INTERNATIONAL STANDARD

ISO 11992-3

Third edition
2021-05

Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles —

Part 3: Application layer for equipment other than brakes and running gear

Véhicules routiers — Échange d'informations numériques sur les connexions électriques entre véhicules tracteurs et véhicules tractés —

Partie 3: Couche d'application pour les équipements autres que les équipements de freinage et les organes de roulement

This document is a preview generated by EVS

Reference number
ISO 11992-3:2021(E)

© ISO 2021

This document is a preview generated by EVS

COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ... **ix**
Introduction ... **x**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Abbreviated terms ... **2**
5 APP – Parameter specification ... **3**
5.1 General definitions ... 3
5.2 Rear obstacle distance ... 3
5.3 Thermal body temperature ... 4
5.4 Obstacle detection device (ODD) request ... 4
5.5 Anti-theft device – Status request ... 4
5.6 Obstacle detection device (ODD) active ... 5
5.7 Anti-theft device – Measured ... 5
5.8 Vehicle type ... 5
5.9 Detailed vehicle type ... 6
5.10 Percent clutch slip ... 6
5.11 Current gear ... 7
5.12 Accelerator pedal low idle switch ... 7
5.13 Engine propulsion system control allowed ... 7
5.14 PTO control allowed ... 8
5.15 Tachograph vehicle speed ... 8
5.16 Engine propulsion system speed measured ... 8
5.17 Driver's demand engine propulsion system – Percent torque ... 8
5.18 Actual engine propulsion system – Percent torque ... 9
5.19 Transmission reference torque ... 9
5.20 Engine propulsion system percent load at current speed ... 9
5.21 Maximum vehicle speed limit ... 9
5.22 Engine propulsion system speed upper limit ... 9
5.23 Engine propulsion system speed lower limit ... 10
5.24 Engine propulsion system coolant temperature warning ... 10
5.25 Engine propulsion system oil pressure warning ... 10
5.26 Engine propulsion system oil temperature ... 11
5.27 Engine propulsion system coolant temperature ... 11
5.28 Engine propulsion system oil pressure ... 11
5.29 Torque converter oil temperature warning ... 11
5.30 Torque converter oil temperature ... 12
5.31 First clutch-dependent PTO feedback ... 12
5.32 Second clutch-dependent PTO feedback ... 12
5.33 Clutch-independent PTO feedback ... 13
5.34 First engine propulsion system-mounted PTO feedback ... 13
5.35 Second engine propulsion system-mounted PTO feedback ... 13
5.36 Starter active ... 14
5.37 Engine propulsion system running ... 14
5.38 Engine propulsion system torque mode ... 14
5.39 First clutch-dependent PTO switch ... 14
5.40 Second clutch-dependent PTO switch ... 15
5.41 Clutch-independent PTO switch ... 15
5.42 First engine propulsion system-mounted PTO switch ... 15
5.43 Second engine propulsion system-mounted PTO switch ... 16
5.44 Requested percent clutch slip ... 16
5.45 Starter lockout switch ... 16

