

TOPAS

Traffic Open Products and Specifications

TOPAS 2504A

Performance Specification for Vehicle Detection Equipment for Vehicle Actuated Portable Traffic Signals

Revision	Date	Scope	Authorised by
A (v1)	09/01/15	Draft	Admin
A (v2)	16/01/15	Review	M Pleydell
A (v3)		Draft	KF
A (v4)	17/04/15	Final	Board
A (v5)	11/03/16	Final	Board

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TOPAS 2504A

PERFORMANCE SPECIFICATION FOR VEHICLE DETECTION EQUIPMENT FOR VEHICLE ACTUATED PORTABLE TRAFFIC SIGNALS

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1 INTRODUCTION

- 1.1 This specification covers the requirements for Vehicle Detection Equipment for use with Portable Vehicle Actuated Traffic Signals.
- 1.2 TOPAS specifications are explicitly purchasing specifications and compliance with them is not mandatory. However Local and other Purchasing Authorities may typically require that equipment purchased complies with TOPAS specifications and is TOPAS registered.
- 1.3 Manufacturers may register products as being compliant with this specification, using the process defined in TOPAS 0600
- 1.4 TOPAS registration requires manufacturers submit a Technical File to an appropriate Technical Assessor to aid compliance verification. The content requirement for the Technical File is defined in Appendix Z of this specification.
- 1.5 Guidance to potential users of this Product is given in Appendix A.
- 1.6 Within this specification, "The Product" shall mean all components necessary to provide a complete operational unit meeting the requirements of this specification and the common requirements defined in TOPAS0600.

Implementation

- 1.7 This specification implements requirements as originally defined in HA specification TR 2504A. Product Approvals to TR2504A may be used to register products to this specification as defined in TOPAS 0600
- 1.8 This specification will be immediately implemented from the date of issue for all new TOPAS Registrations

Glossary of Terms

- 1.9 A comprehensive glossary of terms is given in Highways Agency document TA 84 Code of Practice for Traffic Control and Information Systems for All-Purpose Roads.

2 FUNCTIONAL REQUIREMENTS

General

- 2.1 The Product defined in this specification is intended to enable Vehicle Actuation facilities for portable traffic signal controllers.

Performance

- 2.2 The Product shall detect the presence of the following moving targets as a minimum.
- ◆ Bicycles; (Small)
 - ◆ Mopeds; (Small)
 - ◆ Motorcycles; (Small)
 - ◆ Saloon Cars.
- 2.3 The following detection criteria for approaching targets shall apply:
- ◆ Approaching targets only. Receding targets shall not be detected.
 - ◆ Targets down to 3.6Kph \pm 0.4Kph. No detections shall be detected below this threshold;
 - ◆ Targets at speeds between the low speed threshold and 16Kph in a zone between 5m and 15m upstream from the detector;
 - ◆ Targets at speeds greater than 16Kph in a zone between 5m and 40m upstream from the detector.
- 2.4 The Product shall be designed to minimise the detection of extraneous targets.

- 2.5 The turn-on time for the “Detect Condition” signal shall be less than 500ms.
- 2.6 The “Detect Condition” signal shall be maintained for 500 ms \pm 20% after the object has left the detection zone.

“Nudge” Facility

- 2.7 A “Nudge” signal shall be provided in the form of a 700ms “Detect Condition” signal every 2.5 minutes \pm 20% from the time of the last terminated target detection period.

Electrical Requirements

- 2.8 The Product shall operate using an Extra Low Voltage or Reduced Low Voltage power supply as defined in BS 7671 Requirements for Electrical Installations
- 2.9 The Product shall be designed to provide reverse polarity protection.
- 2.10 An interruption of the Product’s electrical supply shall cause a Category 1 fault. Fault categories are detailed in *Failure modes*.

Interface

- 2.11 The interface characteristics between the Product and the portable signals controller shall be in accordance with TOPAS 2523.
- 2.12 An indicator showing the output status of the Product and, if available, the fault status, shall be positioned such that it is visible from behind and below the unit.

- 2.13 An option may be included that will inhibit the operation of the status indicator when the ambient light falls below 55 LUX.

Alternative Methods of Connection

- 2.14 If a wireless communication is provided the Product shall provide a robust and reliable means of fail-safe communication and provide suitable levels of security, accuracy and reliability to all data messages being transmitted.
- 2.15 Reliable operation shall be maintained in all reasonable expected conditions of use and shall be unaffected by communication transmission from other sources of radio transmission and by screening or reflections from buildings or vehicles.
- 2.16 A permanent loss of communication shall cause a Category 1 fault.

Mutual Interference

- 2.17 Products designed to meet this specification shall not adversely affect adjacent products of the same type when correctly mounted in the following positions:
- ◆ back to back with the housings 25 ± 10 mm apart;
 - ◆ at right angles with housings 25 ± 10 mm apart;
 - ◆ face to face with housings 100m apart;
 - ◆ side by side at 5m apart and facing in the same direction.

Construction

- 2.18 The equipment housing shall be constructed in such a manner and from materials to meet the environmental requirements defined in TR 2130.
- 2.19 The housing shall be supplied with a fixing bracket that will permit alignment to satisfy the performance requirements. See section 2.3.
- 2.20 The bracket shall be supplied with a locking arrangement capable of maintaining alignment of the Product and should be designed to resist vandalism.

