



BSI Standards Publication

Intelligent transport systems – DATEX II data exchange specifications for traffic management and information

Part 9: Traffic signal management publications
dedicated to the urban environment

National foreword

This Published Document is the UK implementation of CEN/TS 16157-9:2020.

The UK participation in its preparation was entrusted to Technical Committee EPL/278, Intelligent transport systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2020
Published by BSI Standards Limited 2020

ISBN 978 0 539 03672 5

ICS 35.240.60

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 May 2020.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

TECHNICAL SPECIFICATION
 SPÉCIFICATION TECHNIQUE
 TECHNISCHE SPEZIFIKATION

CEN/TS 16157-9

April 2020

ICS 35.240.60

English Version

Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 9: Traffic signal management publications dedicated to the urban environment

Systèmes de transport intelligents - Spécification DATEX II d'échange de données pour la gestion du trafic et l'information routière - Partie 9 : Publications pour la gestion des feux de circulation dédiées à l'environnement urbain

Intelligente Verkehrssysteme - Intelligente Verkehrssysteme - DATEX II Datenaustauschspezifikationen für Verkehrsmanagement und Verkehrsinformationen - Teil 9: Lichtsignalanlagen-Management-Publikationen für das städtische Umfeld

This Technical Specification (CEN/TS) was approved by CEN on 13 January 2020 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
 COMITÉ EUROPÉEN DE NORMALISATION
 EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	3
Introduction	4
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	6
4 Conformance.....	8
5 Symbols and abbreviations	8
6 UML notation	8
7 TheTrafficSignals model.....	8
7.1 Overview	8
7.2 <<D2Package>> MapDataPublication.....	10
7.3 <<D2Package>> Geometry	12
7.4 <<D2Package>> GenericLane.....	14
7.5 <<D2Package>> NodeSetXY.....	18
7.6 SignalPhaseAndTiming Publication.....	20
Annex A (normative) Data Dictionary	23
A.1 Overview	23
A.2 Data Dictionary for “TrafficSignals”	24
A.3 Data Dictionary of <<D2Datatype>> for “TrafficSignals”	44
A.4 Data Dictionary of <<D2Datatype>> bits strings for “TrafficSignals”	45
A.5 Data Dictionary of <<D2Enumeration>> for “TrafficSignals”	54
Annex B (normative) Referenced XML Schema for “TrafficSignals”	69
B.1 Overview	69
B.2 Schema	69
Annex C (informative) Example publication messages.....	95
C.1 MapDataPublication Example	95
C.2 SignalPhaseAndTimingPublication Example.....	97
Annex D (normative) Mapping of data concepts between CEN ISO/TS 19091 and this document	101
D.1 Overview	101
D.2 Mapping of data concepts.....	101
Bibliography.....	114

European foreword

This document (CEN/TS 16157-9:2020) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association.

As a user of this document, attention is drawn to the resources of www.datex2.eu < <http://www.datex2.eu/>>. This website contains related software tools and software resources that aid the implementation of EN 16157 DATEX II.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document defines a common set of data exchange specifications to support the vision of a seamless interoperable exchange of traffic and travel information across boundaries, including national, urban, interurban, road administrations, infrastructure providers and service providers.

Standardization in this context is a vital constituent to ensure that interoperability, reduction of risk, reduction of the cost base and promotion of open marketplace objectives are achieved that will lead to many social, economic and community benefits as a result of more informed travellers, network managers and transport operators.

With the aim to support sustainable mobility in Europe, the European Commission has been supporting the development of information exchange mainly between the actors of the road traffic management domain for a number of years. In the road sector, DATEX II has been long in fruition, with the European Commission being fundamental to its development through an initial contract and subsequent cofounding through the Euro-Regional projects, and well as support for Programme Support Action activities.

DATEX II is referenced within European regulations:

- EU Commission Delegated Regulation, (EU) 2013/885 of 15 May 2013 regarding the provision of information services for safe and secure parking places for trucks and commercial vehicles,
- EU Commission Delegated Regulation, (EU) 2013/886 of 15 May 2013 regarding data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users,
- EU Commission Delegated Regulation, (EU) 2015/962 of 18 December 2014 regarding the provision of EU-wide real-time traffic information services,
- EU Commission Delegated Regulation, (EU) 1926/2017 of 31 May 2017 regarding the provision of EU-wide multimodal travel information services.

This document includes the framework, context and specification for exchanges, the modelling approach, data content, data structure and relationships.

This document supports a methodology that is extensible.

This document, which is Part 9 of the CEN 16157 series, deals with the publication of traffic signal related information that is most relevant in the urban environment. It specifies the structures and definitions of information that may be exchanged within two publications:

- The Map Data publication conveys static information related to the intersections and road segments belonging to a road network, related to traffic signal-controlled intersections. The Map Data Publication is the translation in UML of the MapData message (MAP) as it is defined in CEN ISO/TS 19091 and its European profile.
- The Traffic Signal Phase and Timing Publication conveys the dynamic information related to traffic signal-controlled intersections belonging to a road network. Traffic Signal Phase and Timing Publication is the translation in UML of the SignalPhaseAndTiming message (SPAT) as it is defined in CEN ISO/TS 19091 and its European profile.

Both publications are specified as Level B Extensions to the DATEX II model.

The present document was developed by project team PT1709 funded by the European Commission under grant agreement SA/CEN/GROW/EFTA/546/2016-10 'Urban ITS - Traffic Management Data

Models and interfaces' (M/546 [1]). The focus of M/546 is Intelligent Transport Systems in the urban environment – but this does not preclude this document being used in the non-urban environment.

It is noted that the terms and concepts utilized in this document draw heavily on those defined in CEN ISO/TS 19091 and SAE J2735.

1 Scope

This document constitutes a part of the CEN 16157 DATEX II series of standards and technical specifications. This series specifies and defines component facets supporting the exchange and shared use of data and information in the field of traffic and travel. The component facets include the framework and context for exchanges, the modelling approach, the data content, the data structure and relationships and the communications specification.

Part 9, this document, specifies additional data model structures that are applicable for traffic signal management applications in the urban environment. This part specifies data concepts to support the exchange of traffic signal status messaging, intersection geometry definition and attribution in a consistent way with existing C-ITS standards and technical specifications.

It establishes specifications for data exchange between any two instances of the following actors:

- Traffic Information Centres (TICs),
- Traffic Control Centres (TCCs),
- Service Providers (SPs).

Use of this document may be applicable for use by other actors.

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.

EN 16157-1:2018, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 1: Context and framework*

EN 16157-2, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 2: Location referencing*

EN 16157-7:2018, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 7: Common data elements*

CEN ISO/TS 19091:2017, *Intelligent transport systems - Cooperative ITS - Using V2I and I2V communications for applications related to signalized intersections*

SAE J2735:2016, *Dedicated Short Range Communications (DSRC) Message Set Dictionary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16157-1, EN 16157-2 and EN 16157-7 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>