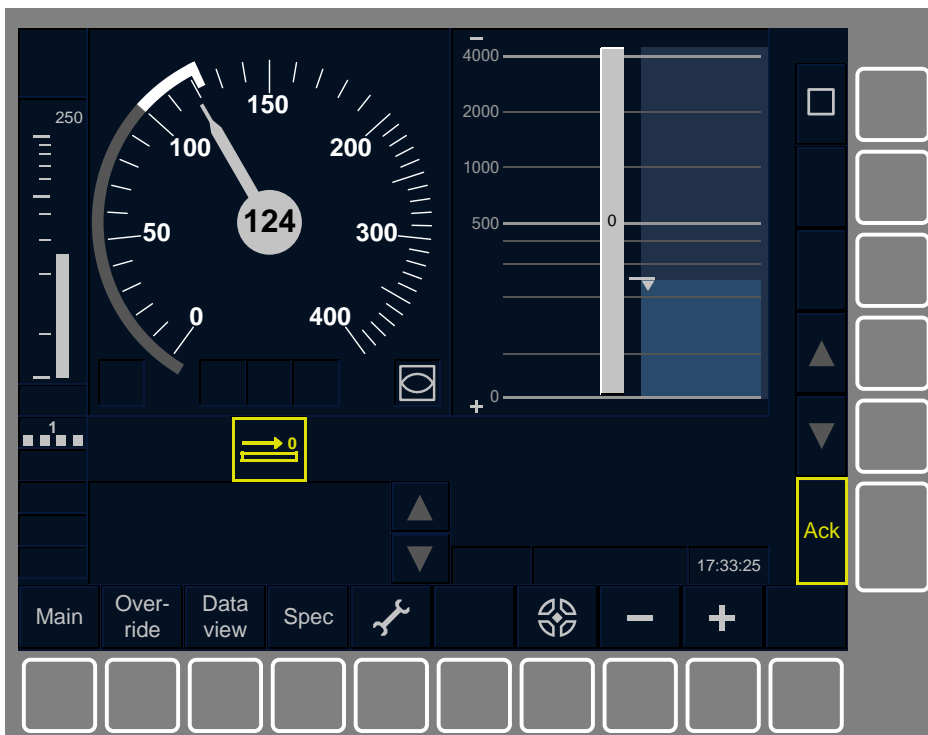
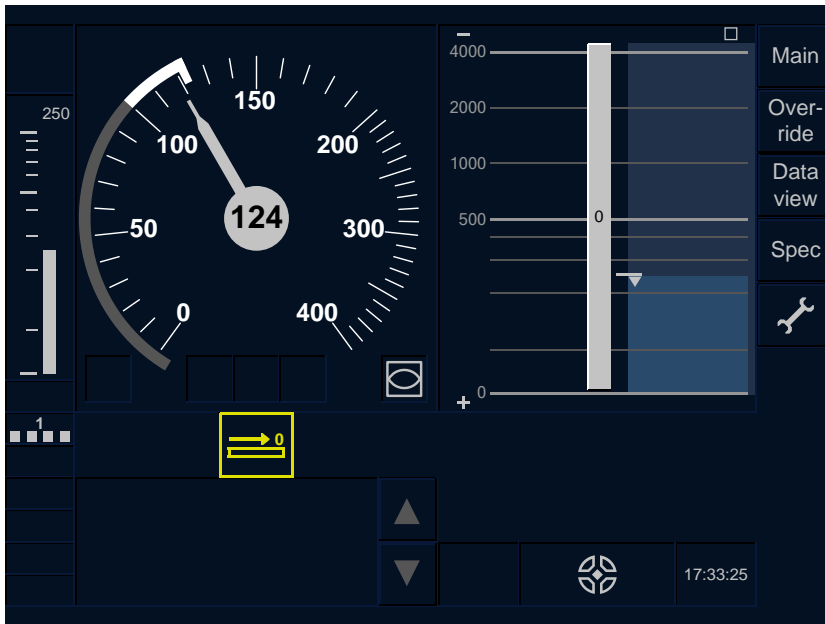
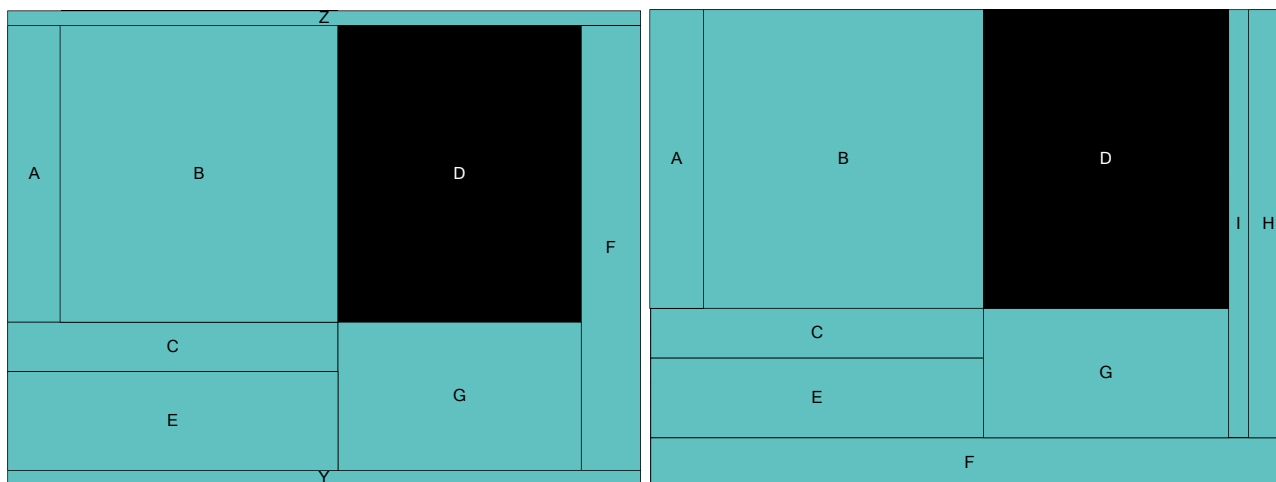


Figure 56 – Level information

### 8.2.3.3 Track Ahead Free information

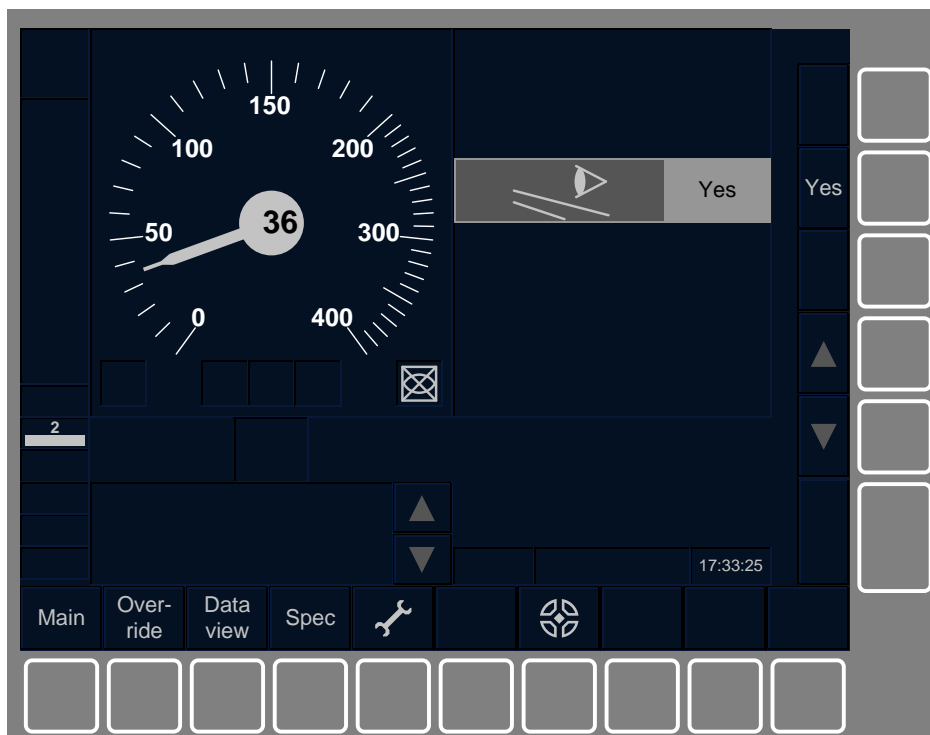
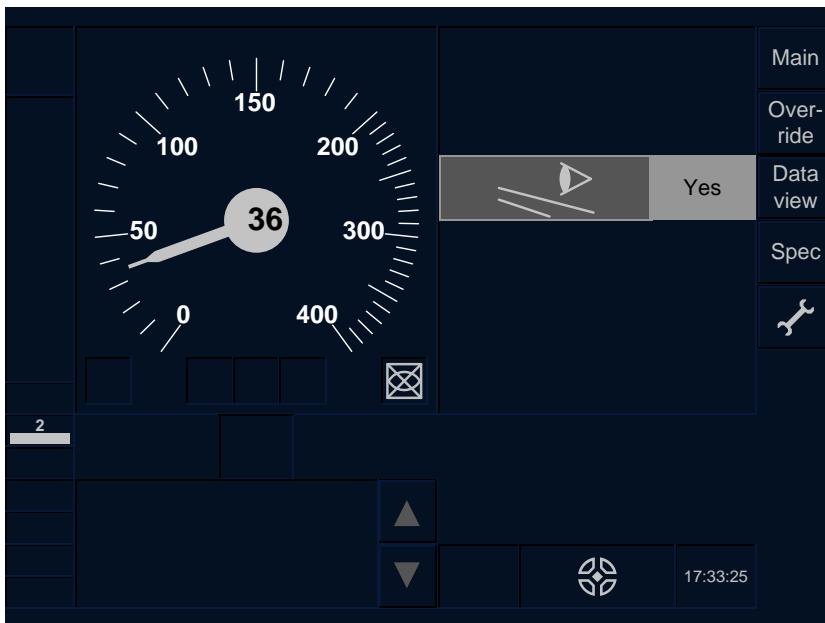
8.2.3.3.1 The track ahead free information shall be displayed in area D (see Figure 57).



**Figure 57 – Area for track ahead free information**

- 8.2.3.3.2 The track ahead free information shall be displayed via a question box.
- 8.2.3.3.3 The height of the question box shall be 50 cells.
- 8.2.3.3.4 The width of the total question box shall be 244 cells.
- 8.2.3.3.5 The top of the question box shall be positioned 100 cells below the top of the D area.
- 8.2.3.3.6 The question box shall be divided into a question part and an answer part.
- 8.2.3.3.7 The width of the question part shall be 162 cells.
- 8.2.3.3.8 The question part shall be placed to the left of the answer part.
- 8.2.3.3.9 The symbol DR02 defined in section 11 shall be displayed centred in the question part. The background colour of the question part shall be dark grey.
- 8.2.3.3.10 The answer part shall be display the label 'Yes' in black. The background colour of the answer part shall be medium grey.
- 8.2.3.3.11 When using touch screen technology, the answer part shall be an up-type enabled button.
- 8.2.3.3.12 When using soft key technology, H3 displaying the label 'Yes' shall be the soft key associated to the answer part.
- 8.2.3.3.13 The question part and the 'Yes' button (i.e. the answer part) shall both have the same borders as an input field applying 5.1.1.1.4.
- 8.2.3.3.14 Figure 58 shows an example of the track ahead free symbol in D.





**Figure 58 – Track Ahead Free information**

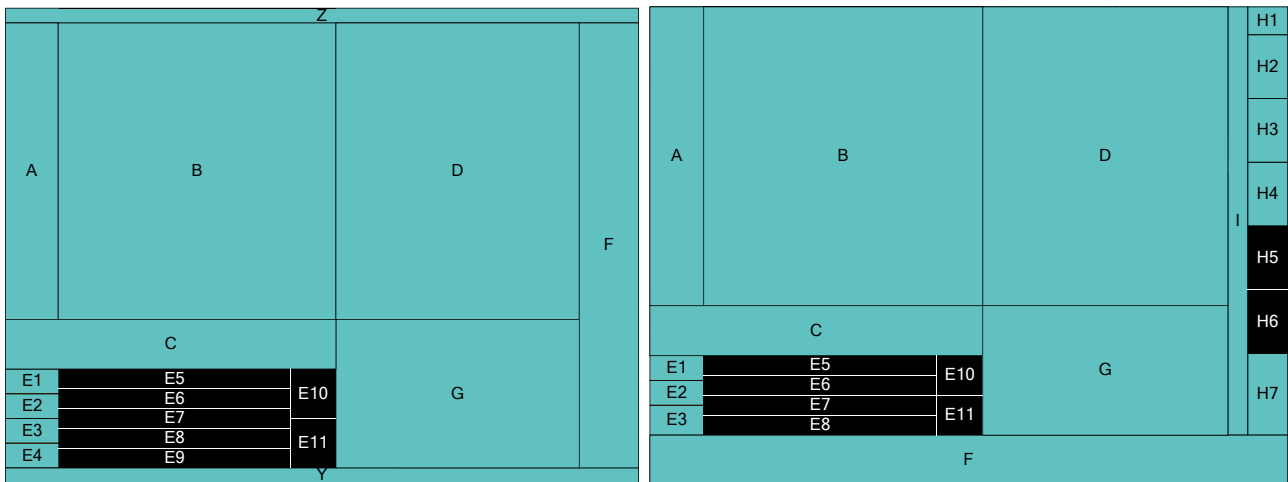
#### **8.2.3.4 Text messages**

8.2.3.4.1 This DMI object displays the plain/fixed text messages received from trackside, the operational text messages specified in 13 and the new traction system.

8.2.3.4.1.1 Note: the exact text displayed for the new traction system is outside of the scope of this specification. It is recommended that this text matches the text on the selector switch related to the traction system.

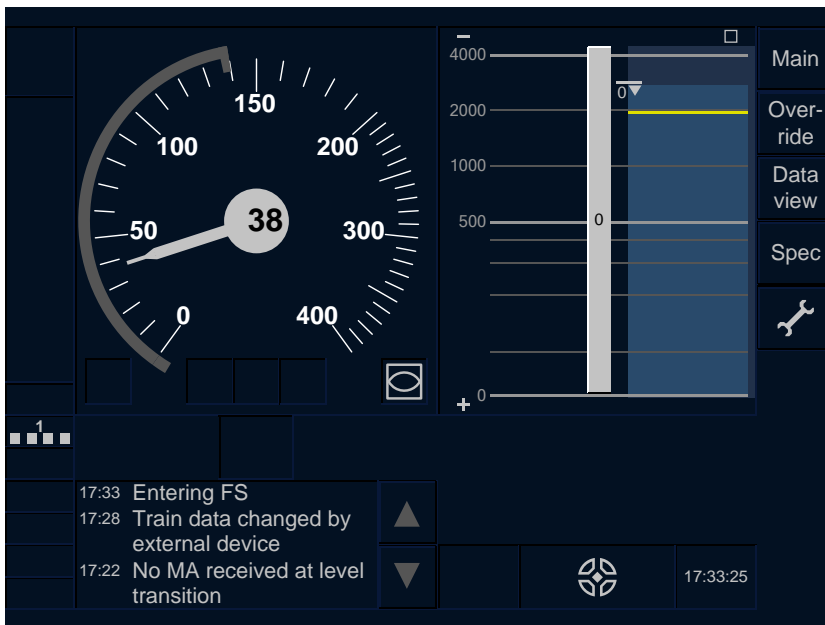
8.2.3.4.2 When using touch screen technology, the text messages shall use the areas E5 – E11 (see Figure 59).

8.2.3.4.3 When using soft key technology, the text messages shall use the areas E5 – E11 and H5-H6 (see Figure 59).



**Figure 59 – Areas for text messages**

8.2.3.4.4 Figure 60 shows an example of the presentation of text messages.



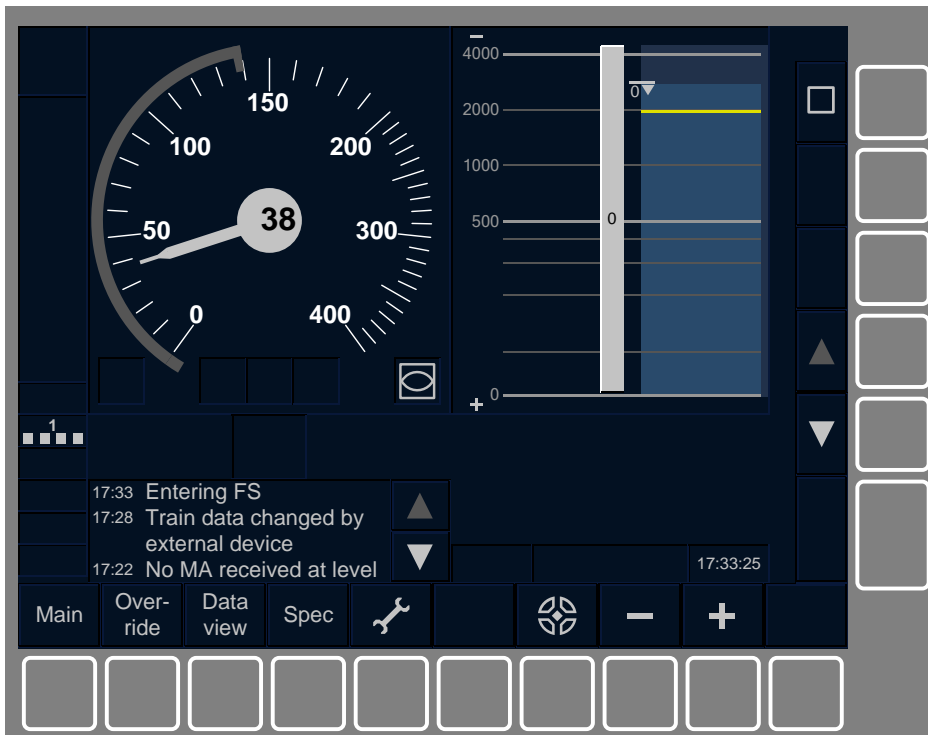
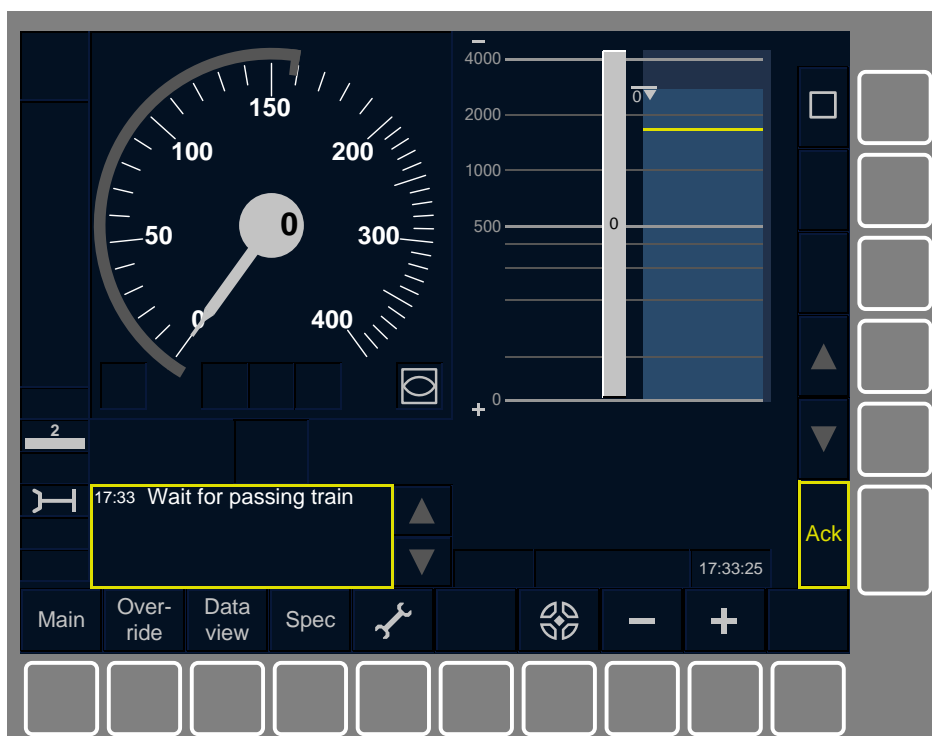


Figure 60 - Text messages

8.2.3.4.5 Figure 61 shows an example of a text message to be acknowledged.





**Figure 61 - Text message to be acknowledged**

8.2.3.4.6 The following applies to all text messages:

- a) The text messages shall be presented in white colour.
- b) The local time of appearance shall be attached to the first line of a displayed text message. It shall be separated from the first character of the displayed text by an indent of 10 cells. This local time shall be in the format 'hh:mm' with a 24 hours time reference.
- c) If a text message does not fit in one area, it shall continue inside the next area (i.e. the text message will be composed of several lines). The next lines shall be aligned with the first character of the displayed text (see Figure 60).

8.2.3.4.7 The following applies to text messages that do not have to be acknowledged:

- a) The text messages shall be divided into two groups. The first group shall contain the operational text messages, the text for the new traction system and the important plain/fixed text messages received from trackside. The second group shall contain the auxiliary plain/fixed text messages received from trackside.
- b) The text messages of the first group shall be displayed above the text messages of the second group.
- c) The text messages of the first group shall be presented with characters in bold style. The text messages of the second group shall be presented with characters in regular style.
- d) The text messages belonging to the same group shall be classified in a chronological way; the newest text message being displayed on top of the group.
- e) It shall be possible to scroll the list of text messages. The scrolling function shall not be circular i.e. the first text message shall not scroll to the last one and vice-versa.

- f) When using touch screen technology, to scroll through the list of text messages the area E10 shall be dedicated to the [Up] button, the area E11 shall be dedicated to [Down] button.
- g) When using soft keys technology, to scroll through the list of text messages the H5 shall be dedicated to the [Up] button and H6 shall be dedicated to the [Down] button. The symbols NA13, NA15 and NA14, NA16 shall echo the [Up] and [Down] buttons respectively in E10 and E11.
- h) Sound Sinfo, see section 12, shall be used when a new text message of the first group is displayed for the first time. No sound shall be used when a new text message of the second group is displayed for the first time.

8.2.3.4.8 The following applies only to text messages to be acknowledged regardless of the group they belong to:

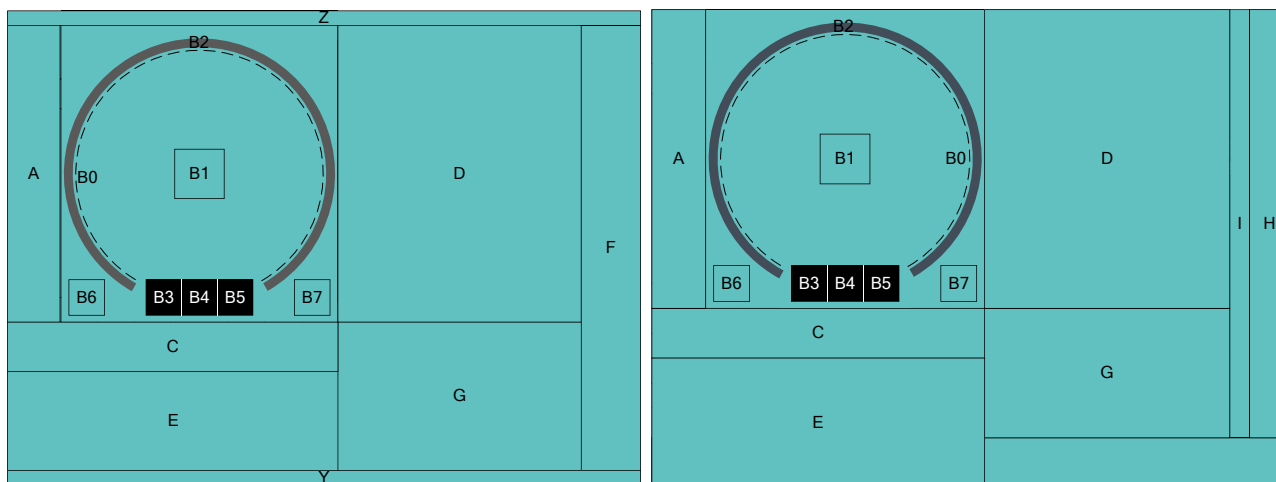
- a) A text message to be acknowledged shall be presented alone (see Figure 61) (the other messages that do not have to be acknowledged are temporarily not shown) in the E5-E9 (touch screen) or E5-E8 (soft key) area.
- b) As long as an ACK is required, the requirements specified in 5.4 shall apply on the full area formed by E5-E9 (touch screen) or E5-E8 (soft keys); E10 and E11 shall show respectively the symbols NA15 and NA16.
- c) After acknowledgement, the corresponding text message shall be managed as a text message that do not have to be acknowledged but without playing the sound Sinfo.

#### **8.2.3.5 Orders and announcements of track conditions**

8.2.3.5.1 This DMI object displays orders and announcement of track conditions, e.g. lowering the pantograph.

8.2.3.5.2 The orders and announcements of track conditions shall be displayed in area B3/4/5 (see Figure 62).

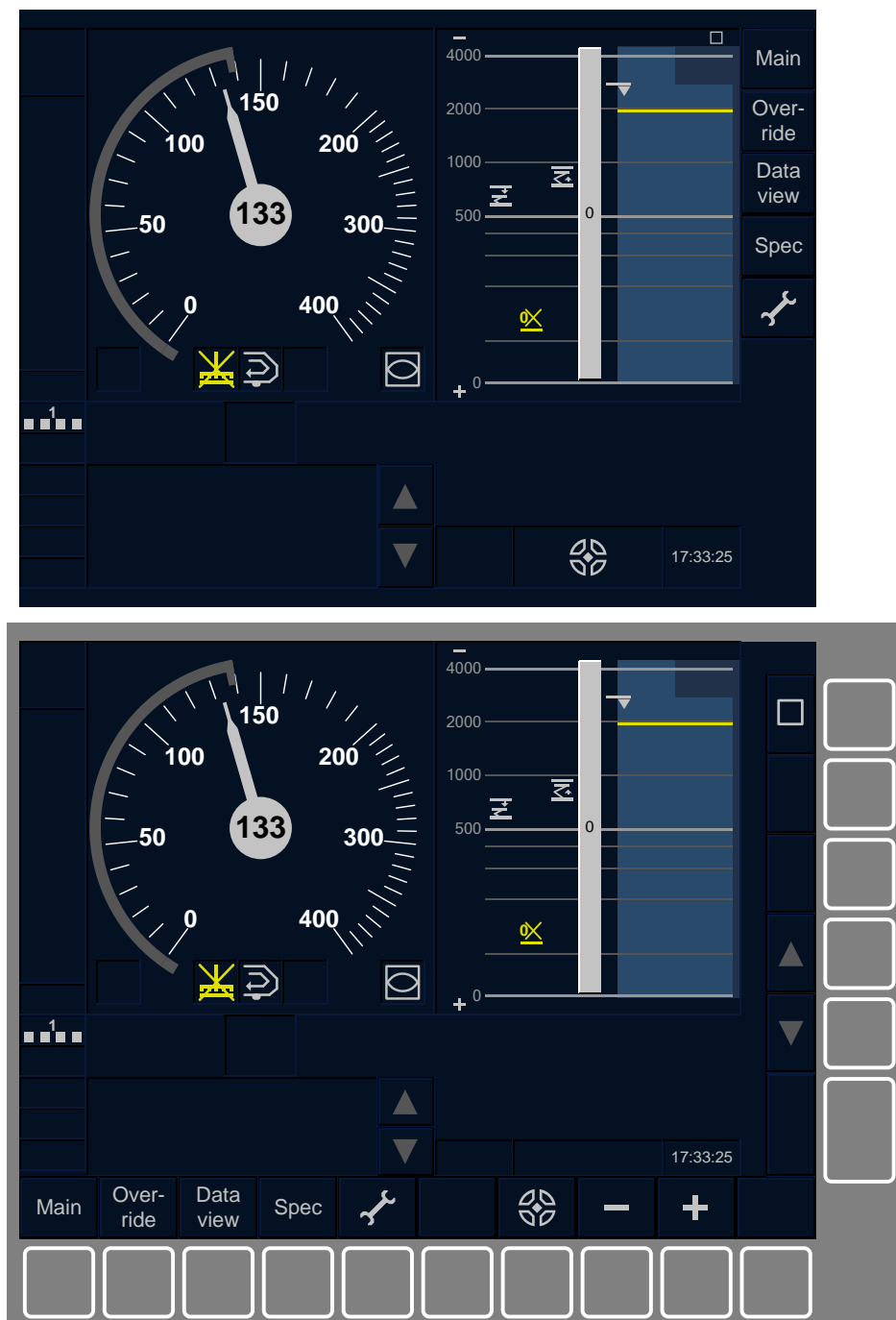
8.2.3.5.3 The placement of the orders and announcements is from left to right filling B3/4/5. When an area is already displaying a symbol, the next area shall be used. When all areas are already displaying symbols, any further order or announcement to be displayed shall wait that B3, B4 or B5 is free.



**Figure 62 – Areas for orders and announcement of track conditions**

- 8.2.3.5.4 The symbols TC19, TC20, TC21, TC22 shall be used to order “open air conditioning intake”, “close air conditioning intake”; symbols TC19, TC20 to indicate an automatic execution, symbols TC21, TC22 when the driver is requested to act.
- 8.2.3.5.5 The symbols TC02, TC03 shall be used to order “Lower pantograph”; symbol TC02 to indicate an automatic execution, symbol TC03 when the driver is requested to act.
- 8.2.3.5.6 The symbol TC01 shall be used to order “Pantograph lowered”.
- 8.2.3.5.7 The symbols TC04, TC05 shall be used to order “Raise pantograph”; symbol TC04 to indicate an automatic execution, symbol TC05 when the driver is requested to act.
- 8.2.3.5.8 The symbols TC06, TC07 shall be used to order “Neutral section announcement”; symbol TC06 to indicate an automatic execution, symbol TC07 when the driver is requested to act.
- 8.2.3.5.9 The symbol TC06 shall be used to order “Neutral section”.
- 8.2.3.5.10 The symbols TC08, TC09 shall be used to order “End of Neutral section”; symbol TC08 to indicate an automatic execution, symbol TC09 when the driver is requested to act.
- 8.2.3.5.11 The symbol TC10, TC11 shall be used respectively to indicate “Non Stopping area” and “Non Stopping area announcement”.
- 8.2.3.5.12 The symbol TC12 shall be used to indicate “Radio hole”.
- 8.2.3.5.13 The symbols TC13, TC14 shall be used to order “inhibition of magnetic shoe brakes”; symbol TC13 to indicate an automatic execution, symbol TC14 when the driver is requested to act.
- 8.2.3.5.14 The symbols TC15, TC16 shall be used to order “inhibition of eddy current brakes”; symbol TC15 to indicate an automatic execution, symbol TC16 when the driver is requested to act.

- 8.2.3.5.15 The symbols TC17, TC18 shall be used to order “inhibition of regenerative brakes”; symbol TC17 to indicate an automatic execution, symbol TC18 when the driver is requested to act.
- 8.2.3.5.16 Note: When there is a track condition involving a change of traction power, the display of the new traction system is handled via text messages, see 8.2.3.4.
- 8.2.3.5.17 Figure 63 gives an example of the presentation of orders and announcements in area B3/4/5.

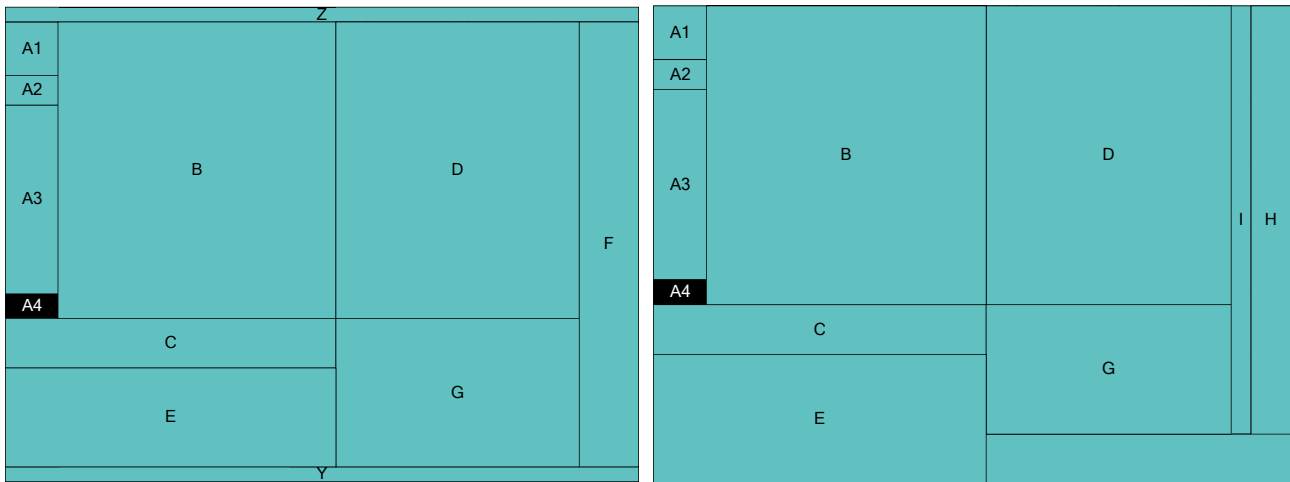


**Figure 63 – orders and announcement of track conditions**

#### **8.2.3.6 Adhesion Factor Indication**

8.2.3.6.1 This DMI object shows that the adhesion factor is set to “slippery rail”.

8.2.3.6.2 The adhesion factor “slippery rail” shall be displayed in area A4 (Figure 64).



**Figure 64 – Area for adhesion factor**

8.2.3.6.3 The symbol ST02, see Figure 65, shall be used.





Figure 65 – Adhesion Factor “slippery rail”

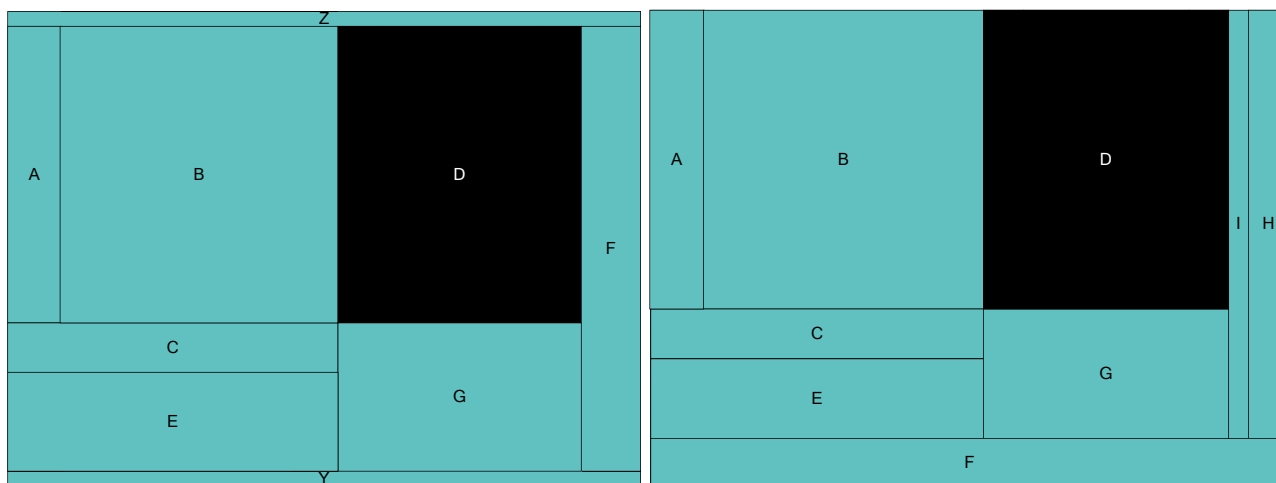
## 8.3 Planning Information

### 8.3.1 General description

8.3.1.1 The planning information shall be shown in area D (see Figure 66) according to the following conditions:

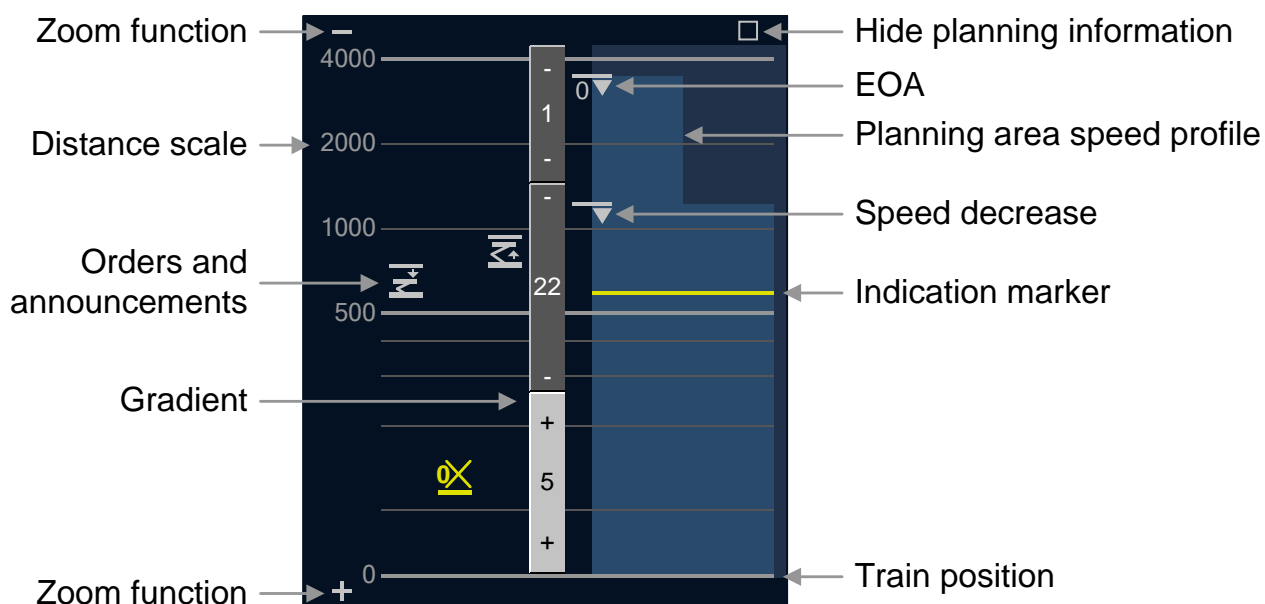
- it is available, and
- the current mode is FS, and
- its status is “show planning information” (see 8.3.8)

8.3.1.1.1 Note: The planning information is considered as not available if the onboard is configured such that the objects of the planning information are permanently disabled. The choice of enabling / disabling the planning information is only train operator dependent, not an ERTMS/ETCS implementation issue.