This document is a preview generated by EVS

© ISO 2021 – All rights reserved

5.46 Engine propulsion system start switch 16
5.47 Engine propulsion system stop switch 17
5.48 Requested engine propulsion system speed upper limit 17
5.49 Requested engine propulsion system speed lower limit 17
5.50 Requested engine propulsion system torque limit 18
5.51 Requested vehicle speed limit 18
5.52 Refuse packer step switch 18
5.53 Operating panel active 19
5.54 Requested engine propulsion system speed 19
5.55 Accelerator pedal position 19
5.56 Ambient air temperature 20
5.57 Fuel level warning 20
5.58 Towed vehicle left-hand stop light(s) 20
5.59 Towed vehicle right-hand stop light(s) 20
5.60 Towed vehicle left-hand direction indicator light(s) 21
5.61 Towed vehicle right-hand direction indicator light(s) 21
5.62 Towed vehicle left-hand rear light(s) 21
5.63 Towed vehicle right-hand rear position light(s) 21
5.64 Towed vehicle left-hand rear fog light(s) 22
5.65 Towed vehicle right-hand rear fog light(s) 22
5.66 Towed vehicle left-hand reversing light(s) 22
5.67 Towed vehicle right-hand reversing light(s) 23
5.68 Towed vehicle left-hand side marker light(s) 23
5.69 Towed vehicle right-hand side marker light(s) 23
5.70 Towed vehicle left-hand rear width indicator light(s) 24
5.71 Towed vehicle right-hand rear width indicator light(s) 24
5.72 Towed vehicle left-hand corner marker light(s) 24
5.73 Towed vehicle right-hand corner marker light(s) 24
5.74 Towed vehicle left-hand rear registration-plate light(s) 25
5.75 Towed vehicle right-hand rear registration-plate light(s) 25
5.76 Towed vehicle rear warning light(s) 25
5.77 Towed vehicle rotating identification light(s) 26
5.78 Towed vehicle interior light(s) 26
5.79 Towed vehicle work light(s) 26
5.80 Body fluid level 27
5.81 Actual pressure 27
5.82 Towed vehicle rear black-out marker select light(s) 27
5.83 Towed vehicle front black-out marker lamp select 27
5.84 Towed vehicle convoy lamp select 28
5.85 Towed vehicle convoy driving lamp select 28
5.86 Towed vehicle black-out brake/stop lamp select 28
5.87 Towed vehicle night vision illuminator select 28
5.88 Towed vehicle black-out work lamp select 28
5.89 Towed vehicle operators black-out intensity selection 29
5.90 Towed vehicle left hand black-out rear light(s) 29
5.91 Towed vehicle right-hand black-out rear light(s) 29
5.92 Towed vehicle left-hand black-out brake/stop light(s) 30
5.93 Towed vehicle right-hand black-out brake/stop light(s) 30
5.94 Towed vehicle rear convoy light(s) 30
5.95 ODM version information 30
5.96 Identification data index 31
5.97 Identification data content 31
5.98 Velocity and yaw rate confidence level 31
5.99 OD status indicator 32
5.100 Cyclic redundancy check (CRC8) 32
5.101 Sequence counter 33
5.102 Longitudinal speed 34
5.103 Lateral speed 34

This preview is a preview generated by EVS

 © ISO 2021 – All rights reserved

5.104 Yaw rate 34
5.105 Articulation angle 35
5.106 OD longitudinal distance object 37
5.107 OD lateral distance object 37
5.108 OD absolute longitudinal speed object 38
5.109 OD absolute lateral speed object 38
5.110 OD standard deviation of longitudinal and lateral distance 39
5.111 OD normal deviation of longitudinal and lateral speed 39
5.112 Track ID 40
5.113 Lane curve coefficients 40
5.114 Lane curve validity interval 42
5.115 Lane marker width 42
5.116 Standard deviation of lane information error 43
5.117 Lane marker type 43
5.118 Object width (dimension in lateral direction) 44
5.119 Object length (dimension in longitudinal direction) 44
5.120 Object classification 44
5.121 Geometric distance 45
5.122 Towed vehicle rear IR-black-out marker select 50
5.123 Towed vehicle IR-black-out stop lamp select 51
5.124 Towed vehicle IR-convoy light ('Leitkreuz') select 51
5.125 Towed vehicle right-hand IR-black-out rear light(s) 51
5.126 Towed vehicle left-hand IR-black-out rear light(s) 51
5.127 Towed vehicle right-hand IR-black-out stop light(s) 52
5.128 Towed vehicle left-hand IR-black-out stop light(s) 52
5.129 Towed vehicle IR-convoy light ('Leitkreuz') 52
5.130 Towed vehicle black-out work lamp(s) 53
5.131 Seconds 53
5.132 Minutes 53
5.133 Hours 54
5.134 Day 54
5.135 Month 54
5.136 Year 55
5.137 Local minute offset 55
5.138 Local hour offset 55
5.139 Trailer left-hand stop light(s) 56
5.140 Trailer right-hand stop light(s) 56
5.141 Trailer left-hand direction indicator light(s) 56
5.142 Trailer right-hand direction indicator light(s) 57
5.143 Trailer left-hand rear light(s) 57
5.144 Trailer right-hand rear light(s) 57
5.145 Trailer left-hand rear fog light(s) 58
5.146 Trailer right-hand rear fog light(s) 58
5.147 Trailer left-hand reversing light(s) 58
5.148 Trailer right-hand reversing light(s) 58
5.149 Trailer left-hand side marker light(s) 59
5.150 Trailer right-hand side marker light(s) 59
5.151 Trailer left-hand rear width indicator light(s) 59
5.152 Trailer right-hand rear width indicator light(s) 60
5.153 Trailer left-hand corner marker light(s) 60
5.154 Trailer right-hand corner marker light(s) 60
5.155 Trailer left-hand rear registration-plate light(s) 61
5.156 Trailer right-hand rear registration-plate light(s) 61
5.157 Trailer rear warning light(s) 61
5.158 Trailer rotating identification light(s) 61
5.159 Trailer interior light(s) 62
5.160 Trailer work light(s) 62
5.161 Trailer left-hand stop light(s) redundancy function 62

