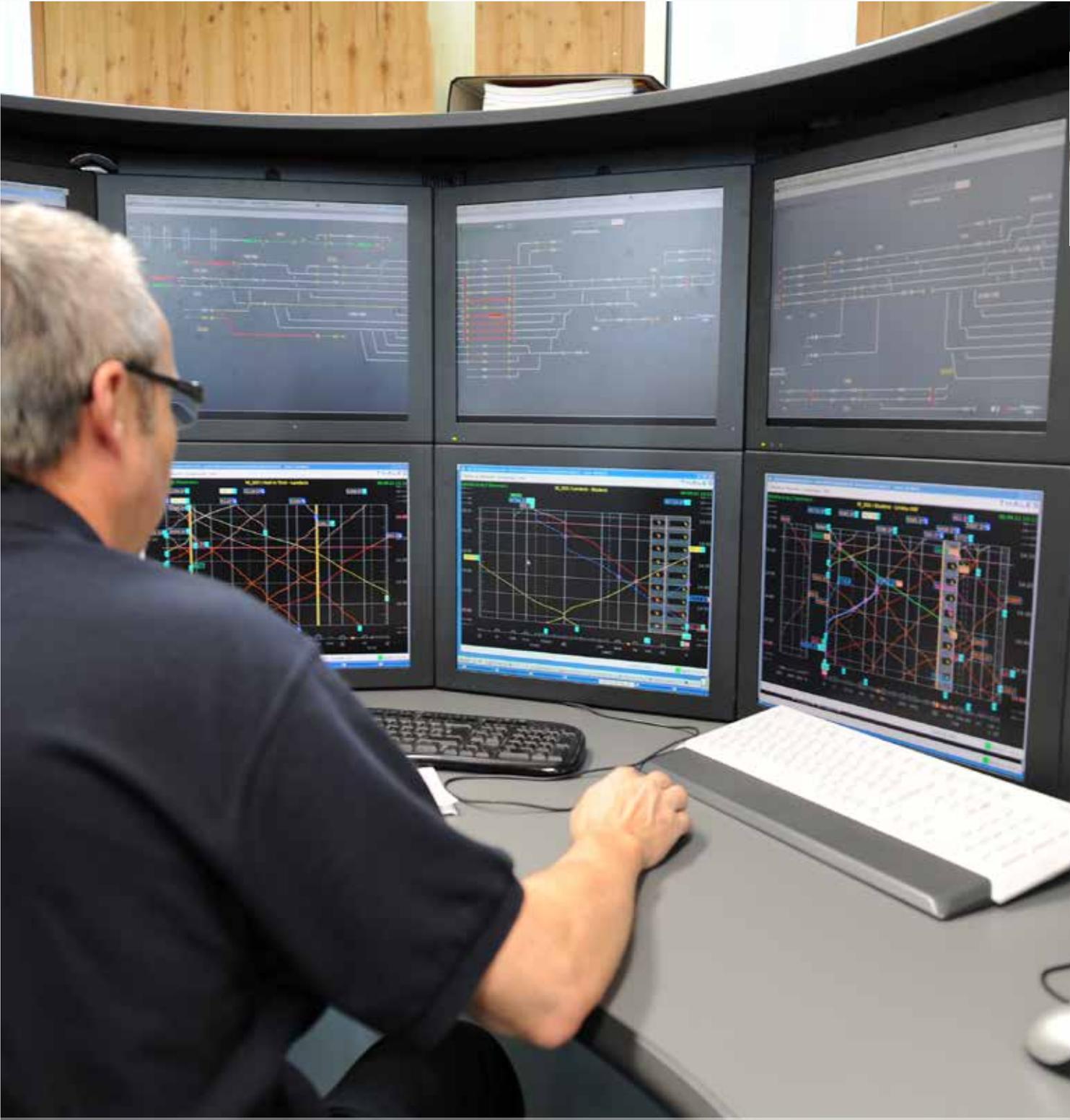


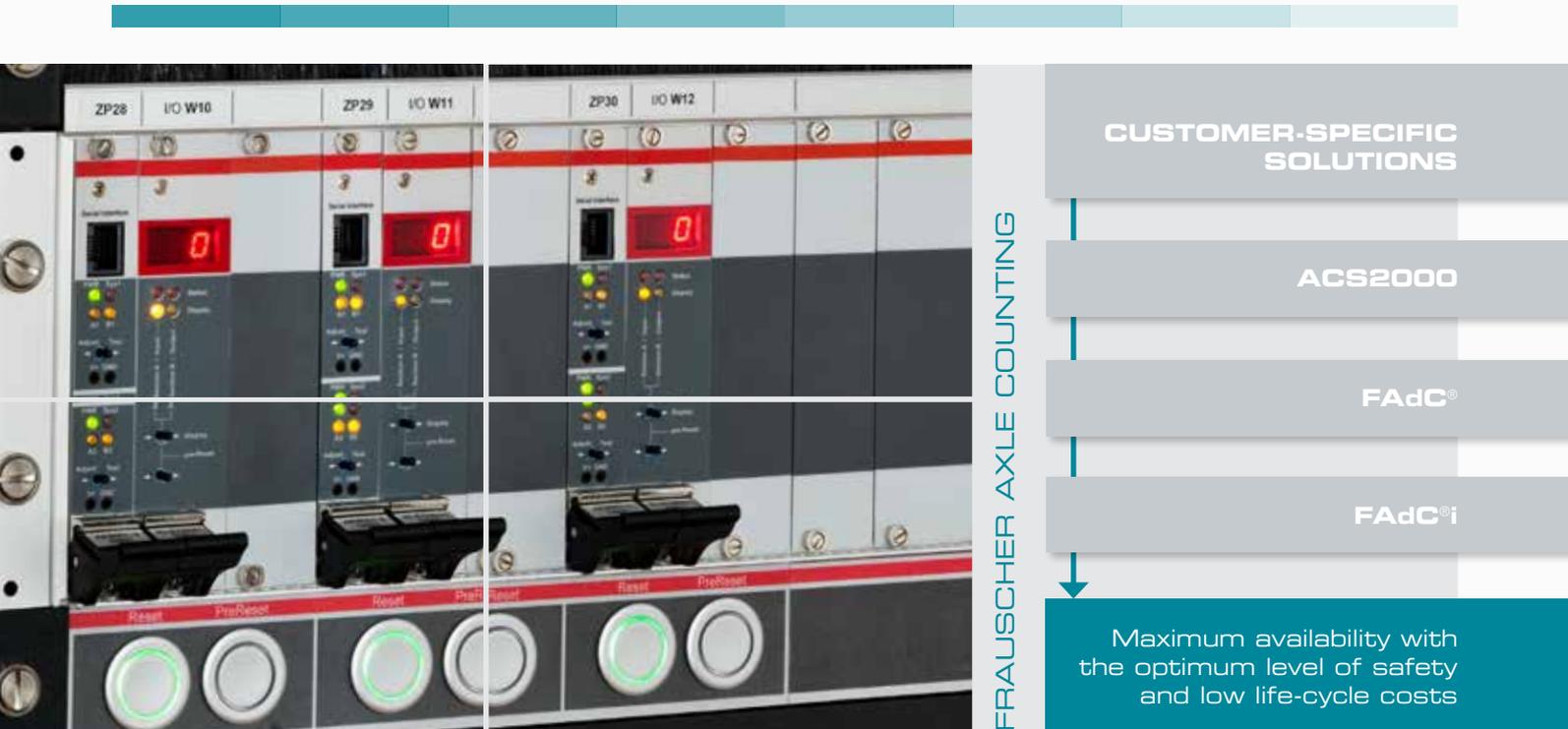
AXLE COUNTING





AXLE COUNTING

System Description



The predominant usage area for highly-available and reliable wheel detection systems is in axle counting systems for track vacancy detection. In many countries throughout the world, track circuit technology is increasingly being superseded or replaced by axle counting systems. Modern axle counting technology is now an integrated part of higher-ranking interlocking and signalling systems. Today, it is also able to provide a great deal of information to complete systems beyond track vacancy detection.

The varying framework conditions and operator requirements call for flexible and individual adaptation of the systems. For this reason, all Frauscher axle counting systems are designed so as to be modular and scaleable, and can be quickly and easily configured, commissioned, maintained and adapted by both system integrators and operators.

Frauscher offers three families of axle counting systems:

- » ACS2000
(Hardware configuration; relay interface)
- » FAdC® Frauscher Advanced Counter with serial interface
(Hardware and software configuration; serial interface)
- » FAdC®i Frauscher Advanced Counter i
(for simplified operating conditions)

With these system families, the optimal customer-specific solution can be provided for all requirements related to function, operation and infrastructure.

As a customer-focused company, Frauscher offers a complete range of services surrounding its products and systems. This encompasses both individual planning and project planning, as well as the provision of support for installation and commissioning. As a result, maximum independence from system suppliers and minimum life-cycle costs are guaranteed.

