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**VOLUME 9 NETWORK - TRAFFIC  
CONTROL AND  
COMMUNICATIONS**  
**SECTION 3 TRAFFIC CONTROL AND  
SURVEILLANCE -  
STANDARDS OF  
PROVISION**

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**PART 1**

**HD 20/05**

**DETECTOR LOOPS FOR MOTORWAYS**

**SUMMARY**

This Standard specifies the standard of provision of detector loops on motorways. It updates and supersedes HD 20/92. The 1992 clause 2.2 “2 km” criteria is removed. A chapter on Positioning and Spacing of Detector Loops is now included.

**INSTRUCTIONS FOR USE**

This Standard is to be incorporated in the Manual.

1. This document supersedes HD 20/92.
2. Remove Contents pages for Volume 9 dated February 2004.
3. Insert new Contents pages for Volume 9 dated November 2005.
4. Remove HD 20/92 from Volume 9, Section 3, Part 1.
5. Insert HD 20/05 into Volume 9, Section 3, Part 1.
6. Archive this sheet as appropriate.

Note: A quarterly index with a full set of Volume Contents Pages is available separately from The Stationery Office Ltd.



**THE HIGHWAYS AGENCY**



**SCOTTISH EXECUTIVE**



Llywodraeth Cynulliad Cymru  
Welsh Assembly Government

**WELSH ASSEMBLY GOVERNMENT  
LLYWODRAETH CYNULLIAD CYMRU**



**THE DEPARTMENT FOR REGIONAL DEVELOPMENT  
NORTHERN IRELAND**

# Detector Loops for Motorways

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2.    Requirements and Implementation
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# 1. INTRODUCTION

## General

1.1 Except as noted below, it has been decided that detector loops should be installed in new motorways, widened motorways, and in existing motorways during major maintenance, to provide for the future requirements of vehicle detection. These are expected to include automatic signal setting, incident detection, vehicle counting, and ramp metering. Installation in this way will avoid disruption to traffic at a later date. This standard gives the requirements to lay loops and integrate them into the communications network. The electronics will be supplied through a specialist contract at a later date, as and when necessary. In Wales the decision whether to install detector loops in accordance with this standard will be made by the Overseeing Organisation on a scheme by scheme basis.

## Scope

1.2 All proposed new motorways, and motorways to be widened. All existing motorways where major reconstruction or overlay is planned.

## 2. REQUIREMENTS AND IMPLEMENTATION

### Requirements

2.1 Detector loops shall be installed in the road pavement of all new motorways and widened motorways.

2.2 When existing motorways are reconstructed or overlaid detector loops shall be installed in the road pavement. The advice of the Overseeing Organisation shall be obtained for lengths of reconstructed or overlaid motorway below which detector loops need not be installed. This advice will be scheme specific.

2.3 Detector loops, and their installation and layout shall comply with clause 1218 of the Specification for Highway Works. Where the installation of detector loops is procured through a contract incorporating the Specification for Highway Works products conforming to equivalent standards of other member states of the European Community will be acceptable in accordance with the terms of the 104 Series of Clauses of that Specification. Any contract not containing these Clauses must contain a suitable clause of mutual recognition having the same effect regarding which advice should be sought.

2.4 The position and spacing of detector loops to be used for MIDAS (Motorway Incident Detection and Automatic Signalling) shall comply with Chapter 3. The advice of the Overseeing Organisation shall be obtained for the positioning and siting of detector loops for other uses.

### Implementation

2.5 This standard is mandatory for all schemes except where the Overseeing Organisation judges that to do so would involve unwarranted additional cost to schemes in progress, or cause delays to opening.

## 3. POSITIONING AND SPACING OF DETECTOR LOOPS

### Scope

3.1 This chapter primarily addresses loops to be used for MIDAS (Motorway Incident Detection and Automatic Signalling) schemes complying with TD 45 (Ref 3). MIDAS schemes account for the overwhelming majority of loop sites. The advice of the Overseeing Organisation shall be obtained for other applications such as vehicle counting, active traffic management and ramp metering. In England, the advice of the Highways Agency shall be obtained for traffic monitoring loops connected to Traffic Monitoring Units installed under the National Traffic Control Centre (NTCC) contract.

### General Requirements

3.2 The installation and testing of detector loops shall comply with Clause 1218 of the Specification for Highway Works (Ref 1).