This document is a preview generated by EVS

© ISO 2021 – All rights reserved

5.162 Trailer right-hand stop light(s) redundancy function 63
5.163 Trailer left-hand direction indicator light(s) redundancy function 63
5.164 Trailer right-hand direction indicator light(s) redundancy function 63
5.165 Trailer left-hand rear light(s) redundancy function 64
5.166 Trailer right-hand rear light(s) redundancy function 64
5.167 Trailer left-hand reversing light(s) redundancy function 64
5.168 Trailer right-hand reversing light(s) redundancy function 65
5.169 Transmission output shaft PTO feedback 65
5.170 Transfer case output shaft PTO feedback 65
5.171 At least one PTO engaged 66
5.172 Transmission output shaft PTO switch 66
5.173 Transfer case output shaft PTO switch 66
5.174 First clutch-dependent PTO engagement consent 67
5.175 Second clutch-dependent PTO engagement consent 67
5.176 Clutch-independent PTO engagement consent 67
5.177 First engine propulsion system mounted PTO engagement consent 68
5.178 Second engine propulsion system mounted PTO engagement consent 68
5.179 Transmission output shaft PTO engagement consent 68
5.180 Transfer case output shaft PTO engagement consent 69
5.181 First clutch-dependent PTO engagement consent – Trailer 69
5.182 Second clutch-dependent PTO engagement consent – Trailer 69
5.183 Clutch-independent PTO engagement consent – Trailer 70
5.184 First engine propulsion system mounted PTO engagement consent – Trailer 70
5.185 Second engine propulsion system mounted PTO engagement consent – Trailer 70
5.186 Transmission output shaft PTO engagement consent – Trailer 71
5.187 Transfer case output shaft PTO engagement consent – Trailer 71
5.188 Cargo hold temperature 1 71
5.189 Cargo hold temperature 2 72
5.190 Cargo hold temperature 3 72
5.191 Cargo hold temperature 4 72
5.192 Cargo hold temperature 5 73
5.193 Cargo hold temperature 6 73
5.194 Reefer unit battery voltage 73
5.195 Reefer unit fuel tank level 74
5.196 Requested evaporator 1 set-point 74
5.197 Requested evaporator 2 set-point 74
5.198 Requested evaporator 3 set-point 75
5.199 Evaporator 1 set-point 75
5.200 Evaporator 2 set-point 75
5.201 Evaporator 3 set-point 76
5.202 Compartment 1 humidity 76
5.203 Compartment 2 humidity 76
5.204 Compartment 3 humidity 77
5.205 Compartment 1 oxygen concentration 77
5.206 Compartment 2 oxygen concentration 77
5.207 Compartment 3 oxygen concentration 78
5.208 Reefer unit alarm status 78
5.209 Status evaporator 1 78
5.210 Status evaporator 2 79
5.211 Status evaporator 3 79
5.212 Reefer unit status 79
5.213 Reefer unit start/stop operating hours 80
5.214 Reefer unit diesel engine propulsion system operating hours 80
5.215 Reefer unit line supply operating hours 80
5.216 Reefer unit generator operating hours 81
5.217 Reefer unit on/off 81
5.218 Reefer unit defrost cycle on/off 81
5.219 Cargo hold door 1 contact switch 81

