Irish Railway Standard IRS-303-A

Requirements for Class B CCO Subsystems in Republic of Ireland – Driver Machine Interface

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1 Foreword

1.1 This Irish Railway Standard:

i. cannot replace any Technical Standard for Interoperability (TSI) or other legal requirements which may be applicable to a given project;
ii. is recommended to be chosen in accordance with RFU-STR-088 as an Alternative Solution in conjunction with a TSI Parameter to demonstrate conformity with the Essential Requirements;
iii. may be called up as a code of practice in conjunction with CSM-REA 352/2009 and 402/2013;
iv. may be called up as good industry practice in conjunction with Railway Safety Act 2005;
v. may be called up as a code of practice in conjunction with the safe integration of projects within the Railway System in the Republic of Ireland as defined under 2008/57/EC Art15 or 2016/797 (EU) Art 18;
vi. may in parts or in full be called up as a National Rule (NR) for the Republic of Ireland in conjunction with 2008/57/EC or 2016/797 (EU).

1.2 Where this document is called up as a National Rule, the reason for its application shall be identified in line with EU 2016/797 Art 13(2):

i. where the TSIs do not cover, or do not fully cover, certain aspects corresponding to the Essential Requirements, including open points as referred to in 2016/797 Article 4(6);
ii. where non-application of one or more TSIs or parts of them has been notified under 2016/797 Article 7 or 2008/57/EC Art9 or Art20;
iii. where a specific case requires the application of technical rules not included in the relevant TSI;
iv. National Rules used to specify existing systems, limited to the aim of assessing technical compatibility of the vehicle with the network;
v. networks and vehicles not covered by TSIs;
vi. as an urgent temporary preventive measure, in particular following an accident.

2 Scope and Application

2.1 Scope

2.1.1 General scope

The focus of this IRS is the specification of the Driver Machine Interface for the Class B train control command and signaling onboard subsystems in IRL, in accordance with [TSI-CCS], which indicates that the definition of the requirements for a Class B system are in the responsibility of the relevant Member State.

This document shall be read in conjunction with [IRS-CLASSB].

2.1.2 Scope of this version

The scope of applicability of this version of IRS as set out in [IRS-CLASSB] section 2.1 also applies to this IRS.

Note: During the development of the current version of this IRS and associated IRS, consideration has been given to Human Factors aspects through workshops and on-train operational trials with RU staff in IRL, together with experience gained from many years of operation with the existing IRL Class B systems. It is intended that a future expanded version of this IRS would be supported by additional Human Factors analyses.

2.2 Editing rules

The editing rules set out in [IRS-CLASSB] section 2.2 also apply to this IRS.

2.3 Conformity assessment

This IRS shall only be assessed in combination with [IRS-CLASSB].

3 Normative references

In the development, operation and management of the CCO and CCT systems the application of the following standards shall be required. Subsequent revisions may be used instead of the quoted revisions.

The list provided in [IRS-CLASSB] section 3 applies also to this IRS. The following references are specific to this IRS:

[IRS-CLASSB]	IRS-301-A Irish Railway Standard - Requirements for Class B CCO and CCT Systems in the Republic of Ireland
[015560]	ERA-ERTMS-015560 UNISIG ERTMS/ETCS DRIVER MACHINE INTERFACE, Issue 3.4.0
[60529]	EN60529 (+A1+A2):1989(+1999+2013) Degrees of Protection Provided by Enclosures (IP Code)

4 Terms and Definitions

The list of Terms and Definitions provided in [IRS-CLASSB] section 4 applies also to this IRS.

5 Symbols and Abbreviated Terms

The list of Symbols and Abbreviated Terms provided in [IRS-CLASSB] section 5 applies also to this IRS.

6 General Requirements for DMI

6.1 Sub-System Requirements

[REQ:IE-DMI_00001];[Allocation:Onboard];[Type:Mandatory]

The DMI shall be an integral part of the CCO.

[END_REQ]

[REQ:IE-DMI_00002];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display information to the driver and detect the driver commands/actions.

[END_REQ]

Note: Wherever practical and with the intent to facilitate a potential transition to ETCS, the DMI design and its operation shall aim to follow the requirements of the relevant ETCS DMI specification.

6.2 Technical Requirements

[REQ:IE-DMI_00003];[Allocation:Onboard];[Type:Mandatory]

The DMI shall provide the driver with a colour graphical interface with the following features as a minimum:

- LCD: 10.4” TFT LCD with LVDS interface
- Display Resolution: 640 x 480 pixel
- Display Aspect Ratio: 8 to 6, horizontal orientation
- Colour Depth: 262k
- Contrast Ratio: 700:1
- Brightness-Range: 330 to 450 cd/m2, adjustable by driver

[END_REQ]

[REQ:IE-DMI_00004];[Allocation:Onboard];[Type:Mandatory]

The dimensions or text sizes given in this document for all displayed objects are based on a display resolution of 640 x 480 pixel. If a display with a resolution greater than 640 x 480 pixel is used, the dimensions of all displayed objects shall be scaled to give the same image, relative to the screen size, as with a display of 640 x 480 pixel resolution.

[END_REQ]

[REQ:IE-DMI_00005];[Allocation:Onboard];[Type:Mandatory]

The DMI shall have a touch screen interface to detect the driver commands/actions.

[END_REQ]

[REQ:IE-DMI_00006];[Allocation:Onboard];[Type:Mandatory]

The touch screen shall be capable of being activated by finger, finger-nail, stylus, credit card (or similar plastic object), key (or similar metal object) or gloved finger.

[END_REQ]

[REQ:IE-DMI_00007];[Allocation:Onboard];[Type:Mandatory]

The front face of the DMI shall have an IP rating of IP65 in accordance with [60529].

The mounting of the DMI in the driver cab shall ensure, that either IP65 in accordance with [60529] is achieved or alternatively the same level of protection which is used throughout the driver desk installations shall be provided.

[END_REQ]

[REQ:IE-DMI_00008];[Allocation:Onboard];[Type:Mandatory]

The DMI shall drive an external loudspeaker to provide audible information to the driver.

The volume requirements of this audible information shall be taken from [TSI LOC&PAS] section 4.2.9.3.4 (5).

[END_REQ]

[REQ:IE-DMI_00009];[Allocation:Onboard];[Type:Mandatory]

The DMI shall permit the driver to adjust five different levels of brightness:

- Level1: 330 cd/m^2
- Level2: 360 cd/m^2
- Level3: 390 cd/m^2
- Level4: 420 cd/m^2
- Level5: 450 cd/m^2

[END_REQ]

[REQ:IE-DMI_00010];[Allocation:Onboard];[Type:Mandatory]

The Vital Computing Unit shall send updates of the status of all DMI objects no less frequently than four times per second.

[END_REQ]

[REQ:IE-DMI_00011];[Allocation:Onboard];[Type:Mandatory]

The DMI shall use only the colours (RGB) listed in the Table 1below.

Colour name	Red	Green	Blue
black	0	0	0
red	255	0	0
yellow	255	255	0
orange	234	145	0
white	255	255	255
grey	195	195	195
medium grey	150	150	150
dark grey	85	85	85
blue	0	0	255
dark blue	3	17	34
light green	45	144	51

Table 1 – DMI colours

[END_REQ]

6.3 Areas of the CCO DMI

Note: The information provided or received by the driver is presented through objects which can be Buttons, Messages, Symbols or other graphical items such as e.g. pointer, dial, or circular speed gauge.

[REQ:IE-DMI_00012];[Allocation:Onboard];[Type:Mandatory]

Each item of information shall be displayed in a specific main and sub area of the DMI in accordance with Figure 1 and Figure 2, which show the reference naming and layout of the different main and sub areas on the DMI.

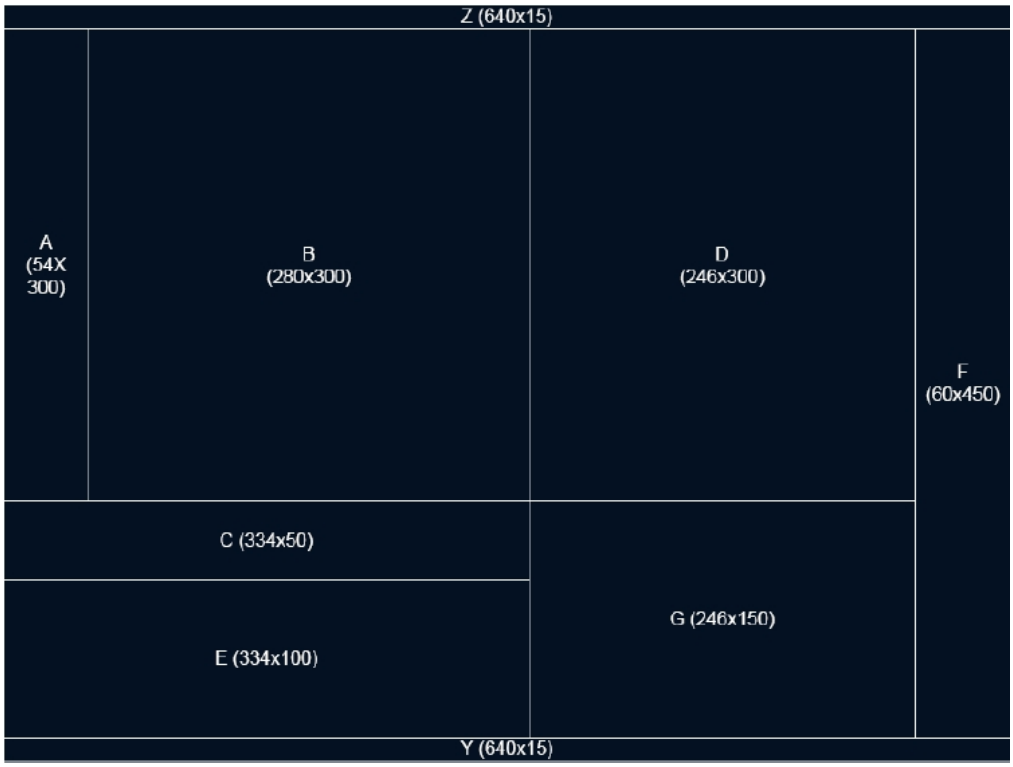


Figure 1 - CCO DMI main areas

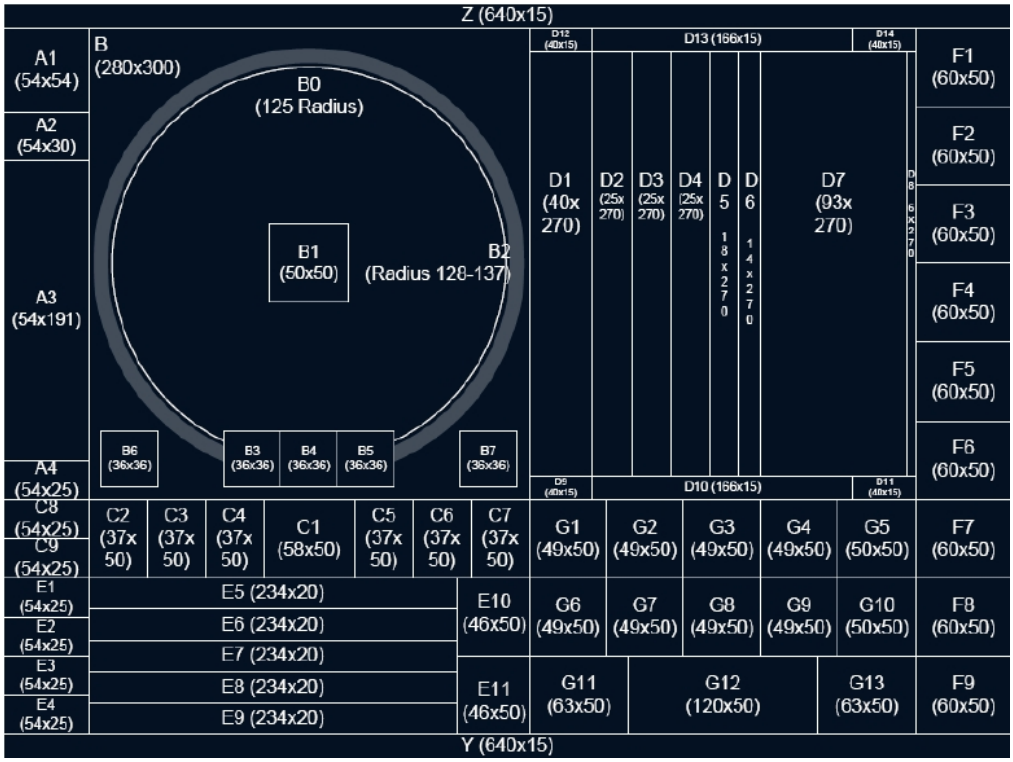


Figure 2 - CCO DMI sub areas and arrangement on screen

[END_REQ]

[REQ:IE-DMI_00013];[Allocation:Onboard];[Type:Mandatory]

Unless stated otherwise, each object shall be centred within its assigned DMI area.

[END_REQ]

[REQ:IE-DMI_00014];[Allocation:Onboard];[Type:Mandatory]

Where, in the tables contained in this IRS, the following conditions apply for an object:

- a DMI area is indicated and
- **no** x and y coordinates are indicated under the heading 'Position' and
- **no** Height and Width are defined.

The following shall apply, unless stated otherwise in this IRS:

- The surface of the corresponding object shall cover the full DMI area. If indicated for the object, this surface shall be touch sensitive.

[END_REQ]

[REQ:IE-DMI_00015];[Allocation:Onboard];[Type:Mandatory]

Where, in the tables contained in this IRS, the following conditions apply for an object:

- a DMI area is indicated and
- **no** x and y coordinates are indicated under the heading 'Position' and
- Height and Width are defined.

The following shall apply, unless stated otherwise in this IRS:

- The corresponding object shall be centered within that DMI area.
- Height and Width define the surface of the corresponding object. If indicated for the object, this surface shall be touch sensitive.

[END_REQ]

[REQ:IE-DMI_00016];[Allocation:Onboard];[Type:Mandatory]

Where, in the tables contained in this IRS, the following conditions apply for an object:

- a DMI area is either indicated or not indicated and
- x and y coordinates are indicated under the heading 'Position' and
- Height and Width are defined.

The following shall apply, unless stated otherwise in this IRS:

- Where a DMI area is indicated, the corresponding object shall be placed within that DMI area.
- The values x and y represent the horizontal and vertical offset from the upper left corner of the DMI

screen to the upper left corner of the corresponding object.

- Height and Width define the surface of the corresponding object. If indicated for the object, this surface shall be touch sensitive.

[END_REQ]

[REQ:IE-DMI_00017];[Allocation:Onboard];[Type:Mandatory]

The DMI background shall be dark blue.

[END_REQ]

7 Buttons

7.1 General Requirements

[REQ:IE-DMI_00018];[Allocation:Onboard];[Type:Mandatory]

The DMI shall consider as touch sensitive surface of a button the full size of the visible surface of the button.

[END_REQ]

[REQ:IE-DMI_00019];[Allocation:Onboard];[Type:Mandatory]

The buttons shall be classified as follows:

- Functional buttons, whose purpose is to allow the driver to activate a CCO Operating Mode, function, or enter certain data directly.
- Data Entry buttons, whose purpose is to allow the driver to enter data via called up Data Entry pages.
- CAWS buttons, whose purpose is to inform the driver about the aspect related to the detected 50Hz -code name and to propose the acknowledgement of a more restrictive aspect.
- Acknowledgement buttons, whose purpose is to allow the driver to perform an acknowledgement action.

[END_REQ]

[REQ:IE-DMI_00020];[Allocation:Onboard];[Type:Mandatory]

The background colour of a DMI button shall be dark blue, unless stated otherwise for specific buttons.

[END_REQ]

[REQ:IE-DMI_00021];[Allocation:Onboard];[Type:Essential]

The DMI shall set a button in the “released” state every time a DMI element containing the button becomes displayed on the DMI.

[END_REQ]

[REQ:IE-DMI_00022];[Allocation:Onboard];[Type:Essential]

The DMI shall consider a button in the “pressed” state if:

- The button was in the “released” state and
- Its touch sensitive surface becomes continuously pressed for a time greater than or equal to a time (Min_Timeout) and
- Its touch sensitive surface is continuously pressed for a time less than a time (Max_Timeout).

[END_REQ]

[REQ:IE-DMI_00023];[Allocation:Onboard];[Type:Essential]

The DMI shall set a button in the “released” state if:

- The button was in the “pressed” state and
- Its touch sensitive surface is no longer pressed for a time equal to a time (Min_Timeout).

[END_REQ]

[REQ:IE-DMI_00024];[Allocation:Onboard];[Type:Essential]

The CCO shall raise an ERR_BUTTON, if a DMI button is continuously pressed for a time greater than or equal to a time (Max_Press_Timeout).

[END_REQ]

7.2 Functional buttons

[REQ:IE-DMI_00025];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the Functional buttons in ‘3D mode’ (an optical 3D effect) by surrounding them with a border of 4 pixel width internal to the button surface. There shall be a 45 degree intersection where two borderlines meet in a corner (to support the optical 3D effect).

[END_REQ]

[REQ:IE-DMI_00026];[Allocation:Onboard];[Type:Mandatory]

If a Functional button is in the “released” state, the DMI shall display its

- top and left border in grey, and
- bottom and right border in dark grey.

