

English version

**Railway applications -
Communications, signalling and processing systems -
ERTMS/ETCS -
External signalling for lines equipped with ERTMS/ETCS Level 2**

Applications ferroviaires -
Systèmes de signalisation,
de télécommunications et de traitement -
ERTMS/ETCS -
Signalisation extérieure pour les lignes
équipées de ERTMS/ETCS Niveau 2

Eisenbahnanwendungen -
Systeme für die Kommunikation,
Signalisierung und Datenverarbeitung -
ERTMS/ETCS -
Außensignale für mit ERTMS/ETCS
Level 2 ausgestattete Strecken

This Technical Report was approved by CENELEC on 2007-06-01.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This Technical Report was prepared by SC 9XA, Communication, signalling and processing systems, of Technical Committee CENELEC TC 9X, Electrical and electronic applications for railways.

The text of the draft was submitted to vote in accordance with the Internal Regulations, Part 2, Subclause 11.4.3.3 (simple majority) and was approved by CENELEC as CLC/TR 50511 on 2007-06-01.

This document is a preview generated by EVS

Contents

1	Scope.....	7
2	Normative references	7
3	Terms and definitions.....	8
4	Symbols and abbreviations	8
5	General principles	9
6	Line side equipment on the Belgian HSL.....	10
6.1	Indication of a required stopping location	10
7	Line side equipment on the Dutch HSL and Betuwe Line.....	11
7.1	Indication of a required stopping location	11
7.2	Electric Traction Orders	15
7.3	Advisory speed for non passenger and special trains	18
7.4	GSM-R sign for voice communication	18
8	Line side equipment on the French HSL "LGVEE".....	19
8.1	Indication of a required stopping location for ERTMS/ETCS fitted trains	19
8.2	Indication of a required stopping location for TVM fitted trains	20
8.3	Transition.....	21
8.4	Electric Traction Orders	24
9	Line side equipment on the Italian HSL ERTMS/ETCS Level 2 "Roma-Napoli" and "Torino-Novara".....	33
9.1	Indication of a required stopping location before point work.....	33
9.2	Indication of a required stopping location on the line (not before point work)	35
9.3	Signs put in at the approach the markers defined in 9.1 and in 9.2	36
9.4	Transition.....	38
9.5	Electric Traction Orders	42
10	High Speed Lines in Spain.....	49
10.1	Overview of the existing High Speed Lines in Spain	49
10.2	Line side equipment on the Spanish HSL "Madrid-Zaragoza-Barcelona-Figueres".....	51
10.3	Technical characteristics of the Spanish marker boards	70
11	Line Side Equipment on the Swiss ERTMS/ETCS Level 2 Lines.....	71
11.1	Swiss ERTMS/ETCS Level 2 Lines.....	71
11.2	Signals in Direct Context with the cab signalisation	72
11.3	Signals for Train Movements and Shunting.....	74
11.4	Signals for Shunting Movements	75
11.5	Signals for Train Movements	75
11.6	Signals for Electrical Operation.....	76
	Bibliography	78
	Figure 1 — In approach and beyond	8
	Figure 2 — Belgian marker.....	10
	Figure 3 — Marker	11
	Figure 4 — Example with white lamp illuminated.....	12
	Figure 5 — Example with white lamp not illuminated	12
	Figure 6 — Example of the colour light signal extinguished with the vertical dot line illuminated.....	12
	Figure 7 — Commencement of cab signal.....	13
	Figure 8 — Termination of cab signal	13
	Figure 9 — Attention or Danger indicator.....	14
	Figure 10 — Example of use of the Reflectorised sign	14
	Figure 11 — Start of neutral section	15
	Figure 12 — End of neutral section	15

