

SSI Applications Group

Approved Discussion Document

DIS172

Sequential Operation of Point Ends

Issue 2

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Approved by:



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This document contains 14 pages and was approved at Issue 2 by SSIAG at its meeting of 23/01/2013

This document forms SSIAG's interim guidance on this topic pending the production of an update to the relevant chapter(s) of the SSI Applications Manual.

Distribution: (this issue only)

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SSI Applications Group

Ely to Norwich Sequential Operation of Point Ends

1. Document Status

This document has been prepared for the SSI Applications Group (SSIAG). Issue 1 has been discussed by the SSIAG on 23rd May 2012 and agreed and approved by the SSIAG for use on the Ely to Norwich scheme subject to minor amendments. Issue 2 has been updated in accordance with those agreed minor changes.

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3. PURPOSE

This document has been produced to specify SSI data constructs which are necessary as part of the new, novel and low-cost approach to the implementation of signalling projects on secondary routes and data not covered by the traditional SSI data preparation standards.

In this case the paper has been prepared to deal with the special data requirements for controlling one point-end at a time within the geographic limits of a single signalling "island".

4. INTRODUCTION

The aim of the Ely to Norwich (ETN) Modular Signalling (MODSIG) concept is to reduce the cost of current re-signalling schemes throughout the life of the scheme, from the initial provision to ongoing minimal maintenance requirements, ideally reducing routine maintenance to security inspections. The MODSIG project targets secondary routes and simple layouts with low traffic densities. The route is signalled as "islands" of signalling separated by plain line, with each island having a single REB to feed all the points and signals within that area.

Cost reductions must be realised in a variety of different ways and shall include (but not be limited to) the following:

- Low initial purchase cost when compared against the present non-modular signalling standard, including the REB power system which is not over-specified and has sufficient capacity to cope with all signalling layouts
- Standard REB power solution, "one size fits all" solutions
- Low power consumption to benefit the whole life cost

One of the many initiatives associated with the Modular Signalling concept is the sequenced operation of point-ends to limit power consumption, by only allowing one point-end to motor at a time. Limiting the power consumption in this way enables standard power solutions to be realised. In addition, it removes over-capacity to ensure that power equipment costs are kept to a minimum.

Providing point-end sequencing controls will increase the time taken to set routes or call points. However, the lines for which the MODSIG concept is intended will be lightly used and therefore the operational requirements will not be as onerous as on a main line.

A double-ended set of points is detected as a single, combined entity in the interlocking, but the two point-ends will be driven in sequence. Each point-end's detection elements (e.g. point machine and supplementary detection) are combined in the same detection circuit. Modular Signalling only supports HW point machines or clamp-locks: other types of point actuator are not supported by Modular Signalling.

The point-end sequencing controls will apply to the points when controlled by either route setting or by individual point key-switch operation or by auto-normalisation.

For Modular Signalling, all points will auto-normalise after the passage of a train that has required them to be in their reverse position. Modular Signalling does not provide points heating on points that are not used daily and the auto-normalisation of points reduces the operational impact of a set of points freezing. The normal route is generally the most used route. Therefore should the points freeze, they will do so in their most-used position. This position is also usually the safest in terms of robust train protection, SPAD consequence, and for trapping and flank protection.

Note that Modular Signalling will not have swinging overlaps or soft-called points.

5. Point-End Sequencing Controls

In order to provide point-end sequencing controls, each point-end must be separately controlled and detected, using separate TFM inputs and outputs, as per SSI8003-77.

The points are grouped together for point-sequencing purposes, with all points that share the same power-supply included in the same group – in practice there is one point-group per signalling "island". After one or more points within a group have been called to move, each of the point-ends concerned should move in sequence, one end at a time. As soon as the first point-end has been detected, and so has finished moving, then the second end should be called to move, and so on. If any point-end fails to make detection, then after about 8 seconds its TFM will cut-off the power to that point-end, and the next point-end in sequence can be called to move.

The point-end sequencing data allows each point-end a maximum of 10 seconds to move. This should allow sufficient margin to ensure that the power to each point-end has been cut-off before the next is called to move, to ensure that two point-ends can't both be drawing power at the same time. The order in which the point-ends within a group move is defined in the control tables: this will be the same for all routes.

Allowing further point calls while the point-ends are in process of moving could lead to storing or over-writing of conflicting point calls, or to two point-ends moving simultaneously. Any further point calls must therefore be inhibited while the point-ends are moving in sequence. This will lead to further route requests or point-key calls failing once the points have started moving. This will prevent the signaller from manually keying a second set of points, or from setting a route requiring a second set of points before the first set of points has finished moving: the Signalbox Instructions will need to include suitable advice to the signaller on these features.

Note that once points have been called, they are committed to move: the signaller cannot for example key them back the other way before they have finished moving. They will also move if, for example, their dead-locking track-section becomes occupied between them being called and starting move.

A signaller's indication will be provided for each group of points to indicate that the points are currently moving, and therefore that further route and point-key requests involving points within that group are likely to fail.