[END_REQ]

[REQ:IE-DMI_00027];[Allocation:Onboard];[Type:Mandatory]

While a Functional button is in the “pressed” state, the DMI shall display its

- top and left border in dark grey, and
- bottom and right border in grey.

[END_REQ]

[REQ:IE-DMI_00028];[Allocation:Onboard];[Type:Essential]

Any text label font of a Functional button shall be:

- font: Helvetica 45 light

- style: bold
- size: 11
- colour: medium grey

[END_REQ]

[REQ:IE-DMI_00029];[Allocation:Onboard];[Type:Mandatory]

Any graphic label of a Functional button shall be medium grey.

[END_REQ]

[REQ:IE-DMI_00030];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the Functional buttons listed in Table 2 and it shall place them in the indicated sub or main areas.

[END_REQ]

Name	Description	Label	Timer			Position			Surface Dimensions	
			Min_Timeout	Max_Timeout	Max_Press_Timeout	DMI area	x	y	Height	Width
B_REL	RUNNING RELEASE		0s	3s	20s	F1	-	-	48	58
B_SHU	FORWARD_SHUNTING		0s	3s	20s	F2	-	-	48	58
B_STOP_OVERRIDE	STOP OVERRIDE		0s	3s	20s	F3	-	-	48	58
B_REV	REVERSE_SHUNTING		0s	3s	20s	F4	-	-	48	58
B_DTP_E	DTP Exclusion		0s	3s	20s	F5	-	-	48	58
B_CODE_RESET	CODE Reset		0s	3s	20s	F6	-	-	48	58
B_DATA	DATA ENTRY		0s	3s	20s	F7	-	-	48	58
B_TEST	CCO BRAKE CONNECTIVITY TEST		0s	3s	20s	F8	-	-	48	58
B_BRIGHTNESS	Luminance adjustment		-	-	-	F9	-	-	48	58
B_SB_TEST	SB connectivity test request		0s	3s	20s	F1	-	-	48	58

Name	Description	Label	Timer			Position			Surface Dimensions	
			Min_Timeout	Max_Timeout	Max_Press_Timeout	DMI area	x	y	Height	Width
B_EB_TEST	EB connectivity test request		0s	3s	20s	F2	-	-	48	58
B_TEST_EXIT	Exit		0s	3s	20s	F4	-	-	48	58
B_CONFIRM_DATA	Yes answer		0s	3s	20s	F8	-	-	48	58
B_NOT_CONFIRM_DATA	No answer		0s	3s	20s	F9	-	-	48	58
B_GLOBAL_DATA_OK	Confirm data entry		0s	3s	20s	F9	-	-	48	58
B_UP	Increase data		0s	3s	120s	F3	-	-	48	58
B_DOWN	Decrease data		0s	3s	120s	F4	-	-	48	58
B_SINGLE_DATA_OK	Confirm single data change		0s	3s	20s	F9	-	-	48	58
B_KEYBOARD_0	Button 0 on keyboard		-	-	-	D	429	217	48	58
B_KEYBOARD_1	Button 1 on keyboard		-	-	-	D	369	67	48	58
B_KEYBOARD_2	Button 2 on keyboard		-	-	-	D	429	67	48	58
B_KEYBOARD_3	Button 3 on keyboard		-	-	-	D	489	67	48	58
B_KEYBOARD_4	Button 4 on keyboard		-	-	-	D	369	117	48	58
B_KEYBOARD_5	Button 5 on keyboard		-	-	-	D	429	117	48	58
B_KEYBOARD_6	Button 6 on keyboard		-	-	-	D	489	117	48	58
B_KEYBOARD_7	Button 7 on keyboard		-	-	-	D	369	167	48	58
B_KEYBOARD_8	Button 8 on keyboard		-	-	-	D	429	167	48	58
B_KEYBOARD_9	Button 9 on keyboard		-	-	-	D	489	167	48	58

Name	Description	Label	Timer			Position			Surface Dimensions	
			Min_Timeout	Max_Timeout	Max_Press_Timeout	DMI area	x	y	Height	Width
B_KEYBOARD_CANCEL	Button Cancel on keyboard	C	-	-	-	D	369	217	48	58
B_KEYBOARD_OK	Button OK on keyboard	OK	0s	3s	20s	D	489	217	48	58

Table 2 – Functional buttons Reference Table

Note: this version of the IRS only addresses the DMI requirements for the purpose of the Simplified Data Entry procedure. The requirements for the Full Data Entry procedure will be specified in a future version of this IRS.

7.3 Data Entry buttons

Note: this version of the IRS only addresses the DMI requirement for the purpose of the Simplified Data Entry procedure. The requirements for the Full Data Entry procedure will be specified in a future version of this IRS.

[REQ:IE-DMI_00031];[Allocation:Application Condition];[Type:Mandatory]

SRAC: An operational rule shall be established to require the driver to only use the Data Entry function (and buttons) while the train is at Standstill.

[END_REQ]

[REQ:IE-DMI_00032];[Allocation:Onboard];[Type:Mandatory]

The text label of a Data Entry button shall consist of a fixed part and a variable part. The variable part shall be the data value.

The layout of a Data Entry button is shown in the Figure 3below:

Figure 3 - Example of Data Entry button

[END_REQ]

[REQ:IE-DMI_00033];[Allocation:Onboard];[Type:Mandatory]

The text label font of a Data Entry button shall be:

- font: Helvetica 45 light
- style: bold
- size: 12

- colour: yellow

[END_REQ]

[REQ:IE-DMI_00034];[Allocation:Onboard];[Type:Mandatory]

If a data value is fixed by CCO pre-parametrisation (i.e. not changeable by the driver), the text label colour shall be grey as shown in the Figure 4below. (Text given in the figure is a placeholder only.)

Figure 4 - Example of Fixed Data Entry button

[END_REQ]

Note: Where simplified data entry is configured, all the displayed values are changeable by the driver. This requirement is only relevant during Full Data entry procedure.

[REQ:IE-DMI_00035];[Allocation:Onboard];[Type:Mandatory]

While the touch sensitive surface of a Data Entry button is pressed, the DMI shall display the button with:

- background colour: white, and
- text colour: blue.

The layout of a pressed Data Entry button is shown in the Figure 5below.

Figure 5 - Example of Pressed Data Entry button

[END_REQ]

[REQ:IE-DMI_00036];[Allocation:Onboard];[Type:Mandatory]

If a Data Entry button is the last selected Data Entry button, the DMI shall display the button with:

- background colour: light green and
- text colour: yellow.

The layout of a last selected Data Entry button is shown in the Figure 6below.

Figure 6 - Example of Selected Data Entry button

[END_REQ]

Note: The green colour background is considered acceptable here (despite the general approach to avoid presentation of a green display to the driver), as the Data Entry buttons must only be displayed and used while in Standstill.

[REQ:IE-DMI_00037];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the Data Entry buttons listed in Table 3 and it shall place them in the indicated DMI areas.

[END_REQ]

Name	Description	Text label (fixed part)	Timer			Position			Surface Dimensions	
			Min_Timeout	Max_Timeout	Max_Press_Timeout	DMI area	x	y	Height	Width
B_NUMBER_OF_VEHICLES	Enter the Single Data Entry page, in order to insert the proper number of vehicles.	Number of Vehicles	0s	3s	20s	-	10	40	50	430
B_EMU_DMU_BRAKES_ISOLATED	Enter the Single Data Entry page, in order to indicate if a driver has isolated brake-equipment on the train (for details see [IRS-CLASSB]).	Brakes Isolated	0s	3s	20s	-	10	100	50	530

Table 3 – Data Entry buttons Reference Table

7.4 CAWS button

[REQ:IE-DMI_00038];[Allocation:Onboard];[Type:Mandatory]

A CAWS button shall be able to assume the following states:

- 'Off' where the related code is not detected
- 'Steady-On' where the related code detected and acknowledged by the driver
- 'Flashing-On' where the related code detected, driver acknowledgement requested.

The layout of CAWS button state display is shown in Table 3.

[END_REQ]

[REQ:IE-DMI_00039];[Allocation:Onboard];[Type:Mandatory]

If a CAWS button is in the Off state, the DMI shall display its Off state label, according to Table 4

[END_REQ]

[REQ:IE-DMI_00040];[Allocation:Onboard];[Type:Mandatory]

If a CAWS button is in the Steady-On state, the DMI shall display its Steady-On state label, according to Table 4.

[END_REQ]

[REQ:IE-DMI_00041];[Allocation:Onboard];[Type:Mandatory]

If a CAWS button is in the Flashing-On state, the DMI shall display its Flashing-On state label according to Table 4, and a yellow flashing frame of 3 pixel width, surrounding the button. The frame shall flash at a rate of 1 Hz ±10% and a 50% ±10% duty cycle

[END_REQ]

[REQ:IE-DMI_00042];[Allocation:Onboard];[Type:Mandatory]

The flashing frame shall not be considered as part of the touch sensitive surface of the button.

[END_REQ]

[REQ:IE-DMI_00043];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the CAWS buttons listed in Table 5 and it shall place them in the indicated areas.

[END_REQ]

Off State	Steady-On State	Flashing-On State
		

Table 4 – Example of CAWS button States (showing a CAWS button on its background)

[REQ:IE-DMI_00044];[Allocation:Onboard];[Type:Essential]

The DMI shall display the button according to Table 5 with:

- background colour: dark blue, and
- button colour: red, yellow or light green.

[END_REQ]

Name	Description	Label (fixed part)	Timer			Position			Surface Dimensions	
			Min_Timeout	Max_Timeout	Max_Press_Timeout	DMI area	x	y	Height	Width
B_GREEN_CODE	Indication for CAWS mode Green aspect: Steady-On / Flashing-On state label		0s	3s	20s	D	405	40	45	70
	Indication for CAWS mode Green aspect: Off state label									
B_YELLOW_CODE	Indication for CAWS mode Yellow aspect: Steady-On / Flashing-On state label		0s	3s	20s	D	405	90	45	70
	Indication for CAWS mode Yellow aspect: Off state label									
B_DOUBLE_YELLOW _CODE	Indication for CAWS mode Double Yellow aspect: Steady-On / Flashing-On state label		0s	3s	20s	D	405	140	95	70
	Indication for CAWS mode Double Yellow aspect: Off state label									
B_RED_CODE	Indication for CAWS mode Red aspect: Steady-On / Flashing-On state label		0s	3s	20s	D	405	240	45	70
	Indication for CAWS mode Red aspect: Off state label									

Table 5 – CAWS buttons Reference Table

7.5 Acknowledgement buttons

[REQ:IE-DMI_00045];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the Acknowledgement buttons with a yellow flashing frame of 3 pixel width, surrounding the button. The frame shall flash at a rate of 1Hz±10% and a 50% ±10% duty cycle.

[END_REQ]

[REQ:IE-DMI_00046];[Allocation:Onboard];[Type:Mandatory]

For Acknowledgement buttons, the touch sensitive surface shall include the area of the flashing frame.

[END_REQ]

[REQ:IE-DMI_00047];[Allocation:Onboard];[Type:Essential]

Any text label font of Acknowledgement buttons shall be:

- font: Helvetica 45 light
- style: bold
- size: 11
- colour: yellow, except for CAWS Code Acknowledgement buttons (B_TEXT_xxx_CODE_ACK), where the text shall be medium grey

Any graphic label of Acknowledgement buttons shall be yellow, except for CAWS Code Acknowledgement buttons (B_TEXT_xxx_CODE_ACK), where the colour of the label shall be red, or yellow or light green as indicated in Table 6.

[END_REQ]

[REQ:IE-DMI_00048];[Allocation:Onboard];[Type:Mandatory]

The DMI shall be able to display the Acknowledgement buttons listed in Table 6 and it shall place them in the indicated DMI areas.

[END_REQ]

Name	Description	Label (fixed part)	Timer			Position			Surface Dimensions	
			Min_Timeout	Max_Timeout	Max_Press_Timeout	DMI area	x	y	Height	Width
B_ATP_ACK	Acknowledgement for transition to ATP mode		0s	3s	20s	C1	-	-	-	-
B_DTP_E_ACK	Acknowledgement for transition to DTP_E mode and for the following functions: - DTP Exclusion - DTP Inclusion		0s	3s	20s	C1	-	-	-	-
B_DTP_E_ATP_ACK	Acknowledgement for transition to DTP_E+ATP mode		0s	3s	20s	C1	-	-	-	-
B_CODE_RESET_ACK	Acknowledgement for CODE Carrier Reset procedure		0s	3s	20s	C1	-	-	-	-
B_CODE_E_ACK	Acknowledgement for transition to CODE_E mode		0s	3s	20s	C1	-	-	-	-
B_DTP_E_CODE_E_ACK	Acknowledgement for transition to DTP_E+CODE_E mode		0s	3s	20s	C1	-	-	-	-
B_SHU_ACK	Acknowledgement for transition to FORWARD_SHUNTING		0s	3s	20s	C1	-	-	-	-

Name	Description	Label (fixed part)	Timer			Position			Surface Dimensions	
			Min_Timeout	Max_Timeout	Max_Press_Timeout	DMI area	x	y	Height	Width
B_REV_ACK	Acknowledgement for transition to REVERSE_SHUNTING		0s	3s	20s	C1	-	-	-	-
B_SO_ACK	Acknowledgement for Stop Override		0s	3s	20s	C1	-	-	-	-
B_TSP_ACK	Acknowledgement for Train Stop		0s	3s	20s	C1	-	-	-	-
B_REL_ACK	Acknowledgement for the following procedures:. - Running Release in ATP and DTP_E+ATP modes. - Reset of Start Against Signal Reminder in CAWS and DTP_E+CAWS modes.		0s	3s	20s	C1	-	-	-	-
B_SR_ACK	Acknowledgement for transition to STAFF_RESPONSIBLE mode		0s	3s	20s	C1	-	-	-	-
B_UN_ACK	Acknowledgement for transition to UNFITTED mode		0s	3s	20s	C1	-	-	-	-
B_DTP_ACK	Acknowledgement for transition to DTP mode		0s	3s	20s	C1	-	-	-	-
B_TEXT_GREEN_CODE_ACK	Acknowledgement for GREEN code detection or CAWS mode or DTP_E+CAWS mode, if the transition occurs in a GREEN code area	 (light green colour)	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_DOUBLE _YELLOW_CODE_ACK	Acknowledgement for DOUBLE YELLOW code detection or CAWS mode or DTP_E+CAWS mode, if the transition occurs in a DOUBLE YELLOW code area	 (yellow colour)	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_YELLOW _CODE_ACK	Acknowledgement for YELLOW code detection or CAWS mode or DTP_E+CAWS mode, if the transition occurs in a YELLOW code area	 (yellow colour)	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_RED_CODE _ACK	Acknowledgement for RED code detection or CAWS mode or DTP_E+CAWS mode, if the transition occurs in a RED code area	 (red colour)	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_ERROR_ACK	Acknowledgement for an error occurrence	Refer to section 9.1.1	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_RUNNING _RELEASE_ACK	Acknowledgement for Running Release request	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-

Name	Description	Label (fixed part)	Timer			Position			Surface Dimensions	
			Min_Timeout	Max_Timeout	Max_Press_Timeout	DMI area	x	y	Height	Width
B_TEXT_SASR_ACK	Acknowledgement for Start Against Signal Reminder request	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_ATP_ACK	Acknowledgement for ATP mode	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_DTP_E_ACK	Acknowledgement for DTP_E mode	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_DTP_E_ATP _ACK	Acknowledgement for DTP_E+ATP mode	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_CODE_E_ACK	Acknowledgement for CODE_E mode	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_DTP_E_CODE_E_ACK	Acknowledgement for DTP_E+CODE_E mode	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_ENTRY_SHU _ACK	Acknowledgement for entry FORWARD_SHUNTING mode request	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_ENTRY_REV _ACK	Acknowledgement for entry REVERSE_SHUNTING mode request	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_SO_ACK	Acknowledgement for STOP OVERRIDE request	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_TSP_ACK	Acknowledgement for TRAIN STOP occurrence	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_SR_ACK	Acknowledgement for STAFF_RESPONSIBLE mode	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_DTP_ACK	Acknowledgement for DTP mode	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_EXIT_SHU _ACK	Acknowledgement for exit FORWARD_SHUNTING mode	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_EXIT_REV _ACK	Acknowledgement for exit REVERSE_SHUNTING mode	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_DTP _EXCLUSION_ACK	Acknowledgement for DTP exclusion request	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-
B_TEXT_DTP _INCLUSION_ACK	Acknowledgement for DTP inclusion request	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-

Name	Description	Label (fixed part)	Timer			Position			Surface Dimensions	
			Min_Timeout	Max_Timeout	Max_Press_Timeout	DMI area	x	y	Height	Width
B_TEXT_CODE _DISABLE_ACK	Acknowledgement for CODE disable request	Refer to section 9.1.2	0s	3s	20s	E5+E6+E7+ E8+E9	-	-	-	-

Table 6 – Acknowledgement buttons Reference Table

8 Symbols

8.1 General Requirements

[REQ:IE-DMI_00049];[Allocation:Onboard];[Type:Mandatory]

Any text font within Symbol shall be:

- font: Helvetica 45 light
- style: bold
- size: 11
- colour: yellow or red or grey as indicated in Table 1.

