



# FS-DES-STD-02 Version 5.0



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### **1. Abbreviations & Acronyms**

## **2.** Introduction

Term	Definition
EMC	Electromagnetic Compatibility
EU	European Union
GRIP	Governance for Railway Investment Projects
LED	Light Emitting Diode
LOPS	Locally Operated Point System
O&M	Operational and Maintenance
PPI	Points Position Indicator
PSP	Point Setting Panel
REB	Relocatable Equipment Building
RSP	Route Setting Panel
SIL	Safety Integrity Level
Vac	Volts, alternating current
Vdc	Volts, direct current

#### 2.1 Executive Summary

This document provides the system description for the FenLock 200 Control System (FCS) for use in depots, intermodal facilities, yards and other non-mainline applications. The FenLock 200 FCS is the entry level system of the series, providing a simple and compact Rail facility control solution.

	Description	
	100	Point Machines operated by individual pl with a Points Position Indicator (optional)
	200	Point Machines operated from a Point points indicated on panel. Points Positic operate points locally.
	300	Point Machines operated centrally from route operated by a single button. Opt limited interlocking e.g. for an interface Acceptance.
	400	Point Machines, standard NR GPL sign counter train detection provided to give clear unless points in correct position a interface with NR signalling functions, o etc. Suitable for remote operation. Addi
	500	Features all the above including Point Mach Setting VDU. Axle counter train detection pu functionality and integration, Train identity re



lungers located by each set of points, combined

Setting Panel, one switch per point. Position of on Indicators provided with optional plunger to

m a Route Setting Panel (RSP) or VDU. Points in a tional PPIs, axle counters for train detec- tion plus to a mainline system, provision of a slot or Shunters

nals controlled from a Route Setting VDU. Axle /e a full but simplified interlocking, e.g. signals won't and axle counter sections clear. Able to relay other Depot Protection Systems, CCTV sys- tems ditional features.

nines, standard NR GPL signals controlled from a Route rovided to give a full interlocking plus additional emote control operation. Fenix Rail Systems are a provider of FenLock Systems in the UK, working in partnership with our strategic supply chain to deliver a range of services and solutions for UK depots. Some existing UK installations are:

- Northampton Gateway Intermodal FenLock 400 system (2024)
- Daventry International Rail Freight Terminal 400 system (2023)
- Nexus Gosforth Depot Newcastle New Build facility (2023/24)
- Bombardier Central Rivers extension. Modification to an existing 400 installation (2001) to provide an additional stabling road (2018)
- Chilterns Banbury Depot, Banbury. 400 installation with 7 point ends, fully interlocked with signals and interfaced to the mainline (2016-17)
- Alstom Golders Green Depot, London. A London Underground application (2006)
- Chilterns Wembley Depot. 400 installation incorporating 8 point ends (2004)
- Alstom Morden Depot, London. 400 installation .A London Underground application with 32 point ends (2004)
- ABP Immingham Depot. 400 installation incorporating 10 points and 1 Route Setting Panel (2002)
- Siemens Southampton Depot. 400 installation incorporating 10 points indicators and approximately 25 axle counters (2002)
- Bombardier Central Rivers Depot, near Derby. 400 installation incorporating 29 point ends, point position indicators throughout and axle counters (2001)



#### 2.2 Overview of Benefits

The main benefits of the 200 system are:



Fenix Rail Systems recommend the 200 DCS for large, but simple, depot layouts.

Developed & compliant with EN standards; including safety integrity levels (SIL);

Operates in harsh environments including coal yards, harsh winters (e.g. in Finland & Poland)

Reduced need for hand shunters – eliminates/reduces risk of staff slips, trips, falls, being struck by a train etc. as well as providing labour cost savings

> Route Setting Panel Trackside or in position where the train can be seen from safe position



Reduced capital cost vs mainline systems



Minimal maintenance low life cycle cost





## **3. Operational overview**

#### 3.1 General Operational Overview

The 200 system is presented on a point setting panel to the user. Indications of the current position of the point machine, normal or reverse, are shown with LEDs. Points are operated by pressing a single button corresponding to a single point end.

It is possible to fit multiple point setting panels. However, as there is no interlocking it is important that procedures are in place that do not allow two users to operate the points concurrently.

#### 3.2 Example of Operation

The operation of the point setting panel is as follows:



## 4. System overview

#### 4.1 System Characteristics

The 200 consists of the same equipment as the 100 but the points are controlled from a Point Setting Panel rather than individually.

