DIN EN 16186-2:2017-12 (E)

Railway applications - Driver's cab - Part 2: Integration of displays, controls and indicators

Contents

Page

European foreword 5

Introduction 6

1 Scope 7

2 Normative references 7

3 Terms and definitions 8

4 Symbols and abbreviations 9

5 Driver's cab displays, controls and indicators for operational functions 10
5.1 General 10
5.2 Display or unit for train communication, monitoring and control 10
5.3 Controls 10
5.3.1 Controls for Intercom 10
5.3.2 Controls for external passenger access 10
5.3.3 Controls for driver's cab temperature 10
5.3.4 Controls for coupling and uncoupling of vehicles 11
5.3.5 Controls for auxiliary desk 11
5.4 Warnings 11
5.4.1 Alarm due to a safety system 11
5.4.2 Alarm due to emergency opening of one or more external doors 11
5.4.3 Driver interface with fire extinguishing system 12
5.4.4 Alarm due to speed reduction 12

6 Characteristics of displays, controls and indicators 12
6.1 General 12
6.1.1 Design principles 12
6.1.2 Reading zone 12
6.1.3 Resistance to damage from cleaning activity 12
6.1.4 Design to prevent the accumulation of dirt 12
6.1.5 Labelling 12
6.2 Characteristics of displays 13
6.2.1 Use of analogue and alphanumeric display 13
6.2.2 Requirements for arrays of display 13
6.2.3 Pointer and scale requirements 13
6.3 Characteristics of controls 13
6.3.1 General Principles 13
6.3.2 Design criteria 14
6.3.3 General characteristics of DAC, controls for external lights and remote control 15
6.4 Characteristics of indicators 15
6.4.1 Readability 15
6.4.2 Warning design principles 15
6.4.3 Audibility of driving related acoustic signals 16
6.4.4 Volume of the loudspeakers 16

7 Positioning of displays and controls 16
7.1 General rules for positioning 16
7.1.1 Driver's desk design 16

7.1.2 Human factors/ergonomic aspects ... 16
7.1.3 Devices positioning principle ... 17
7.1.4 Driving position at the side window ... 17
7.1.5 Space constraints ... 18
7.1.6 Positioning of elements deviating from this standard ... 18
7.2 Positioning of displays ... 18
7.2.1 Display location and orientation ... 18
7.2.2 Preferred fields of vision ... 18
7.2.3 Positioning ATP signalling information ... 18
7.2.4 Integration of heritage ATP systems ... 18
7.3 Positioning of controls ... 19
7.3.1 Reachability of controls on the driver's desk ... 19
7.3.2 Grouping of controls ... 19
7.3.3 Allocation to hands ... 20
7.3.4 Accessibility ... 20
7.3.5 Synchronous operation of elements ... 20
7.3.6 Risk of inadvertent activation ... 20
7.3.7 Position of specific controls ... 20
7.3.8 Controls used while driving, but not located on the driver's desk ... 21
7.3.9 Controls only operated during standstill ... 21

8 Lighting of cab, displays, controls and indicators ... 22
8.1 Cab lighting ... 22
8.2 Reading zone lighting ... 22
8.3 Instruments' lighting ... 22
8.4 Prevent disturbing the driver ... 22
8.5 No green lighting ... 22

9 Symbol and text definition ... 22
9.1 Symbol appearance ... 22
9.2 Harmonized symbols ... 22
9.2.1 General ... 22
9.2.2 Combinations of colours ... 23
9.2.3 Style of symbols ... 23
9.2.4 Location with respect to controls ... 23
9.2.5 Field for symbols ... 23
9.2.6 New symbols ... 23
9.3 Character type ... 23

Annex A (normative) Reach envelopes and fields of vision on the desk ... 24

Figure A.1 -- Reach envelopes for arms ... 24

Figure A.2 -- Optimum and preferred fields of vision in seated position ... 25

Annex B (informative) Examples of main driver's desk configurations - Functional allocation of operating elements and integration constraints at the driver's desk level ... 26

Figure B.1 -- Top view and front view of standardized driver's desk ... 27

Figure B.2 -- Top view and front view of optional standardized EMU/DMUs' central driver's desk ... 28

Table B.1 -- List of elements and their locations including function codes (in accordance with EN 15380-4) ... 29

Annex C (normative) Operating elements and relationship with symbols ... 46

Table C.1 -- Operating elements and relationship with symbols ... 46

Annex D (informative) Project specific symbols ... 61

Table D.1 -- Operating elements and relationship with symbols ... 61

Annex E (informative) Links between requirements and the Functional Breakdown Structure (FBS) of EN 15380-4 65

Table E.1 -- Requirement management elements 65

Annex F (informative) A-deviations 69

Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC 70

Bibliography 71