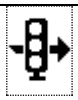
Any graphic element of Symbols shall use the colours grey, black, white, red, yellow, light green, blue as indicated in Table 1.

[END_REQ]

[REQ:IE-DMI_00050];[Allocation:Onboard];[Type:Mandatory]

The DMI shall be able to display the Symbols listed in Table 7 and it shall place them in the indicated DMI areas.

[END_REQ]

Name	Description	Symbol	Position			Surface Dimensions	
			DMI area	x	y	Height	Width
I_SO	Stop Override function activated		C3	-	-	-	-
I_SO_TO	End of Stop Override		C4	-	-	-	-
I_TSP_ACT	Train Stop function activated		C3	-	-	-	-
I_TSP_TO	End of Train Stop		C4	-	-	-	-
I_DTP	DTP mode		C2	-	-	-	-
I_DTP_E	DTP mode exclusion		C2	-	-	-	-

Name	Description	Symbol	Position			Surface Dimensions	
			DMI area	x	y	Height	Width
I_SHU	FORWARD_SHUNTING mode		C3	-	-	-	-
I_REV	REVERSE_SHUNTING mode		C3	-	-	-	-
I_REL	Release procedure activated		C3	-	-	-	-
I_TRK_ERROR	Trackside error (DTP exclusion procedure has been performed)		C6	-	-	-	-
I_DTP_OB_ERROR	On-board DTP error (DTP antenna failure)		C6	-	-	-	-
I_CODE_OB_ERROR	On-board CODE error (Pickup coil failure)		C5	-	-	-	-
I_OB_ERROR	On-board vital error occurrence		C7	-	-	-	-
I_OB_FATAL_ERROR	On-board fatal error occurrence		C7	-	-	-	-
I_EB	Emergency brake intervention		C8	-	-	-	-
I_SB	Service brake intervention		C8	-	-	-	-
I_ATP	ATP code detection mode		C9	-	-	-	-
I_CAWS	CAWS code detection mode		C9	-	-	-	-
I_CODE_E	Code modes exclusion		C9	-	-	-	-
I-FS	Level of supervision: Full Supervision		B7	-	-	-	-
I_ATP_SUP	Level of supervision: ATP Supervision		B7				

Name	Description	Symbol	Position			Surface Dimensions	
			DMI area	x	y	Height	Width
I_CAWS_SUP	Level of supervision: CAWS Supervision		B7				
I_PS	Level of supervision: Partial Supervision		B7	-	-	-	-
I_NS	Level of supervision: No Supervision		B7	-	-	-	-
I_VITALITY_RED_1	Vitality icons to be displayed when the operating mode is CAWS or DTP_E+CAWS with CAWS mode Red aspect		-	2	432	33	33
I_VITALITY_RED_2							
I_VITALITY_RED_3							
I_VITALITY_YELLOW_1	Vitality icons to be displayed when the operating mode is CAWS or DTP_E+CAWS with CAWS mode Yellow aspect						
I_VITALITY_YELLOW_2							
I_VITALITY_YELLOW_3							
I_VITALITY_DYELLOW_1	Vitality icons to be displayed when the operating mode is CAWS or DTP_E+CAWS with CAWS mode Double Yellow aspect						
I_VITALITY_DYELLOW_2							
I_VITALITY_DYELLOW_3							
I_VITALITY_GREEN_1	Vitality icons to be displayed when the operating mode is CAWS or DTP_E+CAWS with CAWS mode Green aspect						
I_VITALITY_GREEN_2							
I_VITALITY_GREEN_3							
I_VITALITY_1	Vitality icons to be displayed when the operating mode is different from CAWS or DTP_E+CAWS						
I_VITALITY_2							
I_VITALITY_3							

Table 7 – Symbol Reference Table

8.2 Vitality Icon

[REQ:IE-DMI_00051];[Allocation:Onboard];[Type:Mandatory]

With the exception of when the CCO operating mode is CAWS or DTP_E+CAWS, the CCO shall cyclically display on the DMI the following icons in sequence, passing from one to the next every 500 milliseconds +/- 0.1%:

- I_VITALITY_1
- I_VITALITY_2
- I_VITALITY_3

The vitality icon behaviour is shown in Table 8 and Table 9.

For a description of the icons, please refer to Table 7.

[END_REQ]

Note: The vitality icon behaviour in modes other than CAWS or DTP_E+CAWS is shown in Table 8

Cycle 1	Cycle 2	Cycle 3
		

Table 8 – Vitality icon behaviour in CCO operating modes other than CAWS or DTP_E+CAWS

[REQ:IE-DMI_00052];[Allocation:Onboard];[Type:Mandatory]

When CCO operating mode is CAWS or DTP_E+CAWS and the detected code name is No-Code, the CCO shall cyclically display on the DMI the following icons in sequence, passing from one to the next every 500 milliseconds +/- 0.1%:

- I_VITALITY_RED_1
- I_VITALITY_RED_2
- I_VITALITY_RED_3

For a description of the icons, please refer to Table 7.

[END_REQ]

[REQ:IE-DMI_00053];[Allocation:Onboard];[Type:Mandatory]

When CCO operating mode is CAWS or DTP_E+CAWS and the detected code is a code name which is associated with a YELLOW signal aspect, the CCO shall cyclically display on the DMI the following icons in sequence, passing from one to the next every 500 milliseconds +/- 0.1%:

- I_VITALITY_YELLOW_1
- I_VITALITY_YELLOW_2
- I_VITALITY_YELLOW_3

For a description of the icons, please refer to Table 7.

[END_REQ]

[REQ:IE-DMI_00054];[Allocation:Onboard];[Type:Mandatory]

When CCO operating mode is CAWS or DTP_E+CAWS and the detected code is a code name which is associated with a DOUBLE YELLOW signal aspect, the CCO shall cyclically display on the DMI the following icons in sequence, passing from one to the next every 500 milliseconds +/- 0.1%:

- I_VITALITY_DYELLOW_1
- I_VITALITY_DYELLOW_2
- I_VITALITY_DYELLOW_3

For a description of the icons, please refer to Table 7

[END_REQ]

[REQ:IE-DMI_00055];[Allocation:Onboard];[Type:Mandatory]

When in CAWS or DTP_E+CAWS mode and the detected code is a code name which is associated with a GREEN signal aspect, the CCO shall cyclically display on the DMI the following icons in sequence, passing from one to the next every 500 milliseconds +/- 0.1%:

- I_VITALITY_GREEN_1
- I_VITALITY_GREEN_2
- I_VITALITY_GREEN_3

For a description of the icons, please refer to Table 7

[END_REQ]

[REQ:IE-DMI_00056];[Allocation:Onboard];[Type:Mandatory]

When CCO operating mode is CAWS or DTP_E+CAWS and a change of code occurs, the CCO shall display on the DMI the vitality icon related to the new code, using the next cycle step of the sequence.

[END_REQ]

Note: An example of the vitality icon behaviour in case of YELLOW to GREEN code transition after cycle step 2 is shown in Table 9.

Cycle 1	Cycle 2	Cycle 3
		

Table 9 – Example of Vitality Icon Behaviour in CAWS Mode with Yellow-Green Code Transition

9 Labels

[REQ:IE-DMI_00057];[Allocation:Onboard];[Type:Mandatory]

Unless stated otherwise, the messages shall have the following characteristics:

- font: Helvetica 45 light
- style: bold
- size: 9
- colour: medium grey
- alignment: centred

[END_REQ]

9.1 Labels for Acknowledgement Buttons

9.1.1 Error text Acknowledgement Buttons

[REQ:IE-DMI_00058];[Allocation:Onboard];[Type:Mandatory]

The label of the B_TEXT_ERROR_ACK Acknowledgment Buttons shall be composed of the following sub-labels:

- Error message sub-label
- Track Identifier sub-label
- Error Distance sub-label
- Error Code sub-label

as described in Table 10**.**

[END_REQ]

[REQ:IE-DMI_00059];[Allocation:Onboard];[Type:Mandatory]

The Error message sub-label shall be able to contain up to three lines. Each line shall be able to contain 18 characters.

[END_REQ]

[REQ:IE-DMI_00060];[Allocation:Onboard];[Type:Mandatory]

The following sub-labels shall consist of a fixed part and a variable part:

- Track Identifier sub-label
- Error Distance sub-label
- Error Code sub-label

[END_REQ]

[REQ:IE-DMI_00061];[Allocation:Onboard];[Type:Mandatory]

The fixed part shall be as defined in the column "Text" of Table 10**.** The variable part shall be as follows.

- In case of Track Identifier sub-label it shall be the NID_AREA and the IEHS_NID_BG related to the last Balise Group detected in nominal direction, before the error occurred. The two variables shall be in the same line separated by a point.
- In case of Error Distance sub-label it shall be the kilometric distance from the to the last Balise Group detected in nominal direction.
- In case of Error Code sub-label it shall be the error code, which identifies that error. The numeric part and the alphabetic part of the Error code shall be in the same line separated by a point.

[END_REQ]

[REQ:IE-DMI_00062];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the Error Message sub-labels listed in Table 10 and it shall place them in the indicated areas.

[END_REQ]

[REQ:IE-DMI_00063];[Allocation:Onboard];[Type:Mandatory]

The x and y coordinates in Table 10 represent the horizontal and vertical offset from the upper left corner of the B-TEXT_ERROR_ACK button area to the upper left corner of the object.

[END_REQ]

Sub-label name	Description	DMI Text	Position			Surface Dimensions	
			DMI area	x	y	Height	Width
Error message sub-label	Short description of the error.	As specified in [IRS-CLASSB]	E5+E6+E7+ E8+E9	6	10	60	222
Track identifier sub-label	Reference to the last balise group detected in nominal direction before the error occurred.	"TI"	E5+E6+E7+ E8+E9	6	70	20	79
Error distance sub-label	Kilometric distance from the related to the last Balise Group detected in nominal direction.	"ED"	E5+E6+E7+ E8+E9	90	70	20	61
Error code sub-label	Error code which identifies the error	"EC"	E5+E6+E7+ E8+E9	156	70	20	72

Table 10 – Error Messages Reference Table

[REQ:IE-DMI_00064];[Allocation:Onboard];[Type:Essential]

The Error Message Label displayed on the DMI shall be as specified in the section defining the Error_Management function in [IRS-CLASSB].

[END_REQ]

9.1.2 Other Acknowledgement Buttons

Label name	Description	DMI text
Entry FORWARD_SHUNTING message	Message to be displayed for driver acknowledgement	Entering Forward Shunting Mode
Exit FORWARD_SHUNTING message	Message to be displayed for driver acknowledgement	Exiting Forward Shunting Mode
Entry REVERSE_SHUNTING message	Message to be displayed for driver acknowledgement	Entering Reverse Shunting Mode
Exit REVERSE_SHUNTING message	Message to be displayed for driver acknowledgement	Exiting Reverse Shunting Mode
DTP Exclusion message	Message to be displayed for driver acknowledgement	Disabling DTP
DTP Inclusion message	Message to be displayed for driver acknowledgement	Enabling DTP
CODE mode disable message	Message to be displayed for driver acknowledgement	Resetting CAWS/ATP carrier
Entry STAFF_RESPONSIBLE message	Message to be displayed for driver acknowledgement	Entering STAFF RESPONSIBLE Mode
Entry ATP message	Message to be displayed for driver acknowledgement	Entering ATP Mode
Entry CODE_E message	Message to be displayed for driver acknowledgement	Entering STAFF RESPONSIBLE Mode with CODE Disabled
Entry DTP_E message	Message to be displayed for driver acknowledgement	Entering STAFF RESPONSIBLE Mode with DTP Disabled
Entry DTP_E+ATP message	Message to be displayed for driver acknowledgement	Entering ATP Mode with DTP Disabled *Note: This message must be reconsidered in a future version of this IRS, as the related mode is expected to be modified as well.*
Entry DTP_E+CODE_E message	Message to be displayed for driver acknowledgement	Entering STAFF RESPONSIBLE Mode with CODE and DTP Disabled
'Start Against Signal Reminder' reset Acknowledgement message	Message to be displayed for driver acknowledgement	Enabling Traction

Label name	Description	DMI text
RUNNING RELEASE Acknowledgement message	Message to be displayed for driver acknowledgement	Entering Running Release
Train Stop Acknowledgement message	Message to be displayed for driver acknowledgement	TRAIN STOP
Stop Override Acknowledgement message	Message to be displayed for driver acknowledgement	Activating Stop Override

Table 11 – Labels for other Acknowledgement Buttons

9.2 Labels for Messages

[REQ:IE-DMI_00065];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display Messages which do not require acknowledgement as listed in Table 12 and it shall place them in E5+E6+E7+E8+E9 DMI area.

[END_REQ]

Message name	Description	DMI text
SB Connectivity Test Message	Message to be displayed together with the button used to initiate the Service Brake Connectivity Test	Execute Service Brake Connectivity Test
SB Connectivity Test Result Message	Message to be displayed to ask to the driver the result of the SB test.	Service Brake Connectivity Test Passed?
EB Connectivity Test Message	Message to be displayed together with the button used to initiate the Emergency Brake connectivity Test	Execute Emergency Brake Connectivity Test
EB Connectivity Test Result Message	Message to be displayed to ask to the driver the result of the EB test.	Emergency Brake Connectivity Test Passed?
SB Connectivity Test Repeat Message	Message to be displayed to ask the driver if he wants to repeat the SB test.	Repeat Service Brake Connectivity Test?
EB Connectivity Test Repeat Message	Message to be displayed to ask the driver if he wants to repeat the EB test.	Repeat Emergency Brake Connectivity Test?
Confirm Train Data message	Message to be displayed when the Confirmation Data Entry page	Confirm Train Data?

Message name	Description	DMI text
	is displayed (for global Train Data)	
CCO Brake Connectivity Test message	Message to be displayed if CCO Brake Connectivity Tests have to be performed.	Carry out Brake Connectivity Test
Data Entry message	Message to be displayed if Data Entry has to be performed.	Input Train Data or select: Forward Shunting, Reverse Shunting
Traction disabled message	Message to be displayed if the driver moves the controller into Power when Starting Against Signal Reminder is active.	SAS Reminder -Traction Disabled

Table 12 –Messages

10 Priority of Information Display

[REQ:IE-DMI_00066];[Allocation:Onboard];[Type:Mandatory]

The CCO shall assign the following grading of priority to objects which are presented in the DMI area E5+E6+E7+E8+E9:

- priority level 1 (highest priority): Error text Acknowledgement Button, refer to B_TEXT_ERROR_ACK in section 7.5 in combination with section 9.1.1
- priority level 2: Train Stop Acknowledgement Button B_TEXT_TSP_ACK, refer to section 7.5 in combination with section 9.1.2
- priority level 3: CAWS Code Acknowledgement Buttons B_TEXT_xxx_CODE_ACK, refer to section 7.5 in combination with section 9.1.2
- priority level 4: CCO operating mode transition Acknowledgement Buttons B_TEXT_xxx(mode)_ACK, refer to section 7.5 in combination with section 9.1.2
- priority level 5: Driver initiated function request Acknowledgement Buttons B_TEXT_xxx(driver initiated function)_ACK, refer to section 7.5 in combination with section 9.1.2
- priority level 6 (lowest priority): Messages, refer to section 9.2

[END_REQ]

11 Distance and Speed Display

11.1 Distance to Target Display

[REQ:IE-DMI_00067];[Allocation:Onboard];[Type:Mandatory]

In the modes where the target distance is displayed, the DMI shall show the remaining distance to a target digitally (Target Distance digital) and graphically (Target Distance bar).

[END_REQ]

[REQ:IE-DMI_00068];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the Target Distance digital in area A2.

[END_REQ]

[REQ:IE-DMI_00069];[Allocation:Onboard];[Type:Mandatory]

The Target Distance digital display shall be compliant with [015560], Section 8.2.2.2.

[END_REQ]

[REQ:IE-DMI_00070];[Allocation:Onboard];[Type:Mandatory]

Distance to target digital font shall be:

- font: Helvetica 45 light
- style: bold
- size: 5
- colour: medium grey

[END_REQ]

The layout of Target Distance display is shown in Figure 7

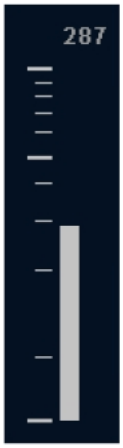


Figure 7 - Example of Distance to target display

[REQ:IE-DMI_00071];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the Target Distance bar in area A3.

[END_REQ]

[REQ:IE-DMI_00072];[Allocation:Onboard];[Type:Mandatory]

The target distance bar display shall be compliant with [015560], Section 8.2.2.1.

[END_REQ]

11.2 Speed dial

[REQ:IE-DMI_00073];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the speed dial in area B0.

[END_REQ]

[REQ:IE-DMI_00074];[Allocation:Onboard];[Type:Mandatory]

The speed dial display shall be compliant with [015560], Section 8.2.1.1.

[END_REQ]

[REQ:IE-DMI_00075];[Allocation:Onboard];[Type:Mandatory]

The speed dial scale shall range from 0 km/h to either 140 km/h, 180 km/h or 240 km/h.

The upper value shall be greater than 110% of Unit Ceiling Speed.

[END_REQ]

[REQ:IE-DMI_00076];[Allocation:Onboard];[Type:Optional]

Optional: The speed dial may also indicate the speed in miles per hour in addition to km/h.

