

Depot control made easy

As in any depot, yard or indeed maintenance facility, it is essential that trains depart on schedule

There are several activities that are undertaken before a train returns into service each day including cleaning, re-watering, re-fuelling, CET service and small repairs.

Therefore, Depot Operators require a simple, easy-to-use Rolling Stock Signalling Control System which provides them with a real-time overview of all train movements within a maintenance depot.

Depot Operators have a busy workload involving setting routes, entering train describer codes and communicating with Train Drivers. They also need to be able to communicate with the production teams, adjacent mainline signalling control centres, operations staff as well as contractors working on site. All these activities and actions require to be automatically recorded for incorporation within daily reports and entry into the train register.

Fenix Signalling Limited is the sole provider of the Tie-FenLock Depot Train Control System (TF-DTCS), which comprises of a Signalling System using Computer Based Interlocking, Trailable Point Machines, Axle Counters, Signal Aspects and, depending on the type of system specified, Point Indicators. Fenix is currently working collaboratively with a variety of customers delivering solutions at Rolling Stock Maintenance Depots and Freight Yards throughout the UK.

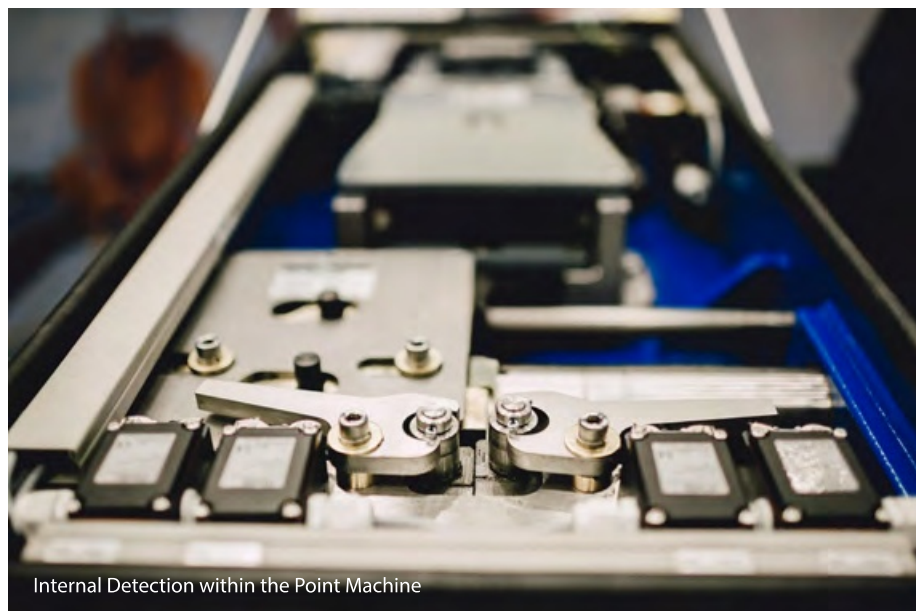
The principle benefits of a TF-DTCS system include:



Depot VDU Control Console

- The use of innovative, 'four-foot' mounted trailable point machines, currently in use on both Network Rail and private railway infrastructure in the UK. Locations include, Banbury, Central Rivers and currently being installed for Buckingham Construction at Nexus's Howdon Satellite Depot.
- The Tie-FenLock Depot Control system only requires one Depot Operator

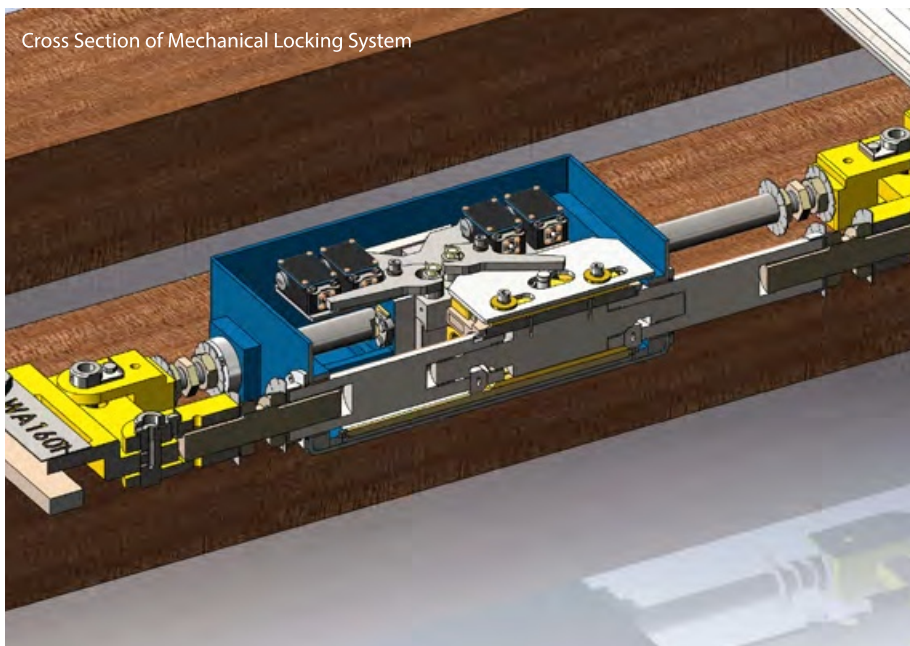
- Supervisor working from one central control console.
- Point and system maintenance is simplified, greatly reduced and extremely cost-effective.
- The Digital system with internal monitoring enables easy fault diagnosis, saving time and money on investigation and fault diagnosis.
- The system has established a proven track record for its outstanding reliability.
- The system is compact with location cases being able to be positioned adjacent to walls, fences and buildings whilst still providing suitable access to the equipment from one side.
- The system points and signals are directly fed from one location.
- The Innovative point machines are SI-4 accredited and require only one cable for control and detection, saving on both material costs and installation time.
- A bespoke technical interface to enable the system to be integrated with any mainline signalling interlocking used in the UK.