**Figure 66 – Area for planning information**

8.3.1.2 Figure 67 gives an overview of the main elements of the planning information



**Figure 67 – Main elements of the planning information**

8.3.1.3 The planning information shall have the following objects:

- a) distance scale
- b) orders and announcements of track conditions
- c) gradient profile
- d) speed profile discontinuities
- e) Planning Area Speed Profile (PASP) for the driver
- f) indication marker
- g) hide and show planning information

h) zoom function

- 8.3.1.4 When the current mode is not FS, the navigation buttons/sensitive areas related to the zoom function and to the show/hide planning information shall not exist.

### 8.3.2 Distance scale

- 8.3.2.1 This DMI object displays the distance scale of the planning information in D1-D7. It affects all functions with distance related information.

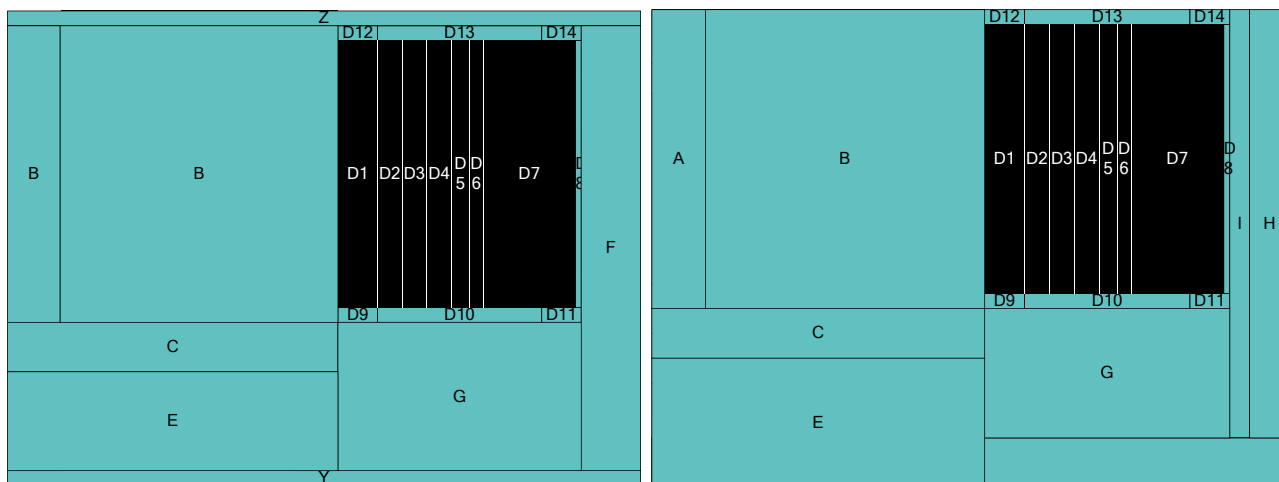
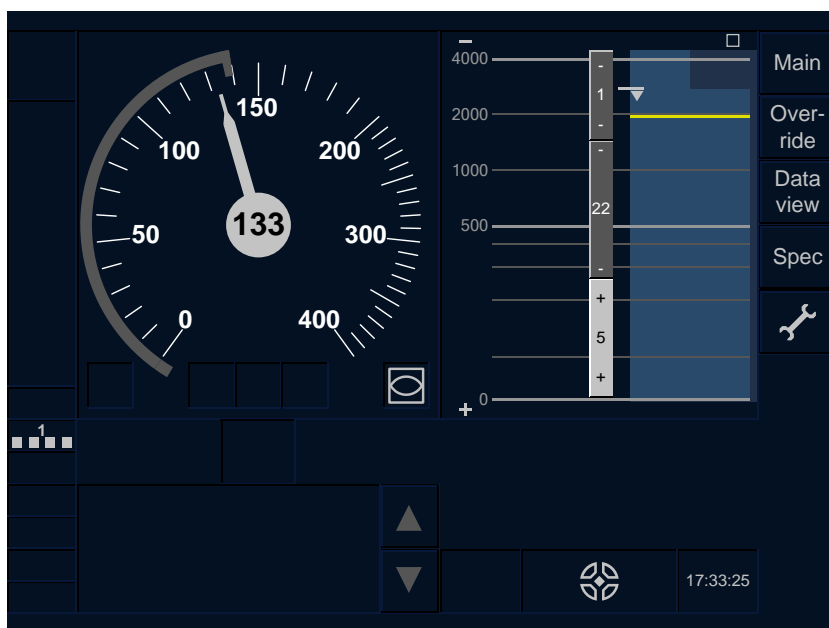
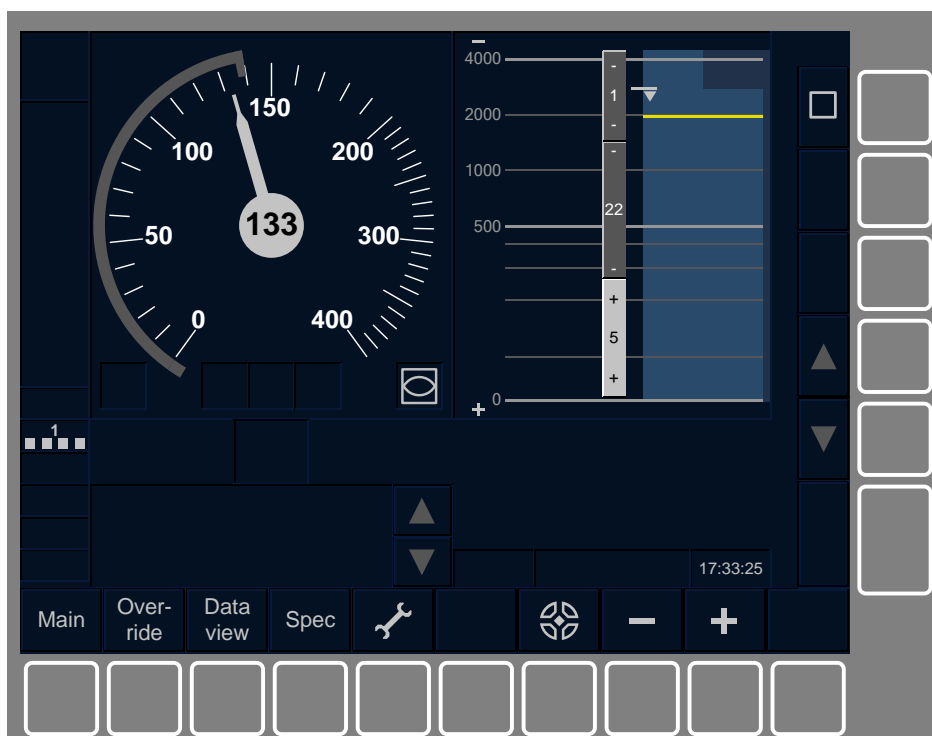


Figure 68 – area for the distance scale





**Figure 69 – Distance scale**

- 8.3.2.2 A logarithmic distance scale shall be displayed.
- 8.3.2.3 The interpolation between 0 and the next distance scale line shall be linear (see Table 16).
- 8.3.2.4 There shall be 6 ranges available: from 0 to 1 000 m, from 0 to 2 000 m, from 0 to 4 000 m, from 0 to 8 000 m, from 0 to 16 000 and from 0 to 32 000 m. Depending on the selected range, the distance scale shall display the numbers and distance scale lines as described in Table 16:

Range	Displayed Numbers	Displayed distance scale lines
0 – 1000	0, 125, 250, 500, 1000	0, 25, 50, 75, 100, 125, 250, 500, 1000
0 – 2000	0, 250, 500, 1000, 2000	0, 50, 100, 150, 200, 250, 500, 1000, 2000
0 – 4000	0, 500, 1000, 2000, 4000	0, 100, 200, 300, 400, 500, 1000, 2000, 4000
0 – 8000	0, 1000, 2000, 4000, 8000	0, 200, 400, 600, 800, 1000, 2000, 4000, 8000
0 – 16000	0, 2000, 4000, 8000, 16000	0, 400, 800, 1200, 1600, 2000, 4000, 8000, 16000
0 – 32000	0, 4000, 8000, 16000, 32000	0, 800, 1600, 2400, 3200, 4000, 8000, 16000, 32000

**Table 16 – Ranges of Distance scale**

8.3.2.5 The last stored distance scale shall be used when opening the desk. In case no distance scale is stored onboard, the 0 – 4000 range shall be used as the default distance scale.

8.3.2.6 9 distance scale lines with a length of 200 cells shall be displayed crossing the areas D2 to D7 and shall be positioned as specified in Table 17. From bottom to top: the first, the sixth and the ninth distance scale lines shall have a 2 cells width, the others shall have a 1 cell width.

Distance scale line	position from bottom of A3 in cells
1 <sup>st</sup>	-1/0 (2 cells width)
2 <sup>nd</sup>	33
3 <sup>rd</sup>	77
4 <sup>th</sup>	102
5 <sup>th</sup>	120
6 <sup>th</sup>	133/134 (2 cells width)
7 <sup>th</sup>	177
8 <sup>th</sup>	220
9 <sup>th</sup>	262/263 (2 cells width)

**Table 17 –Distance scale lines for the planning information**

8.3.2.7 The scale numbers shall be medium grey and vertically centred on the distance scale lines and aligned on the right of area D1. The 2 cell width distance scale lines shall be in medium grey, the 1 cell width distance scale lines in dark grey.

8.3.2.7.1 Note: for the number 0, half of this number will be in D9.

### **8.3.3 Orders and announcements**

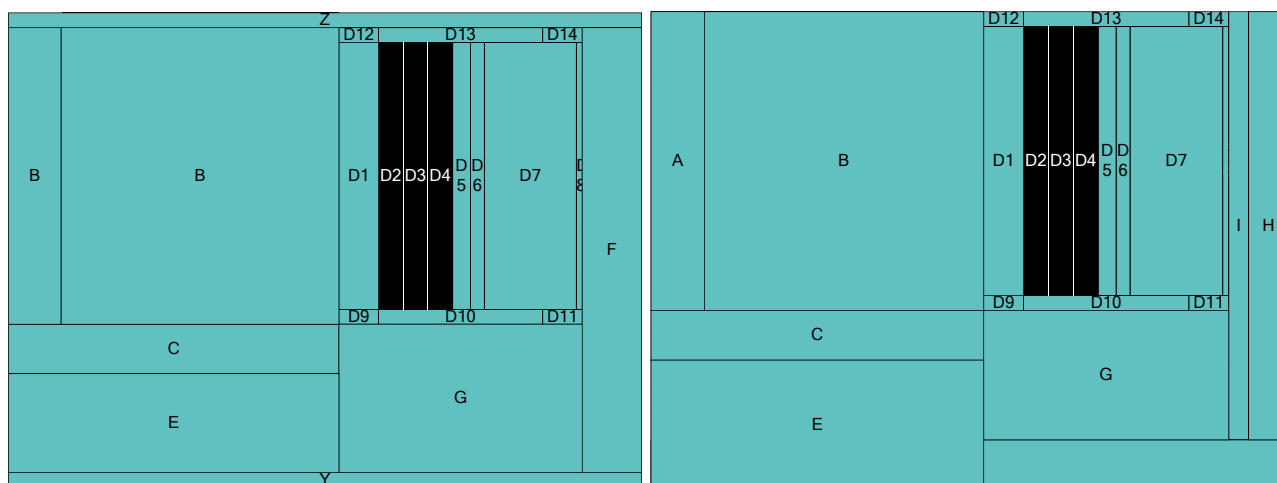
8.3.3.1 This DMI object has the capability to show all the orders and announcements which are known by the onboard and within the distance range selected by the driver for the planning information and within the movement authority.

8.3.3.2 The orders and announcements overview shall be displayed in area D2/D3/D4 (see Figure 70).

8.3.3.3 The symbols PL17, PL18, PL19, PL20 shall be used to show the forthcoming orders “open air conditioning intake”, “close air conditioning intake”; symbols PL17, PL18 to indicate an automatic execution, symbols PL19, PL20 when the driver is requested to act.

8.3.3.4 The symbols PL01, PL02 shall be used to show the forthcoming orders “Lower pantograph”; symbol PL01 to indicate an automatic execution, symbol PL02 when the driver is requested to act.

- 8.3.3.5 The symbols PL03, PL04 shall be used to show the forthcoming orders “Raise pantograph”; symbol PL03 to indicate an automatic execution, symbol PL04 when the driver is requested to act.
- 8.3.3.6 The symbols PL05, PL06 shall be used to show the forthcoming orders “Neutral section announcement”; symbol PL05 to indicate an automatic execution, symbol PL06 when the driver is requested to act.
- 8.3.3.7 The symbols PL07, PL08 shall be used to show the forthcoming orders “End of Neutral section”; symbol PL07 to indicate an automatic execution, symbol PL08 when the driver is requested to act.
- 8.3.3.8 The symbol PL09 shall be used to show forthcoming “Non Stopping area”.
- 8.3.3.9 The symbol PL10 shall be used to indicate forthcoming “Radio hole”.
- 8.3.3.10 The symbols PL11, PL12 shall be used to show the forthcoming orders “inhibition of magnetic shoe brakes”; symbol PL11 to indicate an automatic execution, symbol PL12 when the driver is requested to act.
- 8.3.3.11 The symbols PL13, PL14 shall be used to show the forthcoming orders “inhibition of eddy current brakes”; symbol PL13 to indicate an automatic execution, symbol PL14 when the driver is requested to act.
- 8.3.3.12 The symbols PL15, PL16 shall be used to show the forthcoming orders “inhibition of regenerative brakes”; symbol PL15 to indicate an automatic execution, symbol PL16 when the driver is requested to act.



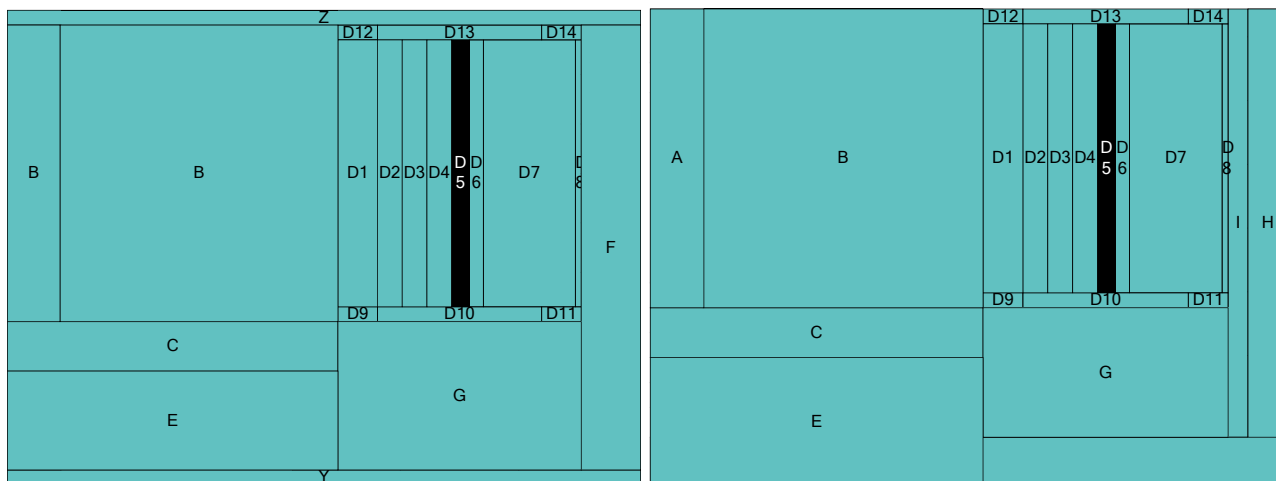
**Figure 70 – area for the orders and announcements**

- 8.3.3.13 Figure 67 gives an example of orders and announcements of the planning information.
- 8.3.3.14 Along the distance scale, the bottom of the symbols shall be positioned at the corresponding distance from the current train front location.
- 8.3.3.15 Symbols shall be distributed over the three columns D2/D3/D4 to avoid overlapping as much as possible. Two adjacent symbols shall not be placed into the same column but in different columns.

### **8.3.4 Gradient profile**

8.3.4.1 This DMI object shows an overview of the gradient profile.

8.3.4.2 The gradient profile shall be displayed in area D5 (see Figure 71) and within the distance range selected by the driver for the planning information and within the movement authority.



**Figure 71 – area for the gradient profile**

8.3.4.3 Figure 69 gives an example of the gradient profile of the planning information.

8.3.4.4 The gradient profile shall be shown as a set of rectangles with different gradients. The rectangles shall have a width equal to the width of D5.

8.3.4.5 Along the distance scale, the bottom of a rectangle shall be positioned at the corresponding distance of the start of the gradient element from the current train front location. The length of the rectangle shall represent the length of the gradient element.

8.3.4.6 If the rectangle for the gradient element is long enough to show the gradient direction, a sign shall be shown at the top and bottom of the rectangle: a '+' for a uphill gradient, a '-' for a downhill gradient.

8.3.4.7 If the rectangle for the gradient element is long enough to show the number (in ‰) in addition to the '+' or '-' sign, this number shall be shown in the middle of the rectangle.

8.3.4.8 Downhill gradients shall be shown in dark grey with characters (sign and/or number) in white. Uphill gradients and zero gradients shall be shown in grey with characters (sign and/or number) in black.

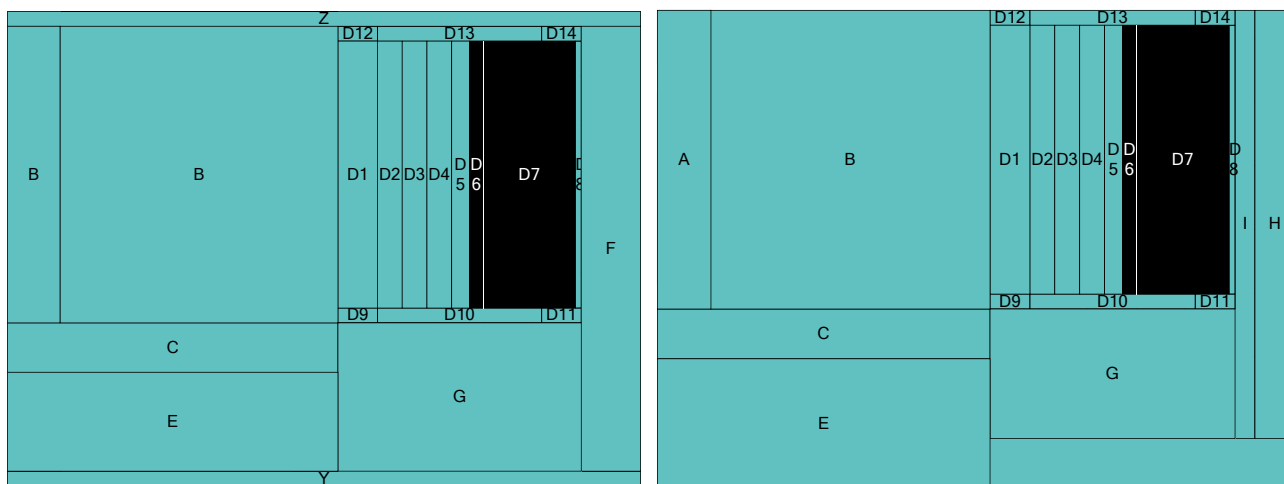
8.3.4.9 The uphill gradient and zero gradient rectangles shall have a 1 cell line on top and left side in white.

8.3.4.10 The downhill gradient rectangles shall have a 1 cell line on top and left side in grey.

8.3.4.11 All gradient rectangles shall have a 1 cell line on the bottom in black.

### **8.3.5 Speed profile discontinuity information**

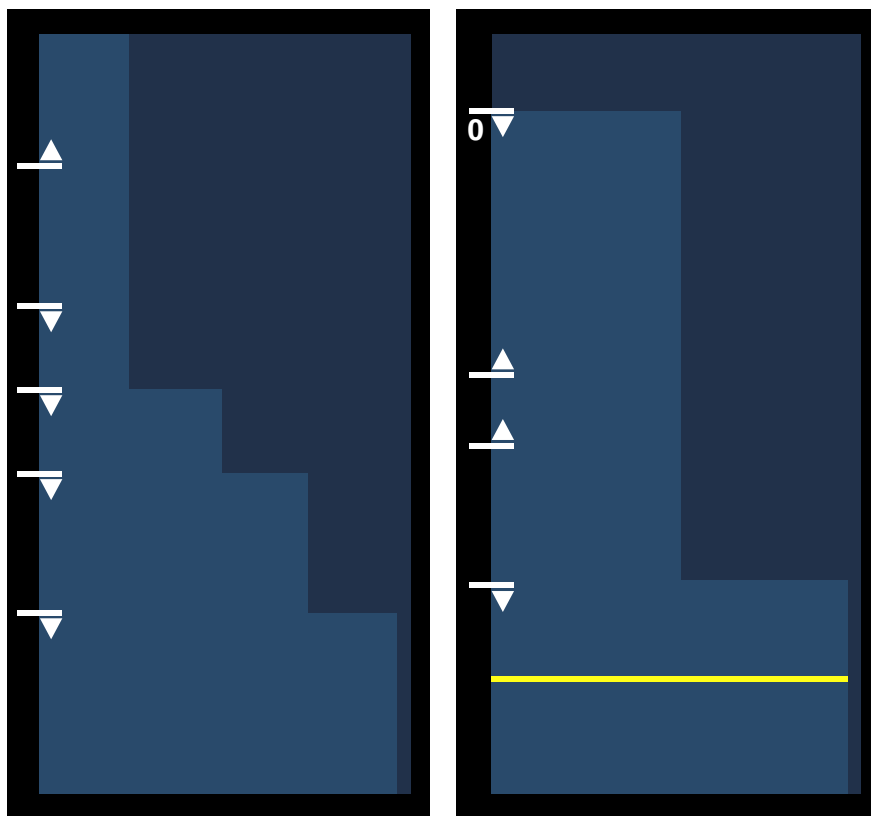
- 8.3.5.1 This DMI object displays symbols that describe whether there is a speed increase or decrease at the speed profile discontinuities within the distance range selected by the driver for the planning information and within the movement authority.
- 8.3.5.2 The symbols shall follow all MRSP discontinuities (see Figure 73 and Figure 75). The symbols PL21, PL22, PL23 shall be used respectively for a speed increase, for a speed decrease and for a speed decrease to the target at zero speed (i.e. the EOA).



**Figure 72 – area for the speed profile discontinuity information**

- 8.3.5.3 Figure 73 gives an example of the speed profile discontinuity information of the planning information.
- 8.3.5.4 Along the distance scale, speed profile discontinuity symbols shall be drawn. The horizontal line of the symbols shall be located at the speed discontinuity location.
- 8.3.5.5 The left-half of the speed profile discontinuity symbols shall cover the right side of area D6. The right-half of the symbols shall cover the left side of area D7.
- 8.3.5.6 If several symbols are overlapping, only the nearest one shall be shown.





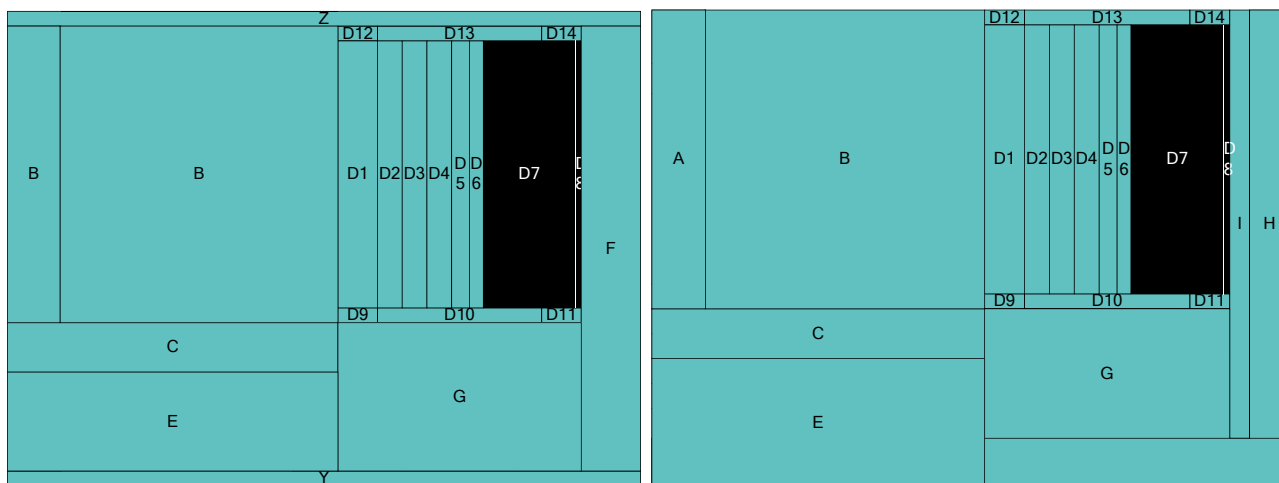
**Figure 73 – Speed profile discontinuity information**

### 8.3.6 Planning Area speed profile (PASP)

8.3.6.1 This DMI object displays the planning area speed profile (PASP) as a speed-distance diagram within the distance range selected by the driver for the planning information and within the movement authority.

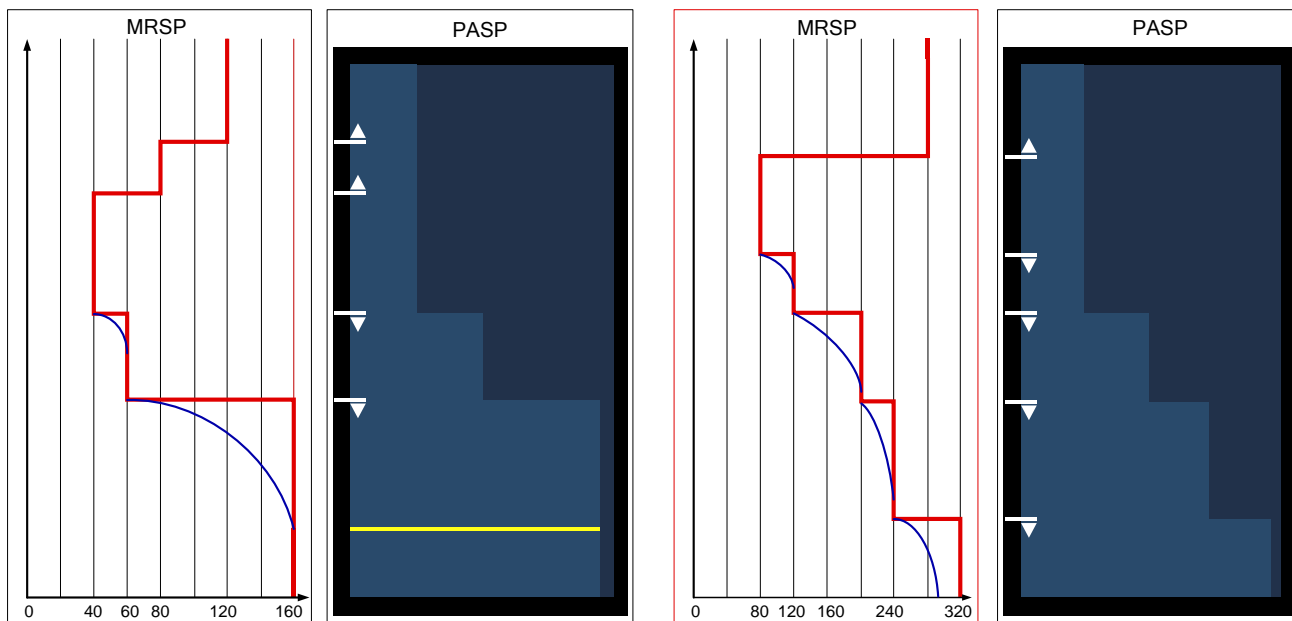
8.3.6.1.1 Note: The PASP is based on the MRSP computed by the onboard.

8.3.6.2 The PASP shall be displayed in area D7 (see Figure 74).



**Figure 74 – area for the planning area speed profile**

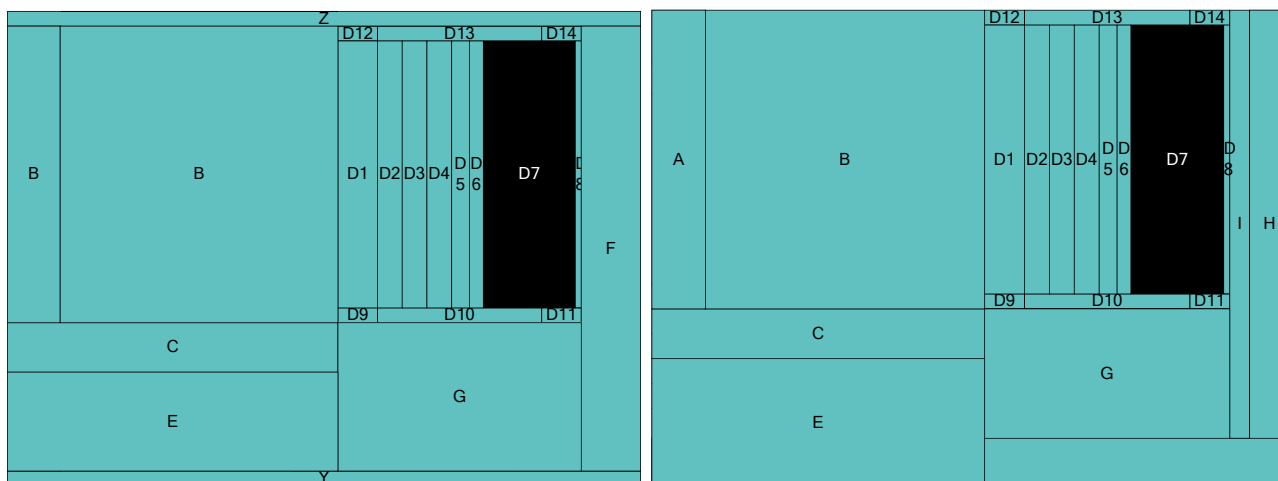
- 8.3.6.3 The PASP information shall be presented as a diagram. On the vertical axis, the locations of the speed discontinuities shall be displayed according to the distance scale. On the horizontal axis, the speed scale shall be divided in 4 identical quarters.
- 8.3.6.4 The maximum ceiling speed shown in D7 and covering the width of D7 shall represent the ceiling permitted speed at the current train front location.
- 8.3.6.5 The PASP information shall only display up to 3 speed discontinuities more restrictive than the ceiling permitted speed at the current train front location and with a speed value greater than zero.
- 8.3.6.6 The fourth speed restriction shall be reserved for the EOA.
- 8.3.6.7 The speed shall not be presented to scale, but with fixed ratios relative to the ceiling permitted speed at the current train front location (1/1). Speed decreases shall be shown as 3/4, 1/2 or 1/4 of the ceiling permitted speed at the current train location. Each time a speed decrease is effective, the width of the diagram shall be shortened by quarter(s) of the full width as follows (with regards to a percentage of the ceiling permitted speed at the current train front location):
- a) From 99% to 75%: 1/4
  - b) From 74% to 50%: 1/2
  - c) From 49 to 1%: 3/4
- 8.3.6.8 Example: if the ceiling permitted speed at the current train front location is 140 km/h and the first speed reduction is 70 km/h, then the speed profile in D7 shows a reduction to 1/2 of the current maximum; if the next speed reduction is 40 km/h, then the speed profile in D7 shows 1/4 of the current maximum.
- 8.3.6.9 If a speed increase is drawn using symbol PL21, no further speed decrease except the speed decrease to zero shall be shown on the PASP in D7.
- 8.3.6.10 The background colour of the PASP in D7-D8 shall be 'PASP dark'.
- 8.3.6.11 The PASP diagram colour shall be 'PASP light'.
- 8.3.6.12 In Figure 75 two examples of the PASP for the driver are given.