Figure 13 — Announcement to lower pantograph.....	15
Figure 14 — Lower pantograph	16
Figure 15 — Raise pantograph.....	16
Figure 16 — Passing the sign with raised pantographs is not allowed.....	17
Figure 17 — Change from 1,5 kV to 3 kV	17
Figure 18 — Example of advisory speed	18
Figure 19 — Change of the GSM-R network	18
Figure 20 — ERTMS/ETCS Level 2 marker along the French LGVEE	19
Figure 21 — TVM marker along the French LGVEE	20
Figure 22 — "CAB".....	21
Figure 23 — Announcement of cab signal line.....	22
Figure 24 — Commencement of a cab signal line	22
Figure 25 — Termination of a cab signal line.....	23
Figure 26 — Transition to TVM 430 track 2	23
Figure 27 — Transition to ERTMS/ETCS Level 2	23
Figure 28 — Announcement to lower the pantograph.....	24
Figure 29 — Colours used for the announcement to lower the pantograph.....	25
Figure 30 — Lower Pantograph.....	26
Figure 31 — Colours used for the order "Lower Pantograph"	26
Figure 32 — Raise Pantograph	27
Figure 33 — Colours used for the sign "Raise Pantograph".....	28
Figure 34 — Neutral section announcement.....	29
Figure 35 — Start of a neutral section	29
Figure 36 — Colours used for the sign "Start of a neutral section"	30
Figure 37 — End of a neutral section	31
Figure 38 — Colours used for the sign "End of a neutral section"	32
Figure 39 — ERTMS/ETCS Level 2 marker before point work on the Italians HSL.....	33
Figure 40 — Example of a starting signal	34
Figure 41 — Sign for "End of Station"	34
Figure 42 — Sign START.....	34
Figure 43 — Point work identification	35
Figure 44 — ERTMS/ETCS Level 2 marker on the Italians HSL.....	35
Figure 45 — Type B	37
Figure 46 — Type A	37
Figure 47 — "Commencement of cab signal Line (ERTMS/ETCS L2)"	38
Figure 48 — "Announcement of commencement of cab signal line (ERTMS/ETCS L2)"	39
Figure 49 — Limit of a cab signal line	40
Figure 50 — Announcement of limit of a cab signal line (ERTMS/ETCS L2).....	41
Figure 51 — Announcement to lower the pantograph.....	42
Figure 52 — Lower Pantograph.....	43
Figure 53 — Raise Pantograph (e.g 25 kV)	44
Figure 54 — Neutral section announcement.....	45
Figure 55 — Start of neutral section	46
Figure 56 — "Start of neutral section" in approach point work, right route.....	47
Figure 57 — "Start of neutral section" in approach point work, left route	47
Figure 58 — End of the neutral section.....	48
Figure 59 — HSL in Spain	49
Figure 60 — Marker for indication of a required stopping location	51
Figure 61 — Commencement of the PTO rules section	53

Figure 62 — Commencement of NEC rules section.....	54
Figure 63 — Termination of NEC rules section.....	55
Figure 64 — Commencement of ASFA.....	56
Figure 65 — Commencement of BLAU.....	56
Figure 66 — Commencement of BAB.....	56
Figure 67 — Termination of ASFA.....	57
Figure 68 — Termination of BLAU with C.T.C.....	57
Figure 69 — Termination of BAB.....	57
Figure 70 — Limit of shunting area.....	58
Figure 71 — Raise Pantograph.....	59
Figure 72 — Lower Pantograph.....	59
Figure 73 — Approach of a neutral section.....	60
Figure 74 — Approach of a temporary neutral section.....	60
Figure 75 — Start of neutral section.....	61
Figure 76 — End of neutral section.....	62
Figure 77 — 200 m beyond the end of a neutral section.....	63
Figure 78 — 400 m beyond the end of a neutral section.....	63
Figure 79 — End of overhead line power supply.....	64
Figure 80 — Change 3 000 V to 25 000 V.....	65
Figure 81 — Change 25 000 V to 3 000 V.....	65
Figure 82 — Change gauge 1 435 mm to 1 668 mm.....	66
Figure 83 — Change of gauge 1 668 mm to 1 435 mm.....	67
Figure 84 — Start of change of gauge facility.....	69
Figure 85 — End of change of gauge facility for single trainset.....	69
Figure 86 — End of change of gauge facility for two coupled trainsets.....	69
Figure 87 — Head of train.....	69
Figure 88 — Limit of B.C.A. block section.....	70
Figure 89 — Overview of Swiss ERTMS/ETCS Level 2 lines.....	71
Figure 90 — Commencement of cab signal area.....	72
Figure 91 — Termination of cab signal area.....	72
Figure 92 — Missing distant signal.....	73
Figure 93 — Marker board for main signal.....	73
Figure 94 — Commencement of station area.....	74
Figure 95 — Termination of station area.....	74
Figure 96 — Light signal "Stop" for shunting movement.....	75
Figure 97 — Sign "Stop" for shunting movement.....	75
Figure 98 — Stop point.....	76
Figure 99 — Neutral section announcement.....	76
Figure 100 — Start of neutral section.....	77
Figure 101 — End of neutral section.....	77
Table 1 — Values for the Belgian marker.....	10
Table 2 — Values applicable for figure.....	11
Table 3 — Values for the two types of ERTMS/ETCS Level 2 marker.....	19
Table 4 — Values for the three sizes of TVM marker.....	20
Table 5 — Values for the three types of signal "CAB".....	21
Table 6 — Values for the announcement to lower the pantograph.....	25
Table 7 — Values for the sign "Lower Pantograph".....	27