Internal Detection within the Point Machine

System technology and architecture

The Tie-FenLock Depot Train Control assists the Depot Operator by minimising the time to set a route (a few seconds) and to organise the traffic in the depot in a safe and reliable way. As the Depot Operator goes about their daily tasks, in the background, the SIL

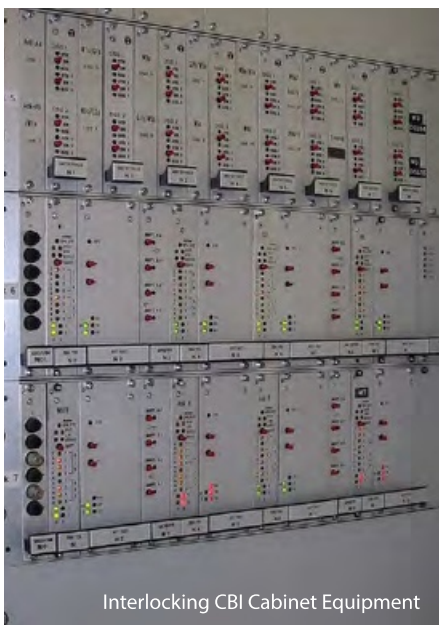


accredited Computer Based Interlocking (CBI) continuously and automatically checks the current traffic and operations permanently checking for conflicts or dangerous situations.

The system also checks that the operator's commands are safe and do not conflict with the Depot's operating rules and procedures.

The system communicates with the Depot Operator via a Visual Display Unit (VDU), ensuring safe operations at all times by not permitting the setting of conflicting train movements. The system is designed to make operations as stress-free as possible.

The Visual Display is designed to suit individual depot requirements, while information about the depot and messages are displayed permanently on the screen. The command level waits in the background



to appear when the mouse hovers over a symbol, keeping the screen clear for a good overview of the depot situation.

Point control

All Points Control Circuits communicate via a serial bus with the Central Control Unit (CCU). Each Control Circuit has its own Micro-controller card for communication and individual functions. Up to 256 points can be controlled one Central Processing Unit (CPU).

There are a number of cost-saving benefits to be had by using the Tie-FenLock System. In order to reduce cabling cost over long distances or to overcome specific local cable route problems on existing infrastructure, splitting the total number of control circuits into smaller local sub-groups to communicate with the main logic via serial data cables also saves on project time and costs.

Signals

Six individual Signal Controllers can be housed in one 19" Rack. Each Signal Controller card is the interface between CCU and local shunt signal, normally a Dorman LED type head in the UK market.

This modular design enables a system to control hundreds of signals that can be modified or upgraded with minimal software and hardware changes by plugging in a new signal control card. This also provides a significant time and cost saving when implementing a system in stages, as both the hardware and software are of a modular design, meaning that the software can easily be updated for each stage, with information on the additional control cards input and output addresses.

Train detection

The Tie-FenLock system receives the vital track occupation or clear information from

the Track Section SIL-4 control circuits. These are purely hardware-based and is a hybrid FPGA-relays-based dual channel design.

The modular design with plug couplers enables and assists the integration of the system into existing depot in stages thereby allowing a quick and easy modification to the next stage commissioning.

Axle counter detection

The Axle Counter head is a SIL-4 accredited Dual-Proximity-Switch Unit designed and manufactured to detect the wheel flanges passing over the two proximity switches. With each detected wheel, the axle counter detection systems send one package of data to the Switching Amplifier.

The evaluating electronic Switching Amplifier is located within cabinets inside REBs or buildings, far away from any Electro Magnetic (EMI) or lightning impacts. The Tie-FenLock axle counting system is, therefore, far more resilient to EMI and any overvoltage issues than systems in the UK market.

Point machines

The point machine for the system is SIL-4 certified, normally mounted in the 'four foot' but can be mounted in the 'six foot' if there are space constraints. A mechanical locking system contains an integral facing point lock obviating the need for an external locking system. Point Detection is achieved with independent point blade detection using dual micro switches for each point blade.

Due to its short height, the point machine can be fitted without alterations being required to the existing rail obviating the need for additional drilling. The machine mounted in this arrangement has the added benefit of increasing on-site safety by eliminating potential trip hazards within adjacent walking routes. The mounting arrangements enable the machine to perform in unison with the track system when traversed by rail traffic. The machine mechanically is an integral part of the track system as mounting bars tie the machine to the rail rather than the bearers, therefore ensuring proper track alignment and reducing the strain on the points.

The point machine has a robust, compact construction and is suitable for both passenger and heavy freight rail traffic. The machine is trailable, which means that if the train travels through the point machine set in the wrong direction, it will not cause a derailment nor damage nor bend the mechanism. The machines internal locking prevents any such events and safely detects the trailing move, immediately notifying the Operator, which is recorded within the Computer Based Interlocking System (CBI).

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