The system also boasts a modular design philosophy which is created from high grade industrial components, thus increasing the availability of spare parts and reducing maintenance costs. The system is constantly performing self-checks on the circuits and reporting faults, which means that malfunctioning units can be swapped very quickly and easily. The metal plates on the front (see figure 3) can be taken off, exposing the logic controller hardware board, known as a card, beneath. This card has a part number and pin-code, meaning only a card of that type can replace the original.

All systems are compatible with relevant EU EMC standards to all traction types. All outdoor equipment has a temperature operating window of at least -25°C to +45°C or harsher.



Figure I - 200 basic layout

#### 2. System Architecture

#### 1. Equipment Housing

Typically the 200 system is installed in location cabinets. Unlike typical NR location cabinets, these are mounted on a swinging frame and therefore necessitate access from one side. The frame is made up of 2 columns of 8 19" racks (although typically only a maximum of 7 are used to allow cable bending and access in the base of the location).



Figure 2 - Location cabinet (frame closed)

Figure 3 - Location cabinet (frame open)

The racks are also compatible with indoor application, where a glass fronted cabinet can be mounted within a designated building or within a relocatable equipment building (REB). This is beneficial in areas where signalling equipment is densely populated.

#### 4.2.2 Point Machine

The 200 system uses trailable point machines which are robust and mounted in the four foot. The machine is normally installed in approximately 80 minutes, which is much faster than current mainline equipment.

A six-foot moving version is mounted on two cross members which clamp to the outside foot of the rail. The overall height of the machine is below the standard BS113 rail running height.



Figure 4 - Point machine installation



The detection and power is supplied by a single cable, with a minimum of 5 cores. The power supply is currently a three-phase neutral 400Vac supply, although a 110Vac varient is in development. It is recommended that the tail cable to the point machine is armoured to prevent damage.

The points machine features an internal mechanism allowing the machine to be safely used in a trailing direction without damaging the components. The machine can be installed with a plate which allows the intergration of a standard six-foot mounted back drive. In the event of a power failure, the machine can be operated manually by inserting a key to engage manual operation and then turning a crank handle.

The machine requires minimal maintenance at an interval of every 6 months, which is limited to the exterior of the machine. This is normally to account for vibration and wear in the turnout. It includes adjustment of the detection rods and maintenance of the screw thread to prevent rusting, in addition to re-torquing the bolts.

When an over-running and/or a trailing move is detected, if safe and in combination with the axle counter system, the points automatically throw the points to the non-trailing position to prevent damage to the infrastructure/train.



#### 4.2.3 Points Position Indicator

The 200 FenLock Control System typically uses unique points position indicators to illustrate the lie of the points to the driver and a positive confirmation to the shunter that the points are correctly set.

These are typically mounted on posts near to the turnout which it is indicating. There are six lamps in total, three on each side. Only two are lit at one time, either horizontal or vertical depending on the lie of the points.



Figure 5 - Points Position Indicator

#### 4.2.4 Point Setting Panel (PSP)

The PSP is a stainless steel push button panel mounted on posts, sited in a convenient location within the depot. Each point end can be moved by pressing the green buttons on the panel. The end position is then shown as a yellow LED indication.



Figure 6 - Design drawing of a PSP

**4.2.5 Signals** Not provided for 100.

## **4.2.6 Train detection** Not required for 100.

#### 4.2.7 Movement Authority

The shunter will need to speak to the driver to tell the driver where and when to proceed.

#### 4.2.8 Cable Routing

Separation between the cable for the plunger and other cables is required. This can be achieved by running the cables in separate troughs, providing 50mm separation between the cables within the trough, or providing a non-conductive barrier between the cables.

#### 4.2.9 Power Supply

The 200 requires a three phase neutral 400Vac supply to the equipment housing, location or REB where it is transformed down and/or distributed as required. The electronic components predominantly run off 12Vdc and 24Vdc.

#### 4.2.10 Points Heating

The 200 system is compatible with most points heating systems. However, should control of the points heating system be required by the depot operator, a more advanced version is required i.e. 300 or 400.

## 5. Further information and reading

The FenLock 200 is a basic route setting system suitable for small operations number 2 of the five Rail/Train Facility options and therefore may not be suitable for all facility applications. Further information can be found in the following documents:



Fenix Rail Systems provide signalling system consultancy and turnkey delivery (design, procurement, installation, testing, commissioning, handover and O&M) in the UK and worldwide for both greenfield projects and brownfield projects requiring complicated stageworks. Project delivery in the UK is aligned with Network Rail standards and procedures.

Our offices are open from 08.30 to 17.30 each day. Key management can be contacted via the office landline 03300 580180 and mobile numbers are provided for convenience outside office hours. Your main contact with Fenix Rail Systems are as follows:

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