**Figure 75 – Relationship between MRSP and the PASP for the driver**

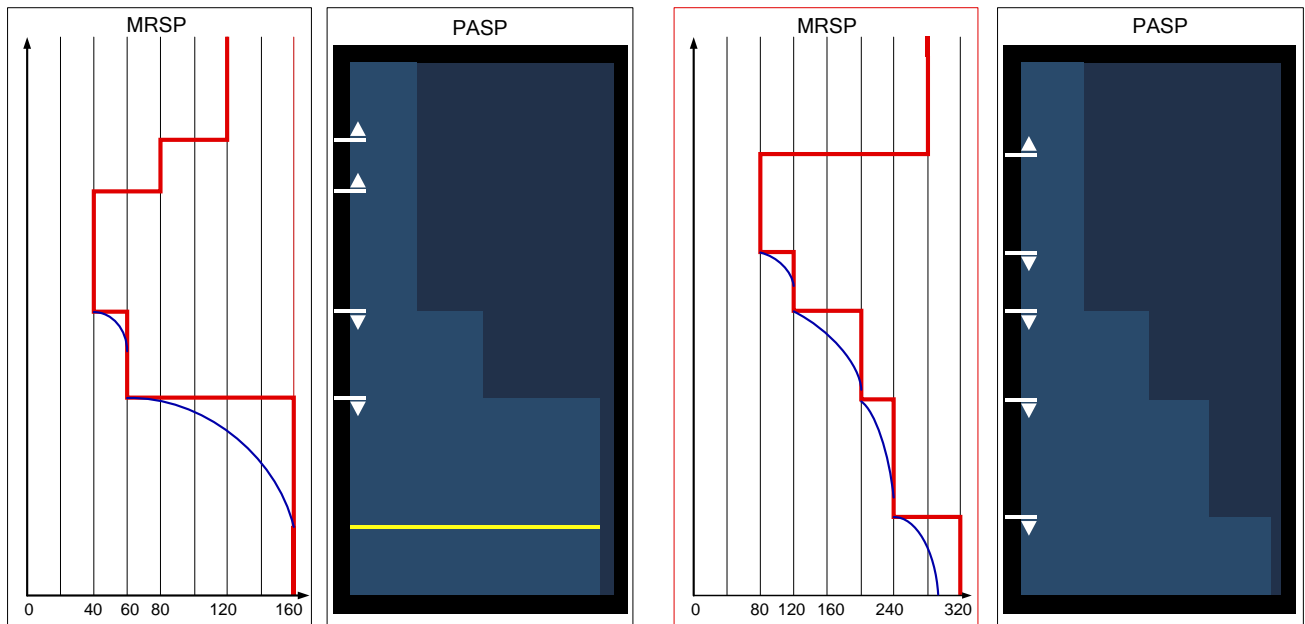
### 8.3.7 Indication Marker

- 8.3.7.1 This DMI object displays the location of the Indication Status in D7 (see Figure 76).
- 8.3.7.2 The indication marker shall be a horizontal line in yellow with a 2 cells width and a length equal to the width of D7.
- 8.3.7.3 The bottom of the indication marker shall be at the indication location related to the current target.



**Figure 76 – area for the indication marker**

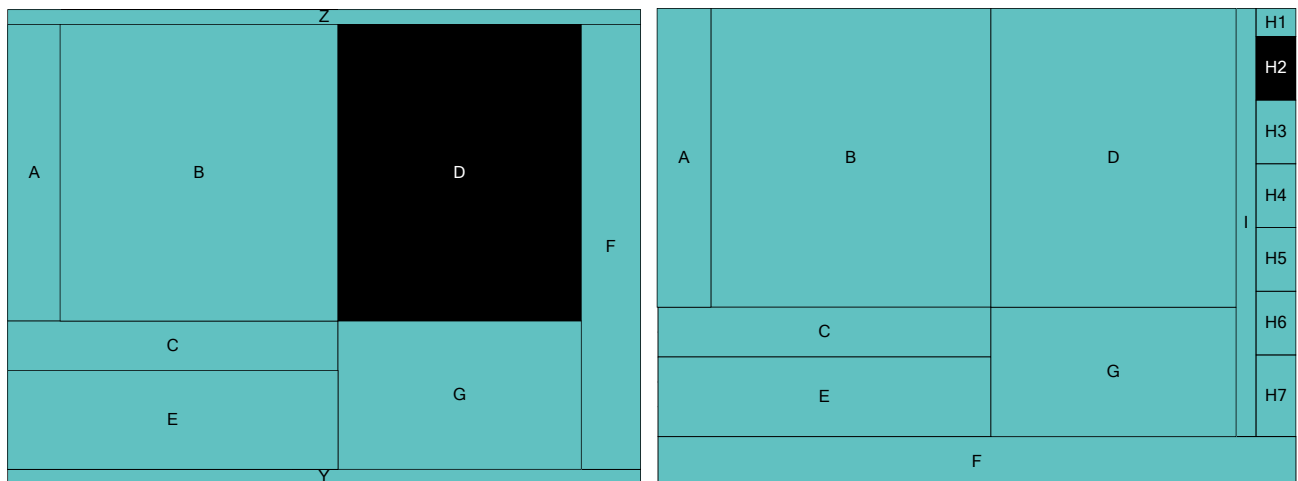
- 8.3.7.4 Figure 73 and Figure 75 show examples of the presentation of the indication marker in the planning information.
- 8.3.7.5 Figure 77 show two examples of the relationship of the MRSP/PASP and the indication marker.



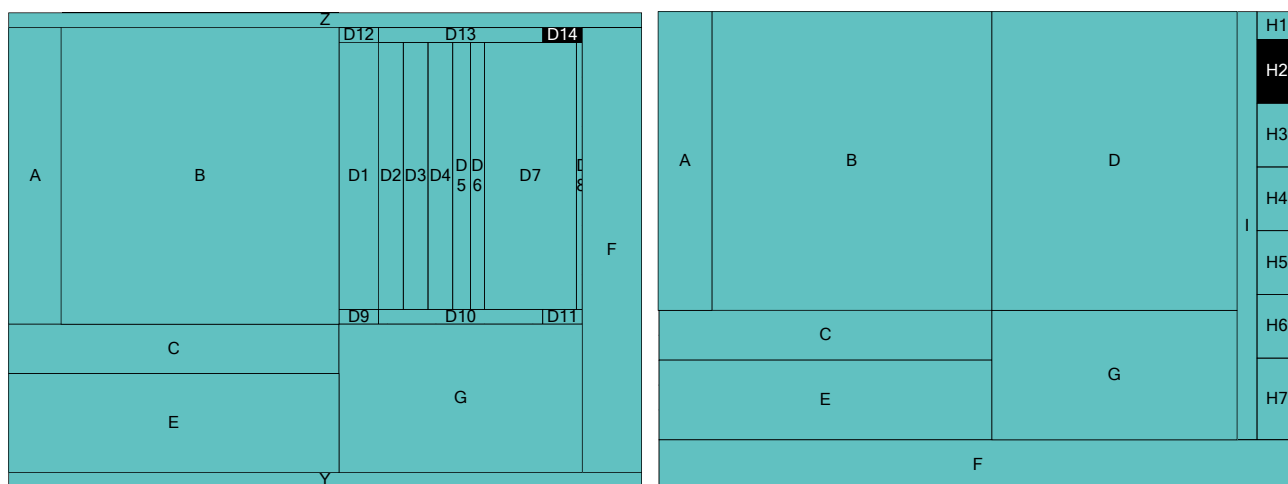
**Figure 77 – Relationship between MRSP/PASP and the indication marker**

### 8.3.8 Show and hide planning information

8.3.8.1 These DMI objects allow the driver to show/hide the planning information. The show function is located respectively in D (touch screen technology) and H2 (soft key technology) (see Figure 78). The hide function is located respectively in D14 (touch screen technology) and H2 (soft key technology) (see Figure 79).



**Figure 78 – area for the show function of the planning information**

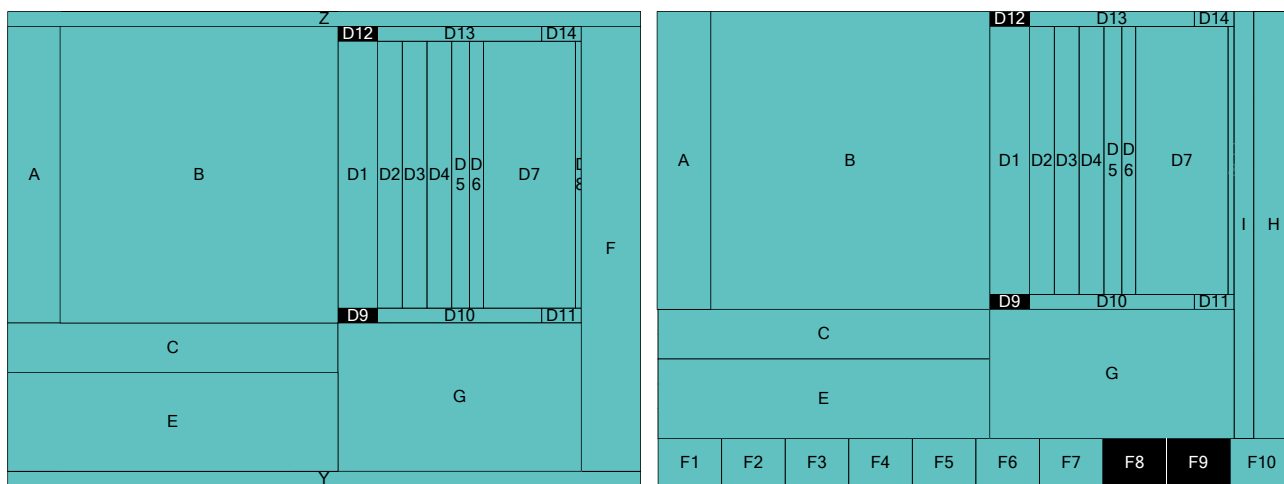


**Figure 79 – area for the hide function of the planning information**

- 8.3.8.2 When using a touch screen technology, when the planning information is shown (see 8.3.1.1 for the conditions), the D14 area shall be a [Hide] button used to set the status of the planning information to “hide planning information”.
- 8.3.8.3 When using a touch screen technology, the sensitive area of D14 shall be enlarged by 15 cells height below D14 giving a total size of the sensitive area of 40x30 (wxh).
- 8.3.8.4 When using touch screen technology, when the planning information is hidden in FS mode, the whole area D shall be sensitive and behave as a [Show] button to set the status of the planning information to “show planning information”.
- 8.3.8.5 When using soft key technology, when the planning information is shown (see 8.3.1.1 for the conditions), H2 shall be a [Hide] button used to set the status of the planning information to “hide planning information”.
- 8.3.8.6 When using soft key technology, when the planning information is hidden in FS mode, H2 shall be a [Show] button used to set the status of the planning information to “show planning information”.
- 8.3.8.7 The last status of the planning information shall be stored. In case no status is stored onboard, it shall be considered as “show planning information”.
- 8.3.8.8 When entering FS mode, the status of the planning information stored onboard shall be used.

### **8.3.9 Zoom function**

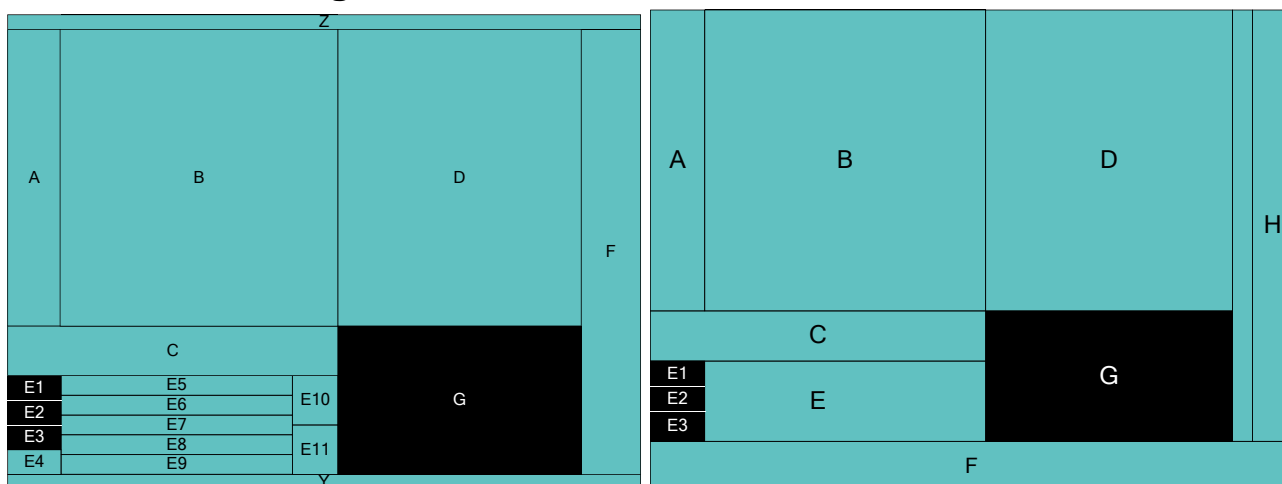
- 8.3.9.1 These DMI objects allow the driver to change the distance scale of the planning information (zoom function). The zoom function is located respectively in D9/D12 (touch screen technology) and F8/F9/D9/D12 (soft key technology) (see Figure 80).



**Figure 80 – area for the zoom function of the planning information**

- 8.3.9.2 When using a touch screen technology, when the planning information is shown, a [Scale Up] button shall be used in the D9 area to shorten the distance scale of the whole planning information.
- 8.3.9.3 When using a touch screen technology, when the planning information is shown, a [Scale Down] button shall be used in the D12 area to enlarge the distance scale of the whole planning information.
- 8.3.9.4 When using a touch screen technology, the sensitive area of D9 shall be enlarged by 15 cells height above D9 giving a total size of the sensitive area of 40x30 (wxh).
- 8.3.9.5 When using a touch screen technology, the sensitive area of D12 shall be enlarged by 15 cells height below D12 giving a total size of the sensitive area of 40x30 (wxh).
- 8.3.9.6 When using soft key technology, when the planning information is shown, a [Scale Up] button shall be used in the area F9 to shorten the distance scale of the whole planning information. One of the symbols NA03, NA05 shall be displayed in D9 in order to echo respectively the NA07 or NA09 of the F9 button.
- 8.3.9.7 When using soft key technology, when the planning informaton is shown, a [Scale Down] button shall be used in the area F8 to enlarge the distance scale of the whole planning information. One of the symbols NA04, NA06 shall be displayed in D12 in order to echo respectively the NA08 or NA10 of the F8 button.
- 8.3.9.8 When a valid activation of the [Scale Up] button is done by the driver, the distance scale shall change to the previous distance range shorter than the current one e.g. change from 0 – 8000 to 0 – 4000.
- 8.3.9.9 When a valid activation of the [Scale Down] button is done by the driver, the distance scale shall change to the next distance range longer than the current one e.g. change from 0 – 8000 to 0 – 16000.

## 8.4 Monitoring Information



**Figure 81 – Monitoring area**

### 8.4.1 Communication session indication

- 8.4.1.1 This DMI object shows the status of the communication session.
- 8.4.1.2 The status of the communication session shall be displayed in area E1 (see Figure 81).
- 8.4.1.3 As soon as the onboard sends the 'session established' message to the RBC, the symbol ST03 shall be displayed in E1.
- 8.4.1.4 As long as the communication session is established, the symbol ST03 shall remain displayed in E1.
- 8.4.1.5 The symbol ST04 shall be displayed in E1 for 20 seconds as soon as one of the following conditions is met:
- a) the onboard considers that the establishment of a communication session has failed (i.e. the number of attempts to set up the safe radio connection is reached), or
  - b) an existing communication session is terminated without an order from trackside
- 8.4.1.6 Figure 82 shows an example of the presentation of the communication session indication in E1.

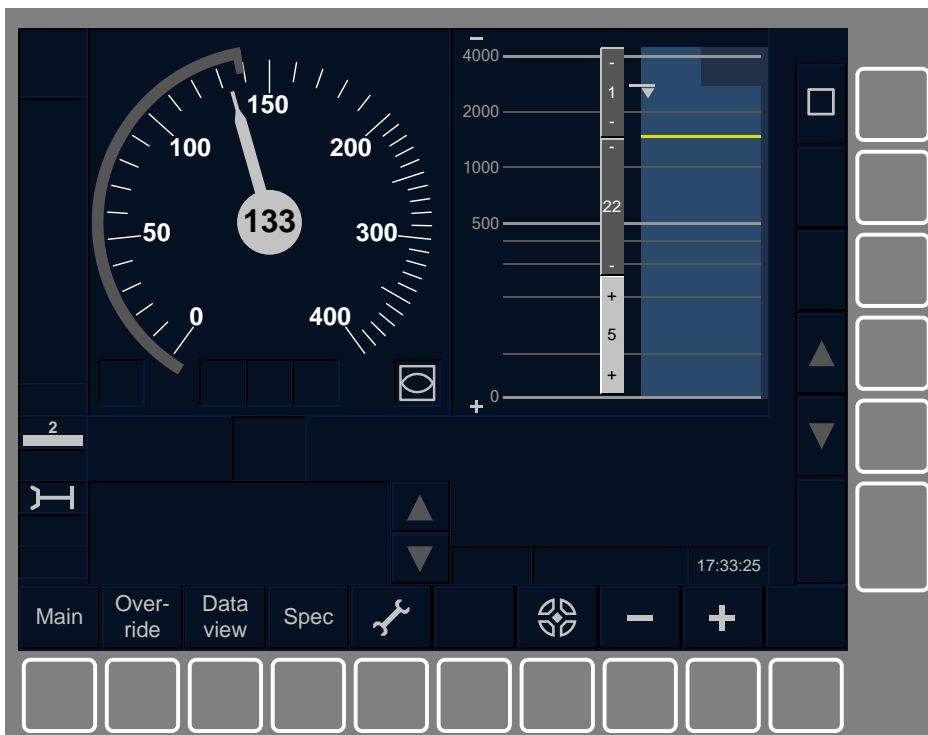
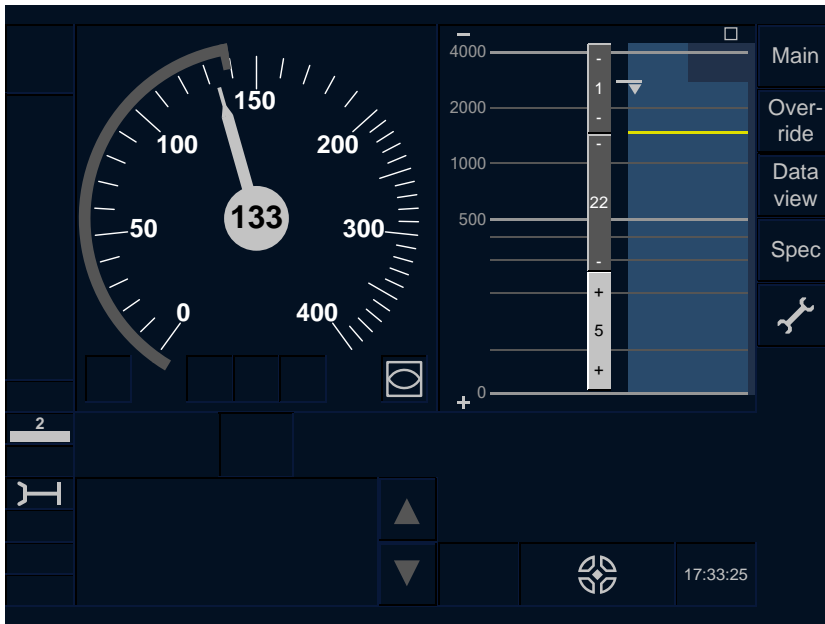


Figure 82 – Communication session and local time

#### 8.4.2 Reversing permitted indication

- 8.4.2.1 This DMI object shows that reversing is permitted.
- 8.4.2.2 When the train is at standstill inside a reversing area, the indication that reversing is permitted shall be displayed in area E2 (see Figure 81) using the symbol ST06.
- 8.4.2.3 Figure 83 shows an example of the presentation of the reversing is permitted in E2.



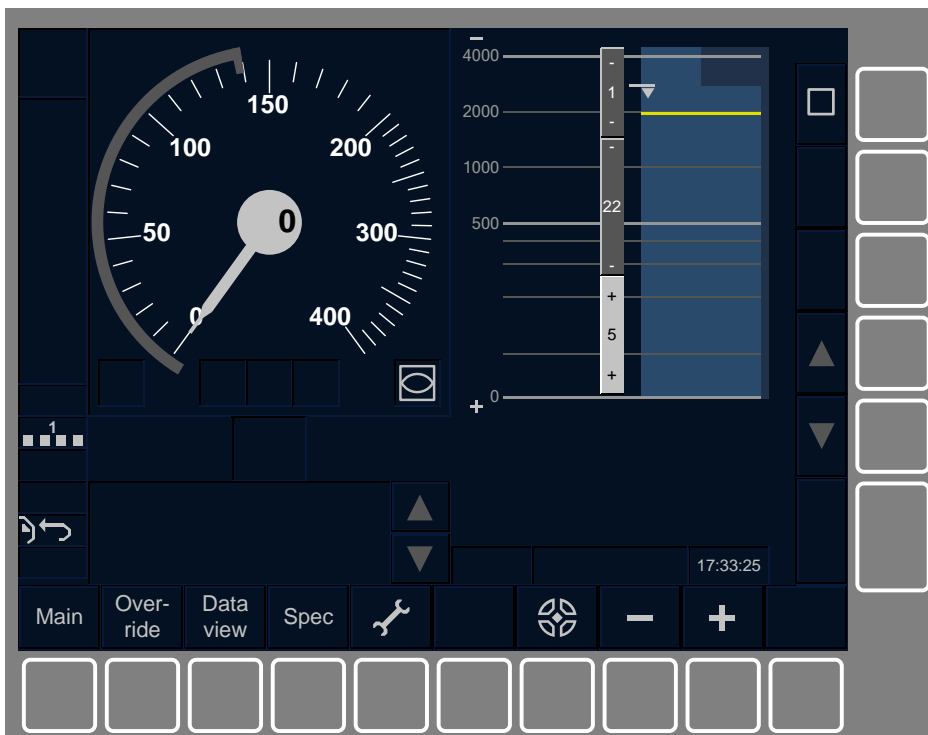
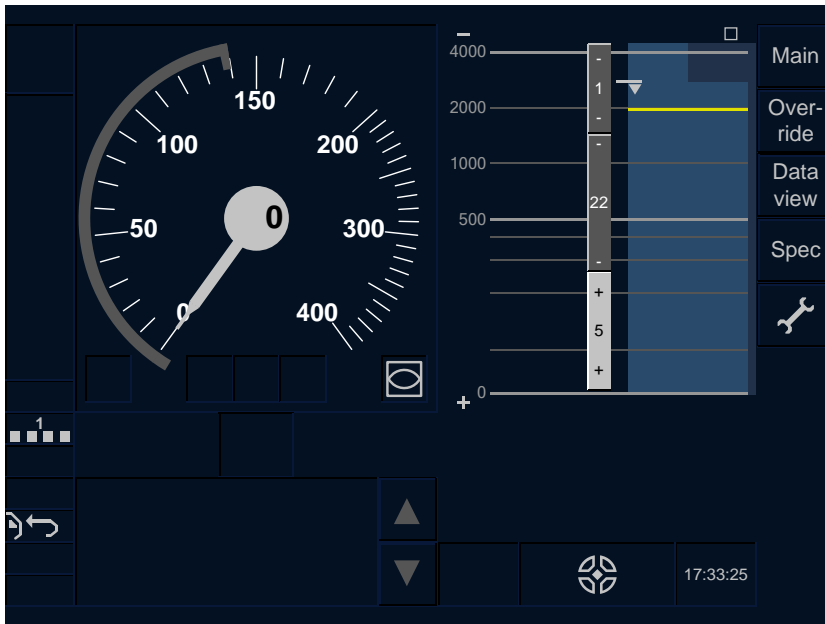
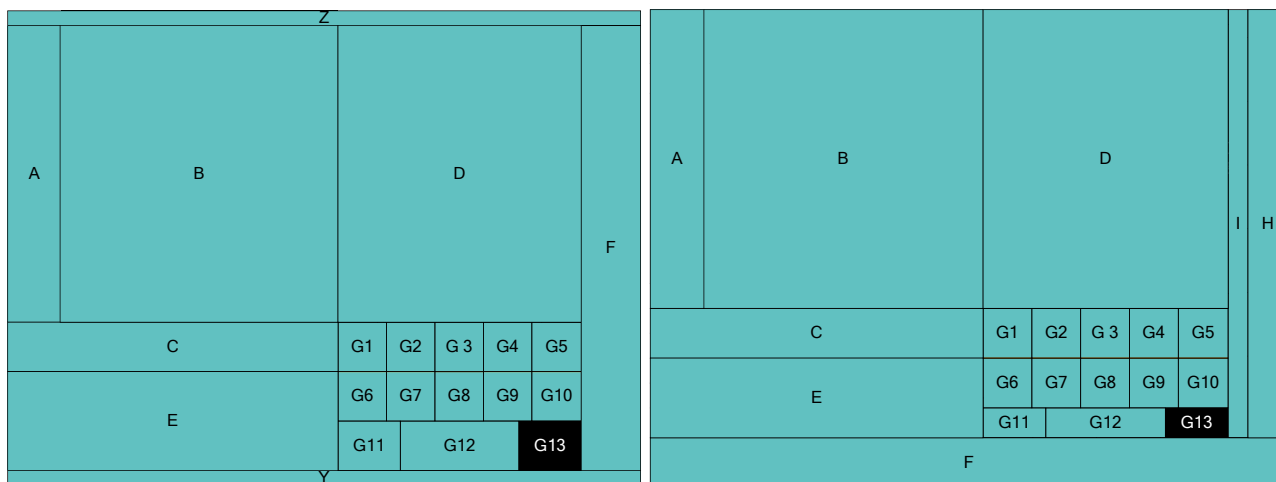


Figure 83 – Reversing permitted

### 8.4.3 Local time

- 8.4.3.1 This DMI object shows the local time.
- 8.4.3.2 The local time shall be displayed in area G13 (see Figure 84).



**Figure 84 – area for the local time**

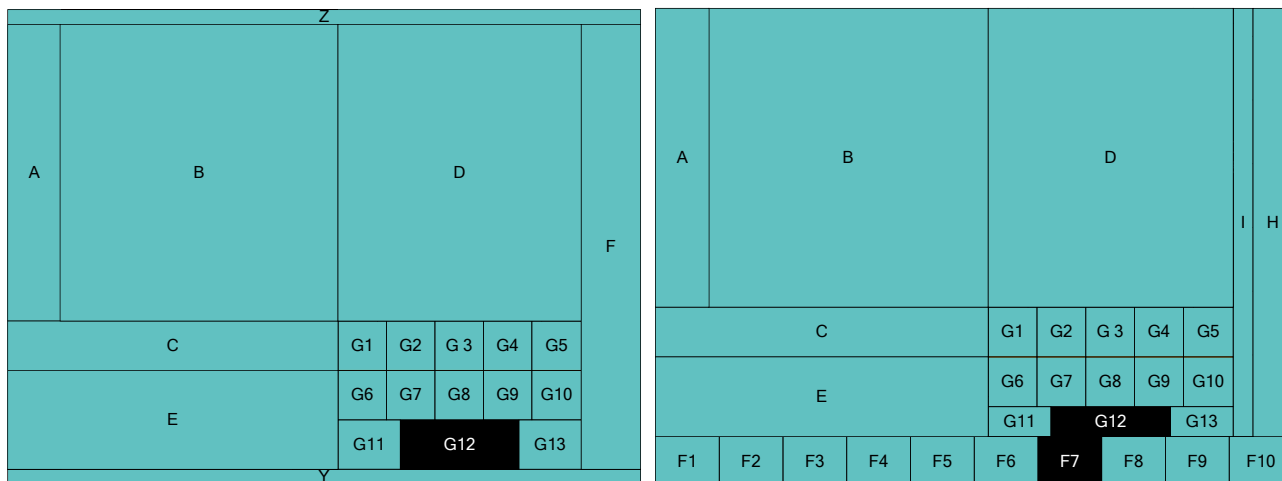
8.4.3.3 Figure 82 shows an example of the presentation of the local time in G13.

8.4.3.4 The local time shall be displayed in grey on a single line in the format 'hh:mm:ss' with a 24 hours time reference.

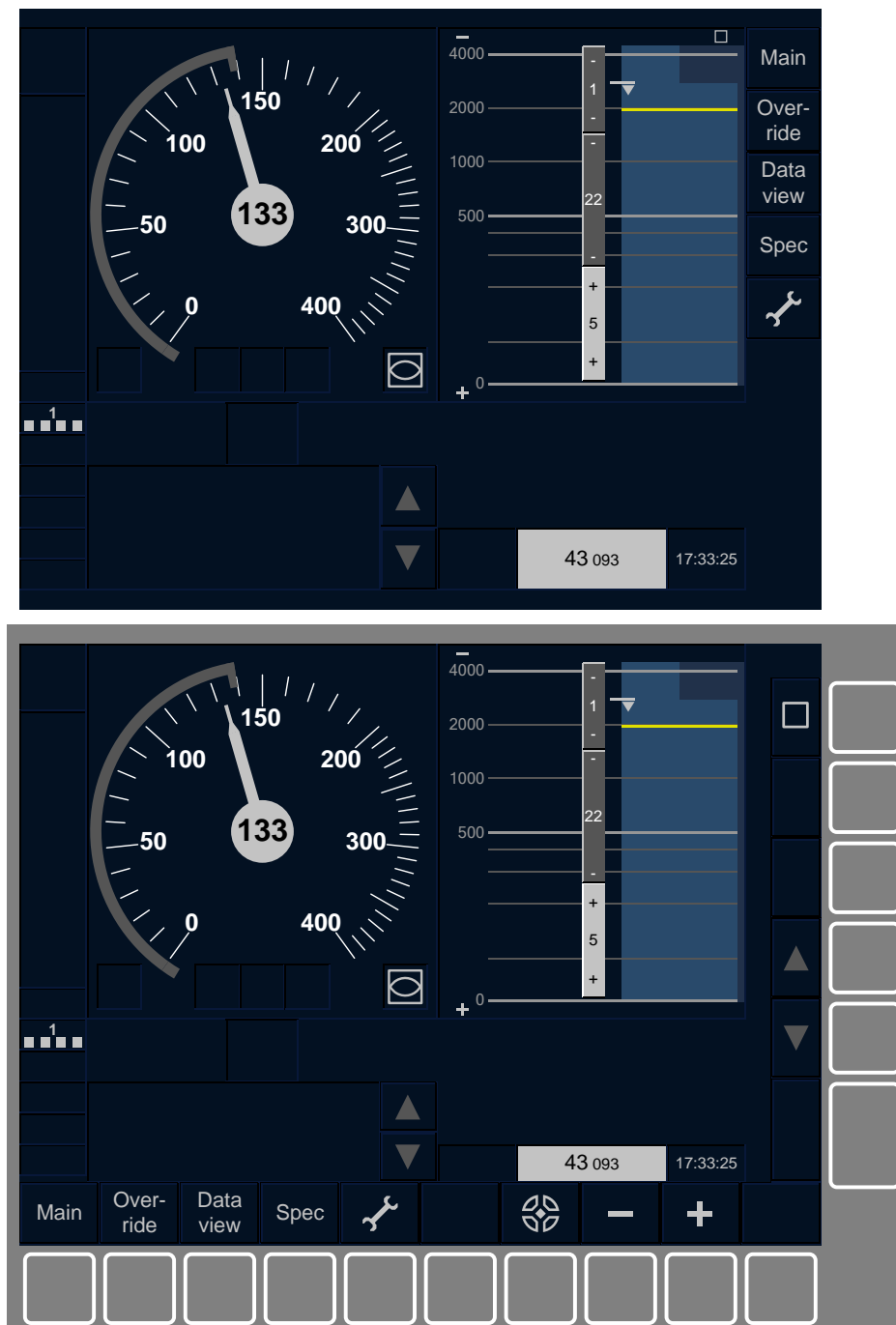
#### **8.4.4 Geographical position**

8.4.4.1 This DMI object shows the geographical position of the train.

8.4.4.2 The geographical position shall be displayed in area G12 (see Figure 85).



**Figure 85 – area for the geographical position**

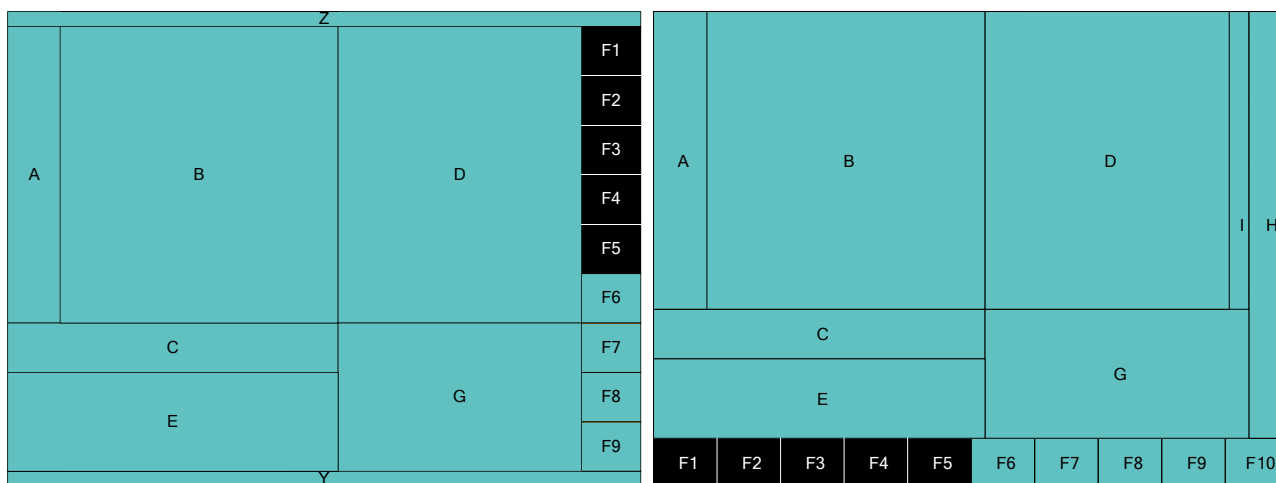


**Figure 86 – geographical position**

- 8.4.4.3 The requirements 8.4.4.4 to 8.4.4.9 shall apply only if the following conditions are fulfilled:
- a) geographical position information is stored onboard and
  - b) the onboard is in one of the modes in which geographical position can be displayed (for the list of modes, see [3])
- 8.4.4.4 It shall be possible to toggle on and off the display of the geographical position by touching the sensitive area of G12 (touch screen technology) or by using F7 (soft key technology).

- 8.4.4.5 As soon as the conditions specified in 8.4.4.3 are fulfilled, the last status of the toggle on/off shall be used for the display of the geographical position.
- 8.4.4.6 When using the touch screen technology, the symbol DR03 shall be shown in G12 if the geographical position is toggled off.
- 8.4.4.7 When using the soft key technology, the symbol DR03 shall be shown in F7.
- 8.4.4.8 When the geographical position is toggled on, the full G12 area shall have a grey background with the geographical position displayed in black and in the centre of the G12 area.
- 8.4.4.9 A space character shall be inserted between the kilometre and the metre parts of the geographical position.
- 8.4.4.10 When using touch screen technology, when the conditions specified in 8.4.4.3 are not fulfilled, the G12 shall not be sensitive and shall not display the symbol DR03.
- 8.4.4.11 When using soft key technology, when the conditions specified in 8.4.4.3 are not fulfilled, no button shall exist in the F7 area.