Table 8 — Values for the sign “Raise Pantograph”	28
Table 9 — Values for the sign “Start of a neutral section”	30
Table 10 — Values for the sign “End of a neutral Section”	31
Table 11 — Values for the two types of ERTMS/ETCS Level 2 marker before point work	33
Table 12 — Values for the two types of ERTMS/ETCS Level 2 marker (not before point work)	36
Table 13 — Values for the two types of the sign type A and type B	37
Table 14 — Values for the “Commencement of cab signal line”	38
Table 15 — Values for the signal “Announcement of commencement of cab signal line”	39
Table 16 — Values for “Limit of a cab signal line”	40
Table 17 — Values for the signal “Announcement of entrance in a cab signal line”	41
Table 18 — Values for the Announcement to lower the pantograph	42
Table 19 — Values for the order “Lower Pantograph”	43
Table 20 — Values for the order “Raise Pantograph”	44
Table 21 — Values for the neutral section announcement	45
Table 22 — Values for the signal “Start of neutral section”	46
Table 23 — Values for the sign “End of the neutral section”	48
Table 24 — Values applicable for Figure 60	52
Table 25 — Values applicable for Figure 61	53
Table 26 — Values applicable for Figure 62	54
Table 27 — Values applicable for Figure 63	56
Table 28 — Values applicable for Figure 70	58
Table 29 — Value applicable for Figures 73 and 74	60
Table 30 — Values applicable for Figure 75	61
Table 31 — Values applicable for Figure 76	62
Table 32 — Values applicable for Figures 77 and 78	63
Table 33 — Values applicable for Figure 79	64
Table 34 — Values applicable for Figures 80 and 81	65
Table 35 — Values applicable for Figure 82	66
Table 36 — Values applicable for Figure 83	68
Table 37 — Values applicable for Figure 88	70

1 Scope

The scope of this Technical Report is to present the different line side information used in 2006 on the ERTMS/ETCS Level 2 lines and required for the application of the ERTMS/ETCS Level 2 operational rules.

NOTE The signs described in this Technical Report are only referring to ERTMS/ETCS Level 2 operations. On lines equipped with ERTMS/ETCS Level 2 there may be some additional signs needed for maintenance, degraded modes, transition to and from other signalling systems and other operational rules. These signs are not necessarily described in this Technical Report.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12899-1:2001, *Fixed, vertical road traffic signs – Part 1: Fixed signs*

CLC/TS 50459-1, *Railway applications – Communication, signalling and processing systems – European Rail Traffic Management System – Driver-Machine Interface – Part 1: Ergonomic principles for the presentation of ERTMS/ETCS/GSM-R information*

CLC/TS 50459-2, *Railway applications – Communication, signalling and processing systems – European Rail Traffic Management System – Driver-Machine Interface – Part 2: Ergonomic arrangements of ERTMS/ETCS information*

CLC/TS 50459-3, *Railway applications – Communication, signalling and processing systems – European Rail Traffic Management System – Driver-Machine Interface – Part 3: Ergonomic arrangements of ERTMS/GSM-R information*

CLC/TS 50459-4, *Railway applications – Communication, signalling and processing systems – European Rail Traffic Management System – Driver-Machine Interface – Part 4: Data entry for the ERTMS/ETCS/GSM-R systems*

CLC/TS 50459-5, *Railway applications – Communication, signalling and processing systems – European Rail Traffic Management System – Driver-Machine Interface – Part 5: Symbols*

CLC/TS 50459-6, *Railway applications – Communication, signalling and processing systems – European Rail Traffic Management System – Driver-Machine Interface – Part 6: Audible information*

UIC 651, *Layout of driver's cabs in locomotives, railcars, multiple-unit trains and driving trailers*