[END_REQ]

[REQ:IE-DMI_00077];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the speed as per Figure 8 or Figure 9 below:

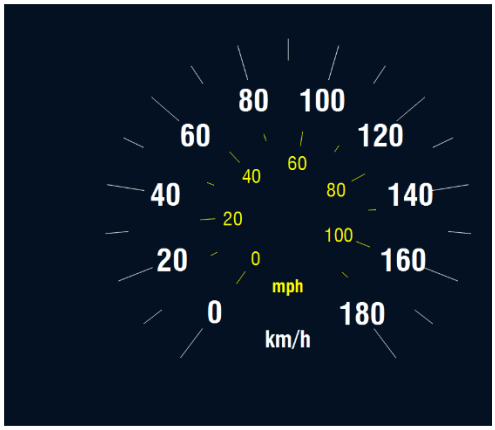


Figure 8 – Speed Dial in km/h and mph

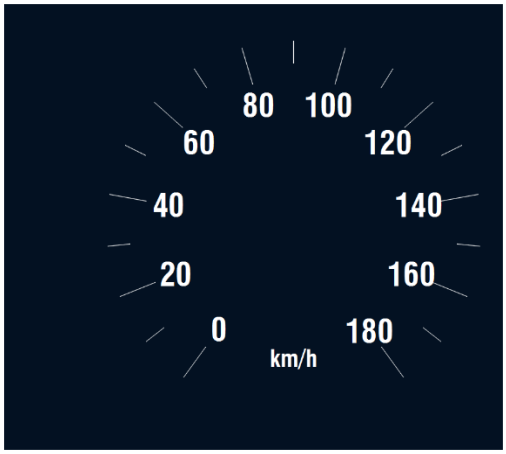


Figure 9 – Speed Dial in km/h only

[END_REQ]

11.3 Current train speed pointer

[REQ:IE-DMI_00078];[Allocation:Onboard];[Type:Mandatory]

The Current Train Speed pointer shall be displayed in DMI area B1+B0.

Its colour shall be in accordance with Table 13below:

[END_REQ]

[REQ:IE-DMI_00079];[Allocation:Onboard];[Type:Mandatory]

The Current Train Speed pointer display shall be compliant with [015560], sections 8.2.1.2.1 to 8.2.1.2.4.

[END_REQ]

[REQ:IE-DMI_00080];[Allocation:Onboard];[Type:Mandatory]

The Current Train Speed pointer shall consist of a needle and a circular part centred in B1. Both parts shall always have the same colour, as indicated in Table 13 below.

[END_REQ]

[REQ:IE-DMI_00081];[Allocation:Onboard];[Type:Essential]

Abbreviations in Table 13, Table 14 and Table 15 shall have the following meanings:

- Vperm = Permitted Speed
- Vtarget = Target Speed. Target Speed is always equal to or smaller than Permitted Speed.

Note: Indication of V_{target} may be active in addition to CSM in certain CCO operating modes. It is active, where CCO has already obtained information on a Target Speed with $V_{target} < V_{perm}$, but the target position is so distant, that train operation may proceed at V_{perm} up the point where CCO indicates the need to retard by switching to TSM. CCO only monitors Permitted Speed until it switches to TSM. The principle for displaying V_{target} in these circumstances will be defined in a future version of this IRS.

- Vrelease = Release Speed
- CSM = Ceiling Speed Monitoring
- TSM = Target Speed Monitoring

Note: TSM may be active in certain CCO operating modes. It is activated, while $V_{target} < V_{perm}$ and while CCO has determined the need to retard towards the Target Speed within the remaining target distance. CCO monitors the Current Permitted Speed and monitors the retardation towards the Target Speed which the train shall assume within the separately displayed target distance. While approaching to the target point, the Current Permitted Speed will gradually reduce to eventually become equal to the Target Speed.

- RSM = Release Speed Monitoring

Note: A release speed is a speed limit under which the train is allowed to run in the vicinity of the End of Movement Authority (e.g. approaching a red signal).

- NoS = Normal Status, train speed is below Vperm or Vrelease
- WaS = Warning Status: Train speed is above Vperm and below the First Intervention Speed and CCO has not demanded any brake application.
- IntS = Intervention Status:
    - Train speed is at or above the First Intervention Speed, or
    - A CCO brake demand is active and train speed is above permitted speed.

[END_REQ]

[REQ:IE-DMI_00082];[Allocation:Onboard];[Type:Essential]

CCO Mode	Supervision status		0 km/h ≤ Current Train Speed ≤ V_{perm}	0 km/h ≤ Current Train Speed ≤ $V_{release}$ (while RSM is active*)	0km/h ≤ Current Train Speed < V_{target}	V_{target} ≤ Current Train Speed ≤ V_{perm}	Current Train Speed > V_{perm} (in CSM or TSM) or > $V_{release}$ (in RSM)
DTP, DTP+CODE, DTP+CODE_E	CSM	NoS	grey	NA	NA	NA	NA
		WaS	NA	NA	NA	NA	orange
		IntS	NA	NA	NA	NA	red
	TSM	NoS	NA	NA	Grey	yellow	NA
		WaS	NA	NA	NA	NA	orange
		IntS	NA	NA	NA	NA	red
	RSM	NoS	NA	Grey/Yellow**	NA	NA	NA
		WaS	NA	NA	NA	NA	orange
		IntS	NA	NA	NA	NA	red
STAFF_RESPONSIBLE, CODE_E	CSM	NoS	grey	NA	NA	NA	NA
		WaS	NA	NA	NA	NA	orange
		IntS	NA	NA	NA	NA	red
	TSM In all referenced modes when operating under TSR supervision. *Note: The requirements relating to the Current Train Speed pointer under TSR supervision will be reviewed for future version of this IRS.*	NoS	-	-	-	-	-
		WaS	-	-	-	-	-
		IntS	-	-	-	-	-
ATP, REVERSE_SHUNTING, FORWARD_SHUNTING, DTP_E, DTP_E+ATP, DTP_E+CODE_E	CSM	NoS	grey	NA	NA	NA	NA
		WaS	NA	NA	NA	NA	orange
		IntS	NA	NA	NA	NA	red

CAWS, DTP_E+CAWS	In these modes no speed indication shall be provided.	NA	NA	NA	NA	NA	NA
Any mode except CAWS, DTP_E+CAWS while either - Train Stop or - Vital Error or - Fatal Error is present.	-	Red, regardless of the Current Train Speed.					
* In a situation where RSM is active, Vtarget is equal to zero. ** When the Current Train Speed is equal to 0 km/h, the pointer shall be grey, otherwise it shall be yellow							

Table 13 – Conditions for colour of the Current Train Speed pointer

[END_REQ]

[REQ:IE-DMI_00083];[Allocation:Onboard];[Type:Mandatory]

The radius of the circular part of the Current Train Speed pointer shall be 25 pixel.

Examples of Current Train Speed pointer display are shown in Table 14

[END_REQ]

Condition	Speed pointer colour	Speed digital colour	Example figure
- in CSM Current Train Speed is less than or equal to the Permitted Speed or, - in TSM Current Train Speed is less than or equal to the Target Speed	grey	black	
in TSM or RSM Current Train Speed is greater than the Target Speed and less than or equal to the Permitted Speed	yellow	black	

Condition	Speed pointer colour	Speed digital colour	Example figure
in CSM or TSM or RSM Current Train Speed is greater than the Permitted Speed and less than the First Intervention Speed	orange	black	
in CSM or TSM or RSM Current Train Speed is equal to or greater than the First Intervention Speed	red	white	

Table 14 – Current Train Speed Pointer and Speed Digital

11.4 Current Train Speed digital

[REQ:IE-DMI_00084];[Allocation:Onboard];[Type:Mandatory]

The Current Train Speed digital shall be displayed in area B1, inside the circular part of the pointer.

[END_REQ]

[REQ:IE-DMI_00085];[Allocation:Onboard];[Type:Mandatory]

The Current Train Speed digital display shall be compliant with [015560], Section 8.2.1.3.

[END_REQ]

[REQ:IE-DMI_00086];[Allocation:Onboard];[Type:Mandatory]

The Current Train Speed digital font shall be:

- font: Helvetica 45 light
- style: bold
- size: 18
- colour: white if the speed pointer colour is red, black otherwise.

Examples of Current Train Speed digital displays are shown in Table 14.

[END_REQ]

11.5 Circular Speed Gauge (CSG)

Note: In this version of IRS the requirements for the CSG only address operation under CSM. TSM and RSM requirements are provided for information only and will be revised in a future version of this IRS.

The CSG is a multi-purpose display for indication of several indication and warning elements:

- *Indication of Permitted Speed range*

Depending on the operational circumstances, the Permitted Speed may gradually or in discrete steps rise or fall. It may also become 0km/h. The Permitted Speed is highlighted with a "hook".

- *Indication of Target Speed range:*

The Target Speed range indication overlays a section of the Permitted Speed range.

The Target Speed may be equal to or smaller than the Permitted Speed.

- *Indication of DTP Release Speed range:*

While in a CCO operating mode where DTP is active and while the Target Speed is 0 km/h, CCO shall display the Release Speed range on the DMI via the CSG.

The DTP Release Speed range indication partially overlays a Section the Permitted Speed range.

- *Warning while above Target Speed:*

When the Current Train Speed is higher than the Target Speed the driver must retard to/ below Target Speed. As indication of warning, the Permitted Speed range colour is changed from white to yellow to indicate the ongoing need of train speed reduction.

- *Warning while above Permitted Speed:*

While the Current Train Speed is higher than the Permitted Speed, the "hook" is extended up to the Current Train Speed. The CSG section between Permitted Speed and Current Train Speed is orange or red. This shall indicate to the driver the immediate need to reduce the train speed below the Permitted Speed.

[REQ:IE-DMI_00087];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the CSG in area B2, around the speed dial. It shall be subdivided into segments which shall have colours in accordance with Table 15:

CCO Operating Mode	Supervision status		Segment of CSG				
			0 km/h ≤CSG ≤V_{perm}	0 km/h ≤CSG ≤$V_{release}$ (while RSM is active*)	0km/h ≤CSG <V_{target}	V_{target} ≤CSG ≤V_{perm}	V_{perm} <CSG≤ $V_{current}$
DTP, DTP+CODE, DTP+CODE_E	CSM	NoS	dark grey	NA	NA	NA	NA
		WaS	dark grey	NA	NA	NA	orange
		IntS	dark grey	NA	NA	NA	red
	TSM****	NoS	NA	medium grey****	dark grey	White/yellow**	NA
		WaS	NA	medium grey****	dark grey	yellow	orange
		IntS	NA	medium grey****	dark grey	yellow	red
	RSM****	NoS	NA	medium grey	NA	White/yellow ***	NA
		WaS	NA	medium grey	NA	yellow	orange
		IntS	NA	medium grey	NA	yellow	red
ATP, DTP_E+ATP, REVERSE_SHUNTING, FORWARD_SHUNTING DTP_E+CAWS STAFF_RESPONSIBLE CODE_E DTP_E DTP_E+CODE_E	CSM	NoS	dark grey	NA	NA	NA	NA
		WaS	dark grey	NA	NA	NA	orange
		IntS	dark grey	NA	NA	NA	red
CAWS	In this mode no CSG shall be provided.	NA	NA	NA	NA	NA	NA

Definitions:
* In a situation where RSM is active, Vtarget is equal to zero. ** CSG segment shall be white if the Current Train Speed is equal or less than the Target Speed, yellow if the Current Train Speed is greater than the Target Speed. *** When Current Train Speed is equal to 0 km/h, the CSG segment shall be white, otherwise it shall be yellow. ***** Note: The conditions under which these Segments are displayed will be defined in a future version of this IRS.*

Table 15 – Circular Speed Gauge Segments and Colours

[END_REQ]

[REQ:IE-DMI_00088];[Allocation:Onboard];[Type:Mandatory]

The circular speed gauge display shall be compliant with [015560] sections 8.2.1.4.1 to 8.2.1.4.8.

[END_REQ]

[REQ:IE-DMI_00089];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the CSG segments with the colours defined in Table 15

Examples of circular speed gauge displays are shown in Table 16, Table 17 and Table 18

[END_REQ]

Ceiling Speed monitoring

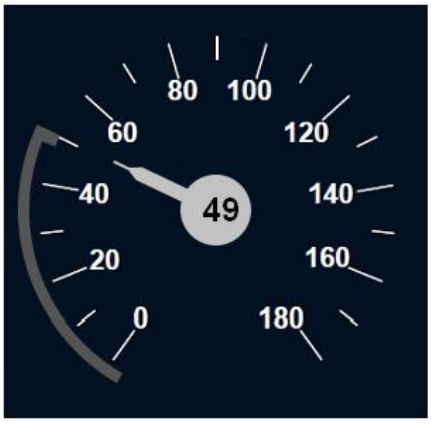
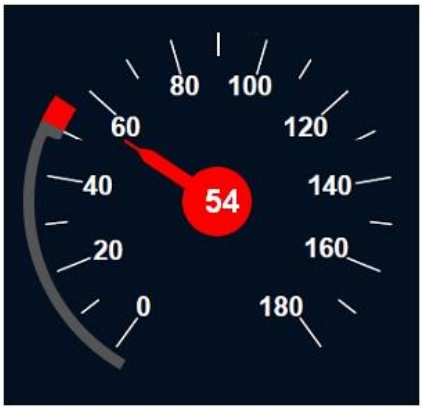
Condition	Circular Speed Gauge Aspects
Normal Status – the Current Train Speed is between 0 km/h and the Permitted Speed. Here Current Train Speed = 49km/h V_{perm} = 50km/h	
Warning status - the Current Train Speed is between the Permitted Speed and the First Intervention Speed. Here Current Train Speed = 51km/h V_{perm} = 50km/h	
Intervention status – the Current Train Speed is at or above the First Intervention Speed. Here Current Train Speed = 54km/h V_{perm} = 50km/h	

Table 16 – Ceiling Speed Monitoring

Target Speed Monitoring with V_{target} greater than zero

Condition	Circular Speed Gauge Aspects
Normal Status – the Current Train Speed is between 0 km/h and the Target Speed. Here Current Train Speed = 67km/h V_{target} = 100km/h V_{perm} = 160km/h	
Normal Status – the Current Train Speed is between the Target Speed and the Permitted Speed. Current Train Speed = 109km/h V_{target} = 100km/h V_{perm} = 160km/h	
Warning Status – the Current Train Speed is between the Permitted Speed and the First Intervention Speed. Here Current Train Speed = 143km/h V_{target} = 75km/h V_{perm} = 133km/h	

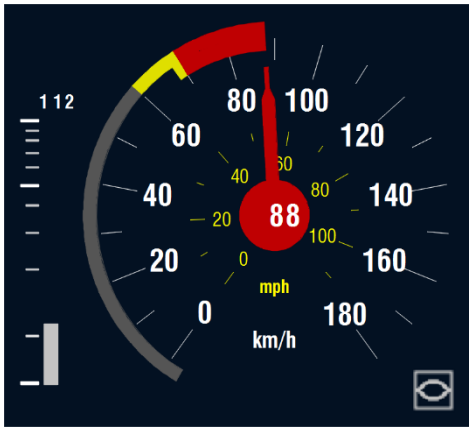
Condition	Circular Speed Gauge Aspects
Intervention Status – the Current Train Speed is at or above the First Intervention Speed. Here Current Train Speed = 88km/h V_{target} = 60km/h V_{perm} = 70km/h	

Table 17 – Target Speed Monitoring with V_{target} greater than zero

Target speed monitoring with V_{target} equal to 0km/h.

