AUTOMATIC SOLUTIONS

Loop Installation Guide

Optimum functioning of the detector module is largely dependent on factors associated with the inductive sensor loop connected to it. These factors include choice of material, loop configuration and correct installation practice. A successful inductive loop vehicle detection system can be achieved bearing the following constraints in mind, and strictly following the installation instructions. The detector must be installed in a convenient weatherproof location as close as possible to the loop.

1. Operational Constraints

1.1. Crosstalk

When two loop configurations are in close proximity, the magnetic fields of one can overlap and disturb the field of the other. This phenomena, known as crosstalk, can cause false detects and detector lock-up.
Crosstalk only occurs between adjacent loops operating from different detector modules and can be eliminated by:

1. Careful choice of operating frequency. The closer together the two loops, the further apart the frequencies of operation must be.
2. Separation between adjacent loops. Where possible a minimum spacing of 2 metres between loops should be adhered to.
3. Careful screening of feeder cables if they are routed together with other electric cables. The screen must be earthed at the detector end only.

NOTE DUAL CHANNEL DETECTORS ELIMINATE ANY CROSSTALK AND OPERATING FREQUENCY AND LOOP SEPARATION OF LOOPS CONNECTED TO THE SAME DETECTOR DO NOT APPLY.

1.2. Reinforcing

The existence of reinforced steel below the road surface has the effect of reducing the inductance, and therefore the sensitivity, of the loop detection system. When roadways in excess of 3 metres wide must be covered in areas where reinforcement is present, the only effective way to overcome this loss of sensitivity is to reduce the overall loop size. Hence, the use of a dual channel detector and the placement of 2 adjacent loops to cover the same area effectively overcomes this loss of sensitivity.

The ideal minimum spacing between the loop and the cable and steel reinforcing is 150mm, although this is not always practically possible. The slot depth should be kept as shallow as possible, taking care that the cable does not remain exposed after the sealing compound has been applied.

Where reinforcing exists, two additional turns should be added to the normal loop configuration, (see Item 3 below) with a practical maximum of 5 turns.

2. Loop and Feeder Specification

The loop must be fabricated of insulated copper conductor, with a minimum cross sectional area equivalent to 1.5 square millimetres. The feeder should comprise of the same material but twisted a minimum of 20 twists per metre.

Joints in the loop or feeder are not recommended. Where this is not possible, joints are to be soldered and terminated in a waterproof junction box or epoxy joint. This is extremely important for reliable detector performance.

3. Sensing Loop Geometry

Sensing loops should, unless site conditions prohibit, be rectangular in shape and should normally be installed with the longest sides at right angle to the direction of traffic movement. These sides should ideally be 1 metre apart.

The length of the loop will be determined by the width of the roadway to be monitored. The loop should reach to within 300mm of each edge of the roadway.

In general, loops having a circumference measurement in excess of 10 metres should be installed using two turns of wire, while loops of less than 10 metres in circumference, should have three turns or more. Loops having circumference measurement less than 6 metres should have four turns. It is good practice at time of installation to construct adjacent loops with alternate three and four turn windings.

4. Loop Installation

All permanent loop installations should be installed in the roadway by cutting slots with a masonry cutting disc or similar devise. A 45° crosscut should be made across the loop corners to reduce the chance of damage that can be caused to the loop at right angle corners.

NOMINAL SLOT WIDTH: 4 - 5mm

NOMINAL SLOT DEPTH: 30mm to 50mm

A slot must also be cut from the loop circumference at one corner of the loop to the roadway edge to accommodate the feeder.

A continuous loop and feeder is obtained by leaving a tail long enough to reach the detector before inserting the cable into the loop slot. Once the required number of turns of wire is wound into the slot around the loop circumference, the wire is routed again via the feeder slot to the roadway edge. A similar length is allowed to reach the detector and these two free ends are twisted together to ensure they remain in close proximity to one another. (Minimum 20 turns per metre) Maximum recommended feeder length is 100 metres. It should be noted that the loop sensitivity decreases as the feeder length increases, so ideally the feeder cable should be kept as short as possible.

The loops are sealed using “quick-set” black epoxy compound or hot bitumen mastic to blend with the roadway surface.

WARNING : Cutting into post tensioned concrete slabs can have catastrophic consequences. As a general rule 30mm is the deepest slot depth allowable in such cases. When any doubt exists the structural engineer’s approval must be sought prior to commencement.

