



BSI Standards Publication

## Intelligent transport systems — Roadside modules SNMP data interface

---

Part 10: Variable message signs

## National foreword

This Published Document is the UK implementation of ISO/TS 20684-10:2021.

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 committee manager.

### Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

This publication is not to be regarded as a British Standard.

© The British Standards Institution 2021  
Published by BSI Standards Limited 2021

ISBN 978 0 560 98801 1

ICS 03.220.20; 35.240.60

**Compliance with a Published Document cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 April 2021.

### Amendments/corrigenda issued since publication

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

---

TECHNICAL  
SPECIFICATION

ISO/TS  
20684-10

First edition  
2021-04

---

---

**Intelligent transport systems —  
Roadside modules SNMP data  
interface —**

**Part 10:  
Variable message signs**

*Systèmes de transport intelligents — Interface de données SNMP pour  
les modules en bord de route —*

*Partie 10: Panneaux à messages variables*



Reference number  
ISO/TS 20684-10:2021(E)

© ISO 2021



**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](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vi</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Symbols and abbreviated terms</b> .....	<b>2</b>
<b>5 Conformance</b> .....	<b>3</b>
<b>6 Physical architecture</b> .....	<b>6</b>
<b>7 User needs</b> .....	<b>6</b>
7.1 Manage the control mode of the VMS.....	6
7.2 Manage the sign display.....	7
7.3 Monitor the sign display doors.....	7
7.4 Monitor the sign display mains power.....	7
7.5 Monitor the sign display power supplies.....	7
<b>8 Requirements</b> .....	<b>7</b>
8.1 Message sign control mode.....	7
8.1.1 Message sign control mode definition.....	7
8.1.2 Message sign control mode data exchange requirements.....	7
8.1.3 Message sign control mode capabilities.....	8
8.2 Message library.....	8
8.2.1 Message library definition.....	8
8.2.2 Message library data exchange requirements.....	8
8.2.3 Message library capabilities.....	10
8.3 Sign display.....	12
8.3.1 Sign display definition.....	12
8.3.2 Sign display data exchange requirements.....	12
8.4 Sign display doors.....	14
8.4.1 Sign display door definition.....	14
8.4.2 Sign display doors data exchange requirements.....	14
8.4.3 Sign display door capability requirements.....	14
8.4.4 Sign display door design constraints.....	14
8.5 Sign display mains power.....	14
8.5.1 Sign display mains power definition.....	14
8.5.2 Sign display mains power data exchange requirements.....	14
8.5.3 Sign display mains power capability requirements.....	14
8.5.4 Sign display mains power design constraints.....	14
8.6 Sign display power supplies.....	15
8.6.1 Sign display power supplies definition.....	15
8.6.2 Sign display power supplies exchange requirements.....	15
8.6.3 Sign display power supplies capability requirements.....	15
8.6.4 Sign display power supplies design constraints.....	15
8.7 Sign display light sensors.....	15
8.7.1 Sign display light sensors definition.....	15
8.7.2 Sign display light sensors exchange requirements.....	15
8.7.3 Sign display light sensors capability requirements.....	15
8.7.4 Sign display light sensors design constraints.....	16
8.8 Sign display pixels.....	16
8.8.1 Sign display pixels definition.....	16
8.8.2 Sign display pixels data exchange requirements.....	16
8.8.3 Sign display pixels capability.....	16
<b>Annex A (normative) Management Information Base</b> .....	<b>17</b>

<b>Annex B (normative) Requirements Traceability Matrix</b> .....	<b>21</b>
<b>Annex C (informative) Relationship to NTCIP 1203</b> .....	<b>26</b>
<b>Bibliography</b> .....	<b>27</b>

Currently in preview, click buy full version

## 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](http://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](http://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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

A list of all parts in the ISO 20684 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](http://www.iso.org/members.html).

## Introduction

### 0.1 Background

A variable message sign (hereinafter referred to as a "VMS") is an electronic traffic sign installed on the roadside to provide real-time traffic information to travellers, thereby improving their efficiency in the utilization of road traffic, and is a major physical component of the intelligent transport system (hereinafter referred to as "ITS") which supplies the system with information for improvement of the safety on the road.