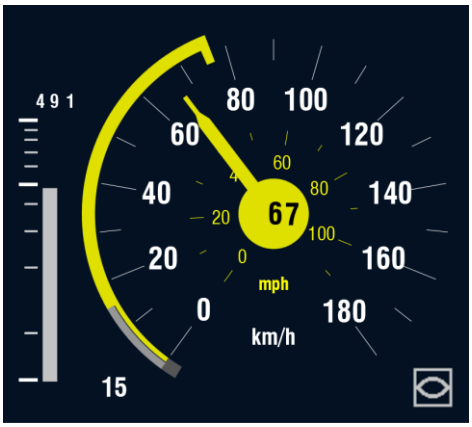
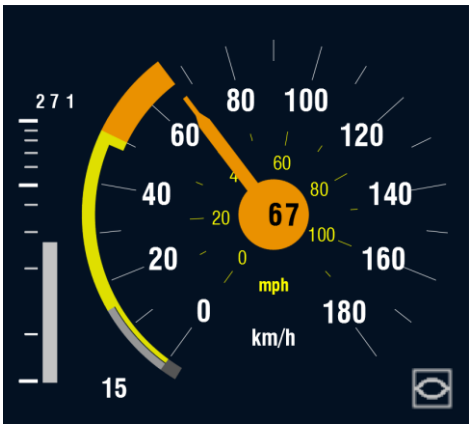
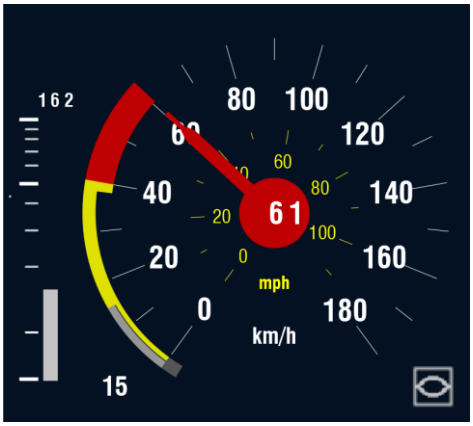
Condition	Circular Speed Gauge Aspects
Normal Status – the speed pointer is between the target speed and the permitted speed. Here Current Train Speed = 67km/h V_{target} = 0 km/h V_{perm} = 77km/h $V_{release}$ = 15km/h	
Warning Status – the speed pointer is between the permitted speed and the First Intervention Speed. Here Current Train Speed = 67km/h V_{target} = 0km/h V_{perm} = 50km/h $V_{release}$ = 15km/h	
Intervention Status – the speed pointer is at or above the First Intervention Speed. Here Current Train Speed = 61km/h V_{target} = 0km/h V_{perm} = 40km/h $V_{release}$ = 15km/h	

Table 18 – Target Speed Monitoring with V_{target} = zero

[REQ:IE-DMI_00090];[Allocation:Onboard];[Type:Mandatory]

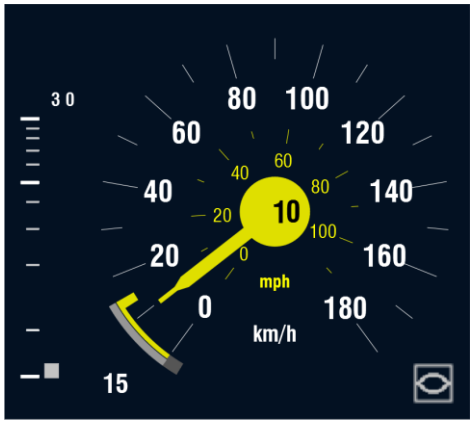
While V_{target} is equal to 0km/h CSG shall also indicate $V_{release}$.

[END_REQ]

Release speed monitoring

[REQ:IE-DMI_00091];[Allocation:Onboard];[Type:Mandatory]

While RSM is active CSG shall also indicate $V_{release}$.

Condition	Circular Speed Gauge Aspects
DTP Release Speed Monitoring Normal Status – the Current Train Speed is equal to 0km/h Here Current Train Speed = 0km/h V_{target} = 0 km/h V_{perm} = 15km/h $V_{release}$ = 15km/h	
DTP Release Speed Monitoring Normal Status – the Current Train Speed is below or equal to release speed Here Current Train Speed = 10km/h V_{target} = 0 km/h V_{perm} = 15 km/h $V_{release}$ = 15km/h	

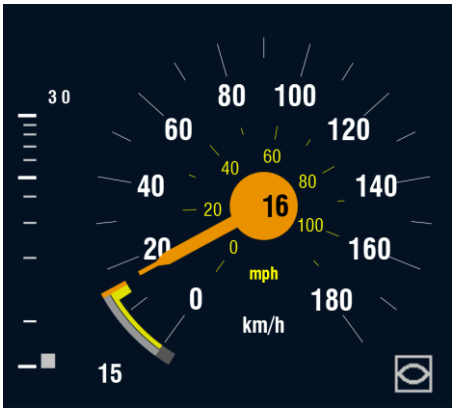
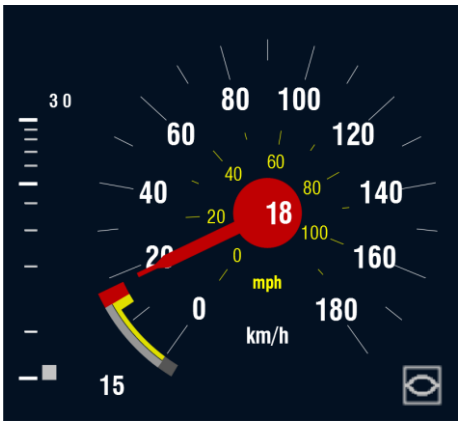
Condition	Circular Speed Gauge Aspects
DTP Release Speed Monitoring Warning Status –the Current Train Speed is above Permitted Speed and below First Intervention Speed Here Current Train Speed = 16km/h V_{target} = 0 km/h V_{perm} = 15 km/h $V_{release}$ = 15km/h	
DTP Release Speed Monitoring Intervention Status – the Current Train Speed is above First Intervention Speed Here Current Train Speed = 18km/h V_{target} = 0 km/h V_{perm} = 15 km/h $V_{release}$ = 15km/h	

Table 19 – Release Speed Monitoring

[END_REQ]

11.6 Release Speed

[REQ:IE-DMI_00092];[Allocation:Onboard];[Type:Mandatory]

The graphical presentation of the Release Speed shall be displayed in area B2.

[END_REQ]

[REQ:IE-DMI_00093];[Allocation:Onboard];[Type:Mandatory]

The Release Speed display shall be compliant with [015560], Section 8.2.1.6

[END_REQ]

[REQ:IE-DMI_00094];[Allocation:Onboard];[Type:Mandatory]

The digital presentation of the Release Speed value shall be displayed in area B6.

The font of the release speed shall be:

- font: Helvetica 45 light
- style: bold
- size: 16
- colour: grey

[END_REQ]

12 DMI Layouts

[REQ:IE-DMI_00095];[Allocation:Onboard];[Type:Mandatory]

The sub-sections of this section contain the requirements related to the DMI pages and keyboards, which are predefined views linked to a CCO operating mode or to a function.

Note: the object's position is represented by the coordinates of its upper left corner relative to the upper left corner of the DMI screen.

[END_REQ]

12.1 General Requirements for DMI Pages

[REQ:IE-DMI_00096];[Allocation:Onboard];[Type:Mandatory]

The background colour of a DMI page shall be dark blue.

[END_REQ]

[REQ:IE-DMI_00097];[Allocation:Onboard];[Type:Mandatory]

With the exception of the following pages a DMI page shall contain the vitality icon:

- MAINTENANCE,
- AUTOTEST
- NOT CONNECTED

[END_REQ]

[REQ:IE-DMI_00098];[Allocation:Onboard];[Type:Mandatory]

With the exception of the following pages:

- NOT CONNECTED
- CCO Brake Connectivity Tests
- Data Entry
    - Full Data Entry
    - Simplified Data Entry
- AUTOTEST
- MAINTENANCE
- NO_CAB_SELECTED,

a DMI page shall contain the following Functional buttons:

- B_REL
- B_SHU
- B_STOP_OVERRIDE
- B_REV
- B_DTP_E
- B_CODE_RESET
- B_DATA
- B_TEST
- B_BRIGHTNESS

This set of buttons shall be collectively referred to as Menu buttons

[END_REQ]

[REQ:IE-DMI_00099];[Allocation:Onboard];[Type:Mandatory]

With the exception of the following pages:

- NOT CONNECTED
- CCO Brake Interface Tests
- Data Entry
- AUTOTEST
- MAINTENANCE
- NO_CAB_SELECTED
- CAWS
- DTP_E+CAWS
- *UNFITTED (will be fully defined in a future version of this IRS)*

A DMI page shall contain the following objects:

- Speed dial
- Current Train Speed pointer
- Current Train Speed digital

[END_REQ]

12.2 NOT CONNECTED

[REQ:IE-DMI_00100];[Allocation:Onboard];[Type:Mandatory]

If the communication between the DMI and the CCO is lost, the DMI shall display the NOT CONNECTED page.

[END_REQ]

[REQ:IE-DMI_00101];[Allocation:Onboard];[Type:Mandatory]

If the communication between the CCO and the DMI of Cab A is lost, the CCO shall raise an ERR_DMI_CAB_A_LOST error.

[END_REQ]

[REQ:IE-DMI_00102];[Allocation:Onboard];[Type:Mandatory]

If the communication between the CCO and the DMI of Cab B is lost, the CCO shall raise an ERR_DMI_CAB_B_LOST error.

[END_REQ]

[REQ:IE-DMI_00103];[Allocation:Onboard];[Type:Mandatory]

The NOT CONNECTED page shall be composed of a text label with the following characteristics:

- Coordinates: x: 0; y: 220
- Dimension: 40 pixel height, 640 pixel width
- Text: “NOT CONNECTED”
- Font: Helvetica 45 light
- Style: bold
- Size: 12
- Colour: yellow
- Alignment: centred

The layout of the NOT CONNECTED page is shown in Figure 10.

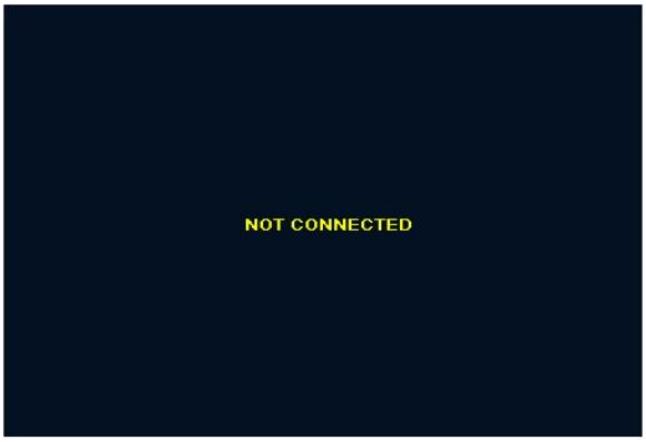


Figure 10 - Not Connected Page

[END_REQ]

12.3 CCO Brake Connectivity Tests page

[REQ:IE-DMI_00104];[Allocation:Onboard];[Type:Mandatory]

The background of the CCO Brake Connectivity Tests pages is shown in Figure 11below.

Figure 11 - CCO Brake Connectivity Tests Page

[END_REQ]

Note: depending on the active stage of the brake connectivity test procedure, different objects will be displayed on this background

12.4 Data Entry procedure pages

12.4.1 Full Data Entry pages

To be completed in future version of this IRS

12.4.2 Simplified Data Entry pages

[REQ:IE-DMI_00105];[Allocation:Onboard];[Type:Mandatory]

The Simplified Global Data Entry page shall contain the following objects:

- Data Entry buttons:
  - B_NUMBER_OF_VEHICLES
  - B_EMU_DMU_BRAKES_ISOLATED

- Functional button:
  - B_GLOBAL_DATA_OK

The layout of the Simplified Global Data Entry page is shown in Figure 12.

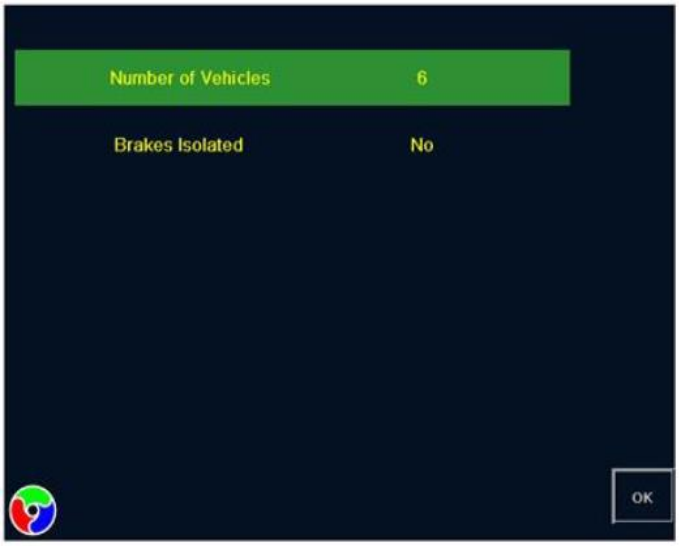


Figure 12 - Example of Global Data Entry page

[END_REQ]

[REQ:IE-DMI_00106];[Allocation:Onboard];[Type:Mandatory]

Each Simplified Single Data Entry page shall contain the following Functional buttons:

- B_UP
- B_DOWN
- B_SINGLE_DATA_OK

The layout of the Simplified Single Data Entry page is shown in Figure 13.

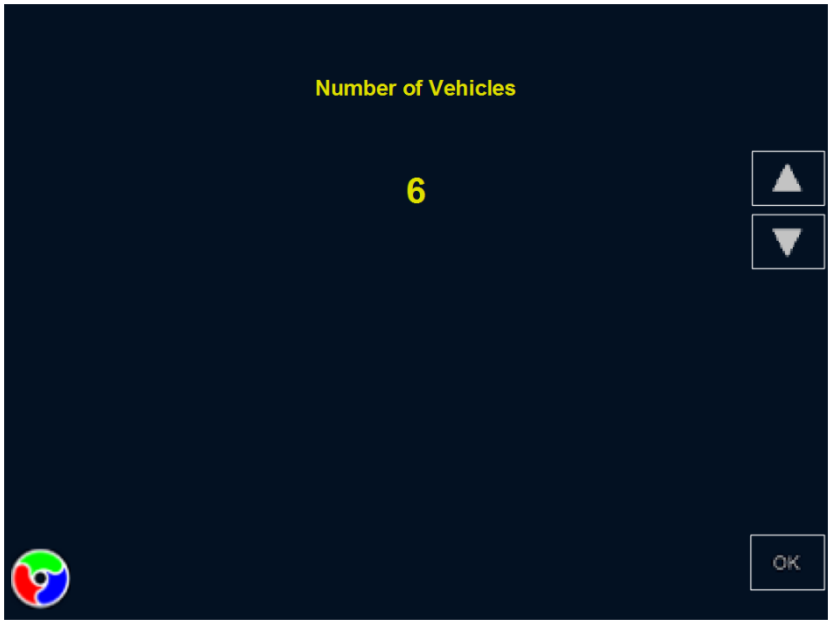


Figure 13 - Example of Single Data Entry page

[END_REQ]

[REQ:IE-DMI_00107];[Allocation:Onboard];[Type:Mandatory]

When a Data Entry Button on the Global Data Entry page is pressed, the related Single Data Entry page shall be displayed. This page shall display the text label of the pressed Data Entry Button with the following characteristics:

- Coordinates: x: 100; y: 40
- Dimension: 50 pixel height, 440 pixel width
- Text: according to Table 3
- Font: Helvetica 45 light
- Style: bold
- Size: 12
- Colour: yellow
- Alignment: centred

[END_REQ]

[REQ:IE-DMI_00108];[Allocation:Onboard];[Type:Mandatory]

When a Simplified Single Data Entry page is displayed, the DMI shall display the value linked to the pressed Data Entry button with the following characteristics:

- Coordinates: x: 100; y: 120
- Dimension: 50 pixel height, 440 pixel width
- Font: Helvetica 45 light
- Style: bold
- Size: 20

- Colour: yellow
- Alignment: centred

[END_REQ]

[REQ:IE-DMI_00109];[Allocation:Onboard];[Type:Mandatory]

The Simplified Global Confirmation Data Entry page shall contain the following objects:

- B_NUMBER_OF_VEHICLES
- B_EMU_DMU_BRAKES_ISOLATED
- B_CONFIRM_DATA
- B_NOT_CONFIRM_DATA
- Confirm Train Data message

The layout of the EMU/DMU Confirmation Data Entry page is shown in Figure 14.

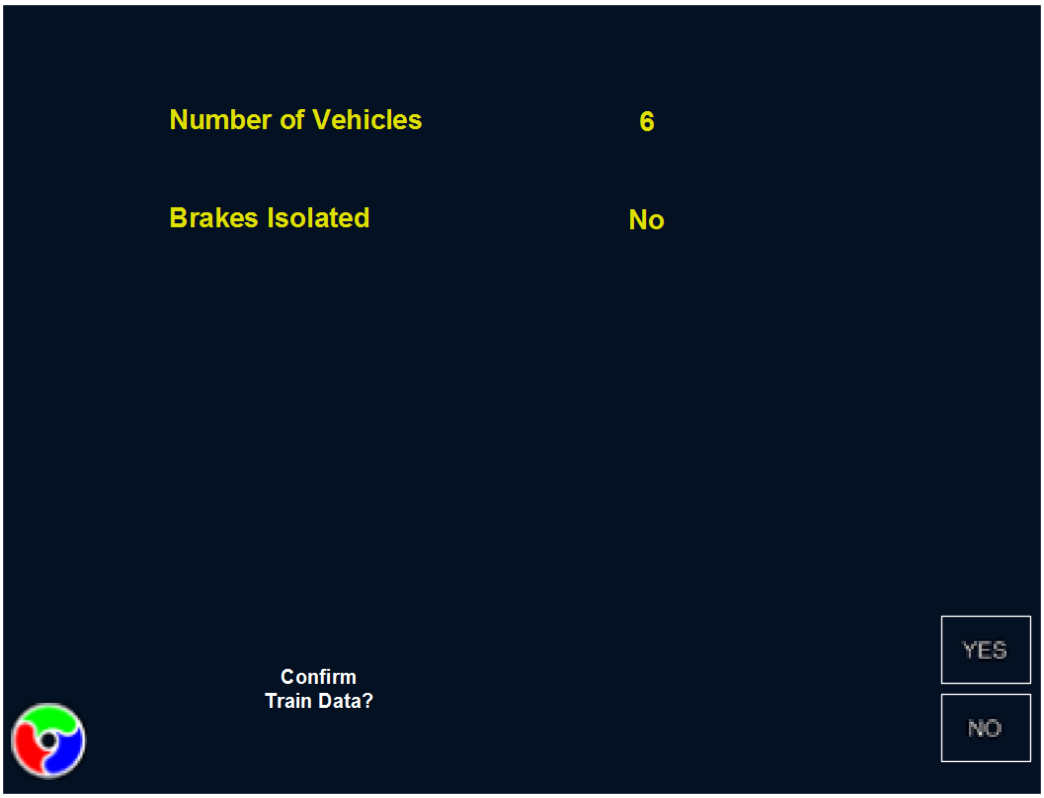


Figure 14 - EMU/DMU Confirmation Data Entry page

[END_REQ]

12.5 AUTOTEST page

[REQ:IE-DMI_00110];[Allocation:Onboard];[Type:Mandatory]

The AUTOTEST page shall be composed of a text label with the following characteristics:

- Coordinates: x: 0; y: 220
- Dimension: 40 pixel height, 640 pixel width
- Text: “AUTOTEST – DO NOT MOVE TRAIN”
- Font: Helvetica 45 light
- Style: bold
- Size: 12
- Colour: yellow
- Alignment: centred

The layout of the AUTOTEST page is shown in Figure 15.