## 8.5 Sub-level window selection



**Figure 87 – Sub-level window selection**

- 8.5.1.1 The sub-level window selection allows the driver to select the specific sub-level windows.
- 8.5.1.2 The sub-level window selection shall be composed of 5 buttons displayed in area F1 – F5.
- 8.5.1.3 The 5 buttons shall be allocated to the areas F1 – F5 as specified in Table 18.
- 8.5.1.4 The 5 buttons for sub-level window selection shall always be ‘enabled’.
- 8.5.1.5 A button of the main menu shall allow accessing the corresponding sub-level window as specified in Table 18.

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**ETCS Driver Machine Interface**

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8.5.1.6 For the 'Settings' sub-level window, the ERTMS/ETCS DMI shall additionally offer the possibility to access it via a button positioned on an ergonomic location on the driver's desk.

8.5.1.7 When using touch screen technology, up-type buttons shall be used.

Area	Button label	Sub-level window
F1	Main	Main
F2	Over-ride	Override
F3	Data view	Data view
F4	Spec	Special
F5	symbol SE04	Settings

**Table 18 – sub-level window selection**

## 9. SUB-LEVEL WINDOWS – GENERAL REQUIREMENTS

### 9.1 Introduction

9.1.1.1 All figures provided in section 9 are only used to show the layout of the sub-level windows for explanatory reasons.

9.1.1.1.1 In the tables provided in section 9, the origin of the X (horizontal axis) – Y (vertical axis) reference is the bottom-left corner of the total grid array. The position of the rectangles (buttons, areas...) is given by the position of the bottom-left corner.

### 9.2 Menu windows

#### 9.2.1 Menu windows for touch screen technology

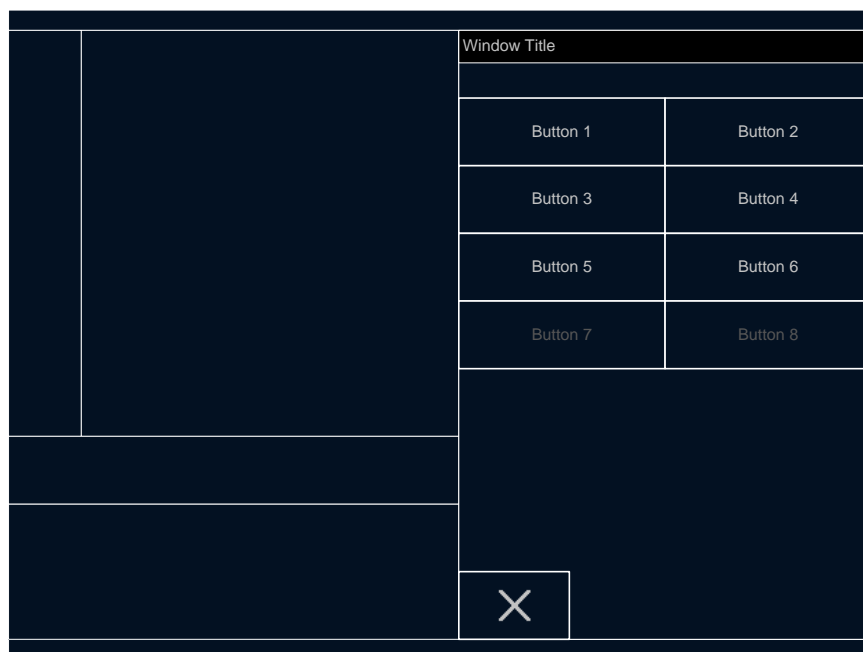
9.2.1.1 Each object shall follow the dimension and position as specified in Table 19.

9.2.1.2 The buttons 1, 2,.. shall be up-type buttons.

<b><i>Menu window</i></b>				
<b><i>Item</i></b>	<b><i>Width</i></b>	<b><i>Height</i></b>	<b><i>X Location</i></b>	<b><i>Y Location</i></b>
D/F/G area	306	450	334	15
Window Title	306	24	334	441
'close' button	82	50	334	15
Button 1	153	50	334	365
Button 2	153	50	487	365
Button 3	153	50	334	315
Button 4	153	50	487	315
...	...	...	...	...

**Table 19 – Menu window (touch screen)**

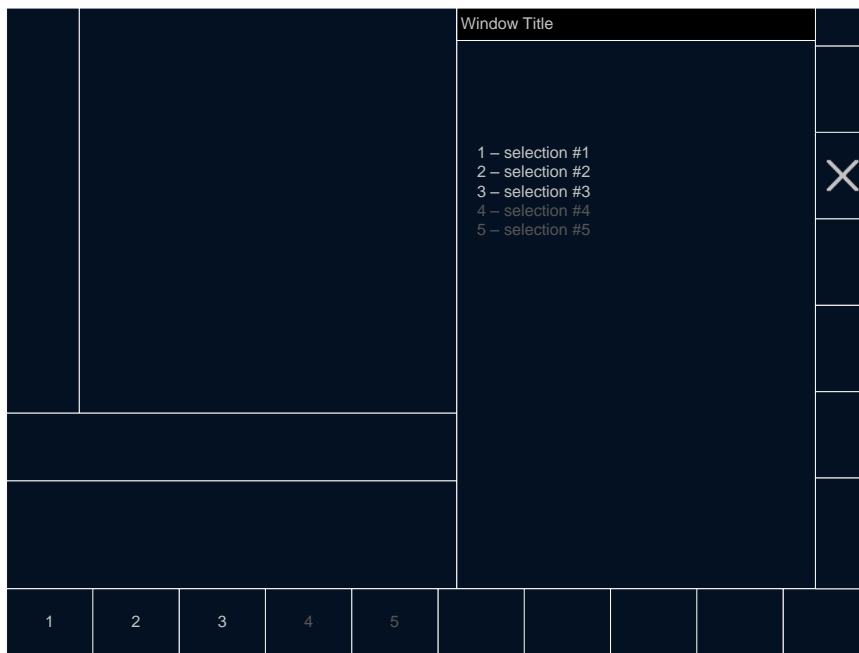
9.2.1.3 Figure 88 gives an example of the layout of a menu window containing 8 buttons with the 7<sup>th</sup> and 8<sup>th</sup> in state 'disabled' (i.e. in dark grey).



**Figure 88 – Menu window (touch screen technology)**

## **9.2.2 Menu windows for soft key technology**

- 9.2.2.1 The [Close] button shall be in H3.
- 9.2.2.2 The window shall contain a list of selections (texts) in area D/G/I.
- 9.2.2.3 The list of selections shall be displayed left aligned with an indent of 15 cells from the left of the area D/G/I i.e. the X position shall be 349.
- 9.2.2.4 The first selection of the list shall be 112 cells (i.e. an indent of 100 cells + the 12 cells of the character size) below the top of area D/G/I i.e. the Y position shall be 380.
- 9.2.2.5 The text of each selection shall:
  - a) start with a number giving the position of the selection in the list ;
  - b) identify the name of the selection ;
  - c) separate the number and the name of the selection by a '-' and 1 space on each side of the dash.
- 9.2.2.6 The numbers used for the selections shall be positioned in a logical order from 1 to maximum 10.
- 9.2.2.7 Example of a selection: "1 – Train data".
- 9.2.2.8 The labels of the F buttons shall be numbers matching the numbers of the selections.
- 9.2.2.9 Figure 89 gives an example of the layout of a menu window containing 5 selections with the 4<sup>th</sup> and 5<sup>th</sup> selections in state 'disabled'.



**Figure 89 – Menu window (soft key technology)**

### **9.2.3 Layers**

9.2.3.1 The layers for menu windows shall be as follows:

- a) Layer 0: D/F/G (touch screen technology) or D/G/I (soft key technology)
- b) All other areas: same as default window (see 8.1.1.4)

## **9.3 Data entry windows**

### **9.3.1 Input fields**

9.3.1.1 An input field shall be used to allow the driver to enter data.

9.3.1.2 The height of the total input field shall be 50 cells.

9.3.1.3 When using the touch screen technology, the width of the total input field shall be 306 cells.

9.3.1.3.1 For touch screen technology, the input fields will be located on the D/F/G area (having a width of 306 cells).

9.3.1.4 When using the soft key technology, the width of the total input field shall be 266 cells.

9.3.1.4.1 For soft key technology, the input fields will be located on the D/G/I area (having a width of 266 cells).

9.3.1.5 Each input field shall be divided into a label area and a data area.

9.3.1.6 The label area shall give the topic of the input field.

9.3.1.7 Exception: If there is only one input field within the window, the input field can only consist of a data area.



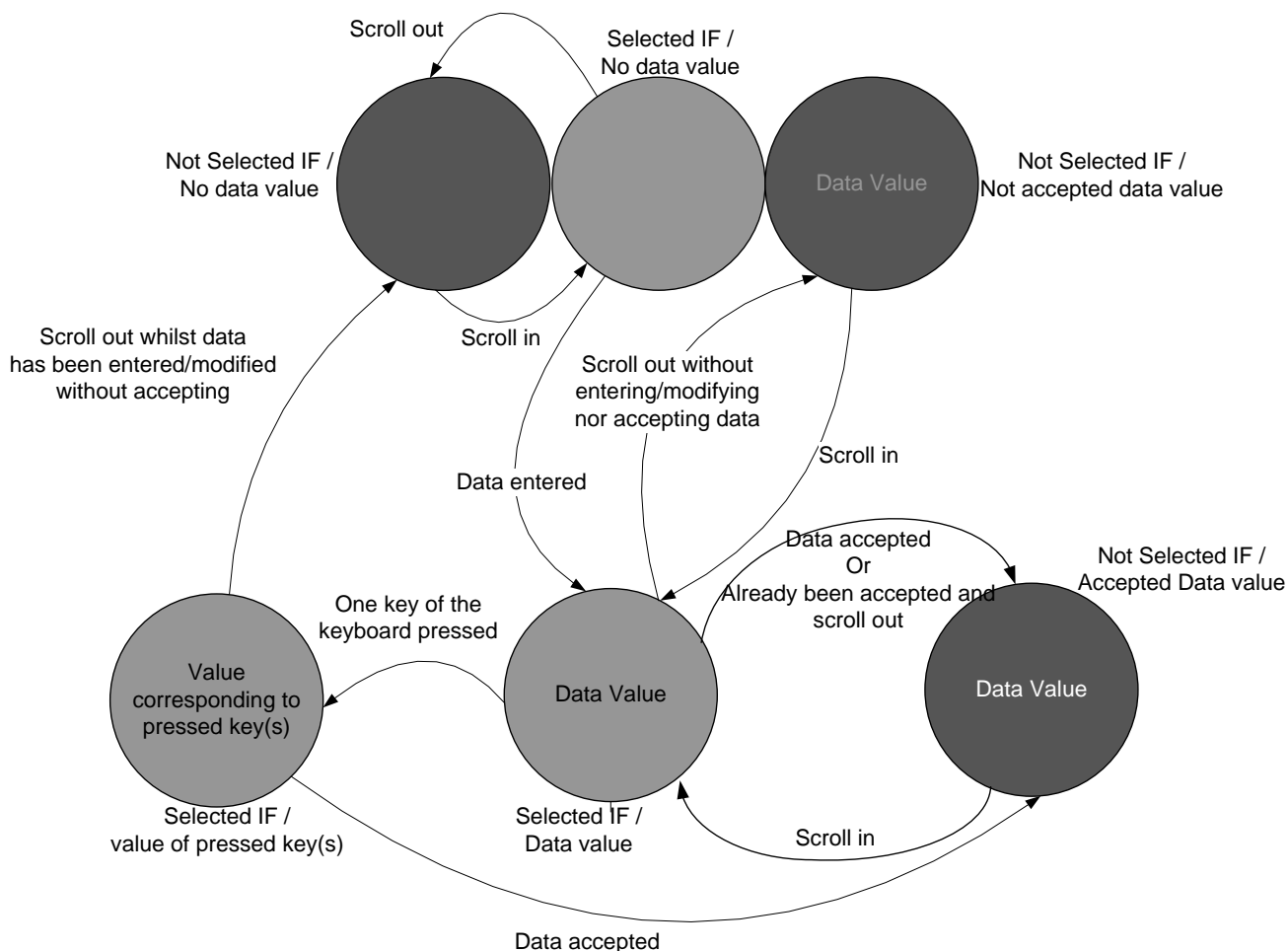
- 9.3.1.7.1 Note: With a single input field, the window title can already indicate unambiguously the topic of the input field.
- 9.3.1.8 When the input field contains a label area, the width of the data area shall be 102 cells.
- 9.3.1.9 The label area shall be placed to the left of the data area.
- 9.3.1.10 The text in the label area shall be aligned to the right of the label area with an indent of 10 cells.
- 9.3.1.11 The value of the data in the data area shall be aligned to the left of the data area with an indent of 10 cells.
- 9.3.1.12 The text colour of the label area shall be grey; the background colour of the label area shall be dark grey.
- 9.3.1.13 If the input field is not selected and no data value has been accepted yet by the driver during the data entry / validation process (i.e. 'not selected' state), the background colour of the data area shall be dark grey and, if any, the data value colour shall be grey.
- 9.3.1.13.1 Note: regarding the definition of a data entry / validation process; see § 9.6.
- 9.3.1.14 If the input field is selected (i.e. 'selected' state), the background colour of the data area shall be medium grey and the colour of the data value or of the value corresponding to the pressed key(s) (see 9.3.1.19) shall be black.
- 9.3.1.15 If the input field is not selected but a data value has already been accepted by the driver during the data entry / validation process (i.e. 'accepted' state), the background colour of the data area shall be dark grey and the the data value colour shall be white.
- 9.3.1.16 Table 20 gives an overview of the data field states.

	Not selected	Selected	Accepted
Background of the data area	dark grey	medium grey	dark grey
Data value	Grey	Black	White
Value corresponding to the pressed key(s) (see 9.3.1.19)	-	Black	-

**Table 20 – Overview of data field states**

- 9.3.1.17 Figure 90 gives an overview of the colour philosophy for an input field during a data entry / validation process.

DATA INPUT FIELD COLOUR DEPENDING ON DATA FIELD STATE



**Figure 90 – state transitions for an input field**

- 9.3.1.18 When an input field is selected, the associated keyboard shall be presented in the area below the area of the input field(s).
- 9.3.1.19 After the first press on a data key of the associated keyboard, the value corresponding to the pressed data key shall be displayed in the data area instead of the data value (if any) of the selected input field.
- 9.3.1.20 If the input field is not selected anymore whilst a value has been entered / modified without accepting it, the entered value shall be erased from the data area and the current data value (if any) shall be deleted.
- 9.3.1.21 To accept the entered value in an input field in order that it replaces the current data value (if any), the driver shall activate the associated [Enter] button.
- 9.3.1.22 When using the touch screen technology, the associated [Enter] button shall be the data field itself.
- 9.3.1.23 When a data entry / validation process starts, the first input field shall be in the 'selected' state, all other input fields shall be in the 'not selected' state.

- 9.3.1.24 After activating the [Enter] button associated to the selected input field, this input field shall go to the 'accepted' state and the next input field related to the same topic (i.e. which can be on a next data entry window) shall be selected automatically.
- 9.3.1.25 The list of input fields of the data entry window(s) related to the same topic shall be circular i.e. the first input field follows the last one and the last input field preceeds the first one.
- 9.3.1.26 When using the touch screen technology, it shall be possible for the driver to select a specific input field by activating the input field area (the label or data part). For the activation, the input field shall behave like an up-type button.
- 9.3.1.27 When using soft keys technology, it shall be possible for the driver to select a specific input field by using the [Up] and [Down] scroll buttons.

### **9.3.2 Entering characters**

- 9.3.2.1 A cursor shall be used to indicate to the driver where his next selected character will be inserted within the input field.
- 9.3.2.2 The cursor shall be a horizontal line below the position of the next character to be entered i.e. an underscore.
- 9.3.2.3 The cursor shall flash by changing from visible to not visible (e.g. background colour) with a nominal frequency of 2 Hz with a symmetrical mark space ratio.
- 9.3.2.4 When a data key of a keyboard allows entering one single character (e.g. all data keys of a numeric keyboard), the cursor shall jump to the next position in the input field as soon as this data key entry is echoed within the input field.
- 9.3.2.5 When a data key of a keyboard allows entering various characters (e.g. all data keys of an alphanumeric keyboard), the following shall apply:
  - a) the cursor shall jump automatically with a delay-time of 2 s to the next position in the input field after displaying this data key entry within the input field.
  - b) by pressing the same data key again within these 2 s delay-time or by holding the data key for some time, another character under the same data key shall be selected;
  - c) by pressing another data key within these 2 s delay-time the cursor shall be forced to jump to the next position in the input field directly.
- 9.3.2.6 The rules specified in 5.1.5 shall apply as soon as the 6<sup>th</sup> character of an alphanumeric or numeric data is entered.

### **9.3.3 Echo texts**

- 9.3.3.1 An echo text shall be composed of a label part and a data part.
- 9.3.3.2 The label part shall be identical to the label of the concerned input field.
- 9.3.3.3 The data part of the echo text shall display the data value of the concerned input field.

- 9.3.3.4 Exception: If the data value is not consistent, the data part of the echo text shall indicate the type of inconsistency as specified in 9.3.4 instead of the data value.
- 9.3.3.5 The echo text shall be white if the entered data has been accepted by the driver during the data entry / validation process, otherwise it shall be grey.
- 9.3.3.6 The echo texts shall be presented inside the A/B/C/E area in the same order as their related input fields in D/F/G (touch screen technology) or D/G/I (soft key technology).
- 9.3.3.7 The labels of the echo texts shall be right aligned with an indent of 5 on the left side of the X position 204.
- 9.3.3.8 The label of the first echo text shall be 112 cells (i.e. an indent of 100 cells + the 12 cells of the character size) below the top of area A/B/C/E.
- 9.3.3.9 The data of the echo texts shall be left aligned with an indent of 5 cells on the right side of the X position 204.
- 9.3.3.10 The data of the first echo text shall be 112 cells (i.e. an indent of 100 cells + the 12 cells of the character size) below the top of area A/B/C/E.

## **9.3.4 Data checks**

### **9.3.4.1 Introduction**

- 9.3.4.1.1 This section defines the mechanisms used to inform the driver about data entry mistakes. For that purpose, two types of checks are defined:
  - a) Range check used when the value of an input field is out of range,
  - b) Cross-check used when the values of several input fields do not fit together.
- 9.3.4.1.2 The values defining the permitted range of a specific input field as well as the cross-check rules between several input fields are pre-configured onboard. However, their definitions are outside of the scope of this specification.
- 9.3.4.1.3 Since these mechanisms rely on the echo texts, it is only possible to inform the driver about data entry mistakes in data entry windows with echo texts.

### **9.3.4.2 Range checks**

- 9.3.4.2.1 The check versus the permitted range shall take place after each entered value is accepted by the driver.
- 9.3.4.2.2 When an entered data value of an input field is outside its pre-configured permitted range, the data part of its echo text shall indicate '++++' in yellow.
- 9.3.4.2.3 The input field that contains the out of range shall remain in the "Selected IF/data value" state (see Figure 90) and shall still show the previously entered value.

### **9.3.4.3 Cross-checks**

- 9.3.4.3.1 When a valid button activation is performed on the 'Yes' button attached to the question '[Window Title] entry complete?' (see 9.3.5 and 9.3.6), the check(s) versus the cross-check rules shall take place.

- 9.3.4.3.2 For the input fields whose values do not comply with the cross-check rules, the data part of their corresponding echo texts shall indicate '????' in yellow.
- 9.3.4.3.3 The input fields not complying with the cross-check rules shall still show their previously entered value.

### **9.3.5 Data entry window for touch screen technology**

- 9.3.5.1 A data entry window shall contain respectively a maximum of 4 or of 3 input fields depending on whether the window covers the total grid array (i.e. A/B/C/D/E/F/G) or covers the half grid array (i.e. D/F/G).
- 9.3.5.1.1 Note: the number of input fields is limited to be able to present a keyboard with 12 keys below the last input field.
- 9.3.5.2 When the window covers the half grid array (D/F/G areas), each object (excluding the keyboard keys) shall follow the dimension and position as specified in Table 21.

<b><i>Data entry window on half grid array</i></b>				
<b><i>Item</i></b>	<b><i>Width</i></b>	<b><i>Height</i></b>	<b><i>X Location</i></b>	<b><i>Y Location</i></b>
D/F/G area	306	450	334	15
'Close' button	82	50	334	15
'Previous' button (when several windows containing input fields related to the same topic exists)	82	50	416	15
'Next' button (when several windows containing input fields related to the same topic exists)	82	50	498	15
Window Title	306	24	334	441
Input field 1 (label part)	204	50	334	365
Input field 1 (data part)	102	50	538	365
Input field 2 (label part)	204	50	334	315
Input field 2 (data part)	102	50	538	315
Input field 3 (label part)	204	50	334	265
Input field 3 (data part)	102	50	538	265

**Table 21 – data entry window on half grid array (touch screen)**

- 9.3.5.3 When the window covers the A/B/C/D/E/F/G areas, each object (excluding the keyboard keys, the echo texts and the objects for 'data entry complete') shall follow the dimension and position as specified in Table 22.

<b><i>Data entry window on total grid array</i></b>				
<b><i>Item</i></b>	<b><i>Width</i></b>	<b><i>Height</i></b>	<b><i>X Location</i></b>	<b><i>Y Location</i></b>
A/B/C/D/E/F/G area	640	450	0	0
'Close' button	82	50	334	15

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'Previous' button (when several windows containing input fields related to the same topic exists)	82	50	416	15
'Next' button (when several windows containing input fields related to the same topic exists)	82	50	498	15
Window Title	334	24	0	441
Input field 1 (label part)	204	50	334	415
Input field 1 (data part)	102	50	538	415
Input field 2 (label part)	204	50	334	365
Input field 2 (data part)	102	50	538	365
Input field 3 (label part)	204	50	334	315
Input field 3 (data part)	102	50	538	315
Input field 4 (label part)	204	50	334	265
Input field 4 (data part)	102	50	538	265

**Table 22 – Data entry window on total grid array (touch screen)**

- 9.3.5.4 When the window covers the total grid array (A/B/C/D/E/F/G areas), the text label of the window title shall be right aligned.
- 9.3.5.5 If the window contains only one input field and only the data part is presented (see 9.3.1.7), the dimension of the data part shall be the dimension of the merged area between input field 1 (label area) and input field 1 (data area) as expressed in Table 21 and Table 22.
- 9.3.5.6 When a window on the total grid array contains more than one single input field, it shall be possible to echo the values of the input fields on the A/B/C/E area applying the requirements in 9.3.3.
- 9.3.5.7 When a window on the total grid array contains more than one single input field , the objects specified in Table 23 shall additionally be presented on the window for confirmation by the driver of the data entry completion.

<b><i>Data entry complete</i></b>				
area for '[Window Title] entry complete?'	334	50	0	65
'Yes' button	334	50	0	15

**Table 23 – Data entry complete objects (touch screen)**

- 9.3.5.8 The sensitive area of the 'Yes' button shall be extended on the area for the '[Window Title] entry complete?' (see Table 23).
- 9.3.5.9 The 'Yes' button shall be enabled when all input fields related to the topic of the window(s) display a data value (displaying a value corresponding to pressed key(s) is not displaying a data value, for further details see Figure 90). Otherwise the 'Yes' button shall be disabled.

- 9.3.5.10 The text label of the 'Yes' button shall be in black. The background colour shall be in dark grey if the 'Yes' button is disabled or in medium grey if it is enabled. The 'Yes' button shall have the same border as an input field applying 5.1.1.1.4.
- 9.3.5.11 The 'Yes' button shall be an up-type button.
- 9.3.5.12 Depending on the selected input field, the window shall present the corresponding keyboard which can be numeric, enhanced numeric, alphanumeric or a dedicated keyboard with predefined choices.
- 9.3.5.13 The buttons of the keyboard shall be down-type buttons.
- 9.3.5.14 Each button of the keyboard shall follow the dimension and position as specified in Table 24 in order to be above the navigation buttons.

<b>Keyboard</b>				
<b>Item</b>	<b>Width</b>	<b>Height</b>	<b>X Location</b>	<b>Y Location</b>
Keyboard key '1'	102	50	334	215
Keyboard key '2'	102	50	436	215
Keyboard key '3'	102	50	538	215
Keyboard key '4'	102	50	334	165
Keyboard key '5'	102	50	436	165
Keyboard key '6'	102	50	538	165
Keyboard key '7'	102	50	334	115
Keyboard key '8'	102	50	436	115
Keyboard key '9'	102	50	538	115
Keyboard key '10'	102	50	334	65
Keyboard key '11'	102	50	436	65
Keyboard key '12'	102	50	538	65
...	...	...	...	...

**Table 24 – keyboard (touch screen)**

- 9.3.5.15 When a numeric keyboard is presented, the keys 1 to 11 shall respectively contain enabled buttons for the numbers '1' to '9', the [delete] and the number '0'. The key 12 shall show the '.' Button as disabled.
- 9.3.5.16 When an enhanced numeric keyboard is presented, the key 12 shall contain the enabled button '.' in addition to the keys of a numeric keyboard.
- 9.3.5.17 When an alphanumeric keyboard is presented, the keys 1 to 11 shall respectively contain enabled buttons for the alphanumeric characters 1, 2/a/b/c,..., 9/w/x/y/z, the [delete], the number '0'. The key 12 shall show the '.' button as disabled. The labels of the keys shall separate the number from the letters with a space character e.g. '2 abc'.
- 9.3.5.18 When a dedicated keyboard is limited to a 'No'/'Yes' choice, the key '7' shall be the 'No' key and the key '8' shall be the 'Yes' key.
- 9.3.5.19 Figure 91 gives the layout of a data entry window with a single input field (without label part) on the half grid array.

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		Window Title		
		Data		
		Key '1'	Key '2'	Key '3'
		Key '4'	Key '5'	Key '6'
		Key '7'	Key '8'	Key '9'
		Key '10'	Key '11'	Key '12'
		X		

**Figure 91 – Data entry window with a single input field on half grid array (touch screen technology)**

9.3.5.20 Figure 92 gives the layout of a data entry window with 4 input fields covering the total grid array including echo texts, a request for '[Window Title] entry complete?', a 'Previous' and a 'Next' button to scroll between the windows related to the same topic.

Window Title (x/y)					
<div>Label 1 Data 1 Label 2 Data 2 Label 3 Data 3 Label 4 Data 4 Label 5 Data 5 ... ..</div> <div>[Window Title] entry complete?</div>	Label 1		Data 1		
	Label 2		Data 2		
	Label 3		Data 3		
	Label 4		Data 4		
	Key '1'	Key '2'	Key '3'		
	Key '4'	Key '5'	Key '6'		
	Key '7'	Key '8'	Key '9'		
	Key '10'	Key '11'	Key '12'		
	YES		X	◀	▶

**Figure 92 – Data entry window with 4 input fields on total grid array (touch screen technology)**



### **9.3.6 Data entry window for soft key technology**

9.3.6.1 A Data entry window shall contain respectively a maximum of 4 or of 3 input fields depending on whether the window covers the total grid array (i.e. A/B/C/D/E/G/I) or covers the half grid array (i.e. D/G/I).

9.3.6.1.1 Note: the number of input fields is limited to be able to present a dedicated keyboard below the last input field.

9.3.6.2 When the window covers the half grid array (D/G/I areas), each object (excluding the keyboard keys) shall follow the dimension and position as specified in Table 25.

<b><i>Data entry window on half grid array</i></b>				
<b><i>Item</i></b>	<b><i>Width</i></b>	<b><i>Height</i></b>	<b><i>X Location</i></b>	<b><i>Y Location</i></b>
D/G/I area	266	430	334	0
Window Title	266	24	334	456
Input field 1 (label part)	164	50	334	380
Input field 1 (data part)	102	50	498	380
Input field 2 (label part)	164	50	334	330
Input field 2 (data part)	102	50	498	330
Input field 3 (label part)	164	50	334	280
Input field 3 (data part)	102	50	498	280

**Table 25 – Data entry window on half grid array (soft key technology)**

9.3.6.3 When the window covers the total grid array (A/B/C/D/E/G/I areas), each object (excluding the keyboard keys, the echo texts and the objects for ‘data entry complete’) shall follow the dimension and position as specified in Table 26.

<b><i>Data entry window on total grid array</i></b>				
<b><i>Item</i></b>	<b><i>Width</i></b>	<b><i>Height</i></b>	<b><i>X Location</i></b>	<b><i>Y Location</i></b>
A/B/C/D/E/G/I area	600	430	0	0
Window Title	334	24	0	456
Input field 1 (label part)	164	50	334	430
Input field 1 (data part)	102	50	498	430
Input field 2 (label part)	164	50	334	380
Input field 2 (data part)	102	50	498	380
Input field 3 (label part)	164	50	334	330
Input field 3 (data part)	102	50	498	330
Input field 4 (label part)	164	50	334	280
Input field 4 (data part)	102	50	498	280

**Table 26 – Data entry window on total grid array (soft key technology)**

9.3.6.4 If the window contains only one input field and only the data part is presented (see 9.3.1.7), the dimension of the data part shall be the dimension of the merged area between input field 1 (label area) and input field 1 (data area) as expressed in Table 25 and Table 26.

- 9.3.6.5 When the window covers the total grid array (A/B/C/D/E/G/I areas), the text label of the window title shall be right aligned.
- 9.3.6.6 When no previous window containing input fields related to the same topic exists, the [Close] button shall be in H3.
- 9.3.6.7 When a previous window containing input fields related to the same topic exists, the [Previous] button shall be in H3.
- 9.3.6.8 When a next window containing input fields related to the topic exists, the [Next] button shall be in H4.
- 9.3.6.9 When a window contains more than one input field, The [Up] and [Down] buttons shall be respectively in H5 and H6.
- 9.3.6.10 The [Enter] button shall be in H7.
- 9.3.6.11 When a window on the total grid array contains more than one single input field, it shall be possible to echo the values of the input fields on the A/B/C/E area applying the requirements in 9.3.3.
- 9.3.6.12 When a window on the total grid array contains more than one single input field, the objects specified in Table 27 shall additionally be presented on the window for confirmation by the driver of the data entry completion.

<b><i>Data entry complete</i></b>				
area for '[Window Title] entry complete?'	334	50	0	100
'Yes' button	334	50	0	50

**Table 27 – Data entry complete objects (soft key technology)**

- 9.3.6.13 The 'Yes' button shall be enabled when all input fields related to the topic of the window(s) display a data value (displaying a value corresponding to pressed key(s) is not displaying a data value, for further details see Figure 90). Otherwise the 'Yes' button shall be disabled.
- 9.3.6.14 The text label of the 'Yes' button shall be in black. The background colour shall be in dark grey if the 'Yes' button is disabled or in medium grey if it is enabled. The 'Yes' button shall have the same border as an input field applying 5.1.1.1.4.
- 9.3.6.15 When the 'Yes' button is enabled, an associated soft key with the label 'Yes' shall be presented in F3 if the [Down] button has been pressed being on the last input field or if the [Up] button has been pressed being on the first input field.
- 9.3.6.15.1 Note: the access to the 'Yes' button is somehow integrated between the last and the first input fields within the circular list of input fields (see 9.3.1.25).
- 9.3.6.16 Depending on the selected input field, the window shall present in area F/H the corresponding keyboard which can be numeric, enhanced numeric, alphanumeric or a dedicated keyboard with predefined choices.
- 9.3.6.17 The buttons of the keyboard shall be down-type buttons.

- 9.3.6.18 When a numeric keyboard is presented, the buttons F1 to F10 shall be used respectively for the numbers 1, 2, ..., 9 and 0.
- 9.3.6.19 When an enhanced numeric keyboard is presented (i.e. when a '.' is used), the buttons F1 to F10 shall be used respectively for the numbers 1/ '.', 2, ..., 9 and 0. The label of F1 shall separate the number 1 from the dot '.' with a space character.
- 9.3.6.20 When an alphanumeric keyboard is presented, the buttons F1 to F10 shall be used respectively for the alphanumeric characters 1, 2/a/b/c, ..., 9/w/x/y/z and 0. The labels of the keys shall separate the number from the letters with a space character e.g. '2 abc'.
- 9.3.6.21 When a numeric, an enhanced numeric or an alphanumeric keyboard is presented, H2 shall be used for the [Delete] button.
- 9.3.6.22 When a dedicated keyboard with predefined choices is presented, the following shall apply:
- a) The window shall contain a list of selections (texts) in area D/G/I.
  - b) The list shall be displayed left aligned with an indent of 15 cells from the left of the area D/G/I i.e. the X position shall be 349.
  - c) The first selection of the list shall be 27 cells (i.e. an indent of 15 cells + the 12 cells of the character size) below the position of the input field 3 (half grid array) or input field 4 (total grid array) i.e. the Y position shall be 253.
  - d) The text of each selection shall:
    - start with a number giving the position of the selection in the list ;
    - identify the name/value of the selection ;
    - separate the number and the name/value of the selection by a '-'.
  - e) The numbers used for the selections shall be positioned in a logical order from 1 to maximum 10 ;
  - f) The labels of the F buttons shall be numbers matching the numbers of the selection/value.
- 9.3.6.22.1 Exception: When a dedicated keyboard is limited to a 'No'/'Yes' choice, no list of selections shall be presented in D/G/I area. F7 shall be the 'No' key and F8 shall be the 'Yes' key.
- 9.3.6.23 Figure 93 gives an example of the layout of a data entry window with a single input field and a numeric keyboard.



**Figure 93 – Data entry window with a single input field on half grid array and a numeric keyboard (soft key technology)**

9.3.6.24 Figure 94 gives an example of the layout of a data entry window with a single input field and a dedicated keyboard.



**Figure 94 – Data entry window with a single input field on half grid array and a dedicated keyboard (soft key technology)**

9.3.6.25 Figure 95 and Figure 96 give examples of the layout of a data entry window with 4 input fields covering the total grid array including echo texts and the request for 'TWindow

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Title] entry complete?'; Figure 95 when a numeric keyboard is associated to the selected input field, Figure 96 when dedicated keyboard is associated to the selected input field.