More VMSs are expected to be installed and operated due to an increase in demand for establishment of ITS and for replacement of existing VMSs which have exceeded their durability terms.

The operator of the traffic management centre needs real time data exchange between a VMS and the centre to supply information to the VMS in real time and to control and manage the VMS.

However, no standards for the information transmitted and received between the traffic management centre and the VMSs have been established, leading to the development of various protocols and their application to each VMS construction project. As a result, a variety of problems have arisen, including redundant investment in development costs and forced dependence on the protocol of the previous operator when replacing the existing VMSs with new ones.

This document therefore defines the data items (messages), formats and communication protocols (Application, Presentation, Session, and Transport layers) required to ensure the interoperability of the information transmitted and received between the VMS and the traffic management centre, thereby ensuring interoperability between the VMS and the centre.

### 0.2 Overview

This document defines the message, the data elements making up the message, and the application layer profile for message transmission in order to ensure the interoperability between the VMS and the traffic management centre.

In particular, in order to ensure the interoperability between the VMS and the traffic management centre, the interoperability is developed based on OSI (open system interconnection) 7 layers. A collection of standard protocols for each layer is referred to as a "profile."

ISO/IEC TR 10000-2 defines the basic classification and object presentation of OSI profiles as follows:

- a) Interchange Format and Representation profiles define the information on and message structure of the data exchanged by applications.
- b) Application profiles define the transmission mechanism for data exchange (concerning OSI layers 5 to 7 — Session, Presentation, and Application layers).
- c) Transport profiles define the procedures and methods for exchanging data packets between systems (concerning OSI layers 1 to 4 — Transport, Network, Data Link, and Physical layers).
- d) Relay profiles define the relaying function which enables the interconnection between systems while using different transmission profiles.

This document defines "Interchange Format and Representation," defined in ISO/IEC TR 10000-2.

- a) Components and data elements of basic messages define the messages and detailed data elements which the operator of the traffic information system needs for operation of the VMS.
- b) The data exchange communication profile defines the procedures and encoding methods for information exchange between the traffic management centre and the VMS.

### 0.3 Document approach and layout

This document defines:

- a) Physical architecture for variable message signs ([Clause 6](#)).
- b) User needs that are deemed to be common to many types of field devices ([Clause 7](#)).
- c) Requirements for implementing the identified user needs, organized by major feature ([Clause 8](#)).
- d) The management information base (MIB) for the features defined by this document ([Annex A](#)).
- e) A requirements traceability table that traces requirements to the design elements ([Annex B](#)).
- f) The relationship to NTCIP 1203 ([Annex C](#)).

In addition, a simplified version of the conformance table and the MIBs are available electronically at <https://standards.iso.org/iso/ts/20684/-10/ed-1/en>.

# Intelligent transport systems — Roadside modules SNMP data interface —

## Part 10: Variable message signs

### 1 Scope

Variable message signs (VMSs) are installed in areas where traffic managers identify a frequent need to convey information to the travelling public, such as upstream from interchanges to alert the public to downstream congestion in time for them to alter their routes. This allows traffic managers to improve the efficiency, safety, and quality of traveller journeys.

In order to manage the operation of a VMS and the messages displayed, information exchange between the management systems and the VMS is needed.

This document identifies basic user needs for the management of light emitting diode (LED) matrix VMSs and traces these needs to interoperable designs. This includes the ability to identify the device, its capabilities, and its status.

NOTE 1 This document is similar to portions of NTCIP 1207 v2.1, which defines how to manage VMSs using an older version of SNMP and is a normative reference in this document.

NOTE 2 ISO 20684-1 provides additional details about how this series of standards relates to the overall ITS architecture.

### 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 20684-1, *Intelligent transport systems – Roadside modules SNMP data interface – Part 1: Overview*

ISO 20684-2:—<sup>1)</sup>, *Intelligent transport systems – Roadside modules SNMP data interface – Part 2: Generalized field device basic management*

IETF RFC 3584, *Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework*

NTCIP 1203:2014, *National Transportation Communication for ITS Protocol — Object Definitions for Dynamic Message Signs (DMS)*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 20684-1 and the following apply.

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

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

1) Under preparation. Stage at the time of publication: ISO/PRF TS 20684-2:2021.