Figure 15 - AUTOTEST mode page

[END_REQ]

12.6 MAINTENANCE page

[REQ:IE-DMI_00111];[Allocation:Onboard];[Type:Mandatory]

The MAINTENANCE page shall be composed of a text label with the following characteristics:

- Coordinates: x: 0; y: 220
- Dimension: 40 pixel height, 640 pixel width
- Text: “MAINTENANCE”
- Font: Helvetica 45 light
- Style: bold
- Size: 12
- Colour: yellow
- Alignment: centred

The layout of the MAINTENANCE page is shown in Figure 16.

Figure 16 - MAINTENANCE mode page

[END_REQ]

12.7 NO_CAB_SELECTED page

[REQ:IE-DMI_00112];[Allocation:Onboard];[Type:Mandatory]

The NO_CAB_SELECTED page shall be composed of a text label with the following characteristics:

- Coordinates: x: 0; y: 220
- Dimension: 40 pixel height, 640 pixel width
- Text: “CAB NOT SELECTED”
- Font: Helvetica 45 light
- Style: bold
- Size: 12
- Colour: yellow
- Alignment: centred

The layout of the NO_CAB_SELECTED page is shown in Figure 17.

Figure 17 - NO CAB SELECTED mode page

[END_REQ]

12.8 CAB_SELECTED page

[REQ:IE-DMI_00113];[Allocation:Onboard];[Type:Mandatory]

The CAB_SELECTED page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- Data Entry Message

The layout of the CAB_SELECTED page is shown in

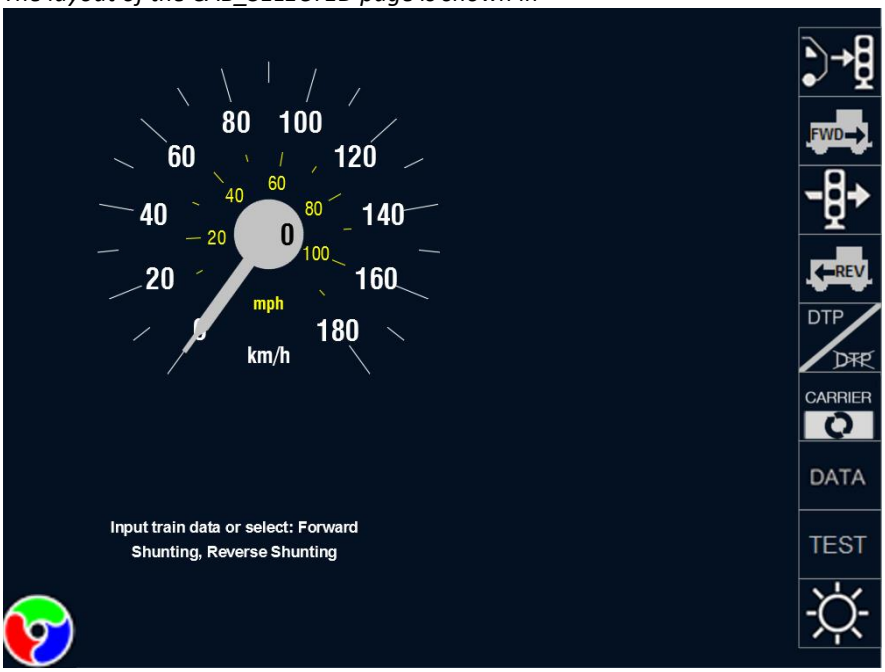


Figure 18.

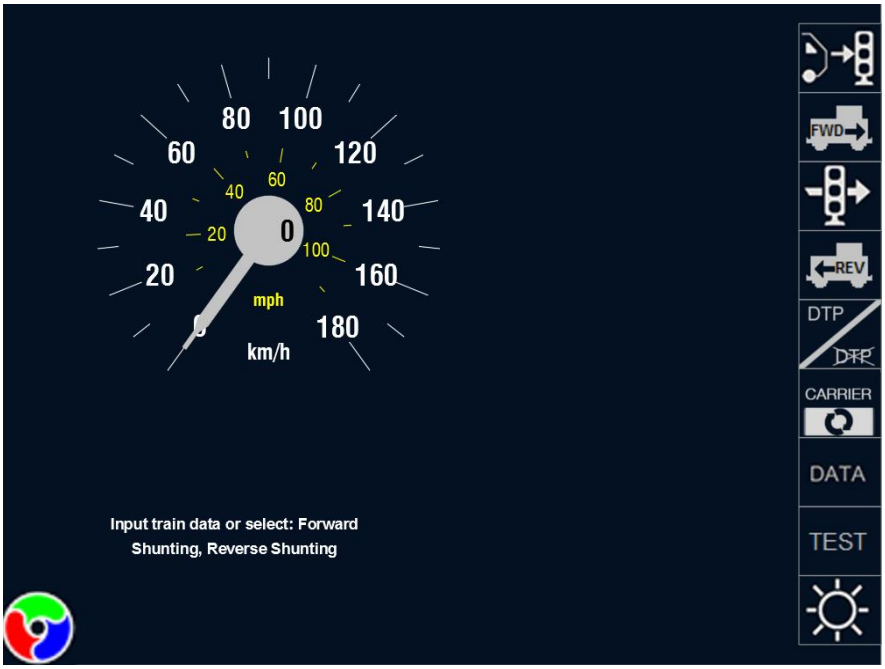


Figure 18 - CAB SELECTED mode page

[END_REQ]

12.9 STAFF_RESPONSIBLE page

[REQ:IE-DMI_00114];[Allocation:Onboard];[Type:Mandatory]

The STAFF_RESPONSIBLE page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- Circular Speed Gauge
- I_PS

The layout of the STAFF_RESPONSIBLE page is shown in Figure 19.

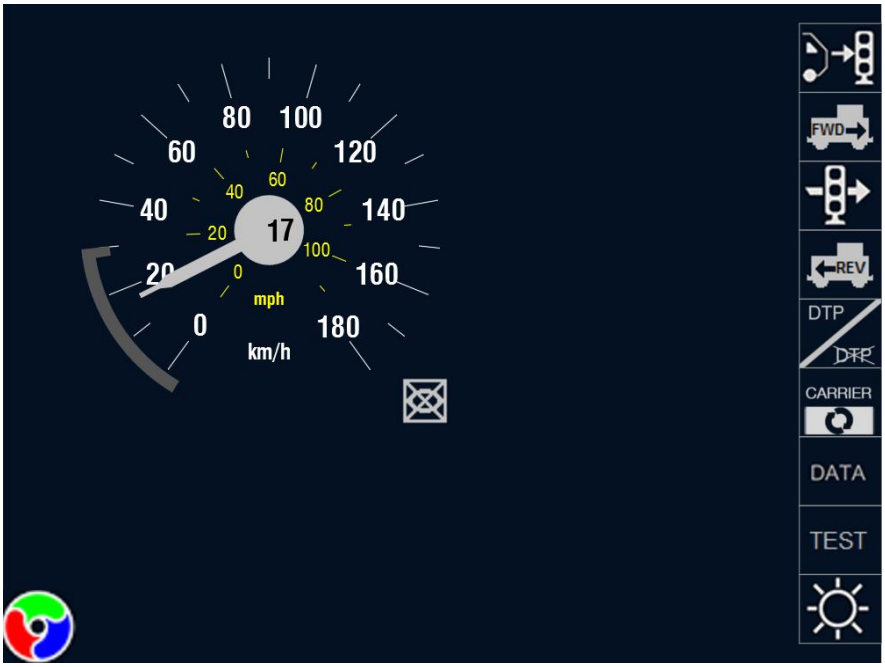


Figure 19 - STAFF RESPONSIBLE mode page

[END_REQ]

12.10 FORWARD_SHUNTING page

[REQ:IE-DMI_00115];[Allocation:Onboard];[Type:Mandatory]

The FORWARD_SHUNTING page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- I_SHU
- Circular Speed Gauge

The layout of the FORWARD_SHUNTING page is shown in Figure 20.

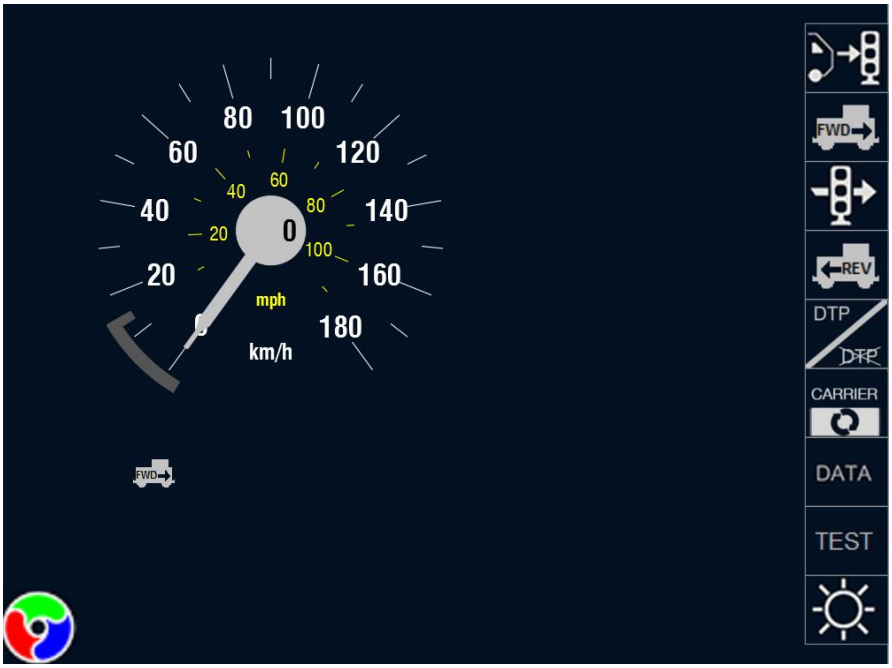


Figure 20 - FORWARD_SHUNTING page

[END_REQ]

12.11 REVERSE_SHUNTING page

[REQ:IE-DMI_00116];[Allocation:Onboard];[Type:Mandatory]

The REVERSE_SHUNTING page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- I_REV
- Circular Speed Gauge

The layout of the REVERSE_SHUNTING page is shown in Figure 21.

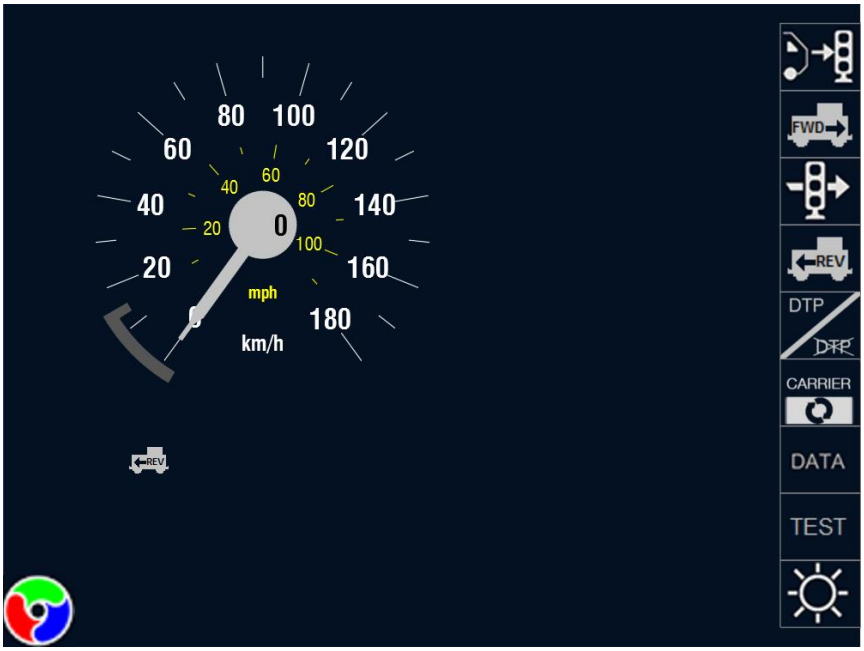


Figure 21 - REVERSE_SHUNTING page

[END_REQ]

12.12 CAWS page

[REQ:IE-DMI_00117];[Allocation:Onboard];[Type:Mandatory]

The CAWS page shall contain the following objects:

- Vitality icon
- Menu buttons
- I_CAWS
- I_CAWS_SUP
- CAWS buttons B_xxx_CODE
- Acknowledgement buttons B_TEXT_xxx_CODE_ACK

The layout of the CAWS page is shown in Figure 22.

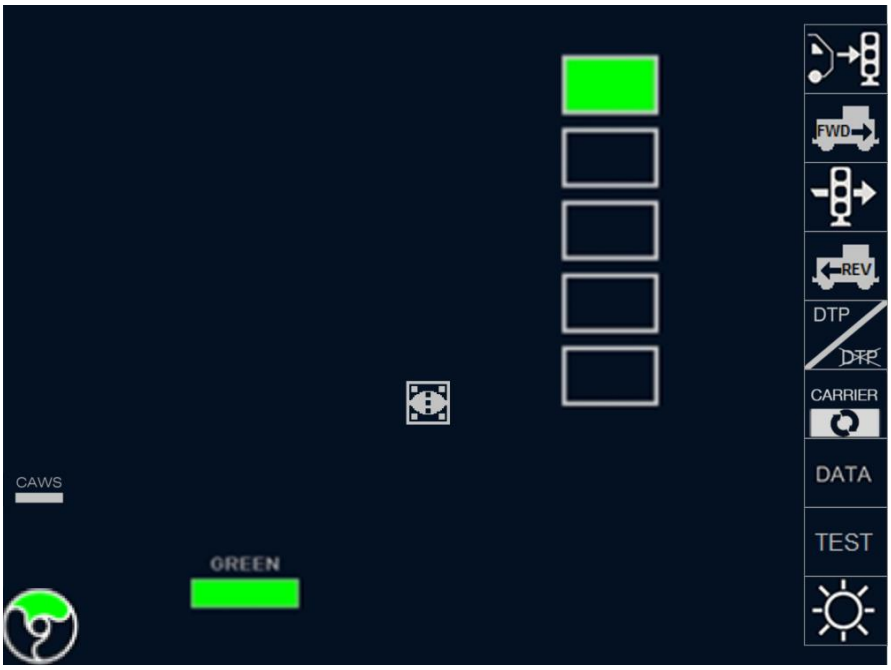


Figure 22 - CAWS page

[END_REQ]

12.13 ATP page

[REQ:IE-DMI_00118];[Allocation:Onboard];[Type:Mandatory]

The ATP page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- I_ATP
- I_ATP_SUP
- Circular Speed Gauge

The layout of the ATP page is shown in Figure 23.

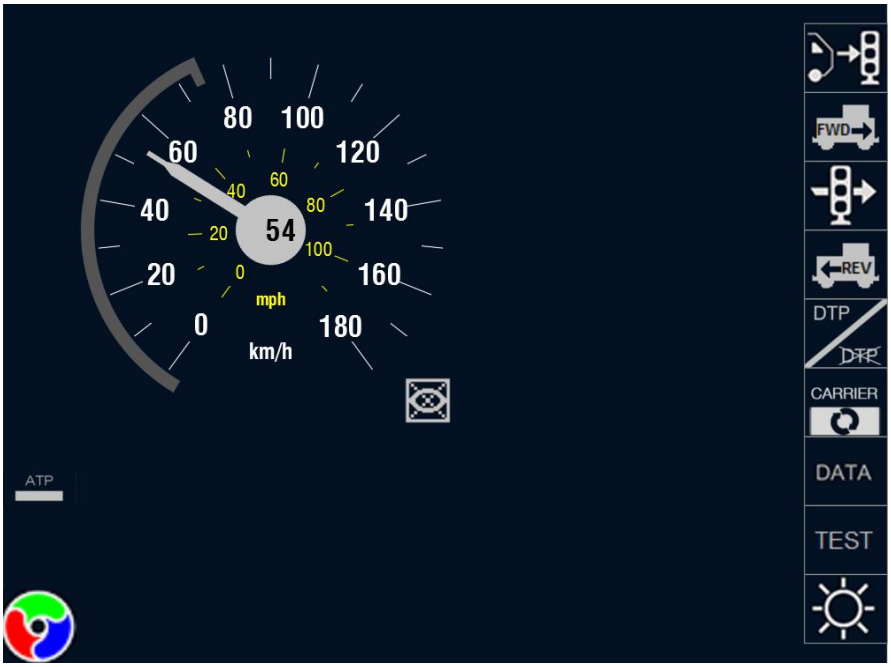


Figure 23 - ATP page

[END_REQ]

12.14 DTP page

[REQ:IE-DMI_00119];[Allocation:Onboard];[Type:Mandatory]

The DTP page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- I_DTP
- I_FS
- Distance target bar
- Distance target digital
- Circular Speed Gauge

The layout of the DTP page is shown in Figure 24.

