
(This page is intentionally left blank.)
TR 2504 A

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

CONTENTS
Section
1  Introduction
2  Functional Requirements
3  Normative References
4  History
Appendix A - Informative Guide
1 INTRODUCTION

1.1 This specification covers the essential requirements for Vehicle Detection Equipment for use with portable vehicle actuated traffic signals.

1.2 This specification supersedes TR 2147 B from the date of issue and the previous approval process described therein.

1.3 As a statutory requirement equipment manufactured according to this specification must be approved before its use is permitted on the public highway.

1.4 Statutory Approval (Approval) shall be in accordance with the requirements for Self-Certification set out in TRG 0600.

1.5 Within this specification, “The Product” shall mean all components necessary to provide a complete operational system meeting the requirements of this specification and the Common Requirements defined in TRG 0600.

1.6 Guidance to potential users of this Product is given in Appendix A.

Implementation

1.7 This specification will be immediately implemented from the date of issue for all new approvals.

1.8 Equipment Approvals for this product issued under the previous procedures defined in TRG 0500 will remain valid and no retrospective action will be required providing the build state of that equipment remains unmodified.

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 ± 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 ±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 ± 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 TR 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 NORMATIVE 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.

**Contact:** +44 (0) 1344 404 429

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 Specifications are published by the Highways Agency.

**Contact:** +44 (0) 117 372 8300
tss_plans_registry@highways.gsi.gov.uk

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

**Other Publications**

TSRGD Traffic Signs Regulations and General Directions
MCHW Volume 1 of the Specification for Highways Works
4 HISTORY

TR 2147  Issue B  December 2001
TR 2504  Issue A  May 2005

Approval of this document for publication is given by the undersigned:

Traffic Signals and Road Lighting Safety
Zone 2/17E
Temple Quay House
2 The Square
Temple Quay
Bristol
BS1 6HA

Mike Smith
Team Manager
Traffic Signals and Road Lighting Safety
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.

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:

<table>
<thead>
<tr>
<th>Extra Low Voltage DC Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
</tr>
<tr>
<td>Red</td>
</tr>
<tr>
<td>Black</td>
</tr>
<tr>
<td>Green</td>
</tr>
<tr>
<td>White</td>
</tr>
<tr>
<td>Yellow</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Blue</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reduced Low Voltage AC Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
</tr>
<tr>
<td>Red</td>
</tr>
<tr>
<td>Blue</td>
</tr>
<tr>
<td>Green</td>
</tr>
<tr>
<td>White</td>
</tr>
<tr>
<td>Yellow</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Black</td>
</tr>
</tbody>
</table>

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.