This preview generated by EVS

 © ISO 2021 – All rights reserved

5.220 Cargo hold door 2 contact switch 82
5.221 Cargo hold door 3 contact switch 82

6 PG specification 82
6.1 Towing vehicle 82
6.1.1 General requirements 82
6.1.2 Overview of towing vehicle PGs 83
6.1.3 CANopen messages 84
6.1.4 General purpose message #1/1 (GPM11) 85
6.1.5 General purpose message #1/2 (GPM12) 85
6.1.6 General purpose message #1/3 (GPM13) 86
6.1.7 General purpose message #1/4 (GPM14) 86
6.1.8 General purpose message #1/5 (GPM15) 87
6.1.9 General purpose message #1/6 (GPM16) 88
6.1.10 General purpose message #1/7 (GPM17) 88
6.1.11 General purpose message #1/8 (GPM18) 89
6.1.12 General purpose message #1/9 (GPM19) 90
6.1.13 Military application message #1/1 (MAM11) 90
6.1.14 Time/Date message #1/1 (TD11) 91
6.1.15 Object detection message #1/1 (ODM11) 91
6.2 Towed vehicle 92
6.2.1 General requirements 92
6.2.2 Overview of towed vehicle messages 93
6.2.3 General purpose message #2/1 (GPM21) 94
6.2.4 General purpose message #2/2 (GPM22) 94
6.2.5 General purpose message #2/3 (GPM23) 95
6.2.6 General purpose message #2/4 (GPM24) 95
6.2.7 General purpose message #2/5 (GPM25) 96
6.2.8 General purpose message #2/6 (GPM26) 97
6.2.9 General purpose message #2/7 (GPM27) 98
6.2.10 General purpose message #2/8 (GPM28) 98
6.2.11 General purpose message #2/9 (GPM29) 99
6.2.12 General purpose message #2/10 (GPM210) 100
6.2.13 General purpose message #2/11 (GPM211) 100
6.2.14 Military application message #2/1 (MAM21) 100
6.2.15 Object detection message #2/1 (ODM21) 101
6.2.16 Object detection message #2/2 (ODM22) 102
6.2.17 Object detection message #2/3 (ODM23) 102
6.2.18 Object detection message #2/4 (ODM24) 103
6.2.19 Object detection message #2/5 (ODM25) 104
6.2.20 Object detection message #2/6 (ODM26) 104
6.2.21 Object detection message #2/7 (ODM27) 105
6.2.22 Object detection message #2/8 (ODM28) 105
6.2.23 Object detection message #2/9 (ODM29) 106
6.2.24 Object detection message #2/10 (ODM210) 107
6.2.25 Object detection message #2/11 (ODM211) 107
6.2.26 Object detection message #2/12 (ODM212) 108
6.2.27 Object detection message #2/13 (ODM213) 108
6.2.28 Object detection message #2/14 (ODM214) 109
6.2.29 Object detection message #2/15 (ODM215) 110
6.2.30 Object detection message #2/16 (ODM216) 110
6.2.31 Object detection message #2/17 (ODM217) 111
6.2.32 Object detection message #2/18 (ODM218) 111
6.2.33 Object detection message #2/19 (ODM219) 112
6.2.34 Object detection message #2/20 (ODM220) 113
6.2.35 Object detection message #2/21 (ODM221) 113