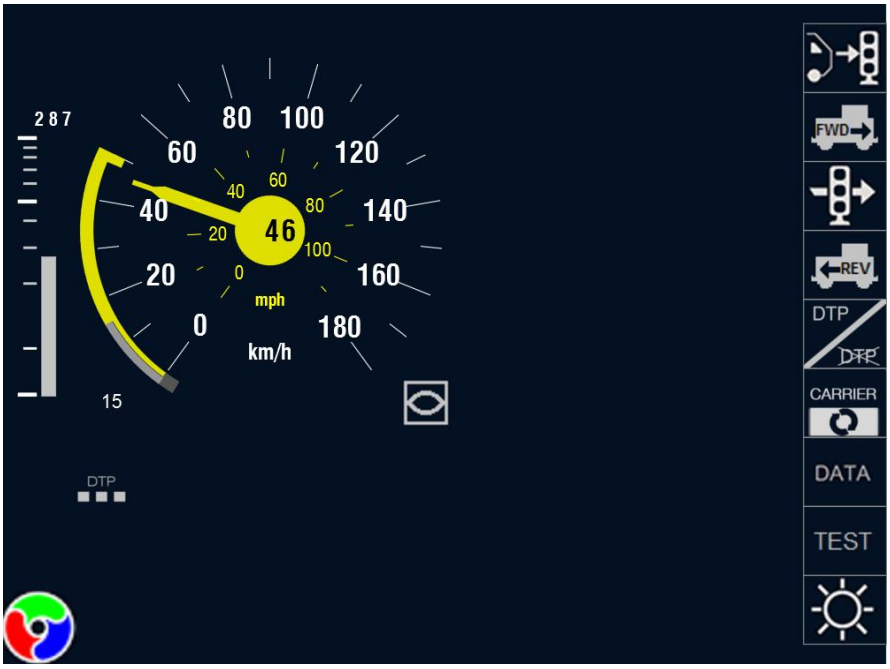


Figure 24 - DTP page

[END_REQ]

12.15 DTP+CODE page

[REQ:IE-DMI_00120];[Allocation:Onboard];[Type:Mandatory]

The DTP+CODE page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- I_DTP
- I_FS
- I_CAWS or I_ATP, depending on CCO carrier
- Distance target bar
- Distance target digital
- Circular Speed Gauge

The layout of the DTP+CODE page is shown in Figure 25.

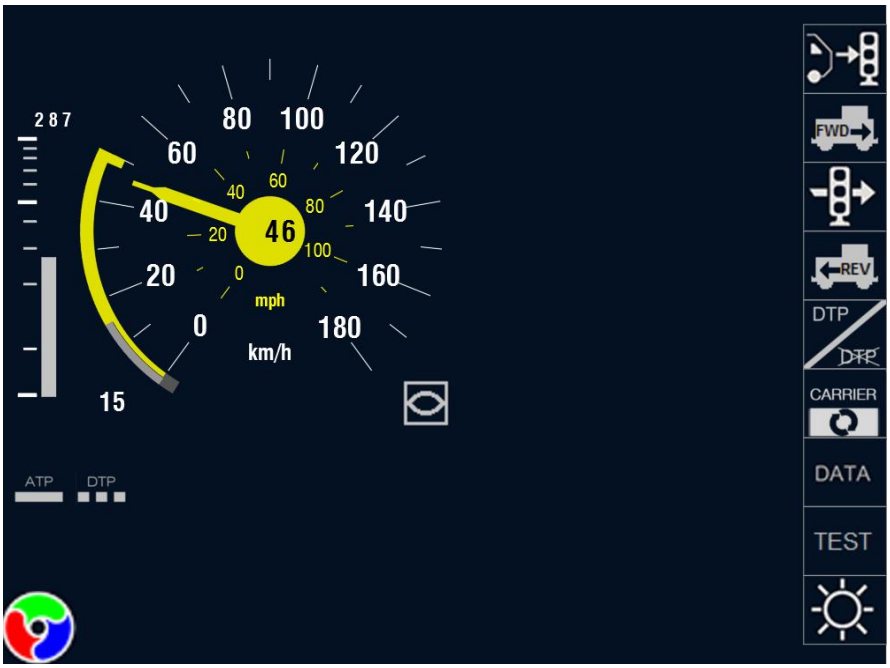


Figure 25 - DTP+CODE page

[END_REQ]

12.16 DTP+CODE_E page

[REQ:IE-DMI_00121];[Allocation:Onboard];[Type:Mandatory]

The DTP+CODE_E page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- I_DTP
- I_FS
- I_CODE_E
- Distance target bar
- Distance target digital
- Circular Speed Gauge

The layout of the DTP+CODE_E page is shown in Figure 26.

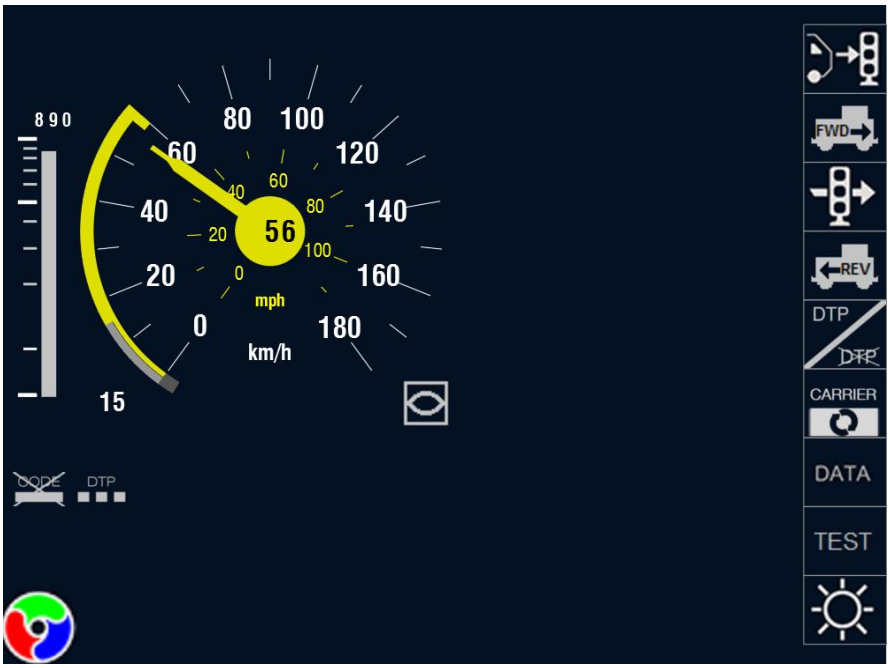


Figure 26 - DTP+CODE_E page

[END_REQ]

12.17 CODE_E page

[REQ:IE-DMI_00122];[Allocation:Onboard];[Type:Mandatory]

The CODE_E page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- I_PS
- I_CODE_E
- Circular Speed Gauge

The layout of the CODE_E page is shown in Figure 27.

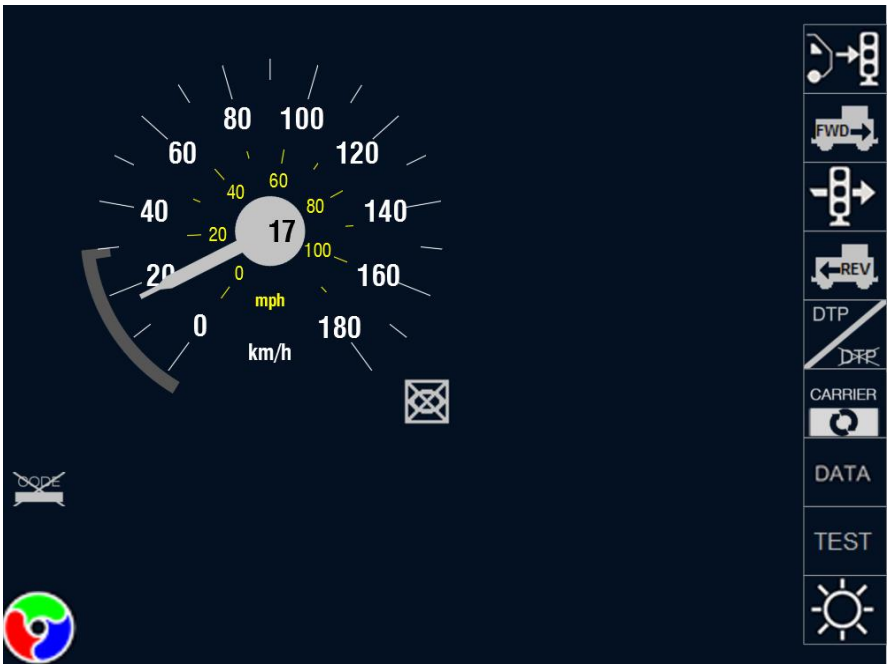


Figure 27 - CODE_E page

[END_REQ]

12.18 DTP_E page

[REQ:IE-DMI_00123];[Allocation:Onboard];[Type:Mandatory]

The DTP_E page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- I_PS
- I_DTP_E
- Circular Speed Gauge

The layout of the DTP_E page is shown in Figure 28.

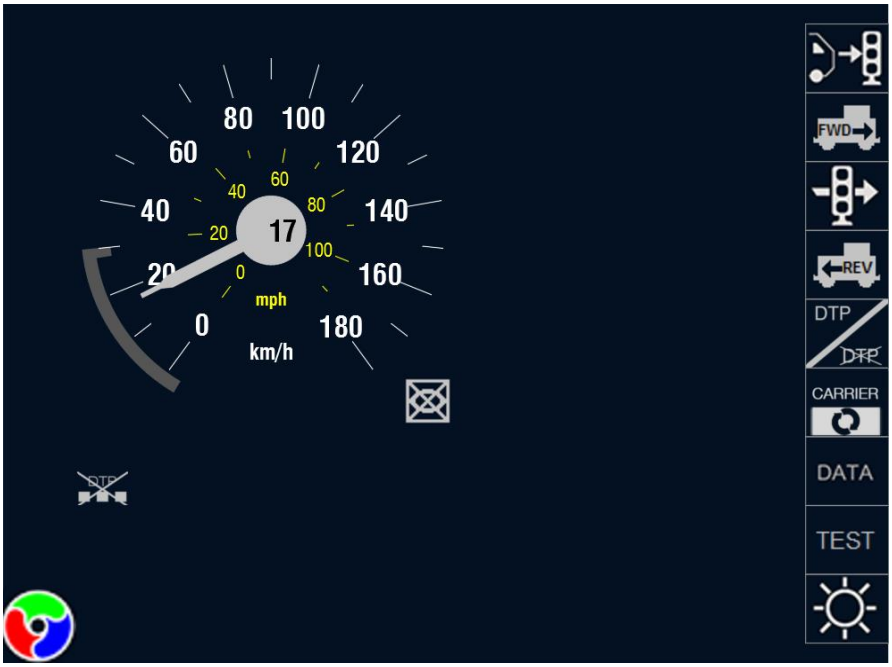


Figure 28 - DTP_E page

[END_REQ]

12.19 DTP_E+CAWS page

[REQ:IE-DMI_00124];[Allocation:Onboard];[Type:Mandatory]

The DTP_E+CAWS page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- I_CAWS
- I_PS
- I_DTP_E
- CAWS buttons B_xxx_CODE
- Acknowledgement buttons B_TEXT_xxx_CODE_ACK
- Circular Speed Gauge

The layout of the DTP_E+CAWS page is shown in Figure 29.

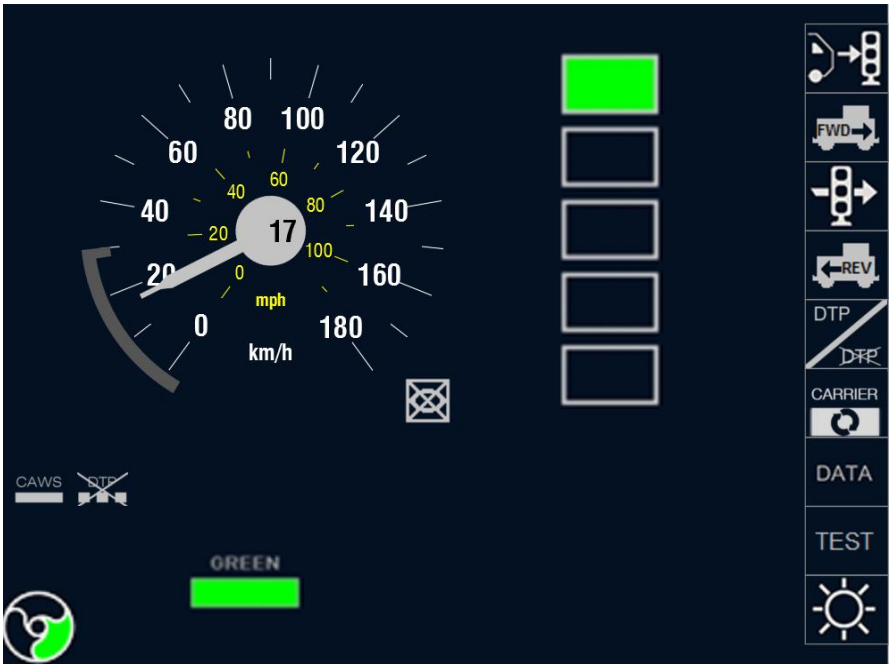


Figure 29 - DTP_E+CAWS page

[END_REQ]

12.20 DTP_E+ATP page

[REQ:IE-DMI_00125];[Allocation:Onboard];[Type:Mandatory]

The DTP_E+ATP page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- I_ATP
- I_ATP_SUP
- I_DTP_E
- Circular Speed Gauge

The layout of the DTP_E+ATP page is shown in Figure 31.

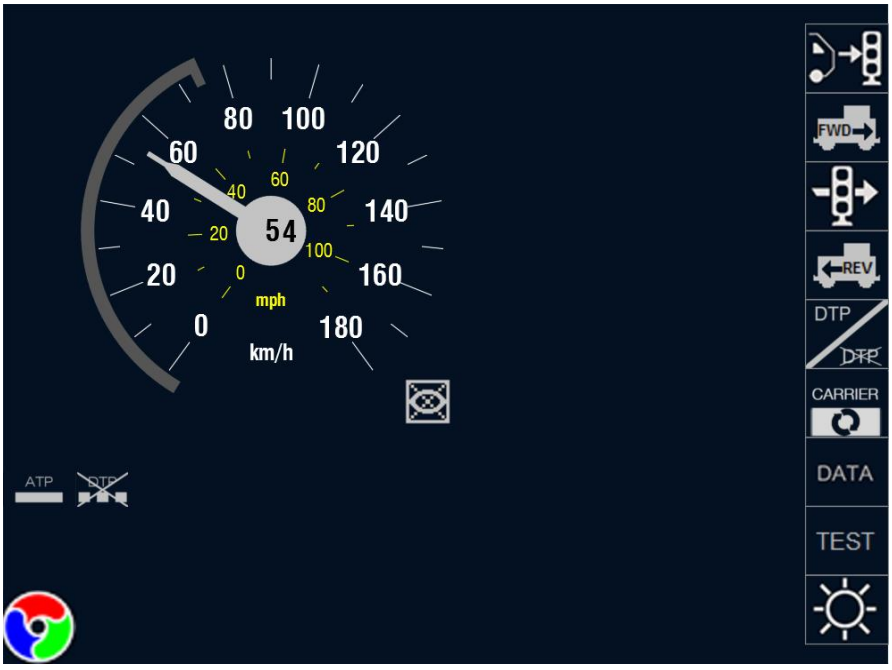


Figure 30 - DTP_E+ATP page

[END_REQ]

Note: In a future version of the document, the I_ATP_SUP icon will be replaced by I_PS icon to align with the 30km/h Permitted Speed in that DTP_E+ATP mode when balises may be installed.

12.21 DTP_E+CODE_E page

[REQ:IE-DMI_00126];[Allocation:Onboard];[Type:Mandatory]

The DTP_E+CODE_E page shall contain the following objects:

- Vitality icon
- Menu buttons
- Speed dial
- Current Train Speed pointer
- Current Train Speed digital
- I_PS
- I_DTP_E
- I_CODE_E
- Circular Speed Gauge

The layout of the DTP_E+CODE_E page is shown in Figure 31.