3.3 The installation and layout of loops shall comply with the G Series of Highway Construction Details.

3.4 Loop pairs shall be installed; in all running lanes of both carriageways, in exit and entry slip road lanes at junctions, in entry slip road lanes to motorway service areas, and throughout the running lanes of motorway-to-motorway link roads. In Scotland and Wales, loop pairs shall also be installed in the hard shoulder.

3.5 An inductive loop shall consist of inductive loop cable to specification TR 2029 "NMCS Inductive Loop Detector Cable" (Ref 6). Each loop pair should be allocated one feeder cable with quad conductor formation as defined in specification TR 2031 "NMCS Feeder Cable for Inductive Loop Detectors" (Ref 7).

3.6 Primary loop tails shall be joined to the red and blue cores and the secondary loop tails to the yellow and black cores of the feeder cable as detailed in TR 2031.

3.7 Feeder cables from loop sites shall be terminated at terminal blocks fitted inside a Type 600 cabinet. Highway Construction Detail MCX 0594 (Ref 2) shows the Type 600 cabinet wiring for MIDAS.

### Loop Site Positioning and Spacing

3.8 Positioning and Spacing are the two steps that are taken sequentially in determining the locations of a series of loop sites. Positioning is determining the location of a loop site in relation to a signal. Spacing is determining the location(s) of loop sites between signals.

#### Loop Site Positioning

3.9 The objective is to site loops where they are required to detect traffic queues. This is just upstream of signals so that the signal settings relate as closely as possible to the traffic conditions. This position shall be 10m plus or minus 20% upstream from the chosen reference signal. Where existing loops are installed they may be used if they are within 10m downstream or 50m upstream of the reference signal.

3.10 The type of signal and the distance intervals between signals are given in TD 46 (Ref 4). Signals are sited in accordance with TA 74 (Ref 5).

#### Loop Site Spacing

3.11 Loop sites shall be spaced at intervals of 500m plus or minus 20%. The overall average loop site spacing for a scheme shall be 500m plus or minus 10%.

3.12 Where signals are sited at spacings between 600m and 1km an intermediate loop site shall be provided equidistant between the signal sites to maintain the 500m average spacing. Where signals are positioned at intervals below 600m an intermediate loop site will not be required.

#### Link Roads and Slip Roads

3.13 On exit slip roads, the loops shall be sited between 10m upstream from the final signal gantry or route confirmatory sign and a maximum of 50m downstream of the soft nose of the diverge, that is, the point of complete physical separation from the main carriageway or, if provided, within 10m of exit slip signals. Queuing always occurs at the head of an exit slip, hence signals would be set permanently if the loops were sited further up the slip.



3.14 On entry slip roads the loops shall be sited downstream of entry slip signals at a minimum distance of 100m from the convergent point with the motorway. Loops shall not be sited downstream of the final TSRGD (Ref 8) diagram 874 or 875 signs. Where Ramp Metering is employed, it is important that the loops are sited where lane changing is at a minimum.

3.15 Entry slip and exit slip loops shall be sited in line plus or minus 50m with the carriageway loops.

3.16 Within motorway to motorway link roads, loops shall be sited at a minimum distance of 100m from the diverge and converge points. Between these two sites the standard 500m plus or minus 20% spacing criteria shall apply.

## 4. REFERENCES

1. Specification for Highways Works: Volume 1 of the Manual of Contract Documents for Highway Works.
2. Highways Construction Details: Volume 3 of the Manual of Contract Documents for Highway Works.
3. TD 45 – Motorway Incident Detection and Automatic Signalling (MIDAS) (DMRB 9.1.2).
4. TD 46 – Motorway Signalling (DMRB 9.1.1).
5. TA 74 – Motorway Signalling (DMRB 9.4.3).
6. TR 2029 - NMCS Inductive Loop Detector Cable.
7. TR 2031 – NMCS Feeder Cable for Inductive Loop Detectors.
8. The Traffic Signs Regulations and General Directions 2002 (SI 2002 No 3113).

References 1, 2, 3, 4, 5 and 8 are available from The Stationery Office.

References 6 and 7 are available from [www.tssplansregistry.org](http://www.tssplansregistry.org)

## 5. ENQUIRIES

All technical enquiries or comments on this Standard should be sent in writing as appropriate to:

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