Window Title					Label 1		Data 1		
Label 1 Data 1 Label 2 Data 2 Label 3 Data 3 Label 4 Data 4					Label 2		Data 2		Del
					Label 3		Data 3		×
					Label 4		Data 4		
[Window Title] entry complete?					▲ ▼ ↩				
YES									
1	2	3	4	5					
6	7	8	9	0					

Figure 95 – data entry window with 4 input fields on total grid array and numeric keyboard (soft key technology)

Window Title					Label 1		Data 1		
Label 1 Data 1 Label 2 Data 2 Label 3 Data 3 Label 4 Data 4					Label 2		Data 2		
					Label 3		Data 3		×
					Label 4		Data 4		
[Window Title] entry complete?					1 - Selection #1 2 - Selection #2 3 - Selection #3 ▲ ▼ ↩				
YES									
1	2	3							

Figure 96 – data entry window with 4 input fields on total grid array and dedicated keyboard (soft key technology)

### **9.3.7 Layers**

- 9.3.7.1 The layers for data entry windows on half grid array shall be as follows:
- a) Layer 0: D/F/G (touch screen technology) or D/G/I (soft key technology)
  - b) All other areas: same as default window (see 8.1.1.4)
- 9.3.7.2 The layers for data entry windows on total grid array shall be as follows:
- a) Layer 0: all areas
  - b) Layer -1: none
  - c) Layer -2: none

## **9.4 Data validation windows**

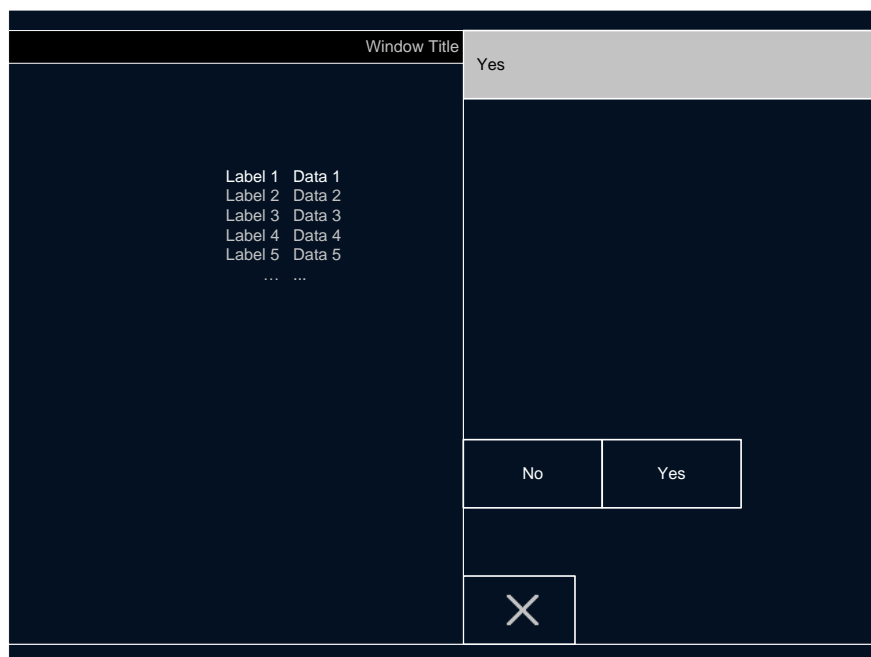
### **9.4.1 Data validation for touch screen technology**

- 9.4.1.1 The data validation window shall contain a single input field (only data part) with a dedicated keyboard being a 'No'/'Yes' choice (see 9.3.5.18).
- 9.4.1.2 Each object shall follow the dimension and position as specified in Table 28.
- 9.4.1.3 The text label of the window title shall be right aligned.

<b><i>Data validation window</i></b>				
<b><i>Item</i></b>	<b><i>Width</i></b>	<b><i>Height</i></b>	<b><i>X Location</i></b>	<b><i>Y Location</i></b>
A/B/C/D/E/F/G area	640	450	0	0
Window Title	334	24	0	441
'Close' button	82	50	334	15
Input field (data part)	306	50	334	415
'No' key	102	50	334	115
'Yes' key	102	50	436	115

**Table 28 – Data validation window (touch screen)**

- 9.4.1.4 The window shall give echo texts corresponding to the input fields of the topic (e.g. train data) to be validated applying the requirements in 9.3.3.
- 9.4.1.5 Figure 97 gives an example of the layout of a data validation window containing 5 data to be validated.



**Figure 97 – Data validation window (touch screen technology)**

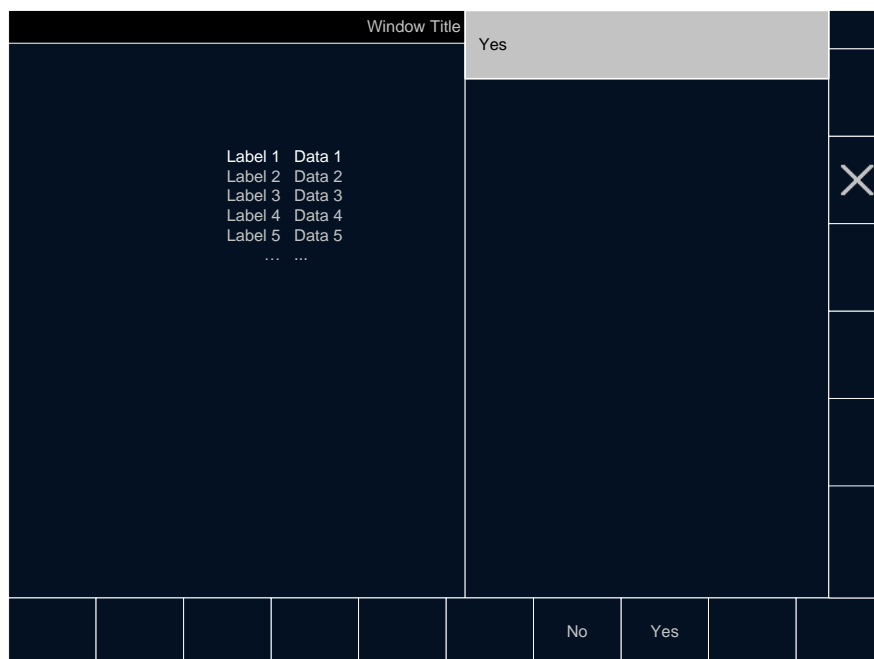
#### **9.4.2 Data validation for soft key technology**

- 9.4.2.1 The data validation window shall contain a single input field (only data part) with a dedicated keyboard being a 'No'/'Yes' choice (see 9.3.6.22.1).
- 9.4.2.2 Each object shall follow the dimension and position as specified in Table 29.
- 9.4.2.3 The text label of the window title shall be right aligned.

<b><i>Data validation window</i></b>				
<b><i>Item</i></b>	<b><i>Width</i></b>	<b><i>Height</i></b>	<b><i>X Location</i></b>	<b><i>Y Location</i></b>
A/B/C/D/E/G/I area	600	430	0	0
Window Title	334	24	0	456
'Input field (data part)	268	50	334	430

**Table 29 – Data validation window (soft key technology)**

- 9.4.2.4 The [Close] button shall be in H3.
- 9.4.2.5 The window shall give echo texts corresponding to the input fields of the topic (e.g. train data) to be validated applying the requirements in 9.3.3.
- 9.4.2.6 Figure 98 gives an example of the layout of a data validation window containing 5 data to be validated.



**Figure 98 – Data validation window (soft key technology)**

### 9.4.3 Layers

9.4.3.1 The layers for data validation window shall be as follows:

- a) Layer 0: all areas
- b) Layer -1: none
- c) Layer -2: none

## 9.5 Data view windows

### 9.5.1 Data view for touch screen technology

9.5.1.1 Each object shall follow the dimension and position as specified in Table 30.

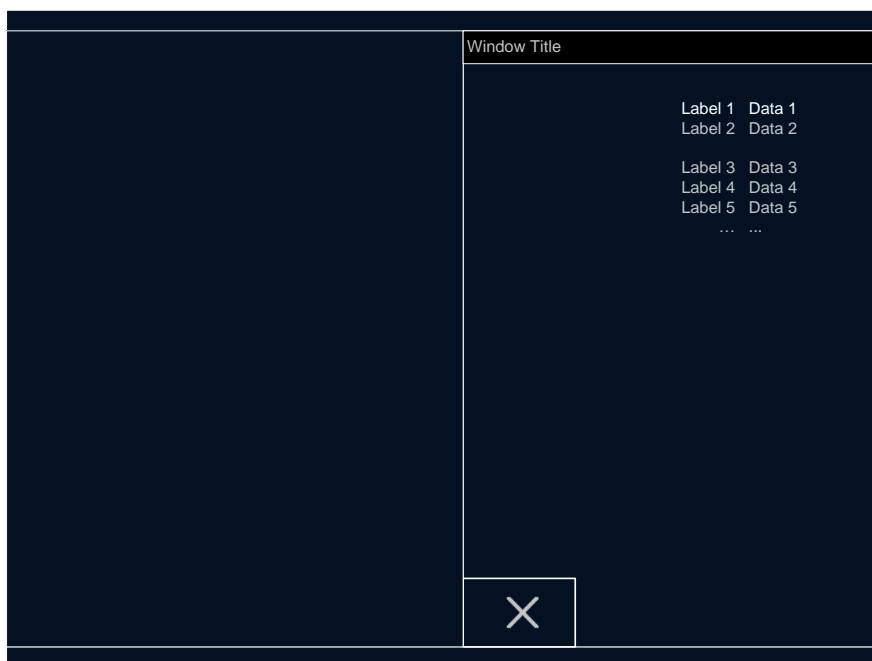
<b><i>Data View window</i></b>				
<b><i>Item</i></b>	<b><i>Width</i></b>	<b><i>Height</i></b>	<b><i>X Location</i></b>	<b><i>Y Location</i></b>
D/F/G area	306	450	334	15
'Close' button	82	50	334	15
Window Title	306	24	334	441

**Table 30 – Data view window (touch screen)**

- 9.5.1.2 A data view text shall be composed of a label part identifying the concerned data and of a data part displaying its data value.
- 9.5.1.3 The data part shall display the value only when it is valid (see reference [3] for the status unknown/invalid/valid).
- 9.5.1.4 The data view text shall be grey.
- 9.5.1.5 The data view texts shall be presented in D/F/G area.



- 9.5.1.6 Data view texts related to different topic shall be separated by one empty text line.
- 9.5.1.7 The labels of the data view texts shall be right aligned with an indent of 5 on the left side of the X position 538.
- 9.5.1.8 The label of the first data view text shall be 62 cells below the top of area D/F/G.
- 9.5.1.9 The data of the data view texts shall be left aligned with an indent of 5 cells on the right side of the X position 538.
- 9.5.1.10 The data of the first data view text shall be 62 cells (i.e. an indent of 50 cells + the 12 cells of the character size) below the top of area D/F/G.
- 9.5.1.11 Figure 99 gives an example of the layout of a data view window containing 5 data; the 2 first data view texts belonging to one topic, the next 3 data view texts belonging to another topic.



**Figure 99 – Data view window (touch screen technology)**

## **9.5.2 Data view for soft key technology**

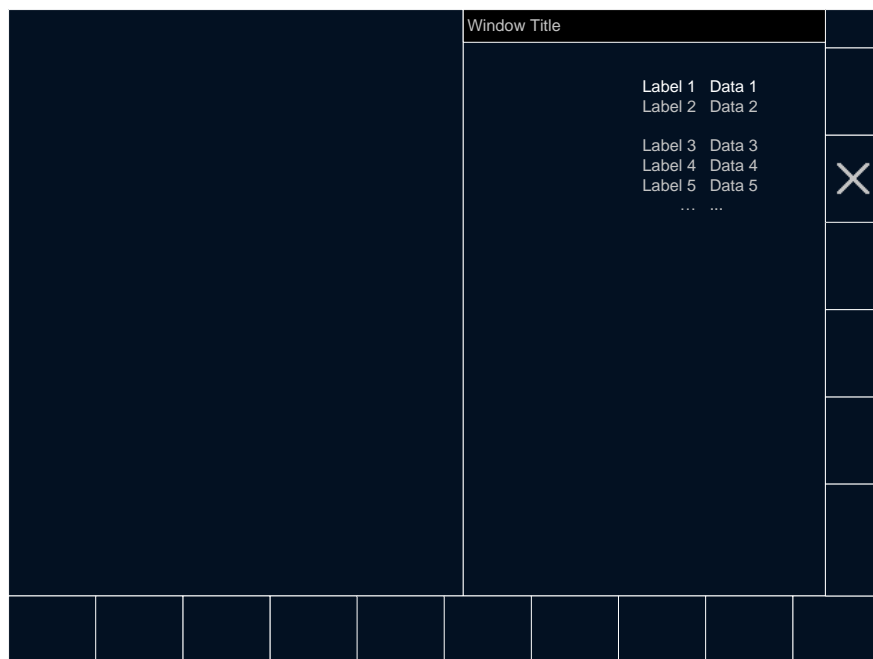
- 9.5.2.1 Each object shall follow the dimension and position as specified in Table 31.

<b><i>Data View window</i></b>				
<b><i>Item</i></b>	<b><i>Width</i></b>	<b><i>Height</i></b>	<b><i>X Location</i></b>	<b><i>Y Location</i></b>
D/G/I area	266	430	334	0
Window Title	266	24	334	456

**Table 31 – Data view window (soft key technology)**

- 9.5.2.2 The [Close] button shall be in H3.
- 9.5.2.3 A data view text shall be composed of a label part identifying the concerned data and of a data part displaying its data value.

- 9.5.2.4 The data part shall display the value only when it is valid (see reference [3] for the status unknown/invalid/valid).
- 9.5.2.5 The data view text shall be grey.
- 9.5.2.6 The data view texts shall be presented in D/G/I area.
- 9.5.2.7 Data view texts related to input fields belonging to different topic shall be separated by one empty text line.
- 9.5.2.8 The labels of the data view texts shall be right aligned with an indent of 5 on the left side of the X position 510.
- 9.5.2.9 The label of the first data view text shall be 62 cells below the top of area D/G/I.
- 9.5.2.10 The data of the data view texts shall be left aligned with an indent of 5 cells on the right side of the X position 510.
- 9.5.2.11 The data of the first data view text shall be 62 cells (i.e. an indent of 50 cells + the 12 cells of the character size) below the top of area D/G/I.
- 9.5.2.12 Figure 100 gives an example of the layout of a data view window containing 5 data; the 2 first data view texts belonging to one topic, the next 3 data view texts belonging to another topic.



**Figure 100 – Data view window (soft key technology)**

### **9.5.3 Layers**

- 9.5.3.1 The layers for data view windows shall be as follows:
- a) Layer 0: D/F/G (touch screen technology) or D/G/I (soft key technology)
  - b) All other areas: same as default window (see 8.1.1.4)

## **9.6 Data entry / validation process**

- 9.6.1.1 If not started yet, a data entry / validation process regarding a topic shall start when the first data entry window of this topic is displayed.
- 9.6.1.2 If no validation window regarding the same topic as the data entry window exists, the data entry / validation process shall stop:
  - a) when one of the data entry window(s) is left by accepting the data values via the 'Yes' button, or
  - b) when any of the data entry window(s) is left via the close button
- 9.6.1.3 If a validation window regarding the same topic as the data entry window exists, the data entry / validation process shall stop:
  - a) when the validation window is left by accepting a data value set to 'Yes' in its input field, or
  - b) when any of the data entry window(s) is left via the close button, or
  - c) when the validation window is left via the close button.

## 10. ERTMS/ETCS SUB-LEVEL WINDOWS

### 10.1 Introduction

10.1.1.1 This chapter defines the ERTMS/ETCS sub-level windows based on the general requirements of chapter 9. It is applicable for all ERTMS/ETCS levels.

### 10.2 Menu Windows

#### 10.2.1 Main window

10.2.1.1 The main window shall comply with the requirements in section 9.2.

10.2.1.2 The window title shall indicate “Main”.

10.2.1.3 The buttons (for touch screen technology) / selections (for soft keys technology) shall indicate the label as specified in Table 32.

10.2.1.4 The buttons of the Main window shall be enabled when the conditions specified in Table 32 are fulfilled.

10.2.1.4.1 Note: The button / selection #4 is intentionally not used.

10.2.1.5 The ‘Shunting’ and ‘Non-Leading’ buttons shall be delay type buttons.

10.2.1.5.1 Note: When buttons #7 and #8 are used respectively for ‘Exit Shunting’ and ‘Exit Non-Leading’, they are up-type buttons.

10.2.1.6 When the hour glass symbol ST05 is presented (due to an exchange of messages with the RBC, see section 10.6), it shall be shown vertically centered in the ‘Main’ window title area. The first X position of the symbol shall be 42 cells from the left of the window title area. It shall then move 26 cells to the right every second. When it is no more possible to display the symbol ST05 inside the window title area, the symbol shall come back to its first position and shall start again moving to the right with the same pace.

Button / selection #	label	Enabling conditions	SRS §
1	Start	(train is at standstill) AND (mode is SB/SR/PT/SE/SN) AND (Driver ID is valid) AND (Train Data are valid) AND (ERTMS/ETCS level is valid) AND (((ERTMS/ETCS level is 0/1/STM) OR ((ERTMS/ETCS level is 2/3) AND (Train Data acknowledged by RBC) AND (no pending emergency stop is stored onboard))))	3.8.2.7
			4.4.11.1.6
			4.4.14.1.6
			4.7.2
			5.4.3.2 S20
			5.11.3 S140
2	Driver ID	(mode is SB/FS/SR/OS/NL/UN/SE/SN)	3.18.4.1
			4.7.2
			5.4.3.2 S1

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Button / selection #	label	Enabling conditions	SRS §
3	Train data	(train is at standstill) AND (Driver ID is valid) AND (ERTMS/ETCS level is valid) AND (mode is SB/FS/SR/OS/UN/SE/SN)	3.18.3.2 a
			3.18.3.2 b
			3.18.3.2 c
			3.18.3.2 d
			3.18.3.2 e
			3.18.3.2 f
			3.18.3.2 g
			3.18.3.2 h
			3.18.3.2 i
			3.18.3.2 j
			3.18.3.2.1
			3.18.3.5
			4.7.2
			5.4.3.2 S12
			5.14.2.2
			5.14.3.3
5	Level	(train is at standstill) AND (Driver ID is valid) AND (mode is SB/FS/SR/OS/NL/UN/SE/SN)	3.18.4.2 (including CR223)
			4.7.2
			5.4.3.2 S2
			5.4.3.2 S10
			5.10.2.9 (including CR223)
			5.15.4.1 (CR748)
			5.15.4.2 (CR748)
6	Train running number	(Driver ID is valid) AND (ERTMS/ETCS level is valid) AND (mode is SB/FS/SR/OS/UN/SE/SN) AND (Train Data are valid)	3.18.3.2 k
			3.18.3.2.1
			3.18.3.5
			4.7.2
			5.4.3.2 S12
			5.14.2.2
			5.14.3.3
7	Shunting	(train is at standstill) AND (Driver ID is valid) AND (mode is SB/FS/SR/OS/UN/PT) AND (ERTMS/ETCS level is valid) AND (((ERTMS/ETCS level is 0/1) OR ((ERTMS/ETCS level is 2/3) AND (communication session exists) AND (no pending emergency stop is stored onboard)))	4.4.8.1.6
			4.4.14.1.7
			4.6.3 [5]
			4.7.2
			5.6.3 E015
			5.4.3.2 S10
			5.6.1.1
			5.11.3 S140
	Exit Shunting	(train is at standstill) AND (Driver ID is valid) AND (ERTMS/ETCS level is valid) AND (mode is SH)	4.6.3 [19] 4.7.2

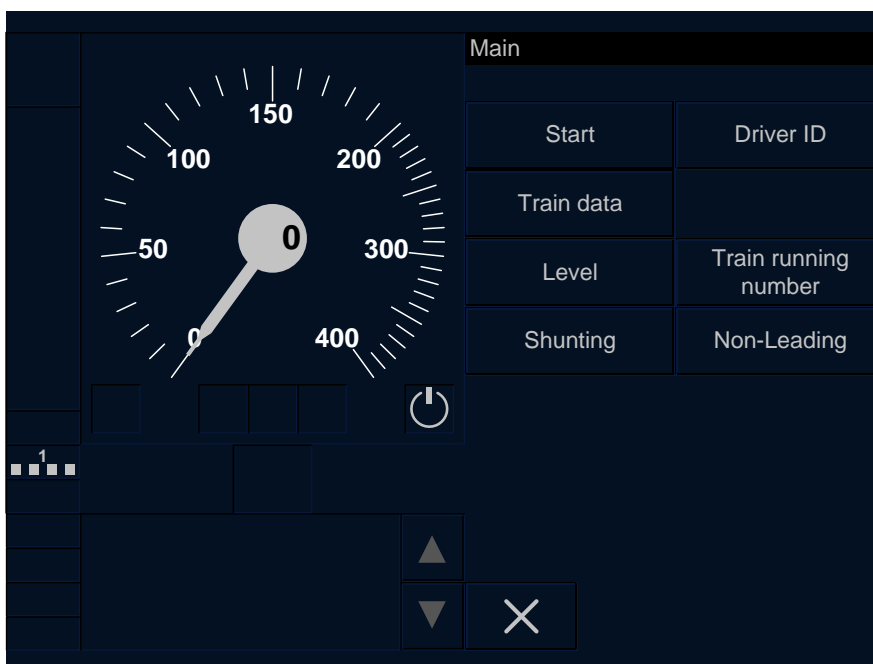
# ERA ERTMS unit

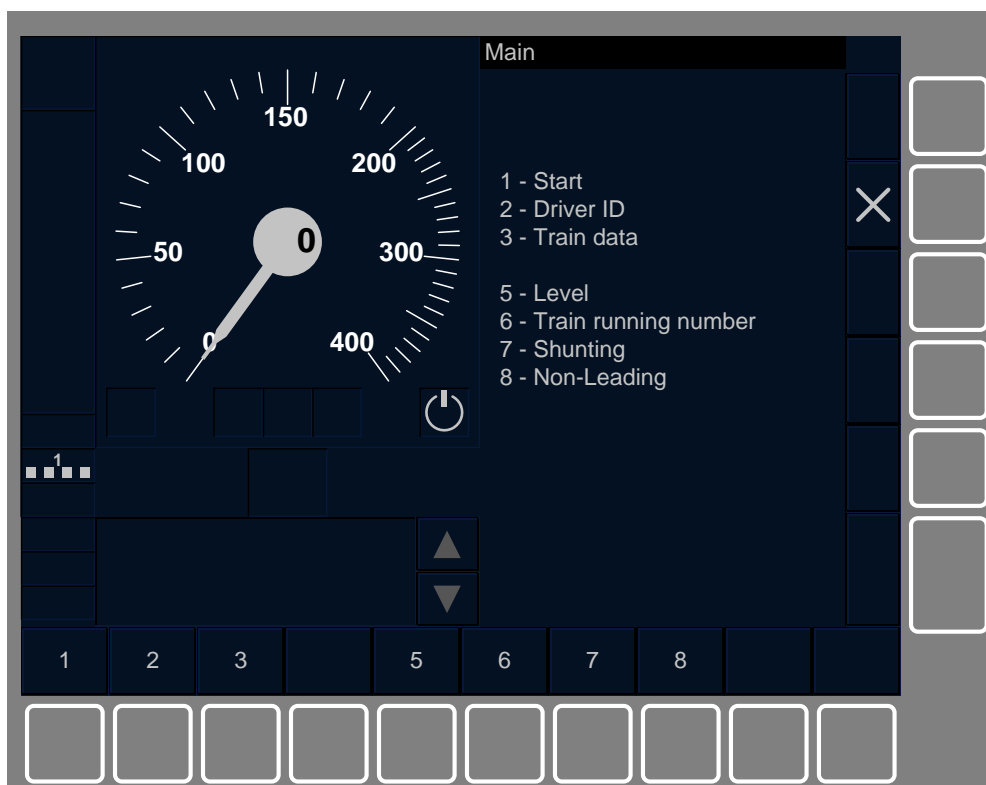
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Button / selection #	label	Enabling conditions	SRS §
8	Non-Leading	(train is at standstill) AND (Driver ID is valid) AND (ERTMS/ETCS level is valid) AND (mode is SB/SH/FS/SR/OS)	4.4.15.3.2
			4.6.3 [46]
			4.7.2
			5.4.3.2 S10
			5.14.3.5
	Exit Non-Leading	(train is at standstill) AND (Driver ID is valid) AND (ERTMS/ETCS level is valid) AND (mode is NL)	4.6.3 [47]
			4.7.2
			5.12.3.4.2

**Table 32 – Button / selection label**

10.2.1.7 Figure 101 shows the presentation of the main window (if not in SH or NL mode).





**Figure 101 – Main window**

## 10.2.2 Override window

10.2.2.1 The override window shall comply with the requirements in section 9.2.

10.2.2.2 The window title shall indicate “Override”.

10.2.2.3 The button (for touch screen technology) / selection (for soft keys technology) shall indicate the label as specified in Table 33.

10.2.2.4 The button of the Override window shall be enabled when the conditions specified in Table 33 are fulfilled.

Button /selection #	label	Enabling conditions	SRS §
1	EOA	(train speed is under max speed limit for triggering the override end of authority function) AND (mode is SB/SH/FS/SR/OS/UN/PT/SE/SN) AND (Driver ID is valid) AND (Train Data are valid) AND (ERTMS/ETCS level is valid)	4.4.11.1.6.5
			4.4.14.1.7
			4.6.3 [37]
			4.7.2
			5.4.3.2 S10
			5.4.5.2
			5.8.2.1
			5.8.2.2
			5.8.2.3
			5.11.4.2
			5.15.4.1 (CR748)
			5.15.4.2 (CR748)

Table 33 – Button / selection label

10.2.2.5 Figure 102 shows the presentation of the override window.

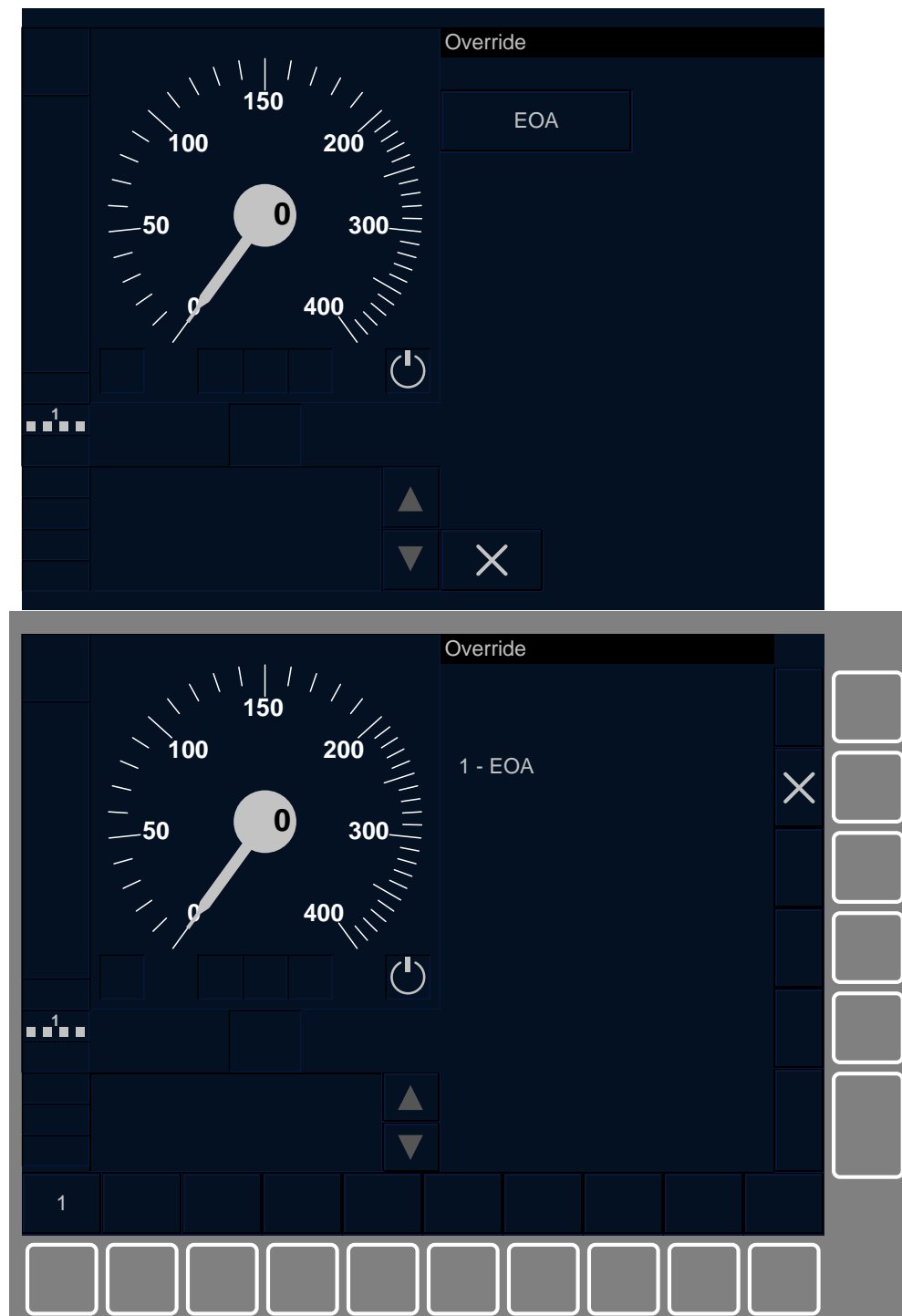


Figure 102 – Override window

### 10.2.3 Special window

10.2.3.1 The Special window shall comply with the requirements in section 9.2.

10.2.3.2 The window title shall indicate “Special”.



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- 10.2.3.3 The buttons (for touch screen technology) / selections (for soft keys technology) shall indicate the label as specified in Table 34.
- 10.2.3.4 The buttons of the Special window shall be enabled when the conditions specified in Table 34 are fulfilled.
- 10.2.3.5 The 'Train integrity' button shall be a delay type button.

Button /selection #	label	Enabling conditions	SRS §
1	Adhesion	(Modification of adhesion factor by driver is allowed by national value) AND (mode is SB/FS/SR/OS/NL/UN/SE/SN)	3.18.4.6.2.1 4.7.2
2	SR speed / distance	(train is at standstill) AND (mode is SR)	4.4.11.1.5 4.7.2 5.8.3.5
3	Train integrity	(train is at standstill) AND (mode is SB/FS/SR/OS/PT) AND (ERTMS/ETCS level is valid) AND (ERTMS/ETCS level is 3)	3.6.5.1.4 c 3.6.5.2.1 3.6.5.2.2 4.7.2

**Table 34 – Button / selection label**

- 10.2.3.6 Figure 103 shows the presentation of the "Special" window (with the SR speed/distance button 'disabled').

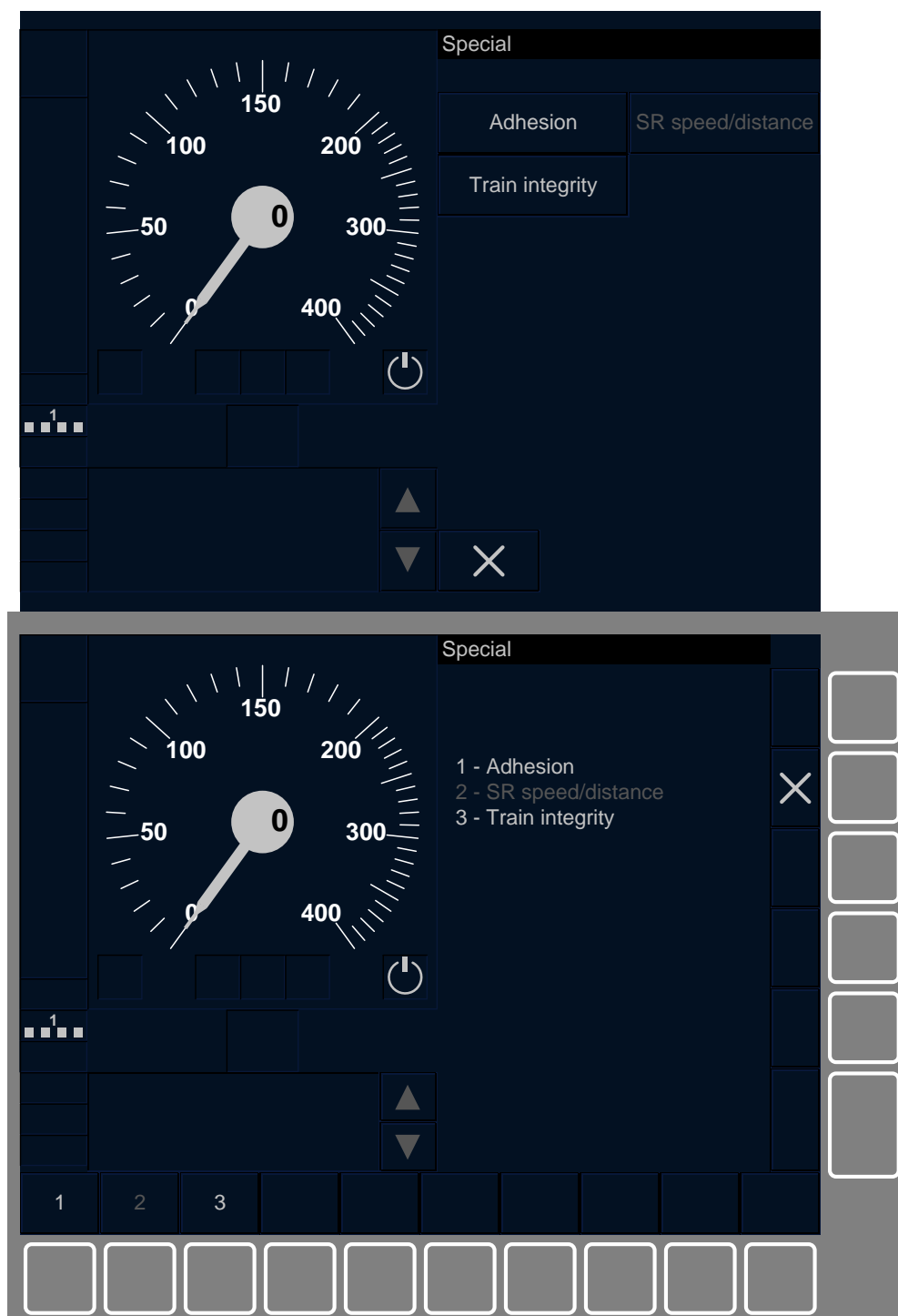


Figure 103 – Special window

#### 10.2.4 Settings window

- 10.2.4.1 The Settings window shall comply with the requirements in section 9.2.
- 10.2.4.2 The window title shall indicate “Settings”.
- 10.2.4.3 The buttons (for touch screen technology) / selections (for soft keys technology) shall indicate the label as specified in Table 35.

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10.2.4.4 The buttons of the Settings window shall be enabled when the conditions specified in Table 35 are fulfilled.