Failure Modes

Category 1

- 2.21 The "Detect Condition" output shall present a high impedance output within 10 seconds.
- 2.22 When power or communications is restored, the Product shall resume normal operations within 20 seconds.

Reliability

- 2.23 The Product shall be designed and manufactured to have a minimum MTBF prediction figure of 20,000 hours.

3 REFERENCES

3.1 Where undated references are listed, the latest issue of the publication applies

British Standards

3.2 The British Standards Institution, London, publishes British Standards.

BS 7671	Requirements for Electrical Installations
BS 7987	Electrical requirements for Road Traffic Signal Systems
BS EN 50293	Electromagnetic Compatibility Road Traffic Signal Systems Product Standard
BS EN 60529	Specification for Degrees of Protection Provided by Enclosures (IP Code)

Specifications

3.3 TOPAS Limited Specifications are available at www.topasgroup.org.uk

TOPAS 2502	Portable Traffic Signal Controller for use at Roadworks
TOPAS 2523	Traffic Signal Control Equipment Interface Specification
TR 2130	Environmental Tests for Motorway Communications Equipment and Portable and Permanent Traffic Control Equipment
TOPAS 0600	Self-Certification Procedures for Statutory Approval of Traffic Signal Control Equipment

Other Publications

TSRGD	Traffic Signs Regulations and General Directions
SHW	Volume 1 of the Manual of Contract Documents for Highway Works
Directive 89/336/EEC	EMC Regulations 1992, (Statutory Instrument 1992 No 2372)

APPENDIX A - INFORMATIVE GUIDE

General

- A1 This Appendix is an informative guide to Highways Authorities who wish to purchase / hire and use Vehicle Detection Equipment that has been declared conformant to this specification, for use with Portable Traffic Signal Controllers.
- A2 Prospective purchasers/hirers should ensure that the procurement contract addresses the following issues.

Extra Low Voltage DC Version		
Colour	Designation	
Red	+ve	Power Supply
Black	0V	
Green	Earth	
White	Common Open (Detect) (+ve)	Output Signal
Yellow		
Blue	Not used	

Interface Characteristics

- A3 Where required, the procurement contract should call for the Interface cable to be in accordance with Def Stan 61-12 part 5 with the minimum number of wires in each core to be 16 with a nominal diameter of each wire being not less than 0.20mm.
- A4 The procurement contract should call for the Product to be fitted with 1-metre cables together with the necessary plugs.
- A5 The procurement contract should call for the cable allocations to be as either of the following:

Reduced Low Voltage AC Version		
Colour	Designation	
Red	Live	Power Supply
Blue	Live	
Green	Earth	
White	Common Open (Detect) (+ve)	Output Signal
Yellow		
Black	Not used	

Marking and Labelling

- A6 The procurement contract should call for the Product to be fitted with a label displaying the Following:
- i) The Technical Requirements Specification against which it has been declared compliant;
 - ii) The product's unique identifier and serial number.
 - iii) The electrical supply requirements of the equipment.

APPENDIX Z TECHNICAL FILE CONTENT

This appendix defines the necessary content for a Technical File Pack (a collection of relevant documents) which must be reviewed by an appropriate Technical Assessor as part of the TOPAS Registration process (See TOPAS 0600).

Only the 'ticked' items are required to be present in a Technical File Pack used to support TOPAS Registration against TOPAS 2504A.

Ref	Item	Description	Required
1	Technical File overview document.	A summary document outlining the product, specifying which TOPAS and other relevant specification(s) the product has been designed to comply with, together with a detailed table of contents for the Technical File Pack. Where copies of external certificates or documents are referred to these may be included within the Technical File overview document or supplied separately as part of the Technical File Pack.	√
2	QA accreditation certificate(s).	A copy of the Quality Management Registration Certificates for the organisation applying for TOPAS Product Registration.	√
3	Details of all CE markings that apply to the product.	A list of all directives complied with and how achieved. Typically this would be references to explicit CE Technical Files and certificate's, copies of which would be included in the Technical File Pack.	√
4	A functional design description of the product.	A reference to the overall System Design Documentation for the product (by document part number and issue).	√
5	Product part numbers	A list of top level assembly part numbers and their issue states including all firmware / software part numbers and issues.	√
6	Test procedures and results	A reference to all test schedules and test result documents (by document	√

		part number and issue).	
7	Statement of compliance	A clause by clause statement of compliance against TOPAS 2504A confirming compliance and/or listing caveats or deviations.	√
8	EMC test results	A reference to EMC test performance requirements. Copies of the results of EMC testing undertaken by an appropriately qualified independent approved test house must be included in the Technical File Pack.	√
9	Optical test results	A reference to Optical tests performance requirements. Copies of the results of Optical testing undertaken by an appropriately qualified independent approved test house must be included in the Technical File Pack.	N/A
10	Environmental test results	A reference to Environmental tests performance requirements. Copies of the results of the Environmental testing undertaken by an appropriately qualified independent approved test house must be included in the Technical File Pack.	√
11	Radio Agency test results	A reference to Radio Agency tests performance requirements. Copies of the results of Radio Agency testing undertaken by an appropriately qualified independent approved test house must be included in the Technical File Pack.	√
12	Primary Safety Test results	For Traffic Control equipment specifically a reference to the Primary Safety Test schedule and test results by part number and issue. A copy of the test results should be included as part of the Technical File Pack.	N/A
13	Failure Mode Analysis	A reference to the product failure mode analysis requirements and results by document part number and issue.	N/A