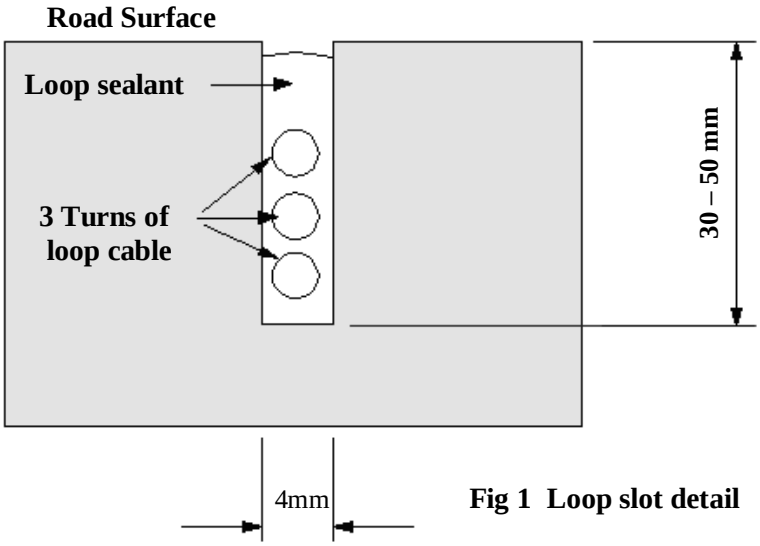

Fig 1 Loop slot detail

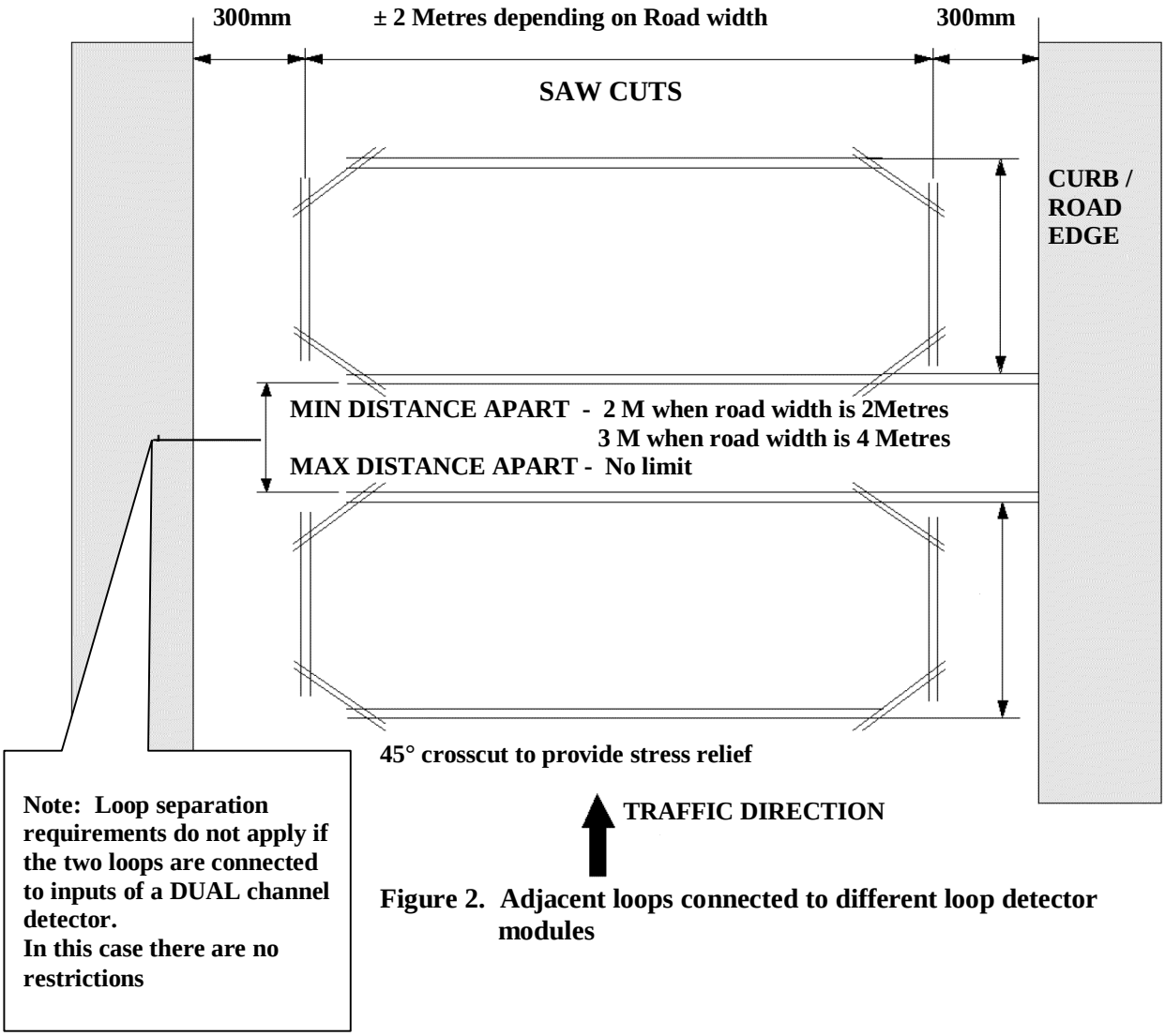

Figure 2. Adjacent loops connected to different loop detector modules