Button /selection #	label	Enabling conditions	SRS §
1	Symbol SE03 (for touch) Language (for soft)	(mode is SB/SH/FS/SR/OS/NL/UN/SE/SN)	4.7.2
2	Symbol SE02 (for touch) Volume (for soft)	(mode is SB/SH/FS/SR/OS/NL/UN/PT/SE/SN)	-
3	Symbol SE01 (for touch) Brightness (for soft)	(mode is SB/SH/FS/SR/OS/NL/UN/PT/SE/SN)	-

**Table 35 – Button / selection label**

10.2.4.5 Figure 104 shows the presentation of the “Settings” window.

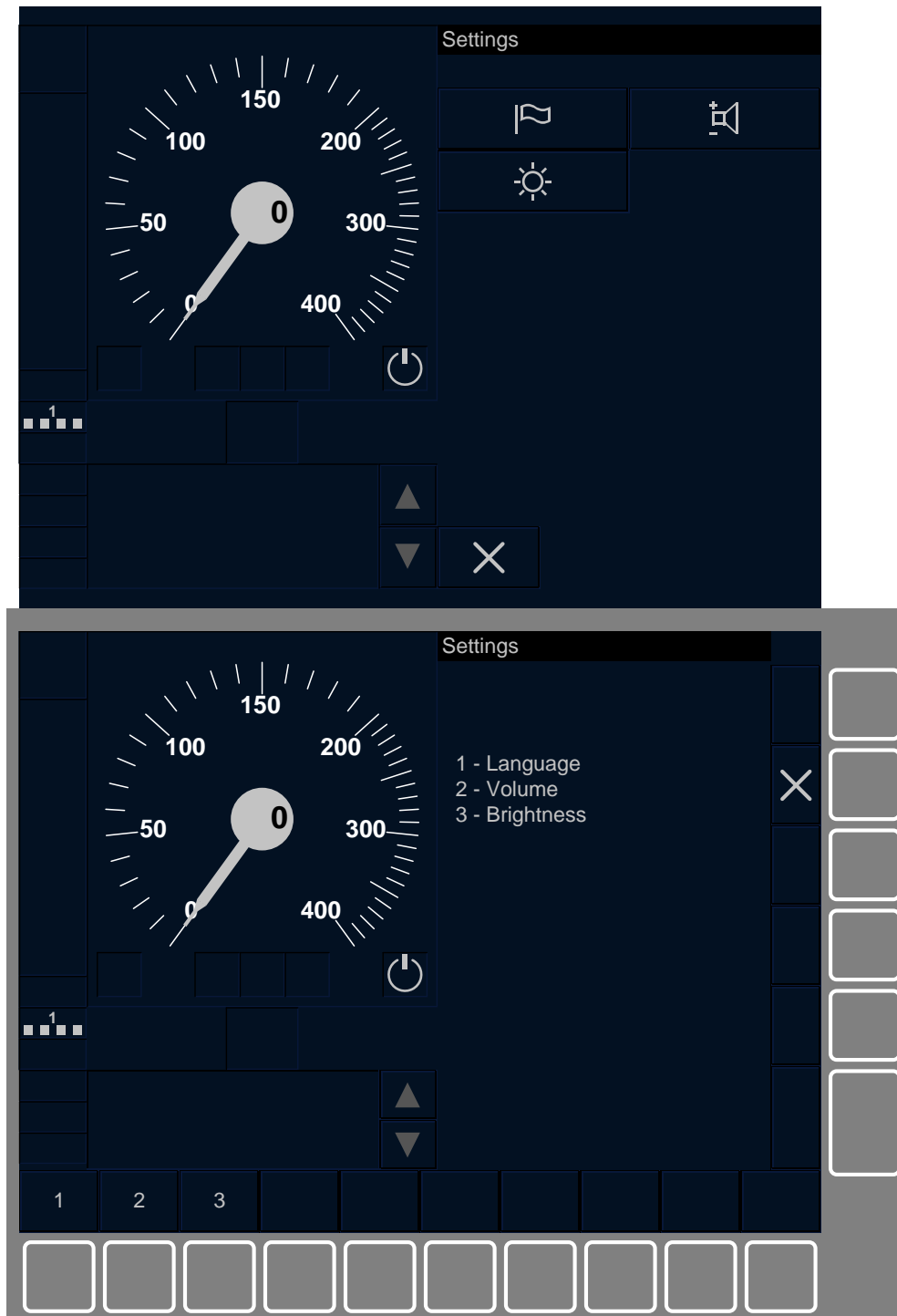


Figure 104 – Settings window

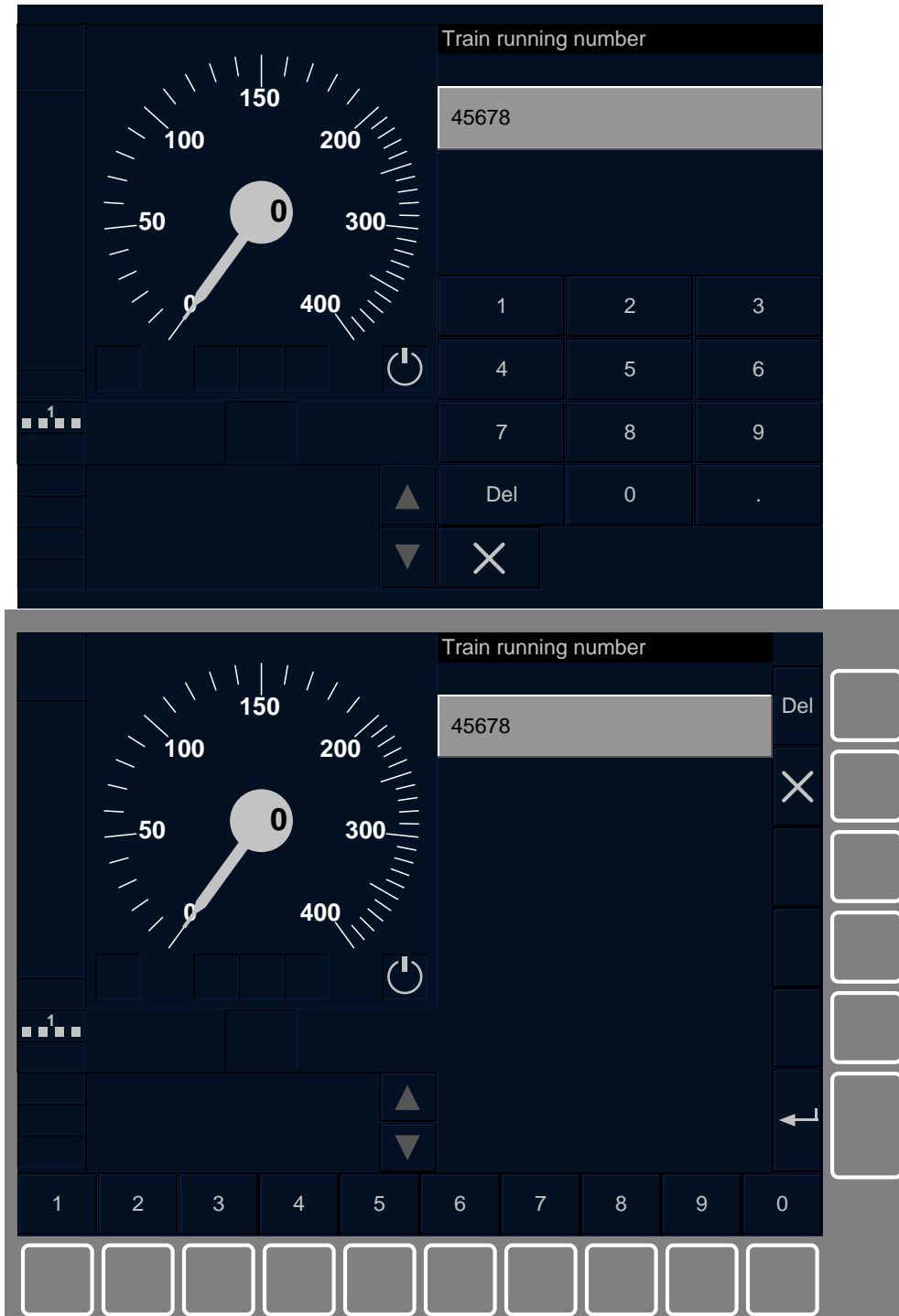
## 10.3 Data entry Windows

### 10.3.1 Train running number window

10.3.1.1 The Special window shall comply with the requirements in section 9.3 for a window on half grid array containing a single input field with only the data part.

10.3.1.2 The window title shall indicate “Train running number”.

- 10.3.1.3 The single input field shall be used for the entry / revalidation of the train running number.
- 10.3.1.4 The keyboard associated to the train running number shall be a numeric keyboard.
- 10.3.1.5 Figure 105 shows the presentation of the Train running number window.



**Figure 105 – Train running number window**

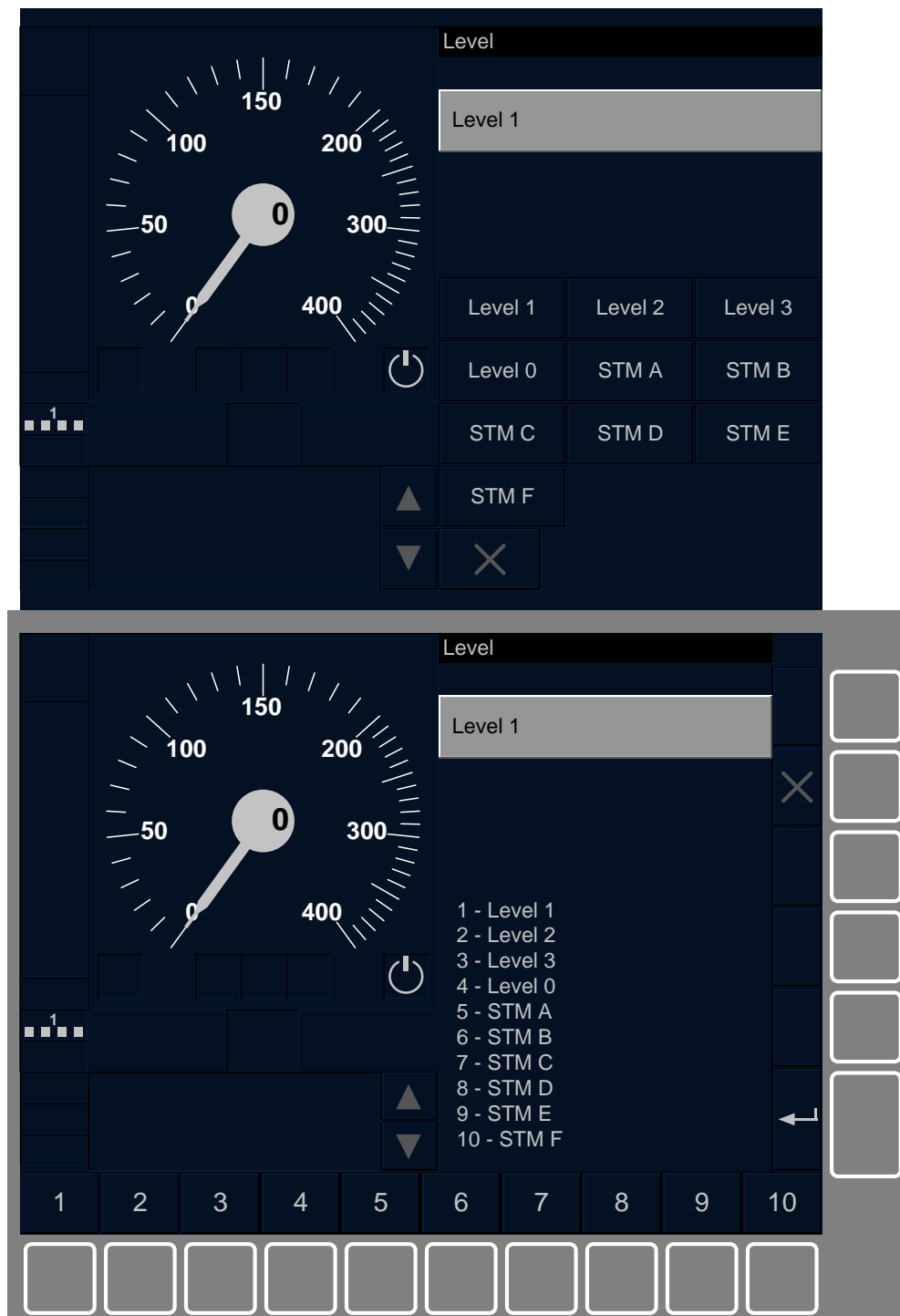
### **10.3.2 ERTMS/ETCS level window**

- 10.3.2.1 The ERTMS/ETCS level window shall comply with the requirements in section 9.3 for a window on half grid array containing a single input field with only the data part.
- 10.3.2.2 The window title shall indicate “Level”.
- 10.3.2.3 The single input field shall be used for the entry / revalidation of the ERTMS/ETCS level.
- 10.3.2.4 The keyboard associated to the ERTMS/ETCS level shall be a dedicated keyboard as specified in Table 36 displaying the possible ERTMS/ETCS level(s).

Button /selection #	Label
1	Level 1
2	Level 2
3	Level 3
4	Level 0
5	STM A
6	STM B
7	STM C
8	STM D
9	STM E
...	...

**Table 36 –keyboard for ERTMS/ETCS level**

- 10.3.2.5 The buttons / selections #1, 2, 3, 4 shall be reserved respectively for the ERTMS/ETCS levels 1, 2, 3, 0.
- 10.3.2.6 For STM levels, the labels ‘STM A’, ‘STM B’, ... shall be replaced by the distinct abbreviations of the concerned STMs (e.g. KVB, PZB, ASFA etc.).
- 10.3.2.7 When a table of priority of trackside supported levels (see document [3] for further details) is available onboard, only the buttons corresponding to ERTMS/ETCS levels satisfying to the following condition shall be enabled; the other buttons shall be disabled:
- a) contained in the table of priority of trackside supported levels, and
  - b) fitted onboard and available for use.
- 10.3.2.8 When a table of priority of trackside supported levels is not available onboard, only the buttons corresponding to ERTMS/ETCS levels satisfying to the following condition shall be enabled; the other buttons shall be disabled:
- a) fitted onboard and available for use.
- 10.3.2.9 Figure 106 shows the presentation of the ERTMS/ETCS level window (with 6 STMs).



**Figure 106 – ERTMS/ETCS level window**

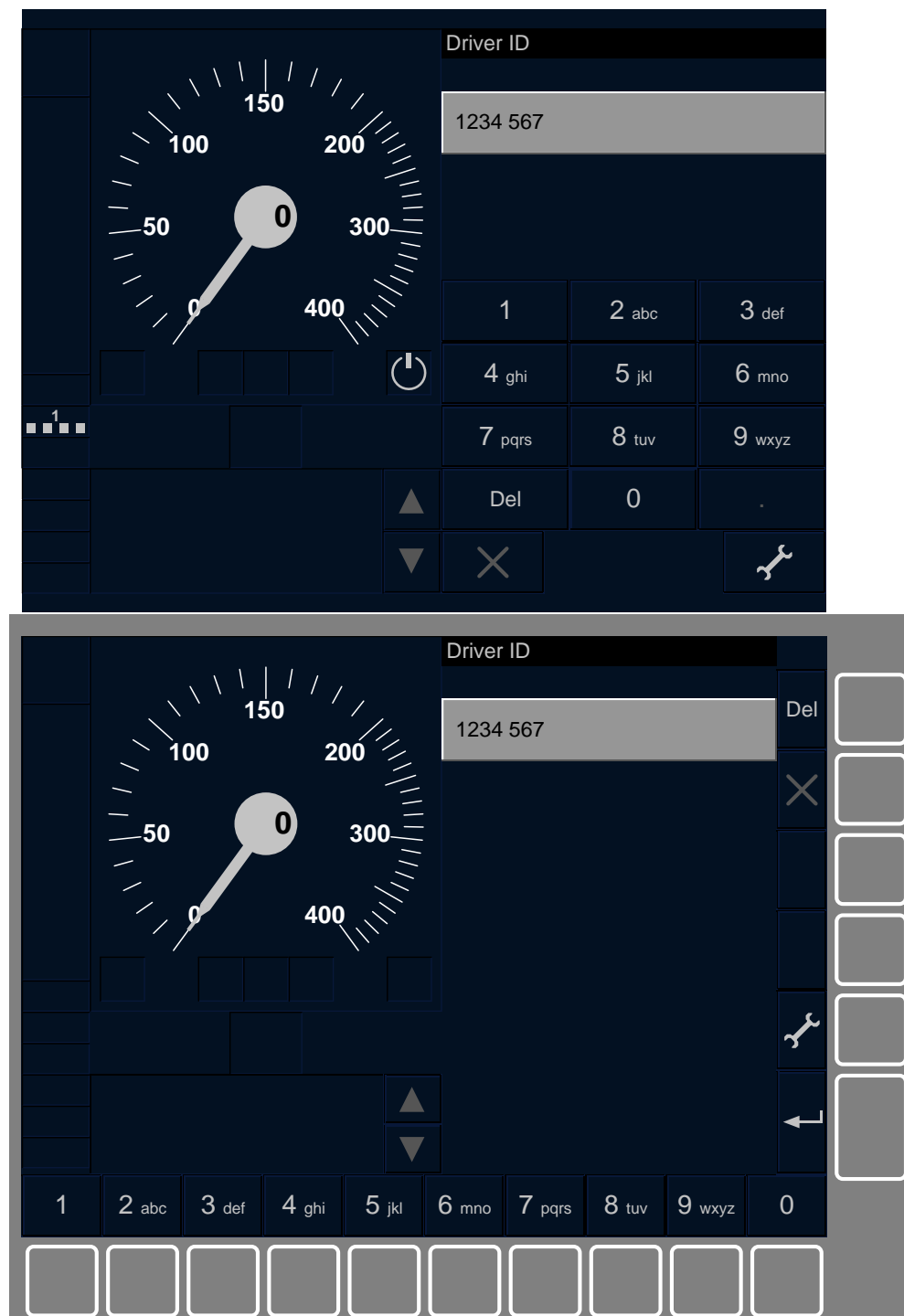
### **10.3.3 Driver ID window**

- 10.3.3.1 The Driver ID window shall comply with the requirements in section 9.3 for a window on half grid array containing a single input field with only the data part.
- 10.3.3.2 The window title shall indicate “Driver ID”.
- 10.3.3.3 The single input field shall be used for the entry / revalidation of the driver ID.
- 10.3.3.4 The keyboard associated to the driver id shall be an alphanumeric keyboard.

10.3.3.5 When the onboard is in the step S1 of the start up dialogue sequence (see 10.7.2), the driver ID window shall also present a 'settings' button with the symbol SE04:

- a) For touch screen technology: in the bottom right corner of D/F/G area with a size of 82 x 50 cells (w x h),
- b) For soft key technology: in H6.

10.3.3.6 Figure 107 shows the presentation of the driver ID window.



**Figure 107 – driver ID window**



### **10.3.4 RBC contact information window**

- 10.3.4.1 The RBC contact information window shall comply with the requirements in section 9.3 for a window on total grid array with the question 'RBC contact information entry complete?' but no echo texts.
- 10.3.4.2 The window title shall indicate "RBC contact information".
- 10.3.4.3 The 1<sup>st</sup> input field with the label 'Radio network ID' shall be used for the entry / revalidation of the Radio network identity.
- 10.3.4.4 The 2<sup>nd</sup> input field with the label 'RBC ID' shall be used for the entry / revalidation of the RBC identity.
  - 10.3.4.4.1 When converting the entered RBC identity into binary format, the 14 less significant bits shall form the variable NID\_RBC and the remaining bits (max 10 bits) shall form the variable NID\_C (see [3] chapter 7 for the definitions of NID\_C and NID\_RBC).
- 10.3.4.5 The 3<sup>rd</sup> input field with the label 'RBC telephone number' shall be used for the entry / revalidation of the RBC telephone number.
- 10.3.4.6 The keyboards associated to the 3 input field(s) shall be numeric keyboards.
- 10.3.4.7 Figure 108 shows the presentation of the RBC contact information window.

The figure displays two versions of the 'RBC contact information' window. The top version is a compact interface with a dark blue background. It features a header 'RBC contact information' and three data fields: 'Radio network ID' (1234 56), 'RBC ID' (1234 5678), and 'RBC telephone number' (1234 5678, 9012 3456). Below these is a 3x3 numeric keypad (1-9) and a 'Del' button. A prompt 'RBC contact information entry complete?' is followed by a 'Yes' button and a close button (X). The bottom version is an expanded interface. It has the same data fields but a larger numeric keypad (0-9) and a 'Del' button. It also includes a 'Yes' button, a close button (X), and a set of navigation buttons (up, down, left, right) on the right side. The prompt 'RBC contact information entry complete?' is also present.

**Figure 108 – RBC contact information window**

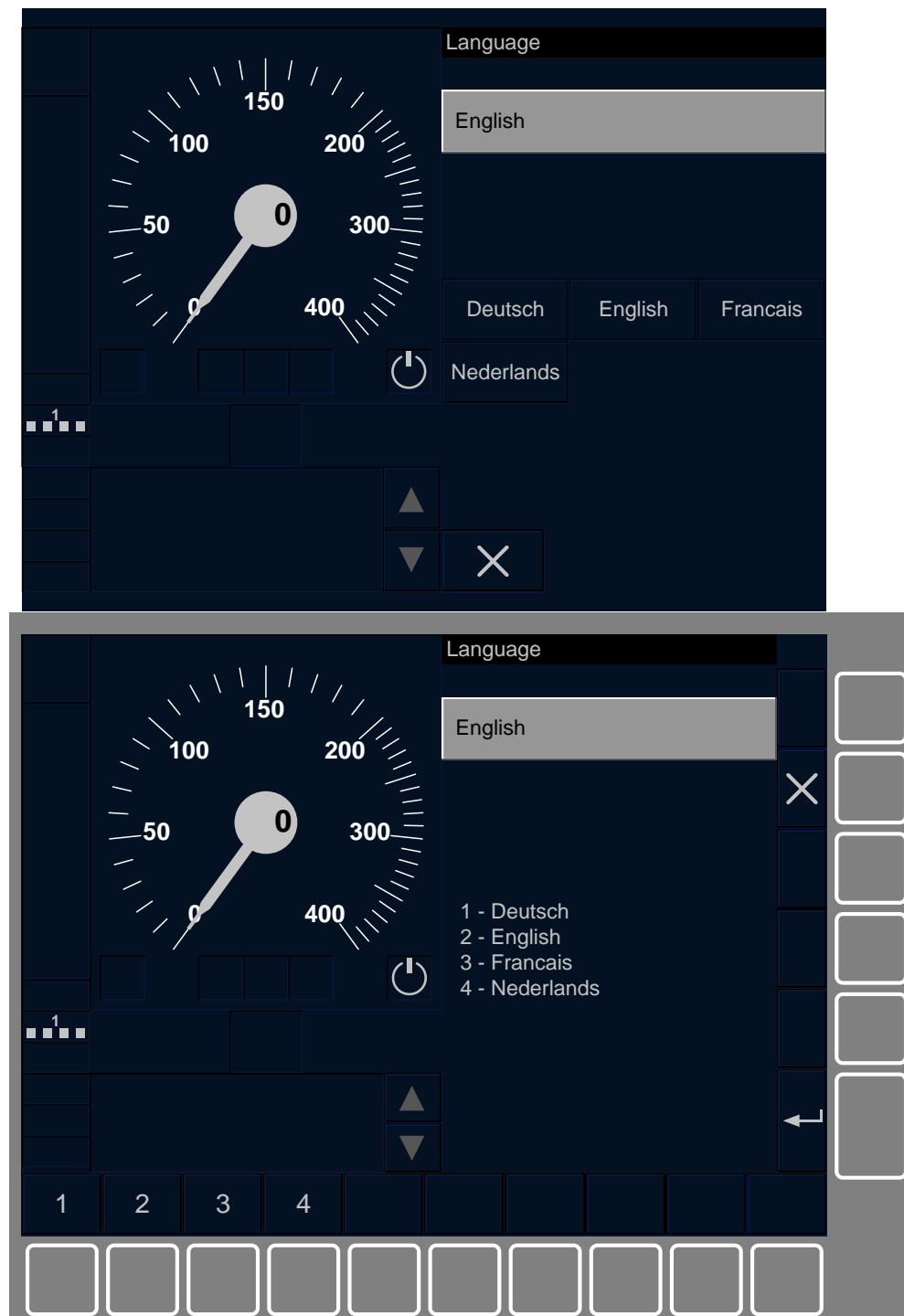
### **10.3.5 Language window**

- 10.3.5.1 The language window shall comply with the requirements in section 9.3 for a window on half grid array containing a single input field with only the data part.
- 10.3.5.2 The window title shall indicate “Language”.
- 10.3.5.3 The single input field shall be used for the entry / revalidation of the language.

10.3.5.4 The keyboard associated to the language shall be a dedicated keyboard displaying the possible language(s).

10.3.5.4.1 Note: the possible language(s) depends on the onboard configuration.

10.3.5.5 Figure 109 shows the presentation of the language window.



**Figure 109 – Language window**

### **10.3.6 Volume window**

10.3.6.1 The Volume window shall comply with the requirements in section 9.3 for a window on half grid array containing a single input field with only the data part.

- 10.3.6.2 The window title shall indicate "Volume".
- 10.3.6.3 The single input field shall be used for the entry / revalidation of the volume.
- 10.3.6.4 The keyboard associated to the volume shall be a dedicated keyboard.
- 10.3.6.4.1 Note: the definition of the keyboard is an implementation issue; e.g. several buttons for different levels of volume, 2 buttons to respectively decrease/increase the volume level,...

### **10.3.7 Brightness window**

- 10.3.7.1 The Brightness window shall comply with the requirements in section 9.3 for a window on half grid array containing a single input field with only the data part.
- 10.3.7.2 The window title shall indicate "Brightness".
- 10.3.7.3 The single input field shall be used for the entry / revalidation of the luminance.
- 10.3.7.4 The keyboard associated to the luminance shall be a dedicated keyboard.
- 10.3.7.4.1 Note: the definition of the keyboard is an implementation issue; e.g. several buttons for different levels of luminance, 2 buttons to respectively decrease/increase the luminance level,...

### **10.3.8 Train data window(s)**

- 10.3.8.1 The Train data window(s) shall comply with the requirements in section 9.3 for a window on total grid array with echo texts and with the question 'Train data entry complete?'.
- 10.3.8.2 The window title shall indicate "Train data".
- 10.3.8.3 If there are more than one 'Train data' window, the window titles shall also comply with 5.3.1.2.1g) for the indication of the sequence number of the windows and the total number of windows related to the train data.
- 10.3.8.4 If data check rules have been defined for train data, the requirements in section 9.3.4 shall apply for the echo texts.
- 10.3.8.5 The number of input fields is not mentioned since it can vary depending on:
  - a) the chosen procedure for the train data entry (see 10.3.8.7),
  - b) whether some train data are pre-configured onboard,
  - c) whether some train data are received from other ERTMS/ETCS external sources (e.g. from the train interface),
  - d) whether train data pre-configured onboard or received from other ERTMS/ETCS external sources are modifiable by the driver,
  - e) the additional needed data for the STMs available onboard.
- 10.3.8.5.1 Note: The choice to allow or not the driver to modify a train data pre-configured onboard or received from other ERTMS/ETCS external sources is outside of the scope of this specification.

10.3.8.6 Additional data for STMs available onboard is out of the scope of this document. The only requirement is that the corresponding input fields shall be part of the train data window(s).

10.3.8.7 It shall be possible to pre-configure the onboard to achieve the train data entry in one of the two following procedures:

- a) *Fixed train data entry*: the train data window shall contain only one input field allowing the driver to enter a train code amongst a limited number of pre-configured ones. Each train code shall represent a combination of all train data. Once a train code is selected, the onboard shall not offer any possibility for the driver to change any value of a specific train data composing the selected train code.
- b) *Flexible train data entry*: the train data entry window shall contain one or more input fields for the specific train data the driver has to enter/modify.

#### **10.3.8.8 Keyboard associated to the fixed train data entry**

10.3.8.8.1 The keyboard associated to the train code of the fixed train data entry shall be as specified in Table 37.

Input Field	Keyboard
Train code	Dedicated keyboard with each key label giving the name of the train code

**Table 37 –keyboard for fixed train data entry**

10.3.8.8.2 Note: the naming of the train codes is outside of the scope of this specification.

#### **10.3.8.9 Keyboards associated to the flexible train data entry**

10.3.8.9.1 The keyboards associated to the possible input field(s) of the flexible train data entry shall be as specified in Table 38.

Input Field	Keyboard
Train category	Dedicated keyboard
Length (m)	Numeric
Brake percentage	Numeric
Maximum speed (km/h)	Numeric
Axle load (t)	Enhanced Numeric
Airtight	Dedicated keyboard Touch screen technology: Key '7' = No Key '8' = Yes Soft Key technology: F7= No F8 = Yes

**Table 38 – keyboards for flexible train data entry**

10.3.8.9.2 The allowed combinations of the cant deficiency and of the train/brake type (for further details, see values of NC\_TRAIN defined in [http://www.era.europa.eu/public/core/ertms/Pages/etcs\\_nc\\_train.aspx](http://www.era.europa.eu/public/core/ertms/Pages/etcs_nc_train.aspx)) as well as the names allocated to these combinations result in the possible values of the 'Train category' input field mentioned in this document. The keys of the dedicated keyboard shall correspond to the names of these allowed combinations.

10.3.8.9.2.1 Note: Defining the allowed combinations and their names requires some harmonisation at European level. This work is still to be done.

#### **10.3.8.10 Example of Train data for a variable train formation**

10.3.8.10.1 This kind of train data windows are typically used for freight trains or passenger trains with a certain number of coaches.

10.3.8.10.2 Figure 110 and Figure 111 show the presentation of the Train data windows for a variable train formation without any train data pre-configured onboard or received from other ERTMS/ETCS external sources.

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Train data (1/2)	
<div>Train category combi 1 Length (m) 200 Brake percentage 135 Max speed (km/h) 160 Axle load (t) 22.5 Airtight no</div> <div>Train data entry complete?</div>	Train category
	combi 1
	Airtight
	no
	Brake percentage
	135
	Max speed (km/h)
	160
	combi 1
	combi 2
combi 3	
combi 4	
combi 5	
combi 6	
combi 7	
combi 8	
combi 9	
Train data entry complete?	
<div>Yes</div> <div style="display: flex; justify-content: space-around; align-items: center;"><span>✕</span><span>◀</span><span>▶</span></div>	

Train data (1/2)	
<div>Train category combi 1 Length (m) 200 Brake percentage 135 Max speed (km/h) 160 Axle load (t) 22.5 Airtight no</div> <div>Train data entry complete?</div>	Train category
	combi 1
	Length (m)
	200
	Brake percentage
	135
	Max speed (km/h)
	160
	1 - combi 1
	2 - combi 2
3 - combi 3	
4 - combi 4	
5 - combi 5	
6 - combi 6	
7 - combi 7	
8 - combi 8	
9 - combi 9	
Train data entry complete?	
<div>Yes</div> <div style="display: flex; justify-content: space-around; align-items: center;"><span>✕</span><span>▶</span><span>▲</span><span>▼</span><span>↶</span></div>	

1

2

3

4

5

6

7

8

9

**Figure 110 – Train data window for a variable train formation without train data pre-configured onboard or received from other ERTMS/ETCS external sources (1<sup>st</sup> window)**

Train data (2/2)

Axle load (t) 22.5

Airtight no

Train category combi 1  
Length (m) 200  
Brake percentage 135  
Max speed (km/h) 160  
Axle load (t) 22.5  
Airtight no

1 2 3  
4 5 6  
7 8 9

Train data entry complete?

Yes Del 0

Train data (2/2)

Axle load (t) 22.5

Airtight no

Train category combi 1  
Length (m) 200  
Brake percentage 135  
Max speed (km/h) 160  
Axle load (t) 22.5  
Airtight no

Train data entry complete?

Yes

Del

← → ↑ ↓ ↶

1 . 2 3 4 5 6 7 8 9 0

□ □ □ □ □ □ □ □ □ □

**Figure 111 – Train data window for a variable train formation without train data pre-configured onboard or received from other ERTMS/ETCS external sources (2<sup>nd</sup> window)**

10.3.8.10.3 Figure 112 shows the presentation of the Train data windows for a variable train formation with the train category and the airtight pre-configured onboard or received from other ERTMS/ETCS external sources and not modifiable by the driver i.e. without a 'Train category' input field.



The figure displays two versions of the 'Train data' window. The top window is a standard data entry screen with a dark blue background. It features a 'Train data' header, a list of train parameters (Length, Brake percentage, Max speed, Axle load) with their values, and a 'Train data entry complete?' prompt with a 'Yes' button. The bottom window is a more complex version, showing the same data but with additional controls on the right side, including a 'Del' button, a large 'X' button, and a set of navigation buttons (up, down, left, right). The bottom window also includes a numeric keypad at the bottom.

Train data	
Length (m)	200
Brake percentage	135
Max speed (km/h)	160
Axle load (t)	22.5
Train data entry complete?	
Yes	

Train data	
Length (m)	200
Brake percentage	135
Max speed (km/h)	160
Axle load (t)	22.5
Train data entry complete?	
Yes	

Figure 112 – Train data window for a variable train formation with the train category and the airtight pre-configured onboard and not modifiable by the driver

#### 10.3.8.11 Example of Train data for a fixed train formation

10.3.8.11.1 This kind of train data windows are typically used for train sets (coupled or not) or push-pull trains.

10.3.8.11.2 Figure 113 shows the presentation of the Train data window for a fixed train formation.

The figure displays two versions of the 'Train data' window. The top version is a basic interface with a dark blue background. It has a header bar with 'Train data' and 'Train code' tabs, and a 'code 1' field. Below this, the text 'Train code code 1' is displayed. At the bottom, there are three buttons labeled 'code 1', 'code 2', and 'code 3'. A prompt 'Train data entry complete?' is shown with 'Yes' and 'X' buttons. The bottom version is an enhanced interface with a similar layout but includes a list of codes: '1 - code 1', '2 - code 2', and '3 - code 3'. It also features a vertical stack of buttons on the right side, including a 'X' button, up and down arrow buttons, and a left arrow button. At the bottom, there is a horizontal row of buttons, with the first three labeled '1', '2', and '3', followed by several empty boxes.

**Figure 113 – Train data window for a fixed train formation**

### **10.3.9 SR speed / distance window**

- 10.3.9.1 The SR speed/distance window shall comply with the requirements in section 9.3 for a window on total grid array with the question ‘SR speed / distance entry complete?’ but no echo texts.
- 10.3.9.2 The window title shall indicate “SR speed / distance”.
- 10.3.9.3 The 1<sup>st</sup> input field shall be used for the entry / revalidation of the SR speed.

- 10.3.9.4 The 2<sup>nd</sup> input field shall be used for the entry / revalidation of the SR distance.
- 10.3.9.5 The keyboards associated to the 2 input field(s) “SR speed” and “SR distance” shall be numeric keyboards.
- 10.3.9.6 Figure 114 shows the presentation of the SR speed / distance window.

SR speed/distance

SR speed (km/h) 40

SR distance (m) 450

1 2 3

4 5 6

7 8 9

Del 0 .

SR speed/distance entry complete?

Yes

X

SR speed/distance

SR speed (km/h) 40

SR distance (m) 450

Del

X

▲

▼

←

SR speed/distance entry complete?

Yes

1 2 3 4 5 6 7 8 9 0

**Figure 114 – SR speed / distance window**

### **10.3.10 Adhesion window**

- 10.3.10.1 The adhesion window shall comply with the requirements in section 9.3 for a window on half grid array containing a single input field with only the data part.
- 10.3.10.2 The window title shall indicate “Adhesion”.
- 10.3.10.3 The single input field shall be used for the entry / revalidation of the adhesion.
- 10.3.10.4 The keyboard associated to the adhesion shall be a dedicated keyboard as specified in Table 39 displaying the possible adhesion status.

Button /selection #	Label
1	Non slippery rail
2	Slippery rail

**Table 39 – keyboard for adhesion**

- 10.3.10.5 Figure 115 shows the presentation of the adhesion window.