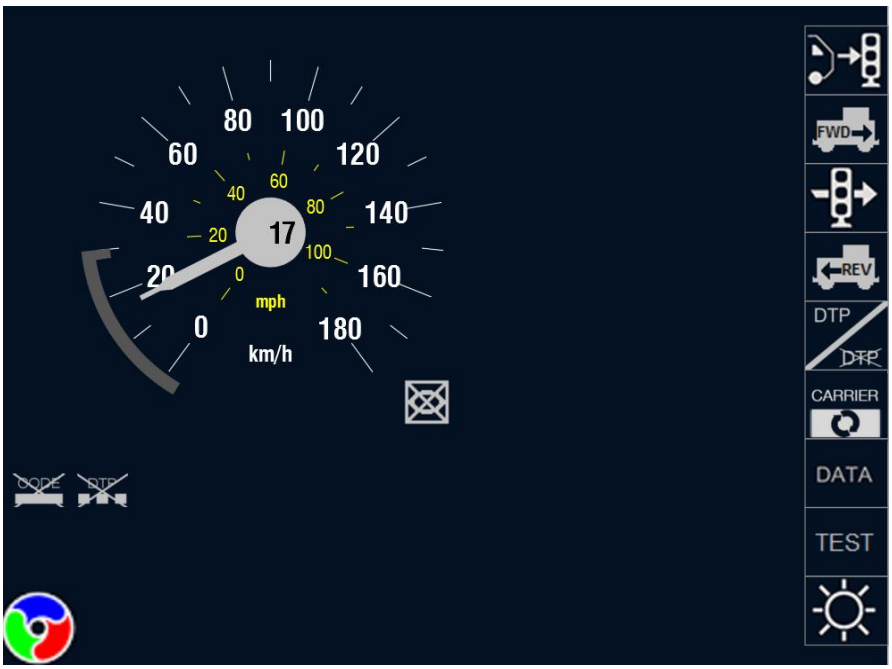


Figure 31 - DTP_E+CODE_E page

[END_REQ]

12.22 Stop Override keyboard

[REQ:IE-DMI_00127];[Allocation:Onboard];[Type:Mandatory]

The Stop Override keyboard shall be composed of the following objects, as per Figure 32:

- Input field:
  - IF_STO
- Functional buttons:
  - B_KEYBOARD_0
  - B_KEYBOARD_1
  - B_KEYBOARD_2
  - B_KEYBOARD_3
  - B_KEYBOARD_4
  - B_KEYBOARD_5
  - B_KEYBOARD_6
  - B_KEYBOARD_7
  - B_KEYBOARD_8
  - B_KEYBOARD_9
  - B_KEYBOARD_CANCEL
  - B_KEYBOARD_OK

Figure 32 - Stop Override Keyboard

This keyboard shall be displayed overlaid to the active DMI page.

[END_REQ]

[REQ:IE-DMI_00128];[Allocation:Onboard];[Type:Mandatory]

When required during the execution of the Stop_Override function, the DMI shall display the Stop Override input field in the area indicated in Table 20, and shall display the functional buttons in the areas indicated in Table 2.

Name	Description	Position			Dimension	
		DMI area	x	y	Height	Width
IF_STO	Stop Override input field	D	369	23	40	178

Table 20 – Stop Override Keyboard Reference Table

[END_REQ]

[REQ:IE-DMI_00129];[Allocation:Onboard];[Type:Mandatory]

The DMI shall display the IF_STO input field with an internal blue border of 3 pixel width.

[END_REQ]

[REQ:IE-DMI_00130];[Allocation:Onboard];[Type:Mandatory]

The background colour of the IF_STO input field shall be white.

[END_REQ]

[REQ:IE-DMI_00131];[Allocation:Onboard];[Type:Mandatory]

The text font of the IF_STO input field shall be:

- font: Helvetica 45 light
- style: bold
- size: 12
- colour: blue
- alignment: centre

[END_REQ]

[REQ:IE-DMI_00132];[Allocation:Onboard];[Type:Mandatory]

When the DMI displays the Stop Override keyboard, the input field shall be initially empty.

[END_REQ]

[REQ:IE-DMI_00133];[Allocation:Onboard];[Type:Mandatory]

The Stop Override keyboard shall allow the driver to enter the Balise Group identifier of the signal at red to be passed and it shall display on its input field the entered NID_AREA (first 3 digits) and IEHS_NID_BG (second 3 digits), separated by the character "-". The character "-" shall be automatically added after the

third digit has been entered by the driver.

[END_REQ]

[REQ:IE-DMI_00134];[Allocation:Onboard];[Type:Mandatory]

If the driver presses the B_KEYBOARD_CANCEL button, the DMI shall:

- Clear the input field if the input field was not clear.
- Hide the Stop Override keyboard if the input field was clear.

[END_REQ]

13 DMI Audible Information

[REQ:IE-DMI_00135];[Allocation:Onboard];[Type:Mandatory]

The DMI shall be able to play the sounds listed in Table 21 via its associated loudspeaker.

[END_REQ]

[REQ:IE-DMI_00136];[Allocation:Onboard];[Type:Mandatory]

With the exception of the Button-up sound and of the Button-down sound, while several audio messages have to be played at the same time, the DMI shall only play the sound with the highest priority, as stated in Table 21. Priority 1 is the highest priority.

[END_REQ]

Priority	Sound Name	Condition	To be compliant with sound references and and Filename
1	Emergency Brake Sound	While Emergency brake is demanded by CCO.	IE01: “IE01_Emergency Brake Sound.wav”
2	Service Brake Sound	While Service Brake is demanded by CCO.	S1: “S1_toofast.wav”
3	Acknowledgement Sound	While an acknowledgement by the driver is requested due to: - a transition to a different CCO operating mode , or - a CAWS aspect downgrade.	IE02: “IE02_Downgrade or Acknowledgement Sound.wav”
4	Warning Sound	While Permitted Speed is exceeded	S2: “S2_warning.wav”
5	Running Release Sound	Upon activation of the Running_Release function	IE03: “IE03_Running Release Sound.wav”
6	Traction Inhibition Reminder Sound	Upon the driver moving the traction controller or combined traction/brake controller into a traction demand position while ‘Starting Against Signal’ Reminder is active.	IE06: “IE06_Traction Disabled Sound.wav”

Priority	Sound Name	Condition	To be compliant with sound references and and Filename
7	Information Sound	When a transition occurs to an operating mode that does not require acknowledgement by the driver or, when the signal balise group is passed during the stop override procedure.	S_Info: "S_info.wav"
8	CAWS Code Upgrade Sound	When a CAWS code name changes to represent a less restrictive signal aspect	IE05: "IE05_CAWS Upgrade Sound.wav"
9	Button-Down Sound	When a DMI button switches from the "released" state to the "pressed" state.	S_FEEDBACK1_DOWN : "S_Feedback1_Down.wav"
10	Button-Up Sound	When a DMI button switches from the "pressed" state to the "released" state.	S_FEEDBACK2_UP : "S_Feedback2_Up.wav"

Table 21 – DMI audible information through loudspeaker

13.1 Sound file descriptions

Note: The sound files described in this sub-section can be obtained upon request from the CRR office.

13.1.1 IE01

[REQ:IE-DMI_00137];[Allocation:Onboard];[Type:Mandatory]

The IE01 sound shall present the following sound wave and characteristics:

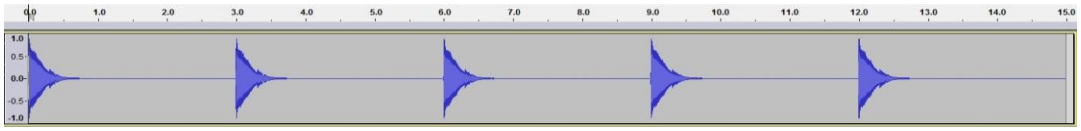


Figure 33 - Emergency Brake sound wave

- Duration: 0.8 s.
- Tempo: every 3 s (pause 2.2 s).

[END_REQ]

13.1.2 S1

[REQ:IE-DMI_00138];[Allocation:Onboard];[Type:Mandatory]

The S1 sound shall present the following sound wave and characteristics:

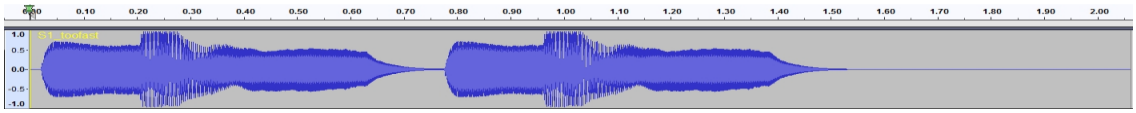


Figure 34 - ETCS S_TOOFAST Sound Wave

- To be compliant with the ETCS S1 sound

[END_REQ]

13.1.3 IE02

[REQ:IE-DMI_00139];[Allocation:Onboard];[Type:Mandatory]

The IE02 sound shall present the following sound wave and characteristics:

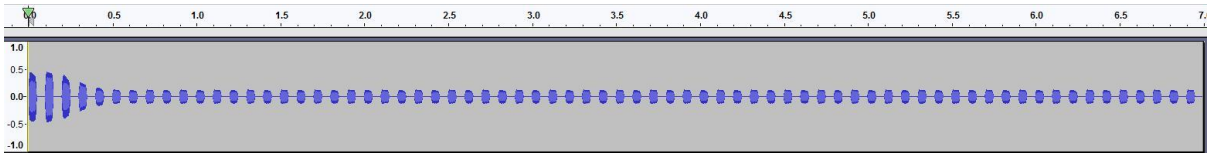


Figure 35 - CCO operating mode Downgrade / CAWS Code Downgrade Sound wave

Main characteristics:

- Duration: 0.05 s high tone + 0.05 s pause + 0.05 low tone + 0.05 s pause
- Tempo: Fast, every 0.2 s

[END_REQ]

13.1.4 S2

[REQ:IE-DMI_00140];[Allocation:Onboard];[Type:Mandatory]

The S2 sound shall present the following sound wave and characteristics:

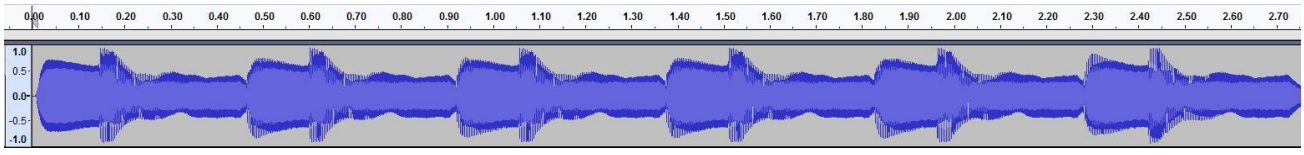


Figure 36 - ETCS S2_warning Sound wave

Main characteristics:

- To be compliant with the ETCS S2 sound

[END_REQ]

13.1.5 IE03

[REQ:IE-DMI_00141];[Allocation:Onboard];[Type:Mandatory]

The IE03 sound shall present the following sound wave and characteristics:

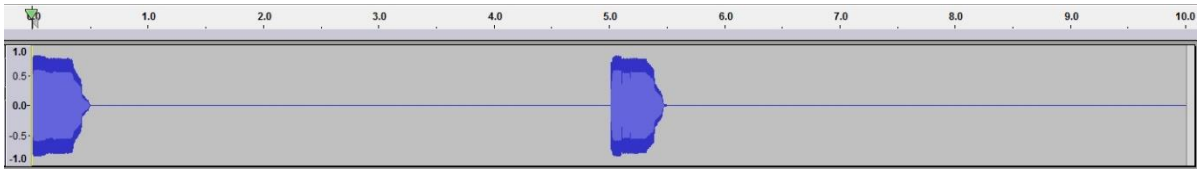


Figure 37 - Running Release / Driver Reminder Appliance Sound wave

Main characteristics:

- Duration: 0.5 s
- Tempo: every 5 s (pause 4.5 s)

[END_REQ]

13.1.6 IE06

[REQ:IE-DMI_00142];[Allocation:Onboard];[Type:Mandatory]

The IE06 sound shall present the following sound wave and characteristics:

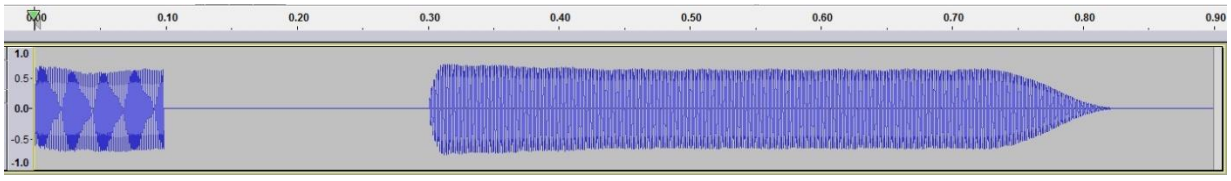


Figure 38 - Traction Disabled Sound wave

Main characteristics:

- Duration: 0.1 s high tone + 0.2 s pause + 0.52 s low tone = 0.82 s
- Tempo: Not applicable.

[END_REQ]

13.1.7 S_Info

[REQ:IE-DMI_00143];[Allocation:Onboard];[Type:Mandatory]

The S_info sound shall present the following sound wave and characteristics:

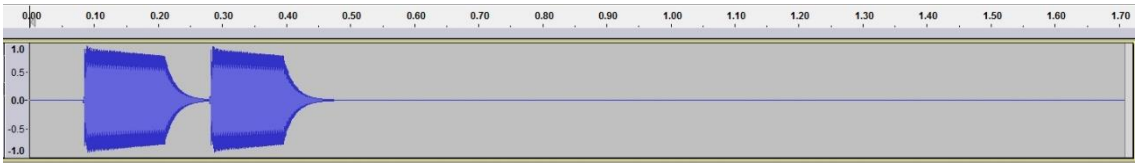


Figure 39 - ETCS S_info Sound Wave

Main Characteristics:

- To be compliant with the ETCS S_info sound

[END_REQ]

13.1.8 IE05

[REQ:IE-DMI_00144];[Allocation:Onboard];[Type:Mandatory]

The IE05 sound shall present the following sound wave and characteristics:

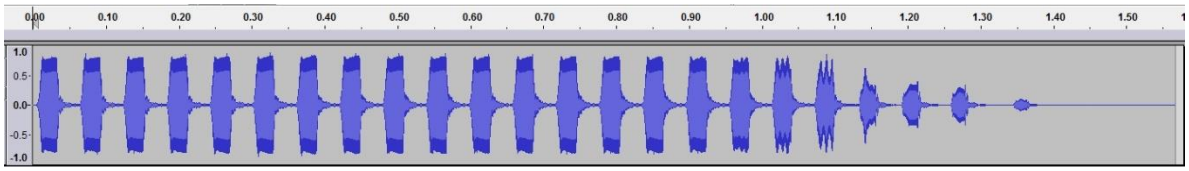


Figure 40 - CAWS Code Upgrade Sound wave

Main characteristics:

- Duration: 1.4 s.
- Tempo: Not applicable.

[END_REQ]

13.1.9 S_FEEDBACK1_DOWN

[REQ:IE-DMI_00145];[Allocation:Onboard];[Type:Mandatory]

The S_FEEDBACK1_DOWN sound shall present the following sound wave and characteristics:

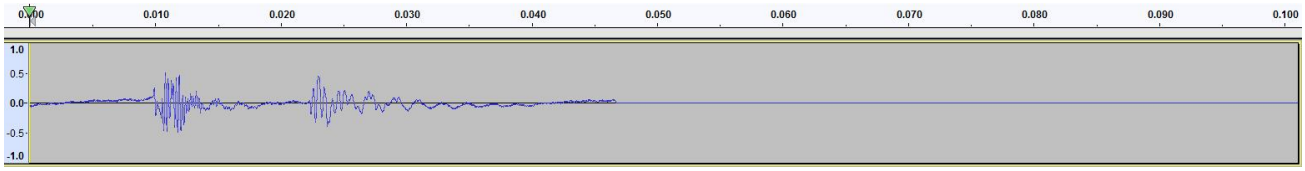


Figure 41 - ETCS S_FEEDBACK1_DOWN Sound Wave

Main characteristics:

- To be compliant with the ETCS S_FEEDBACK1_DOWN sound
- Reference information: (file: S_FEEDBACK1_DOWN.WAV).

[END_REQ]

13.1.10 S_FEEDBACK2_UP

[REQ:IE-DMI_00146];[Allocation:Onboard];[Type:Mandatory]

The S_FEEDBACK2_UP sound shall present the following sound wave and characteristics:

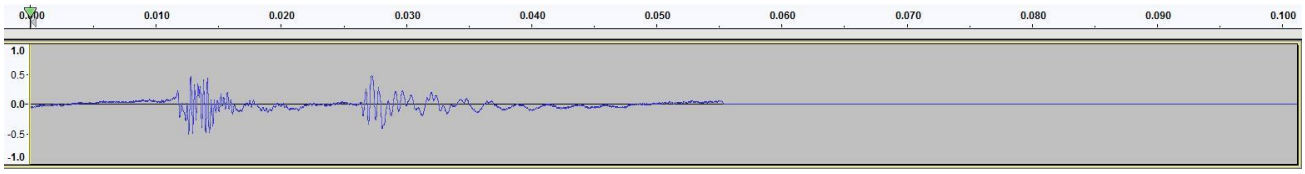


Figure 42 - ETCS S_FEEDBACK2_UP Sound Wave

Main characteristics:

- To be compliant with the ETCS S_FEEDBACK2_UP sound

[END_REQ]

14 Further Clarification

Further clarification can be sought from the CRR by phone at +353 1 206 8110 or by email info@crr.ie.

15 List of Participants

The participants for each revision of this IRS are shown below in Table 2.

Table 22 List of Participants by Revision

Participant Name and Organisation		**Involved in Issue A**		
Francois Pignard	IÉ-IM	✓		
Maik Wuttke	CRR	✓		
Paraic O'Lochlainn	IÉ-IM	✓		