7 Application 114
7.1 General requirements 114

This document is a preview generated by EVS

© ISO 2021 – All rights reserved

7.2 Address assignment ... 114
7.3 Address assignment method of a towing and towed vehicle ... 115
7.4 Vehicle node capabilities ... 115
7.5 Parameter attributes ... 116
8 AL – Application layer ... 116
8.1 AL – Message PDU format ... 116
8.2 AL – Message routing ... 117
8.3 AL – Parameter specification ... 117
8.3.1 AL – General ... 117
8.3.2 AL – Parameter attribute ranges ... 117
9 PL – Presentation layer ... 117
10 AL – ODM requirements ... 117
10.1 AL – Message latency ... 117
10.2 AL – Object selection ... 118
10.2.1 AL – General ... 118
10.2.2 AL – On the side of the vehicle ... 118
10.2.3 AL – Behind the vehicle ... 118
10.2.4 AL – Further objects ... 118
10.3 AL – Error handling ... 118
Annex A (informative) **Object detection (OD) sensor states ... 120**
Annex B (informative) **Message flow ... 128**
Bibliography ... 133

This document is a preview generated by EVS

© ISO 2021 – All rights reserved

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*.

This third edition cancels and replaces the second edition (ISO 11992-3:2003), which has been technically revised. It also incorporates the Amendment ISO 11992-3:2003/Amd. 1:2008.

The main changes compared to the previous edition are as follows:

— introduced requirements structure;

— Clause 7: added new parameters;

— Clause 8: added new messages;

— added Annex A (informative) object detection (OD) sensor states; and

— added Annex B (informative) message flow.

A list of all parts in the ISO 11992 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This document is a preview generated by EVS

© ISO 2021 – All rights reserved

Introduction

The ISO 11992 series specifies the interchange of digital information between road vehicles with a maximum authorised total mass greater than 3 500 kg, and towed vehicles, including communication between towed vehicles in terms of parameters and requirements of the lower OSI layers (physical and data link layer) of the electrical connection used to connect the electrical and electronic systems.

This document is structured according to the Open Systems Interconnection (OSI) Basic Reference Model, in accordance with ISO/IEC 7498-1 and ISO/IEC 10731 [5], which structures communication systems into seven layers. When mapped on this model, the application layer protocol and data link layer framework requirements specified/referenced in the ISO 11992 series are structured according to Figure 1.

Figure 1 illustrates a simplified communication framework:

— vehicle normal communication framework,

— vehicle diagnostic communication framework,

— vehicle-specific use case framework, and the

— vehicle lower-layers framework.

The vehicle normal communication framework is composed of ISO 11992-2 and ISO 11992-3.

The vehicle diagnostic communication framework is composed of ISO 14229-1 [8], ISO 14229-2 [9], ISO 14229-3 [10] and ISO 11992-4 [6].

The vehicle-specific use case framework is composed of ISO 11992-4 [6], ISO 22901-1 [13] or vehicle manufacturer-specific diagnostic data definition.