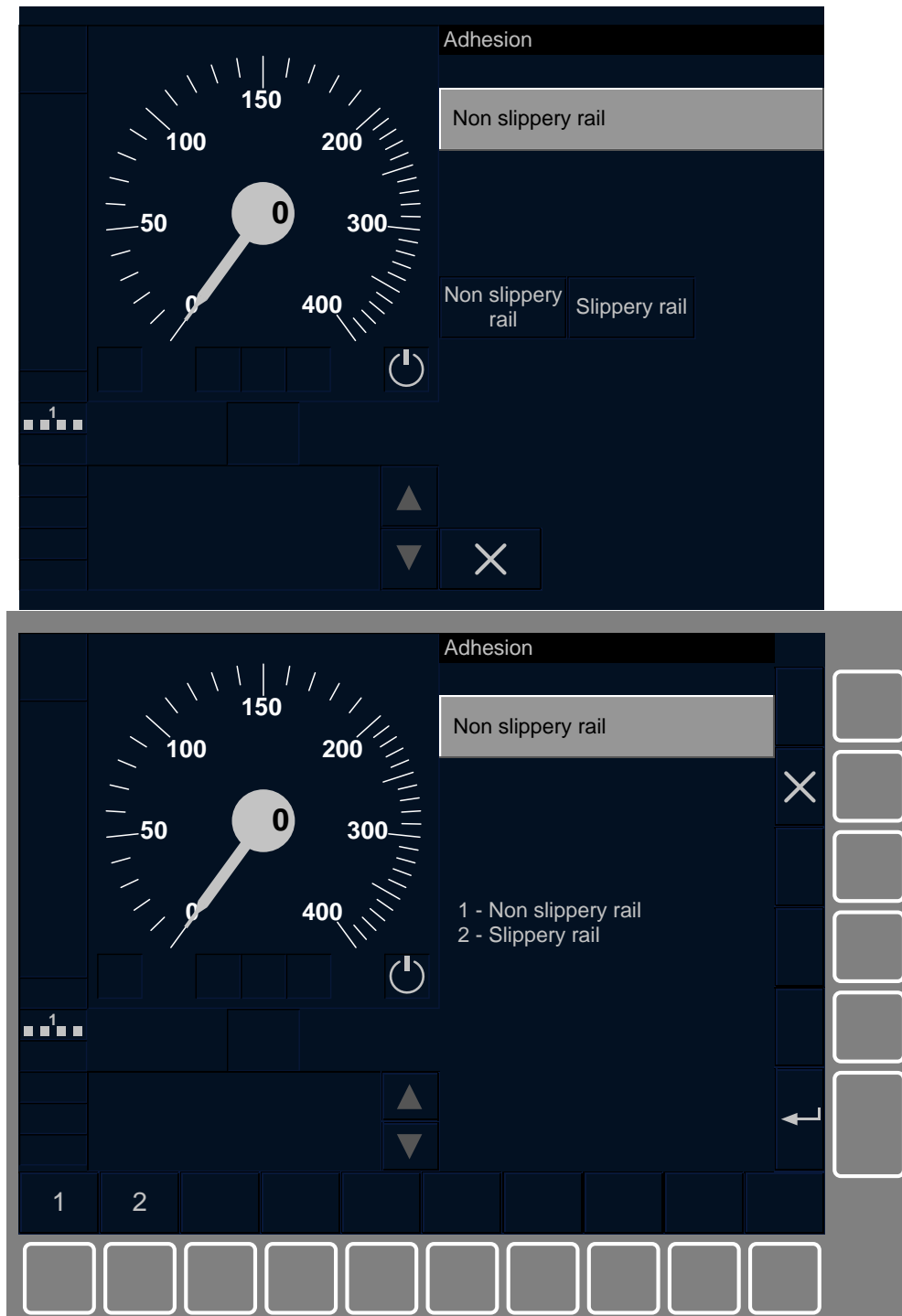


Figure 115 – Adhesion window

## 10.4 Data validation windows

### 10.4.1 Train data validation window

- 10.4.1.1 The Train data validation window shall comply with the requirements in section 9.4.
- 10.4.1.2 The window title shall indicate “Validate train data”.
- 10.4.1.3 The echo texts shall echo data of the Train data window(s) (see 10.3.8).

- 10.4.1.4 Figure 116 shows the presentation of the Train data validation window with the data of the 2 input fields 'length' and 'max speed' modified by the driver and consequently shown in white applying 9.3.3.5.

Validate train data Yes

Train category combi 1  
Length (m) 300  
Brake percentage 135  
Max speed (km/h) 140  
Axle load (t) 22.5  
Airtight no

No Yes

X

Validate train data Yes

Train category combi 1  
Length (m) 300  
Brake percentage 135  
Max speed (km/h) 140  
Axle load (t) 22.5  
Airtight no

X

←

No Yes

□ □ □ □ □ □ □ □ □ □

**Figure 116 – Train data validation window**

## **10.5 Data view windows**

### **10.5.1 Data view window**

- 10.5.1.1 The Data view window shall comply with the requirements in section 9.5.

10.5.1.2 The window title shall indicate “Data view”.

10.5.1.3 The data view texts shall be as specified in Table 40.

Topic #	data view text #	data
1 (driver ID)	1	Driver ID
2 (train running number)	1	Train running number
3 (train code)	1	Train code (if fixed train data entry is used)
4 (train data)	1	Train category
	2	Length (m)
	3	Brake percentage
	4	Maximum speed (km/h)
	5	Axle load (t)
	6	Airtight

**Table 40 – Data view texts**

10.5.1.4 Figure 117 shows the presentation of the Data view window.

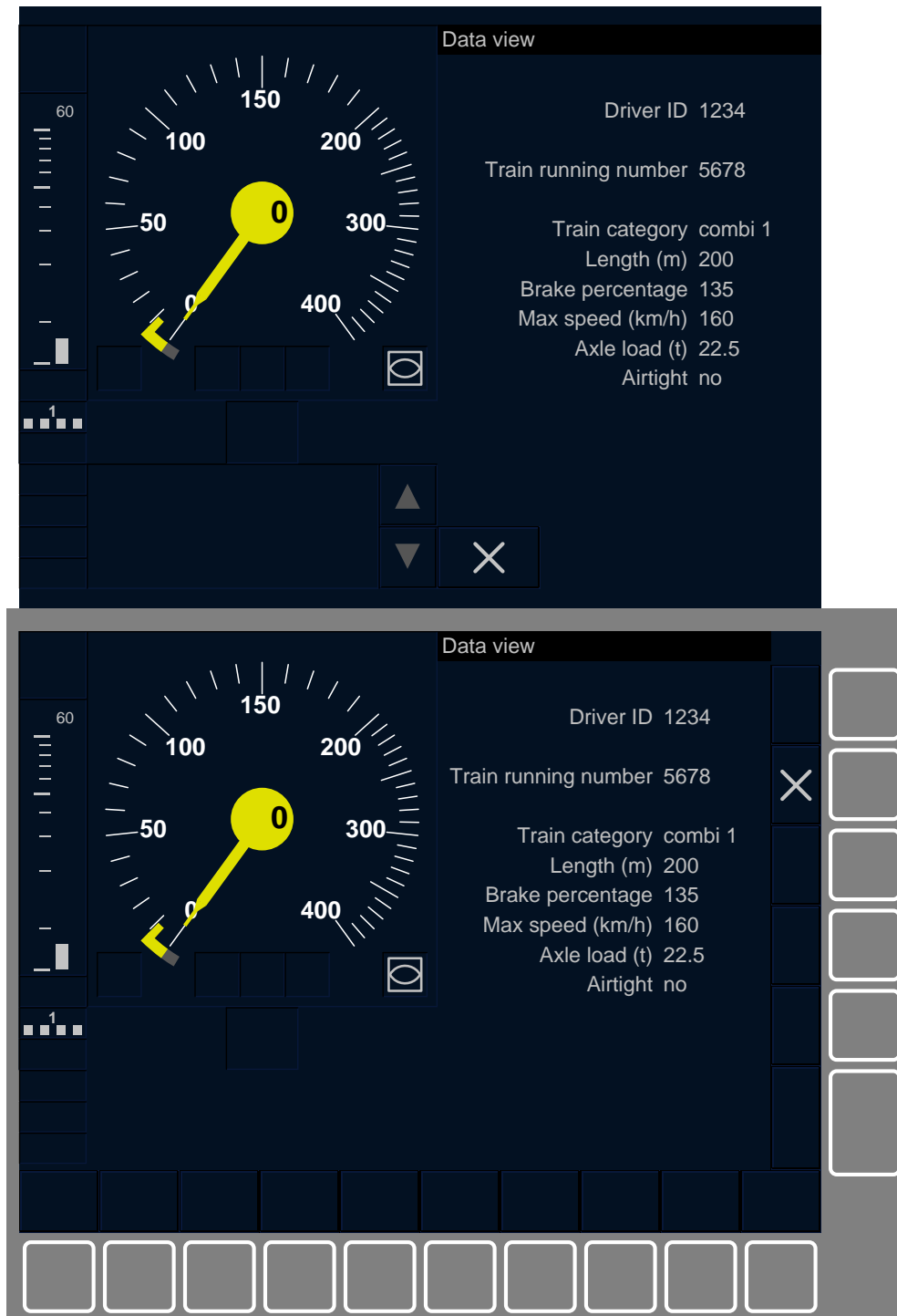


Figure 117 – Data view window



## 10.6 Parent/child relationship

- 10.6.1.1 With regards to the use of the close button, the relationship between parent and child windows shall be as specified in Table 41.
- 10.6.1.2 During the start up dialogue sequence (see 10.7.2 steps S1 and S1-1), the Driver ID window shall be the parent of the Settings window.

<b>Parent/child relationship</b> <i>(from left to right = from parent to child)</i>		
Default	Main	Driver ID
		Train Data <i>(one or more windows)</i>
		Train Data Validation <i>(accessible via Train Data windows)</i>
		Level
		RBC contact information <i>(accessible via the Level window and only if the level is 2/3)</i>
		Train Running Number
	Override	-
	Data View	-
	Special	Adhesion
		SR speed / distance
	Settings	Language
		Volume
		Brightness

**Table 41 – Parent/child relationship**

## 10.7 Dialogue sequences

### 10.7.1 Introduction

- 10.7.1.1 In a dialogue sequence, the latest active window including the mentioned configuration of objects/symbols (e.g. the main window with all buttons disabled and the hour glass symbol ST05 displayed) shall remain displayed until another window or another configuration of the same window is mentioned further on in the flowchart.

- 10.7.1.2 When an event involves a driver's action on a button, it assumes that the corresponding button is enabled (see 10.1 for the conditions enabling a button).
- 10.7.1.3 The status of data mentioned in the dialogue sequences refers to the status of data stored onboard as defined in document [3].
- 10.7.1.4 If the status is "invalid" or "valid", the value stored onboard shall be presented to the driver when entering the corresponding data entry window.
- 10.7.1.4.1 Exception: for the train data windows; see S3-1 of the main dialogue sequence. For the train data validation window; see S3-2 of the main dialogue sequence.
- 10.7.1.5 For a window with a single input field, the value stored onboard shall be replaced by the data value of the input field when the driver accepts this data value.
- 10.7.1.6 For a window with multiple input fields, the values stored onboard shall be replaced by the data values of the input fields when the driver presses the 'Yes' button.
- 10.7.1.6.1 Exception: for the train data windows, the values stored onboard shall be replaced by the values of the input fields for train data only when the train data validation window is left with the value of its input field set to 'Yes'. It means that no action is done on the train data stored onboard when the driver presses the 'Yes' button of the train data windows (see S3-2 of the main window dialogue sequence).

## **10.7.2 Start Up**

- 10.7.2.1 The "Start Up" dialogue sequence shall guide the driver when a start of mission is initiated as specified in [3] §5.4.
  - 10.7.2.1.1 Note: When possible, the steps refer to the numbering in the SRS (see document [3]) to facilitate the traceability.
  - 10.7.2.2 The [close] button shall be disabled in all windows presented before reaching S10 except in the step S1-1.
    - 10.7.2.2.1 Note: In S10, the driver can therefore close the start up dialogue sequence to go to another sub-level window e.g. to go to the override window and press the EOA button (if enabled).
- 10.7.2.3 Note: Some of steps of the start of mission procedure (see SRS 5.4) are kept for the sake of understanding. These steps are marked in the figure with a specific background (see D32 to A39) and in the following table by italic texts in the grey rows.

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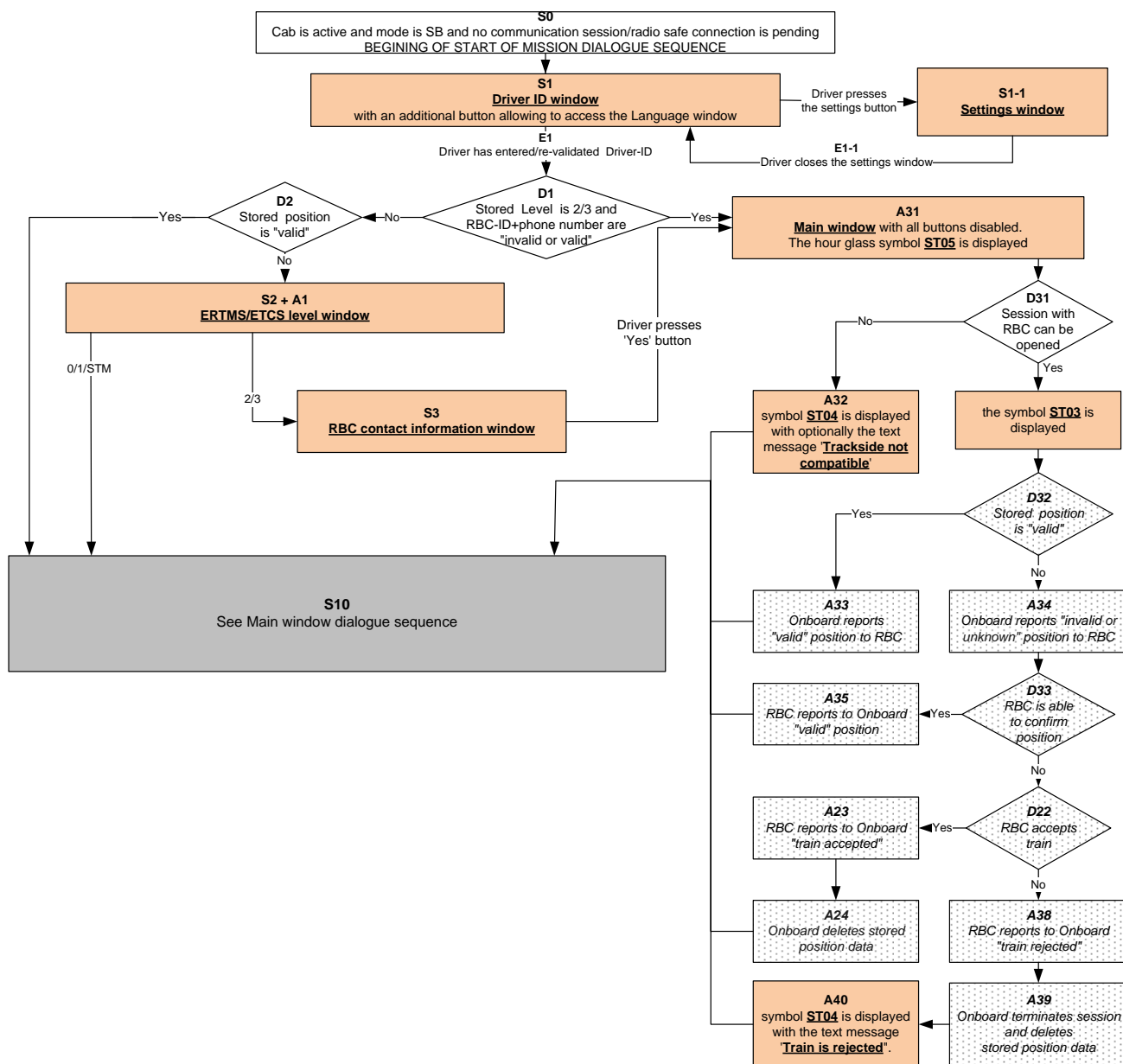


Figure 118 – Start Up dialogue sequence

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10.7.2.3.1

ID in Flow Chart	Requirements	Window
<b>S0</b>	The Start Up procedure shall be engaged when the ERTMS/ETCS on-board equipment initiates a start of mission.	
<b>S1</b>	<p>The <b><u>driver ID window</u></b> shall request the driver to enter the Driver-ID (if the status of the Driver-ID is “unknown”) or shall request the driver to revalidate or re-enter the Driver-ID (if the status of Driver-ID is “invalid”).</p> <p>Once the Driver-ID is entered or revalidated (<b>E1</b>), the procedure shall go to <b>D1</b></p> <p>If the driver presses the settings button, the procedure shall go to <b>S1-1</b></p>	Figure 107 – driver ID window
<b>S1-1</b>	<p>The <b><u>Settings window</u></b> shall be presented to the driver. (See 10.7.7 for the settings dialogue sequence)</p> <p>Once the driver closes the settings window (<b>E1-1</b>), the procedure shall go back to <b>S1</b></p>	Figure 104 – Settings window
<b>D1</b>	If, according to the stored information (status “valid” or “invalid”), the level is 2 or 3 with a RBC-ID and phone number, then the procedure shall go to <b>A31</b> , otherwise, it shall go to <b>D2</b>	
<b>D2</b>	<p>If the stored position is valid, the procedure shall go to <b>S10</b></p> <p>If the stored position is invalid or unknown, the procedure shall go to <b>S2 + A1</b></p>	
<b>S2 + A1</b>	<p>The <b><u>ERTMS/ETCS level window</u></b> shall request the driver to enter the Level data (if the status of the Level data is “unknown”) or shall request the driver to revalidate or re-enter the Level data (if the status of Level data is “invalid”).</p> <p>If the entered / re-validated level is 2 or 3, the procedure shall go to <b>S3</b></p> <p>If the entered / re-validated level is 0 or 1 or one of proposed STM level, the procedure shall go to <b>S10</b></p>	Figure 106 – ERTMS/ETCS level window

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ID in Flow Chart	Requirements	Window
<b>S3</b>	<p>The <b><u>RBC contact information window</u></b> shall request the driver to</p> <ul style="list-style-type: none"> <li>revalidate or re-enter the Radio Network ID</li> <li>enter the RBC-ID / phone number (if the status of the RBC-ID/phone number is “unknown”) or to revalidate or re-enter the RBC-ID/phone number (if the status of RBC-ID/phone number is “invalid”).</li> </ul> <p>When the ‘Yes’ button related to the ‘RBC contact information entry complete?’ question is enabled (i.e. all input fields contains a value), if the driver presses this ‘Yes’ button, the procedure shall go to <b>A31</b></p>	Figure 108 – RBC contact information window
<b>S10</b>	The procedure shall go to the <b>S1</b> of the main window dialogue sequence	
<b>A31</b>	<p>The <b><u>Main window</u></b> shall be presented to the driver with all buttons ‘disabled’.</p> <p>The symbol <b><u>ST05</u></b> shall be displayed to show that the onboard awaits an answer from the RBC.</p>	Figure 101 – Main window
<b>D31</b>	<p>If the opening of the session is successful, the symbol <b><u>ST03</u></b> is displayed and the procedure shall go to <b>D32</b></p> <p>If the opening of the session has failed, the procedure shall go to <b>A32</b></p>	
<b>A32</b>	<p>When the opening of the session has failed or the session is terminated due to no compatible version, the symbol <b><u>ST04</u></b> shall be displayed.</p> <p>If the communication session is terminated due to no compatible version, the text message “<b><u>Trackside not compatible</u></b>” (see § 13) shall also be displayed.</p> <p>This procedure shall go to <b>S10</b>.</p>	
<b>D32</b>	<p><i>If the stored position is valid, the procedure shall go to <b>A33</b></i></p> <p><i>If the stored position is invalid, the procedure shall go to <b>A34</b></i></p>	

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ID in Flow Chart	Requirements	Window
<b>A33</b>	<p><i>If the train position data stored in the on-board equipment is of status “valid”, the train position, marked as “valid” shall be transmitted to the RBC via the “SoM position report” message.</i></p> <p><i>This condition leads to <b>S10</b>.</i></p>	
<b>A34</b>	<p><i>If the train position data stored in the on-board equipment is of status “invalid” or “unknown”, the train position, marked as “invalid” or “unknown” shall be transmitted to the RBC via the “SoM position report” message.</i></p> <p><i>The procedure shall then go to <b>D33</b></i></p>	
<b>D33</b>	<p><i>When the position report marked as “invalid” is received by the RBC, this latter shall check whether it can validate this position report.</i></p> <p><i>If the position report can be validated by the RBC, the procedure shall go to <b>A35</b></i></p> <p><i>Otherwise, if the position report was marked “unknown”, or the “invalid” position report cannot be validated by the RBC, the procedure shall go to <b>D22</b></i></p> <p><i>Note: How the RBC is able to validate the position report is a national issue, out of the scope for this specification</i></p>	
<b>A35</b>	<p><i>The RBC shall inform the ERTMS/ETCS onboard equipment that the reported position is valid.</i></p> <p><i>When this message is received by the ERTMS/ETCS on-board equipment, the status of the position shall be set to “valid”</i></p> <p><i>The procedure shall go to <b>S10</b>.</i></p>	

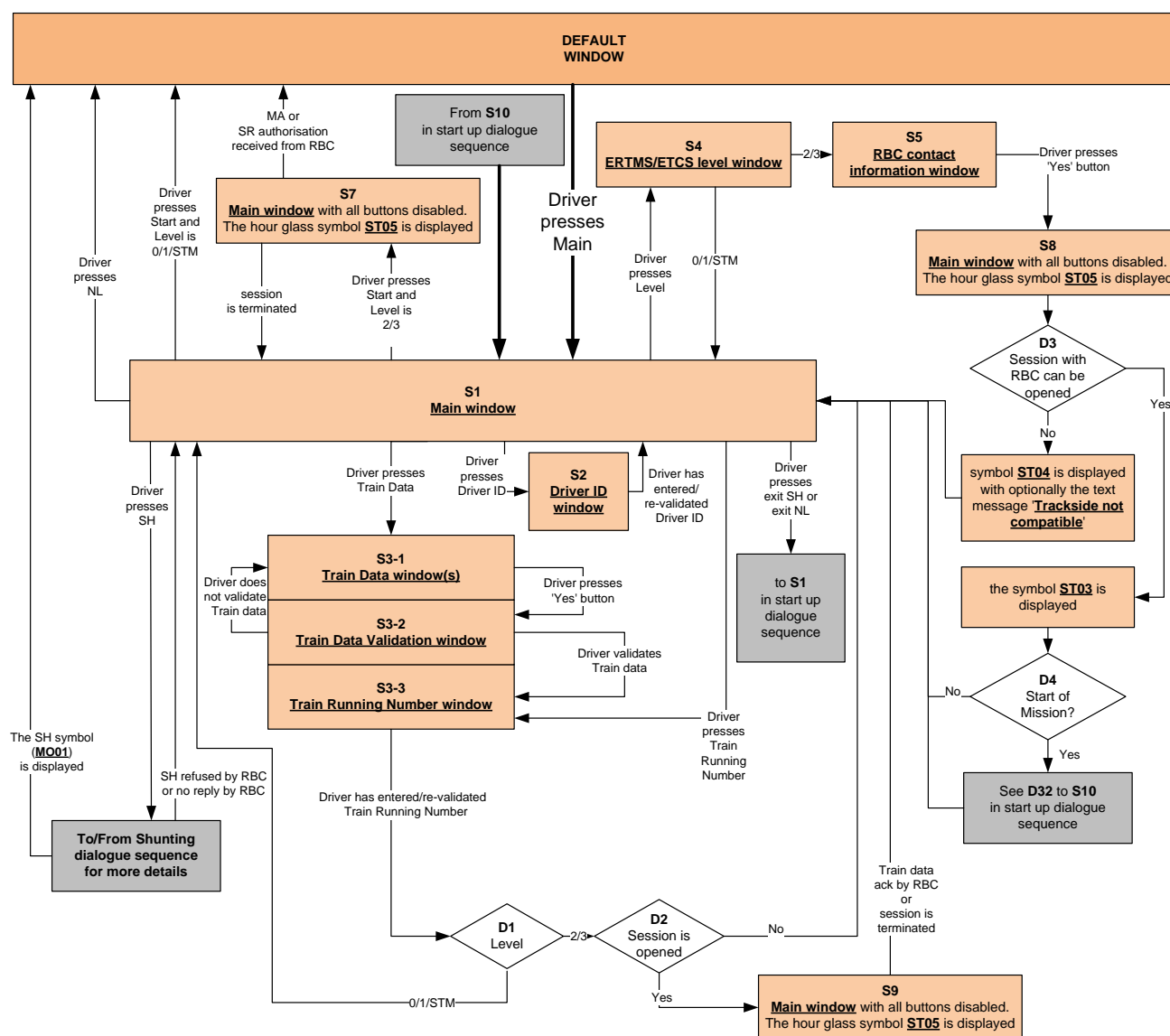
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ID in Flow Chart	Requirements	Window
<b>D22</b>	<p><i>If the reported train position is “unknown”, or the RBC is not able to confirm a reported “invalid” position, the RBC shall nevertheless decide whether it accepts the train or not.</i></p> <p><i>If yes, the procedure shall go to <b>A23</b></i></p> <p><i>If no, the procedure shall go to <b>A38</b></i></p> <p><i>Note: How the RBC assumes responsibility for the train is a national issue, out of the scope for this specification</i></p>	
<b>A23</b>	<p><i>The RBC shall inform the ERTMS/ETCS on-board equipment that it accepts the train although the on-board has no “valid” position information.</i></p>	
<b>A24</b>	<p><i>When the ERTMS/ETCS on-board equipment is informed that the train is accepted without valid position data, it shall delete the train position data (new status: “unknown”)</i></p> <p><i>This condition leads to <b>S10</b>.</i></p>	
<b>A38</b>	<p><i>The RBC shall inform the ERTMS/ETCS on-board equipment that it rejects the train</i></p>	
<b>A39</b>	<p><i>When the ERTMS/ETCS on-board equipment is informed that the train is rejected, it shall delete the train position data (new status: “unknown”) and shall terminate the session with the RBC.</i></p> <p><i>The procedure shall then go to <b>A40</b></i></p>	
<b>A40</b>	<p>The text message “<b><u>Train is rejected</u></b>” (see § 13) shall inform the driver that the train is rejected</p> <p>When the session is terminated, the symbol <b><u>ST04</u></b> shall be displayed.</p> <p>This procedure shall go to <b>S10</b>.</p>	

10.7.3.1 The “Main window” dialogue sequence shows the interaction with the driver when the main window is presented either because he has pressed the main button on the default window or because the start up dialogue sequence is in S10.

10.7.3.2 The [close] button shall be enabled in all windows except in the steps S7, S8 or S9 where they shall be disabled.



**Figure 119 – Main window dialogue sequence**



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ID in Flow Chart	Requirements	Window
<b>S1</b>	<p>The <b>Main window</b> shall offer the possibility to the driver to select 'Driver ID', 'Shunting' / 'Exit Shunting', 'Non leading' / 'Exit Non leading', 'Train Data', 'Level', 'Train Running Number' and 'Start'.</p> <ul style="list-style-type: none"> <li>• If the driver presses 'Driver ID', the procedure shall go to <b>S2</b>.</li> <li>• If the driver presses 'Shunting', the procedure shall go to the Shunting dialogue sequence.</li> <li>• If the driver presses 'Non Leading', the procedure shall go back to <b>the default window</b>.</li> <li>• If the driver presses 'Exit Non Leading' or 'Exit Shunting', the procedure shall go to <b>S1</b> of the start up dialogue sequence.</li> <li>• If the driver presses 'Train Data', the procedure shall go to <b>S3-1</b></li> <li>• If the driver presses 'Level', the procedure shall go to <b>S4</b></li> <li>• If the driver presses 'Train Running Number', the procedure shall go to <b>S3-3</b></li> <li>• If the driver presses 'Start' and the level is 0/1/STM, the procedure shall go back to <b>the default window</b>.</li> <li>• If the driver presses 'Start' and the level is 2/3, the procedure shall go to <b>S7</b></li> </ul>	Figure 101 – Main window
<b>S2</b>	<p>The <b>driver ID window</b> shall request the driver to revalidate or re-enter the Driver-ID.</p> <p>Once the Driver-ID is re-entered or revalidated, the procedure shall go back to <b>S1</b> (the Main window)</p>	Figure 107 – driver ID window

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ID in Flow Chart	Requirements	Window
<b>S3-1</b>	<p>When entering <b>S3-1</b>, the 1<sup>st</sup> <b><u>Train data window</u></b> shall be presented to the driver to initiate to entry of train data.</p> <p>The <b><u>Train data window(s)</u></b> shall request the driver to enter (if no value is proposed) or to accept / re-enter (if a value is proposed) each input field for train data.</p> <p>If <b>S3-1</b> is entered from <b>S1</b> (i.e. the train data entry / validation process starts):</p> <ul style="list-style-type: none"> <li>• When the status of train data is “valid”, the proposed value for each input field shall be the corresponding train data value stored onboard.</li> <li>• When the status of train data is “unknown” or “invalid”, if a value is proposed, it can be either the value of the corresponding train data stored onboard (only if “invalid”), a value pre-configured onboard or a value received from another ERTMS/ETCS external source (e.g. from the train interface).</li> </ul> <p><u>Note:</u> For each input field, the source used for proposing a value is only rolling stock dependent, not an ERTMS/ETCS implementation issue.</p> <p>If <b>S3-1</b> is entered from <b>S3-2</b> (i.e. the train data entry / validation process is going on):</p> <ul style="list-style-type: none"> <li>• The proposed value for each input field shall be the data value from the previous <b>S3-1</b>.</li> </ul> <p>When the ‘Yes’ button related to the ‘Train data entry complete?’ question is enabled (i.e. every input field for train data in all ‘train data’ windows contains a data value), if the driver presses this ‘Yes’ button and all data values comply with the data checks, the procedure shall go to <b>S3-2</b></p> <p><u>Note:</u> In this step, when the driver presses the ‘Yes’ button, train data are not validated yet and consequently are not yet the train data stored onboard for the mission (see 10.7.1.6.1). This is why the term “accept” is used instead of the term “revalidate” and the term “input field for train data” is used instead of “train data”.</p>	<p>Figure 110 – Train data window for a variable train formation without train data pre-configured onboard or received from other ERTMS/ETCS external sources (1<sup>st</sup> window)</p> <p>Figure 111 – Train data window for a variable train formation without train data pre-configured onboard or received from other ERTMS/ETCS external sources (2<sup>nd</sup> window)</p> <p>Figure 112 – Train data window for a variable train formation with the train category and the airtight pre-configured onboard and not modifiable by the driver</p> <p>Figure 113 – Train data window for a fixed train formation</p>

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ID in Flow Chart	Requirements	Window
<b>S3-2</b>	<p>The <b><u>Train data validation window</u></b> shall request the driver to validate or not the values of the input fields for train data.</p> <p>When entering <b>S3-2</b>, the train data validation window shall always propose the value 'Yes' in the input field for train data validation.</p> <p>Once the input field for train data validation is entered or revalidated, if the value is 'No', the procedure shall go back to <b>S3-1</b>. Otherwise, if the value is 'Yes', the procedure shall go to <b>S3-3</b></p>	Figure 116 – Train data validation window
<b>S3-3</b>	<p>The <b><u>Train running number window</u></b> shall request the driver to enter the Train running number (if the status of the Train running number is "unknown") or shall request the driver to revalidate or re-enter the Train running number (if the status of Train running number is "invalid" or "valid").</p> <p>Once the train running number is entered or revalidated, the procedure shall go to <b>D1</b></p>	Figure 105 – Train running number window
<b>D1</b>	<p>When the validated level is 2/3, the procedure shall go to <b>D2</b></p> <p>When the validated level is 0, 1 or STM, the procedure shall go back to <b>S1</b> (the Main window)</p>	
<b>D2</b>	<p>When the session is open, the procedure shall go to <b>S9</b>, otherwise the procedure shall go back to <b>S1</b> (the Main window)</p>	
<b>S9</b>	<p>The <b><u>Main window</u></b> shall be presented to the driver with all buttons 'disabled'.</p> <p>The symbol <b><u>ST05</u></b> shall be displayed to show that the onboard awaits an answer from the RBC.</p> <p>When the train data acknowledgement is received from the RBC or when the communication session is terminated due to no reply from RBC, the procedure shall go back to <b>S1</b> (the Main window)</p> <p>The symbol <b><u>ST04</u></b> is displayed if the communication session is terminated.</p>	Figure 101 – Main window

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ID in Flow Chart	Requirements	Window
<b>S4</b>	<p>The <b><u>ERTMS/ETCS level window</u></b> shall request the driver to revalidate or re-enter the Level data.</p> <p>If the entered / re-validated level is 2 or 3, the procedure shall go to <b>S5</b></p> <p>If the entered / re-validated level is 0 or 1 or one of proposed STM level, the procedure shall go back to <b>S1</b> (the Main window)</p>	Figure 106 – ERTMS/ETCS level window
<b>S5</b>	<p>The <b><u>RBC contact information window</u></b> shall request the driver to</p> <ul style="list-style-type: none"> <li>revalidate or re-enter the Radio Network ID</li> <li>enter the RBC-ID / phone number (if the status of the RBC-ID/phone number is “unknown”) or to revalidate or re-enter the RBC-ID/phone number (if the status of RBC-ID/phone number is “invalid” or “valid”).</li> </ul> <p>When the ‘Yes’ button related to the ‘RBC contact information entry complete?’ question is enabled (i.e. all input fields contains a value), if the driver presses this ‘Yes’ button, the procedure shall go to <b>S8</b></p>	Figure 108 – RBC contact information window
<b>S8</b>	<p>The <b><u>Main window</u></b> shall be presented to the driver with all buttons ‘disabled’.</p> <p>The symbol <b><u>ST05</u></b> shall be displayed to show that the onboard awaits an answer from the RBC.</p>	Figure 101 – Main window
<b>D3</b>	<p>If the opening of the session is successful, the symbol <b><u>ST03</u></b> is displayed and the procedure shall go to <b>D4</b></p> <p>If the opening of the session has failed or the session is terminated due to no compatible version, the symbol <b><u>ST04</u></b> is displayed and the procedure shall go back to <b>S1</b> (the Main window)</p> <p>If the communication session is terminated due to no compatible version, the text message “<b><u>Trackside not compatible</u></b>” (see § 13) shall also be displayed.</p>	

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ID in Flow Chart	Requirements	Window
<b>D4</b>	<p>If a start of mission is ongoing, the procedure shall go to the <b>D32</b> of the start up dialogue sequence.</p> <p>If no start of mission is ongoing, the procedure shall go back to <b>S1</b> (the Main window)</p>	
<b>S7</b>	<p>The <b>Main window</b> shall be presented to the driver with all buttons 'disabled'.</p> <p>The symbol <b>ST05</b> shall be displayed to show that the onboard awaits an answer from the RBC.</p> <p>When an MA or an SR authorisation is received from the RBC, the procedure shall go back to <b>the default window</b>.</p> <p>When the communication session is terminated due to no reply from RBC, the procedure shall go back to <b>S1</b> (the Main window)</p> <p>The symbol <b>ST04</b> shall be displayed if the communication session is terminated.</p>	Figure 101 – Main window

## 10.7.4 Shunting

10.7.4.1 The Shunting dialogue sequence shows the interaction with the driver when he has pressed the shunting button on the main window.

10.7.4.2 The [close] button shall be disabled in the step S1.

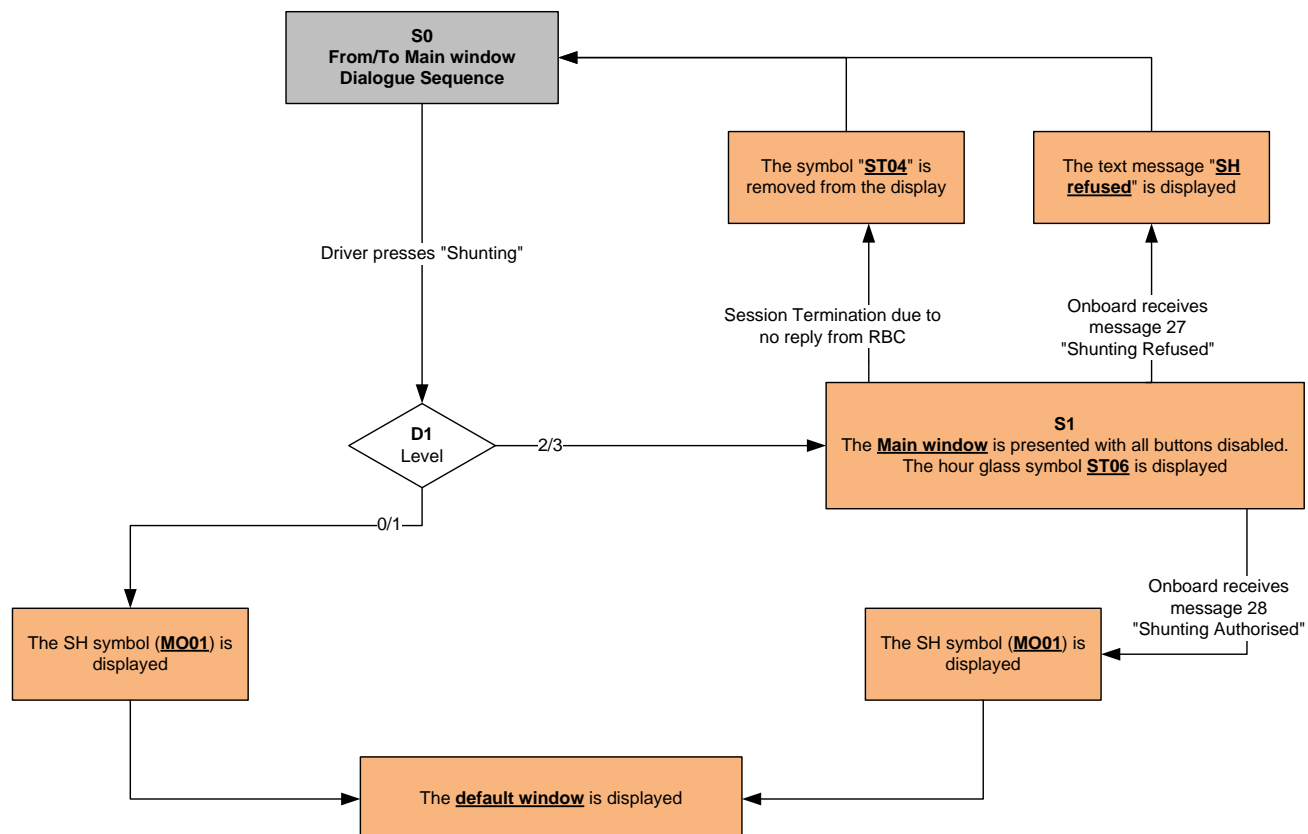


Figure 120 – Shunting dialogue sequence

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10.7.4.3

ID in Flow Chart	Requirements	Window
<b>S0</b>	When the driver presses the Shunting button in S1 of the Main window dialogue sequence, the procedure shall go to <b>D1</b> .	
<b>D1</b>	If the level is 0/1, the SH symbol <b>MO01</b> shall be presented and the procedure shall go back to <b>the default window</b> .  If the level is 2/3, the procedure shall go to <b>S1</b> .	
<b>S1</b>	The <b>Main window</b> shall be presented to the driver with all buttons 'disabled'.  The symbol <b>ST05</b> shall be displayed to show that the onboard awaits an answer from the RBC.  When the message 'Shunting Refused' is received from the RBC or the communication session is terminated due to no reply from RBC, the procedure shall go back to <b>S0</b> (i.e. S1 of the Main window dialogue sequence)  The symbol <b>ST04</b> shall be displayed if the communication session is terminated.  When the message 'Shunting Authorised' is received from the RBC, the SH symbol <b>MO01</b> shall be presented and the procedure shall go back to <b>the default window</b> .	Figure 101 – Main window

### 10.7.5 Override window

10.7.5.1 The override window dialogue sequence shows the interaction with the driver when he presses the 'Override' button on the default window.

10.7.5.2 The [close] button shall always be enabled on the override window.

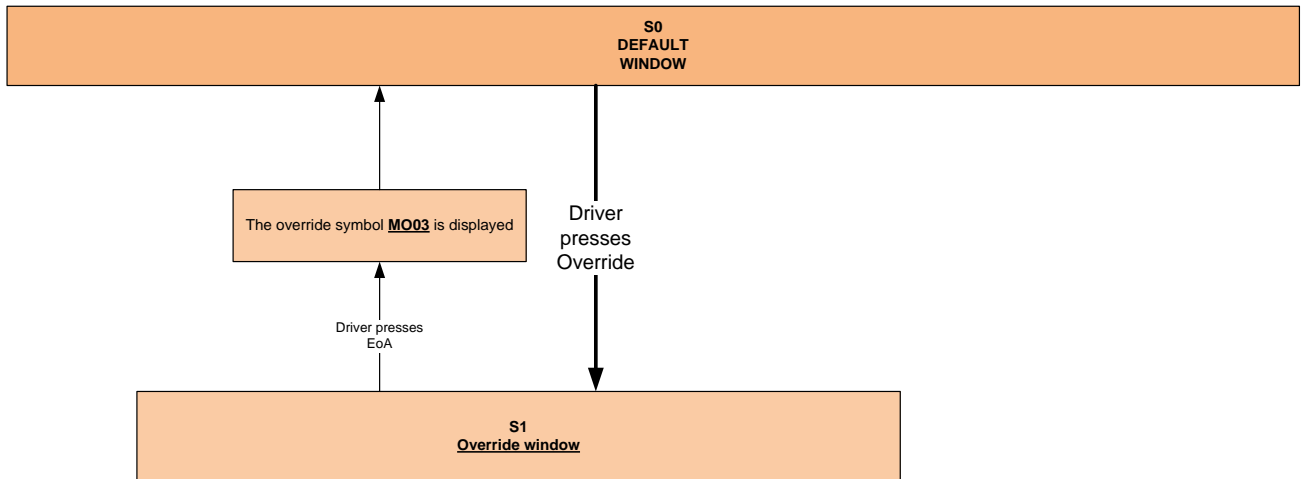


Figure 121 – Override window dialogue sequence



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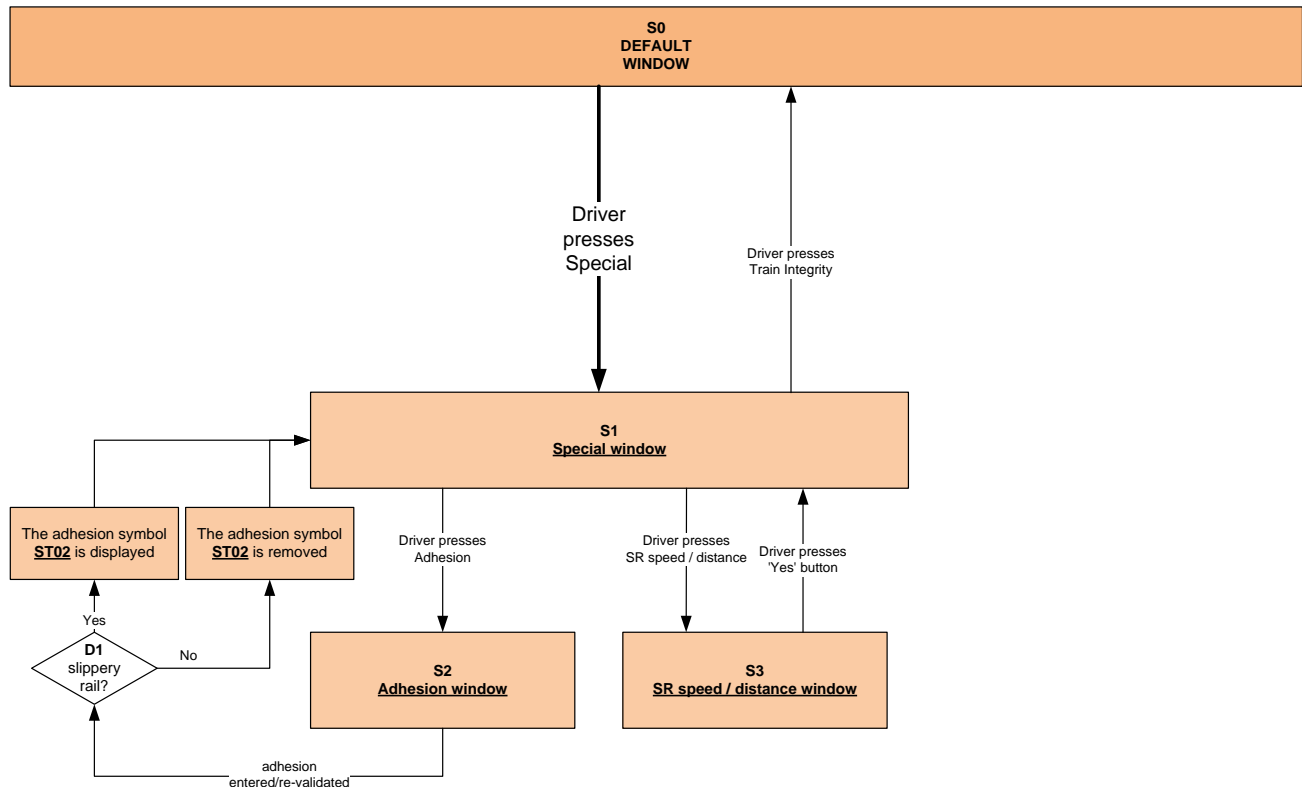
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10.7.5.3

ID in Flow Chart	Requirements	Window
<b>S0</b>	When the driver presses the override button on <u>the default window</u> , the procedure shall go to <b>S1</b> .	
<b>S1</b>	The <u>Override window</u> shall be presented to the driver. When the driver presses the 'EOA' button, the override EOA symbol <b>MO03</b> shall be presented and the procedure shall go back to <u>the default window</u> .	Figure 102 – Override window

### 10.7.6 Special window

- 10.7.6.1 The special window dialogue sequence shows the interaction with the driver when he presses the 'Special' button on the default window.
- 10.7.6.2 The [close] button shall always be enabled on the 'Special', 'Adhesion' and 'SR speed / distance' windows.



**Figure 122 – Special window dialogue sequence**

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10.7.6.3

ID in Flow Chart	Requirements	Window
<b>S0</b>	When the driver presses the special button on <u>the default window</u> , the procedure shall go to <b>S1</b> .	
<b>S1</b>	The <u>Special window</u> shall be presented to the driver. When the driver presses the 'Adhesion' button, the procedure shall go to <b>S2</b> . When the driver presses the 'Train Integrity' button, the procedure shall go back to <u>the default window</u> . When the driver presses the 'SR speed / distance' button, the procedure shall go to <b>S3</b> .	Figure 103 – Special window
<b>S2</b>	The <u>Adhesion window</u> shall request the driver to revalidate or re-enter the adhesion. Once the adhesion is entered or revalidated, the procedure shall go to <b>D1</b>	Figure 115 – Adhesion window
<b>D1</b>	When the adhesion is “slippery rail”, the adhesion symbol <u>ST02</u> shall be displayed and the procedure shall go back to <b>S1</b> . When the adhesion is “non slippery rail”, the adhesion symbol <u>ST02</u> shall not be displayed and the procedure shall go back to <b>S1</b> .	
<b>S3</b>	The <u>SR speed / distance window</u> shall request the driver to revalidate or re-enter the SR speed and/or the SR distance. When the 'Yes' button related to the 'SR speed / distance entry complete?' question is enabled (i.e. both input fields contains a value), if the driver presses this 'Yes' button, the procedure shall go back to <b>S1</b>	Figure 114 – SR speed / distance window

### 10.7.7 Settings window

10.7.7.1 The settings window dialogue sequence shows the interaction with the driver when he presses the 'Settings' button on the default window.

10.7.7.2 The [close] button shall always be enabled on all windows.

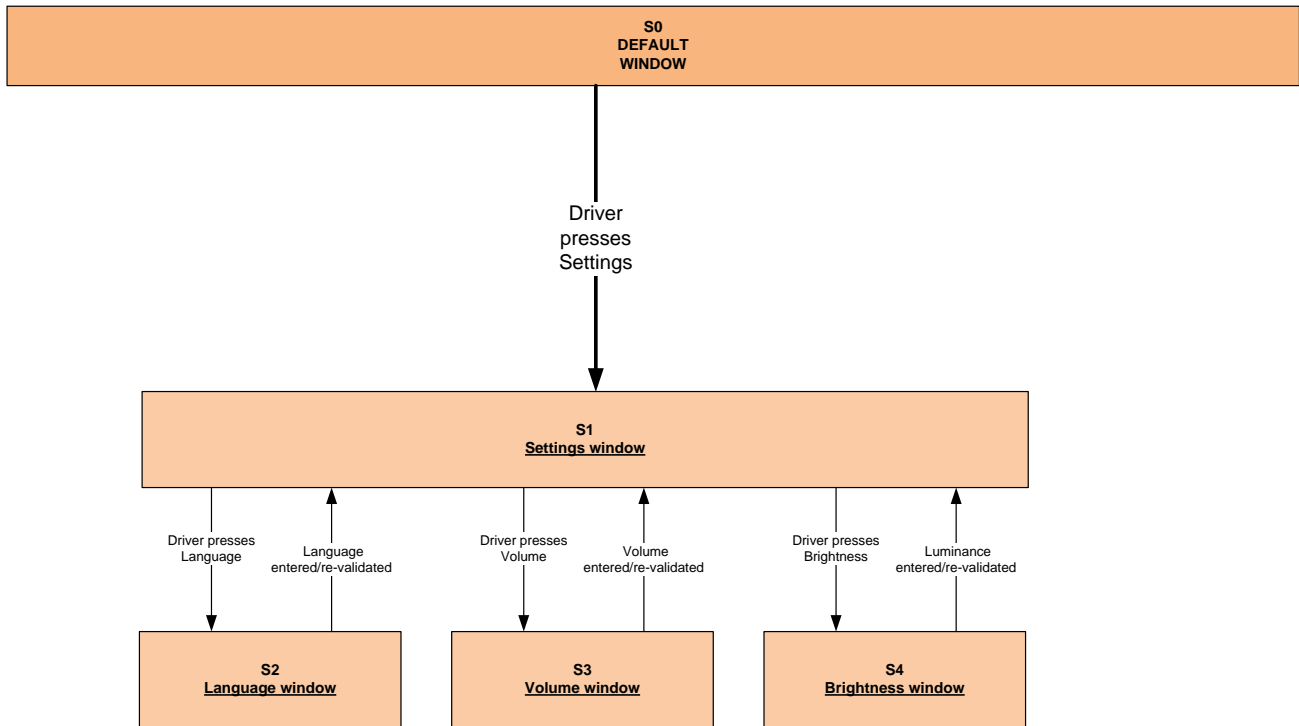


Figure 123 – Settings window dialogue sequence

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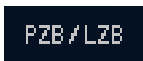





10.7.7.3

ID in Flow Chart	Requirements	Window
<b>S0</b>	When the driver presses the settings button on <u>the default window</u> , the procedure shall go to <b>S1</b> .	
<b>S1</b>	The <u>Settings window</u> shall be presented to the driver. When the driver presses the 'Language' button, the procedure shall go to <b>S2</b> . When the driver presses the 'Volume' button, the procedure shall go to <b>S3</b> . When the driver presses the 'Brightness' button, the procedure shall go to <b>S4</b> .	Figure 104 – Settings window
<b>S2</b>	The <u>Language window</u> shall request the driver to revalidate or re-enter the language. Once the language is re-entered or revalidated, the procedure shall go back to <b>S1</b>	Figure 109 – Language window
<b>S3</b>	The <u>Volume window</u> shall request the driver to revalidate or re-enter the volume. Once the volume is re-entered or revalidated, the procedure shall go back to <b>S1</b>	
<b>S4</b>	The <u>Brightness window</u> shall request the driver to revalidate or re-enter the luminance. Once the luminance is re-entered or revalidated, the procedure shall go back to <b>S1</b>	


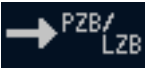







## 11. SYMBOLS

### 11.1 Level Symbols

11.1.1.1 Level symbols are presented in Table 42.


Symbol number	Symbol form/shape	Bitmap file	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
LE01		LE_01.bmp	Level 0; grey	52 x 21	C8	
LE02	 example: 	LE_02.bmp  LE_02a.bmp	level STM; grey	52 x 21	in level STM, the location is not specified	For STM level the text 'STM' is replaced by the distinct abbreviation of the corresponding STM (e.g. KVB, PZB, ASFA etc.)
LE03		LE_03.bmp	Level 1, Intermittent transmission; grey	52 x 21	C8	
LE04		LE_04.bmp	Level 2, Continuous transmission; grey	52 x 21	C8	
LE05		LE_05.bmp	Level 3, Continuous transmission; grey	52 x 21	C8	
LE06		LE_06.bmp	Level 0 announcement; grey	52 x 21	C1 exception: in level STM, the location is not specified	
LE07		LE_07.bmp	Level 0 announcement; yellow	52 x 21	C1 exception: in level STM, the location is not specified	Always with a flashing frame

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Symbol number	Symbol form/shape	Bitmap file	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
LE08	  example: 	LE_08.bmp  LE_08a.bmp	level STM announcement; grey	52 x 21	C1 exception: in level STM, the location is not specified	For STM level the text 'STM' is replaced by the distinct abbreviation of the corresponding STM (e.g. KVB, PZB, ASFA etc.)
LE09	  example: 	LE_09.bmp  LE_09a.bmp	level STM announcement; yellow	52 x 21	C1 exception: in level STM, the location is not specified	Always with a flashing frame  For STM level the text 'STM' is replaced by the distinct abbreviation of the corresponding STM (e.g. KVB, PZB, ASFA etc.)
LE10		LE_10.bmp	Level 1 announcement, Intermittent transmission; grey	52 x 21	C1 exception: in level STM, the location is not specified	
LE11		LE_11.bmp	Level 1 announcement, Intermittent transmission; yellow	52 x 21	C1 exception: in level STM, the location is not specified	Always with a flashing frame
LE12		LE_12.bmp	Level 2 announcement, Continuous transmission; grey	52 x 21	C1 exception: in level STM, the location is not specified	
LE13		LE_13.bmp	Level 2 announcement, Continuous transmission; yellow	52 x 21	C1 exception: in level STM, the location is not specified	Always with a flashing frame
LE14		LE_14.bmp	Level 3 announcement, Continuous transmission; grey	52 x 21	C1 exception: in level STM, the location is not specified	

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Symbol number	Symbol form/shape	Bitmap file	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
LE15		LE_15.bmp	Level 3 announcement, Continuous transmission; yellow	52 x 21	C1 exception: in level STM, the location is not specified	Always with a flashing frame

**Table 42 – Level Symbols**



## 11.2 Mode Symbols

11.2.1.1 Mode symbols are presented in Table 43.

Symbol number	Symbol form/shape	Bitmap file	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
MO01		MO_01.bmp	Shunt mode; grey	32 x 32	B7	
MO02		MO_02.bmp	Acknowledgement for shunting; yellow	32 x 32	C1	Always with flashing a frame
MO03		MO_03.bmp	Override EOA is active; grey	32 x 32	C1	
MO04		MO_04.bmp	Trip; red with grey background	32 x 32	B7	
MO05		MO_05.bmp	Trip Acknowledgement; yellow	32 x 32	C1	Always with flashing a frame
MO06		MO_06.bmp	Post trip; grey	32 x 32	B7	
MO07		MO_07.bmp	Drive on sight; grey	32 x 32	B7	
MO08		MO_08.bmp	Acknowledgement for Drive on sight; yellow	32 x 32	C1	Always with flashing a frame
MO09		MO_09.bmp	Staff responsible; grey	32 x 32	B7	
MO10		MO_10.bmp	Acknowledgement for Staff responsible; yellow	32 x 32	C1	Always with a flashing frame







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Symbol number	Symbol form/shape	Bitmap file	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
MO11		MO_11.bmp	Full Supervision; grey	32 x 32	B7	
MO12		MO_12.bmp	Non-leading; grey	32 x 32	B7	
MO13		MO_13.bmp	Stand By; grey	32 x 32	B7	
MO14		MO_14.bmp	Reversing; grey	32 x 32	B7	
MO15		MO_15.bmp	Acknowledgement for Reversing; yellow	32 x 32	C1	Always with a flashing frame
MO16		MO_16.bmp	Unfitted; grey	32 x 32	B7	
MO17		MO_17.bmp	Acknowledgement for Unfitted; yellow	32 x 32	C1	Always with a flashing frame
MO18		MO_18.bmp	System failure; red with grey background	32 x 32	B7	
MO19		MO_19.bmp	STM National; grey	32 x 32	in level STM, the location is not specified	
MO20		MO_20.bmp	Acknowledgement for STM National; yellow	32 x 32	C1	Always with a flashing frame

**Table 43 – Mode Symbols**

## 11.3 Status Symbols

11.3.1.1 Status symbols are presented in Table 44.

Symbol number	Symbol form/shape	Bmp file name	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
ST01		ST_01.bmp	Service brake intervention or emergency brake intervention; red with grey background	52 x 21	C9	
ST02		ST_02.bmp	Slippery Rail; grey	52 x 21	A4	
ST03		ST_03.bmp	communication session existing; grey	52 x 21	E1	
ST04		ST_04.bmp	no communication session; red	52 x 21	E1	
ST05		ST05.bmp	hour glass; grey	20 x 20	Window title of 'Main' sub-level window	
ST06		ST06.bmp	reversing permitted	52 x 21	E2	

**Table 44 – Status Symbols**

## 11.4 Orders and Announcement of Track Condition Symbols

11.4.1.1 Orders and announcement of track condition symbols are presented in Table 45.

Symbol number	Symbol form/shape	Bmp file name	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
TC01		TC_01.bmp	Pantograph lowered; grey	32 x 32	B3/4/5	
TC02		TC_02.bmp	Lower pantograph; grey	32 x 32	B3/4/5	
TC03		TC_03.bmp	Lower pantograph; yellow	32 x 32	B3/4/5	
TC04		TC_04.bmp	Raise pantograph; grey	32 x 32	B3/4/5	
TC05		TC_05.bmp	Raise pantograph; yellow	32 x 32	B3/4/5	
TC06		TC_06.bmp	Neutral section and Neutral section announcement; grey	32 x 32	B3/4/5	
TC07		TC_07.bmp	Neutral section announcement; yellow	32 x 32	B3/4/5	
TC08		TC_08.bmp	End of neutral section; grey	32 x 32	B3/4/5	
TC09		TC_09.bmp	End of neutral section; yellow	32 x 32	B3/4/5	
TC10		TC_10.bmp	Non stopping area; grey	32 x 32	B3/4/5	
TC11		TC_11.bmp	Non stopping area announcement; yellow	32 x 32	B3/4/5	

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Symbol number	Symbol form/shape	Bmp file name	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
TC12		TC_12.bmp	Radio hole; grey	32 x 32	B3/4/5	
TC13		TC_13.bmp	Inhibition of Magnetic Shoe Brakes; grey	32 x 32	B3/4/5	
TC14		TC_14.bmp	Inhibition of Magnetic Shoe Brakes; yellow	32 x 32	B3/4/5	
TC15		TC_15.bmp	Inhibition of Eddy Current Brakes; grey	32 x 32	B3/4/5	
TC16		TC_16.bmp	Inhibition of Eddy Current Brakes; yellow	32 x 32	B3/4/5	
TC17		TC_17.bmp	Inhibition of Regenerative Brakes; grey	32 x 32	B3/4/5	
TC18		TC_18.bmp	Inhibition of Regenerative Brakes; yellow	32 x 32	B3/4/5	
TC19		TC_19.bmp	Close Air Conditioning intake; grey	32 x 32	B3/4/5	
TC20		TC_20.bmp	Open Air Conditioning intake; grey	32 x 32	B3/4/5	
TC21		TC_21.bmp	Close Air Conditioning intake; yellow	32 x 32	B3/4/5	
TC22		TC_22.bmp	Open Air Conditioning intake; yellow	32 x 32	B3/4/5	

**Table 45 – Orders and Announcement of Track Condition Symbols**

## 11.5 Planning Information Symbols

11.5.1.1 Planning information symbols are presented in Table 46.

Symbol number	Symbol form/shape	Bmp file name	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
PL01		PL_01.bmp	Lower pantograph; grey	20 x 20	D2/3/4	
PL02		PL_02.bmp	Lower pantograph; yellow	20 x 20	D2/3/4	
PL03		PL_03.bmp	Raise pantograph; grey	20 x 20	D2/3/4	
PL04		PL_04.bmp	Raise pantograph; yellow	20 x 20	D2/3/4	
PL05		PL_05.bmp	Neutral section announcement; grey	20 x 20	D2/3/4	
PL06		PL_06.bmp	Neutral section announcement; yellow	20 x 20	D2/3/4	
PL07		PL_07.bmp	End of neutral section; grey	20 x 20	D2/3/4	
PL08		PL_08.bmp	End of neutral section; yellow	20 x 20	D2/3/4	
PL09		PL_09.bmp	Non stopping area; grey	20 x 20	D2/3/4	
PL10		PL_10.bmp	Radio hole; grey	20 x 20	D2/3/4	
PL11		PL_11.bmp	Inhibition of Magnetic Shoe Brakes; grey	20 x 20	D2/3/4	
PL12		PL_12.bmp	Inhibition of Magnetic Shoe Brakes; yellow	20 x 20	D2/3/4	
PL13		PL_13.bmp	Inhibition of Eddy Current Brakes; grey	20 x 20	D2/3/4	












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Symbol number	Symbol form/shape	Bmp file name	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
PL14		PL_14.bmp	Inhibition of Eddy Current Brakes; yellow	20 x 20	D2/3/4	
PL15		PL_15.bmp	Inhibition of Regenerative Brakes; grey	20 x 20	D2/3/4	
PL16		PL_16.bmp	Inhibition of Regenerative Brakes; yellow	20 x 20	D2/3/4	
PL17		PL_17.bmp	Close Air Conditioning intake; grey	20 x 20	D2/3/4	
PL18		PL_18.bmp	Open Air Conditioning intake; grey	20 x 20	D2/3/4	
PL19		PL_19.bmp	Close Air Conditioning intake; yellow	20 x 20	D2/3/4	
PL20		PL_20.bmp	Open Air Conditioning intake; yellow	20 x 20	D2/3/4	
PL21		PL_21.bmp	Speed increase: grey	20 x 20	D6 (half left part) / D7 (half right part)	
PL22		PL_22.bmp	Speed decrease: grey	20 x 20	D6 (half left part) / D7 (half right part)	
PL23		PL_23.bmp	Speed decrease to zero target: grey	20 x 20	D6 (half left part) / D7 (half right part)	

**Table 46 – Planning information Symbols**

## 11.6 Navigation Symbols

11.6.1.1 Navigation symbols are presented in Table 47.

Symbol number	Symbol form/shape	Bmp file name	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
NA01		NA_01.bmp	Hide information; planning grey	12 x 12	D14	Touch screen
NA02		NA_02.bmp	Show/Hide information; planning grey	32 x 32	H2	Soft keys
NA03		NA_03.bmp	Scale up planning information; grey	12 x 12	D9	Touch screen
NA04		NA_04.bmp	Scale down planning information; grey	12 x 12	D12	Touch screen
NA05		NA_05.bmp	Scale up planning information; dark grey	12 x 12	D9	Touch screen (used for disabled button)
NA06		NA_06.bmp	Scale down planning information; dark grey	12 x 12	D12	Touch screen (used for disabled button)
NA07		NA_07.bmp	Scale up planning information; grey	32 x 32	F9	Soft keys
NA08		NA_08.bmp	Scale down planning information; grey	32 x 32	F8	Soft keys
NA09		NA_09.bmp	Scale up planning information; dark grey	32 x 32	F9	Soft keys (used for disabled button)
NA10		NA_10.bmp	Scale down planning information; dark grey	32 x 32	F8	Soft keys (used for disabled button)
NA11		NA_11.bmp	Close window; grey	32 x 32	[close] button in D/F/G area  H5	Touch screen  Soft keys




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Symbol number	Symbol form/shape	Bmp file name	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
NA12		NA_12.bmp	Close window; dark grey	32 x 32	[close] button in D/F/G area H5	Touch screen  Soft keys (used for disabled button)
NA13		NA_13.bmp	Scroll up; grey	32 x 32	E10 H5	Touch screen  Soft keys
NA14		NA_14.bmp	Scroll down; grey	32 x 32	E11 H6	Touch screen  Soft keys
NA15		NA_15.bmp	Scroll up; dark grey	32 x 32	E10 H5	Touch screen  Soft keys (used for disabled button)
NA16		NA_16.bmp	Scroll down; dark grey	32 x 32	E11 H6	Touch screen  Soft keys (used for disabled button)
NA17		NA_17.bmp	Next; grey	32 x 32	[Next] button in D/F/G area H4	Touch screen  Soft keys
NA18		NA_18.bmp	Previous; grey	32 x 32	[previous] button in D/F/G area H3	Touch screen  Soft keys
NA18.2		NA_18.2.bmp	Next; dark grey	32 x 32	[Next] button in D/F/G area H4	Touch screen  Soft keys (used for disabled button)
NA19		NA_19.bmp	Previous; dark grey	32 x 32	[previous] button in D/F/G area H3	Touch screen  Soft keys (used for disabled button)
NA20		NA_20.bmp	Enter, grey	32 x 32		

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Symbol number	Symbol form/shape	Bmp file name	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
NA21		NA_21.bmp	Delete, grey	32 x 32		

**Table 47 - Navigation Symbols**

## 11.7 Settings Symbols




11.7.1.1 Settings symbols are presented in Table 48.

Symbol number	Symbol form/shape	Bmp file name	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
SE01		SE_01.bmp	Luminance adjustment, grey	32 x 32		
SE02		SE_02.bmp	Volume adjustment, grey	32 x 32		
SE03		SE_03.bmp	Language selection, grey	32 x 32		
SE04		SE_04.bmp	Settings menu, grey	32 x 32		

**Table 48 - Settings Symbols**

## 11.8 Driver Request Symbols

11.8.1.1 Driver request symbols are presented in Table 49.

Symbol number	Symbol form/shape	Bmp file name	Symbol and colour description	Symbol size (cells)	Symbol area(s)	Remarks
DR01		DR_01.bmp	Toggling function ; grey	32 x 32	F6	Soft keys
DR02		DR_02.bmp	Track Ahead Free, grey	75 x 46		
DR03		DR_03.bmp	Geographical Position; grey	32 x 32	G12 F7	Touch screen Soft keys

**Table 49 – Driver request Symbols**

## **12. AUDIBLE INFORMATION**

### **12.1 Introduction**

12.1.1.1 Audible information is used to draw the driver's attention from the outside to the display.

### **12.2 Feedback Audible information**

#### **12.2.1 click**

12.2.1.1 The audible information 'click' is given as feedback while pressing the finger on a button.

12.2.1.2 This 'click' sound shall be played once.

12.2.1.3 The 'click' sound shall be compliant with the "S\_click.wav" file.

### **12.3 ERTMS/ETCS Audible information**

#### **12.3.1 Sinfo - Information on DMI**

12.3.1.1 This is to draw the attention of the driver to some new visual information.

12.3.1.2 This Sinfo sound shall be played once.

12.3.1.3 The Sinfo sound shall be compliant with the "S\_info.wav" file.

#### **12.3.2 S1 - Driving too fast**

12.3.2.1 This is to draw the driver's attention that the current train speed ( $V_{train}$ ) has exceeded the permitted speed ( $V_{perm}$ ) in TSM (i.e. the Over-speed status is activated).

12.3.2.2 This S1 sound shall be played once.

12.3.2.3 The S1 sound shall be compliant with the "S1\_toofast.wav" file.

#### **12.3.3 S2 - Speed warning**

12.3.3.1 This is to draw the driver's attention that the current train speed ( $V_{train}$ ) is close to the intervention speed ( $V_{int}$ ) (i.e. the Warning status is activated).

12.3.3.2 This S2 sound shall be played as long as the Warning status information is active.

12.3.3.3 The S2 sound shall be compliant with the "S2\_warning.wav" file.

## 13. LIST OF OPERATIONAL TEXT MESSAGES

- 13.1.1.1 The operational text messages mentioned in Table 50 shall be displayed to the driver to fulfil the driver information required by the corresponding clauses in doc [3].
- 13.1.1.2 The case of the displayed operational texts shall comply with the case of the texts in Table 50.
- 13.1.1.3 The operational texts shall be displayed as text messages not to be acknowledged.
- 13.1.1.3.1 Note: the operational text messages are provided in English. However, the actual operational text messages displayed to the driver depends on the selected language (see section 5.5).
- 13.1.1.4 Results of the self-test and of the test of the external devices as mentioned in doc [3] §4.4.7.1.2 shall result in text messages only when some tests failed. These text messages are product dependent texts and are therefore not part of Table 50.

Operational text message	SRS section	Comment
Balise read error	3.16.2.6.1	Trip reason
	4.4.15.1.10	
	3.16.2.4.4.3	
	3.16.2.5.3	
	CR791: 3.16.2.7.1.1	
	CR791: 3.16.2.7.2.2	
	3.16.2.4.9	
	4.6.3 [17]	Trip reason
	3.16.2.3.2	Trip reason
	4.6.3 [66]	Trip reason
Communication error	3.16.3.4.4	
	4.6.3 [41]	Trip reason
Entering FS	4.4.9.1.4	
	4.7.2	
Entering OS	4.4.12.1.7	
	4.7.2	
No track condition will be received	5.4.3.2 S10	
Runaway movement	3.14.2.6	Roll Away Protection
	3.14.3.4	Reverse Movement Protection
	CR180 (DC):3.14.4.5	Standstill supervision
	CR490 (DC): 4.4.14.1.3	PT distance exceeded
SH refused	5.6.3 A220	

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Operational text message	SRS section	Comment
	4.7.2	
Trackside not compatible	3.17.3.5	Trip reason
	3.17.3.8	
	4.6.3 [65]	Trip reason
Train data changed	CR500	
	5.17.2.2 A1	
	CR500: 5.17.2.2 S2	
Train is rejected	5.4.3.2 A40	
Unauthorized passing of EOA / LOA	3.13.8.1	Trip reason
	3.13.8.1.1	Trip reason
	4.6.3 [16]	Trip reason
	3.11.6.4	Trip reason
	4.6.3 [18]	Trip reason
No MA received at level transition	4.6.3 [39]	Trip reason
	5.10.3.2.3	Trip reason
	5.10.3.4.1	Trip reason
	5.10.3.7.3	Trip reason
	5.10.3.8.1	Trip reason
	4.6.3	Trip reason
	4.6.3 [67]	Trip reason
SR distance exceeded	4.4.11.1.3 b	Trip reason
	4.6.3 [42]	Trip reason
SH stop order	4.4.8.1.1 c	Trip reason
	4.6.3 [49]	Trip reason
	4.4.8.1.1 b	Trip reason
	4.6.3 [52]	Trip reason
SR stop order	4.4.11.1.3 d	Trip reason
	4.6.3 [54]	Trip reason
	4.4.11.1.3 c	Trip reason
	4.6.3 [36]	Trip reason
Emergency stop	4.7.2	
	3.10.2.1.3	Trip reason
	CR792: 4.6.3 [20]	Trip reason

**Table 50 - Operational text messages**