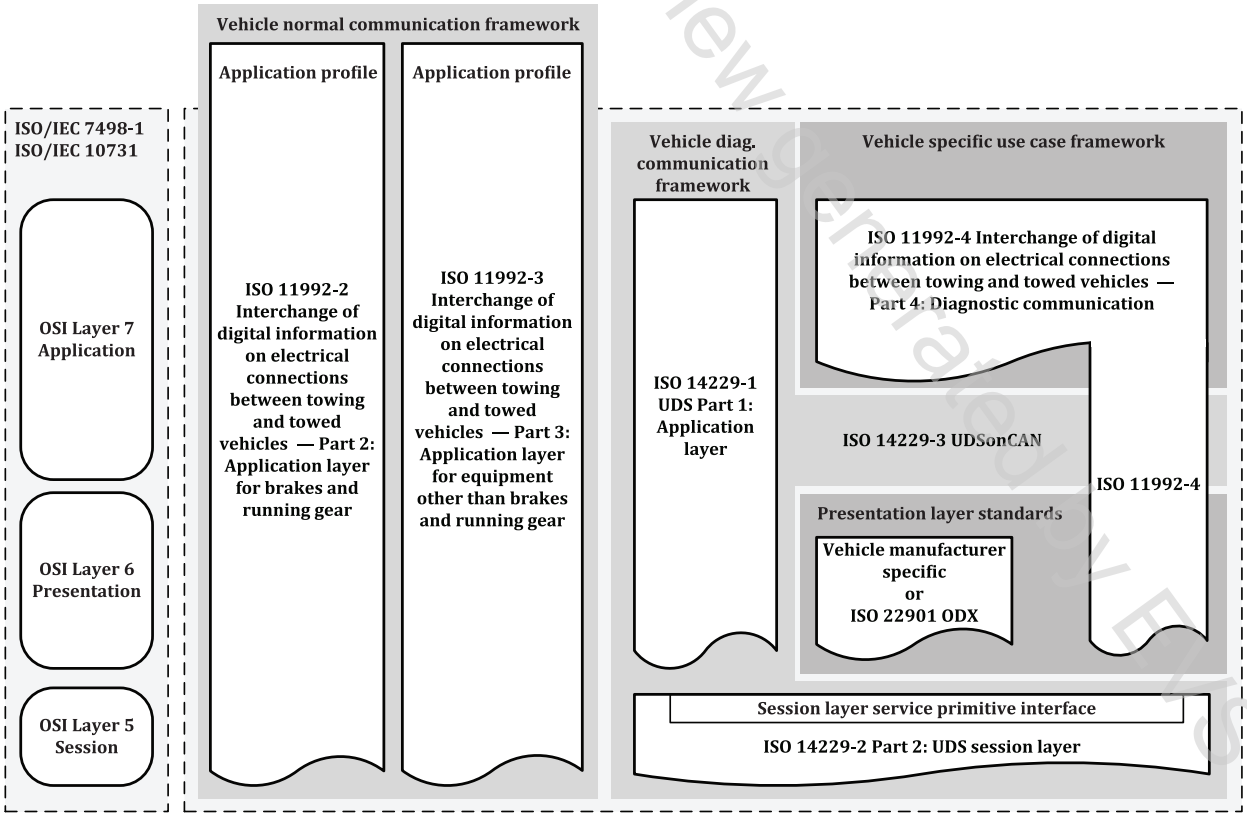

Figure 1 — ISO 11992 documents reference according to the OSI model

This document is a preview generated by EVS

© ISO 2021 – All rights reserved

Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles —

Part 3: Application layer for equipment other than brakes and running gear

This document is a preview generated by EVS

1 Scope

This document specifies the application layer, the payload of messages, and parameter groups for equipment other than brakes and running gears, to ensure the interchange of digital information between road vehicles with a maximum authorized total mass greater than 3 500 kg and their towed vehicles, including communication between towed vehicles.

This document supports the parameters and message sets for object detection (OD). The installation of the object detection (OD) device compliant to this document in the towed vehicle is identified by a dedicated message.

Additionally, some lighting parameters and messages are specified.

The conformance and interoperability test plans are not part of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 612, *Road vehicles — Dimensions of motor vehicles and towed vehicles — Terms and definitions*

ISO/IEC 8859-1, *Information technology — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1*

ISO 11992-2, *Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles — Part 2: Application layer for brakes and running gear*

ISO 80000-1, *Quantities and units — Part 1: General*

SAE J1939-21, *Data Link Layer*

SAE J1939-71:2020, *Vehicle Application Layer*

SAE J1939-DA, *J1939 Digital Annex*

SAE J1850, *Class B Data Communications Network Interface*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11992-2 and the following apply.

© ISO 2021 – All rights reserved