AXLE COUNTING

Areas of use



Track vacancy detection

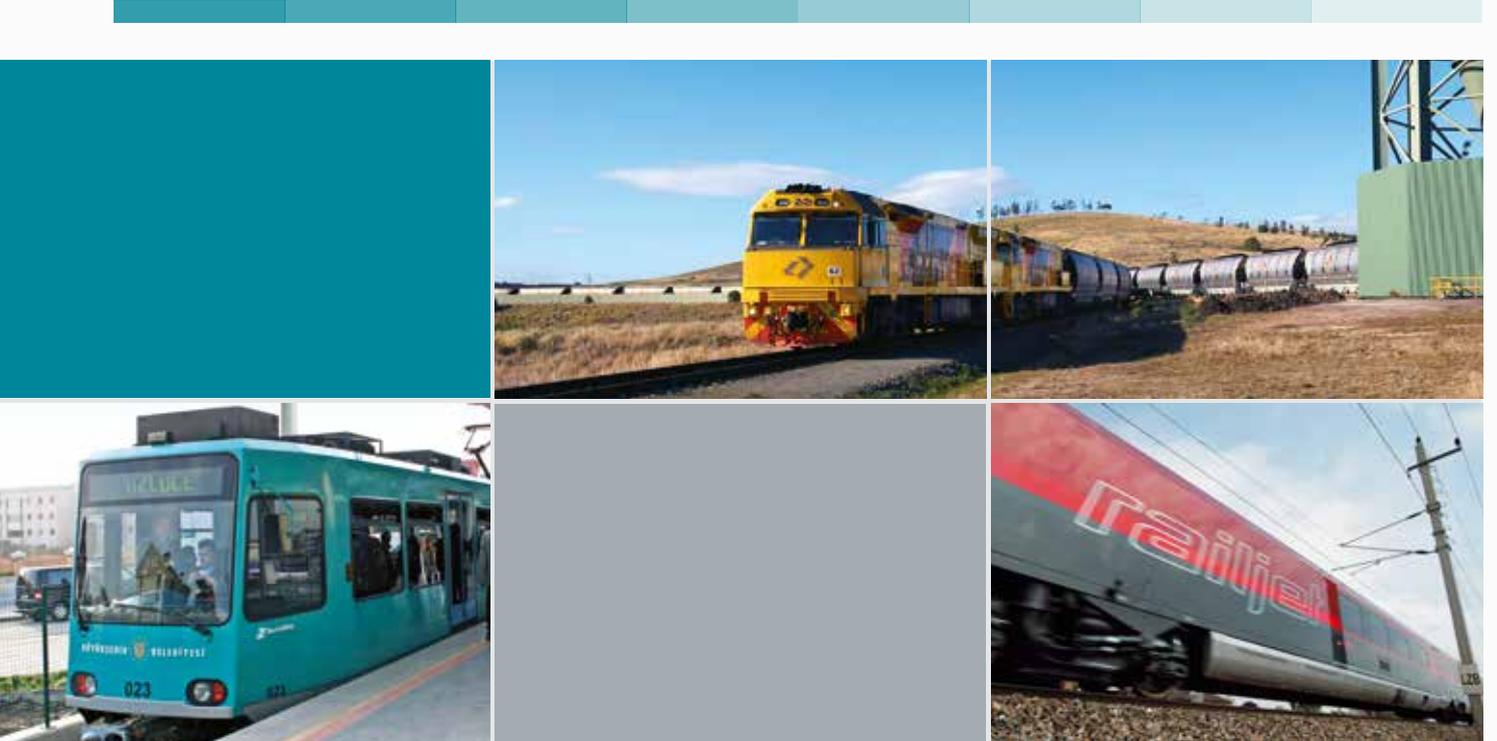
The main use of axle counting is consistent track vacancy detection for stretches of track and station sections, combined with interlocking systems. The length of the track clear sections in or between stations does not affect the axle counting systems. Fixed track vacancy detection is a vital part of the overall system, even with modern train monitoring and control systems (e.g. ETCS, CBTC).

Level Crossings

By using axle counting systems, there are numerous options for switching on and off and resetting non signal-dependent level crossing protection systems in a fail-safe and highly available manner. In combination with additional individual wheel detection points, which can also provide fail-safe direction information, almost all requirements can be covered.

Point changeover protection

Frequently, axle counting is also used as a highly-available and safe method of changeover protection for points. The clear/occupied indication is then evaluated as a release or locking of the point mechanism. A further application is the implementation of EOWs (locally-operated electric points systems). Unlike track-circuit technology, axle counting technology can also be used unrestrictedly and easily for depicting multiple branching gridirons.



Back-up systems

Modern train control and train protection systems (e.g. CBTC, ATP, etc.) allow a high train density and optimised running of trains. These highly-complex systems generally use proven fixed and automatic track vacancy detection systems as a back-up or fall-back plan. The fact that axle counting systems generally do not require any maintenance enables cost-effective operation of these stand-by systems.

Metros and tramways

One rapidly growing area of use for axle counting is rail-bound public transportation. Due to the high number of trains, axle counting systems impress operators with their high availability and low maintenance costs. If wheel detection is specifically tailored to the vehicles, these systems also attain the high levels of availability and safety that are familiar from rail operations.

Shunting and industry

With its robust properties, its economy and, in particular, its wider range of functionalities (axle/wagon counting, wheel diameter, speed, etc.), axle counting technology is used very successfully in the field of industrial plants, depots, and shunting and marshalling yards.

AXLE COUNTING

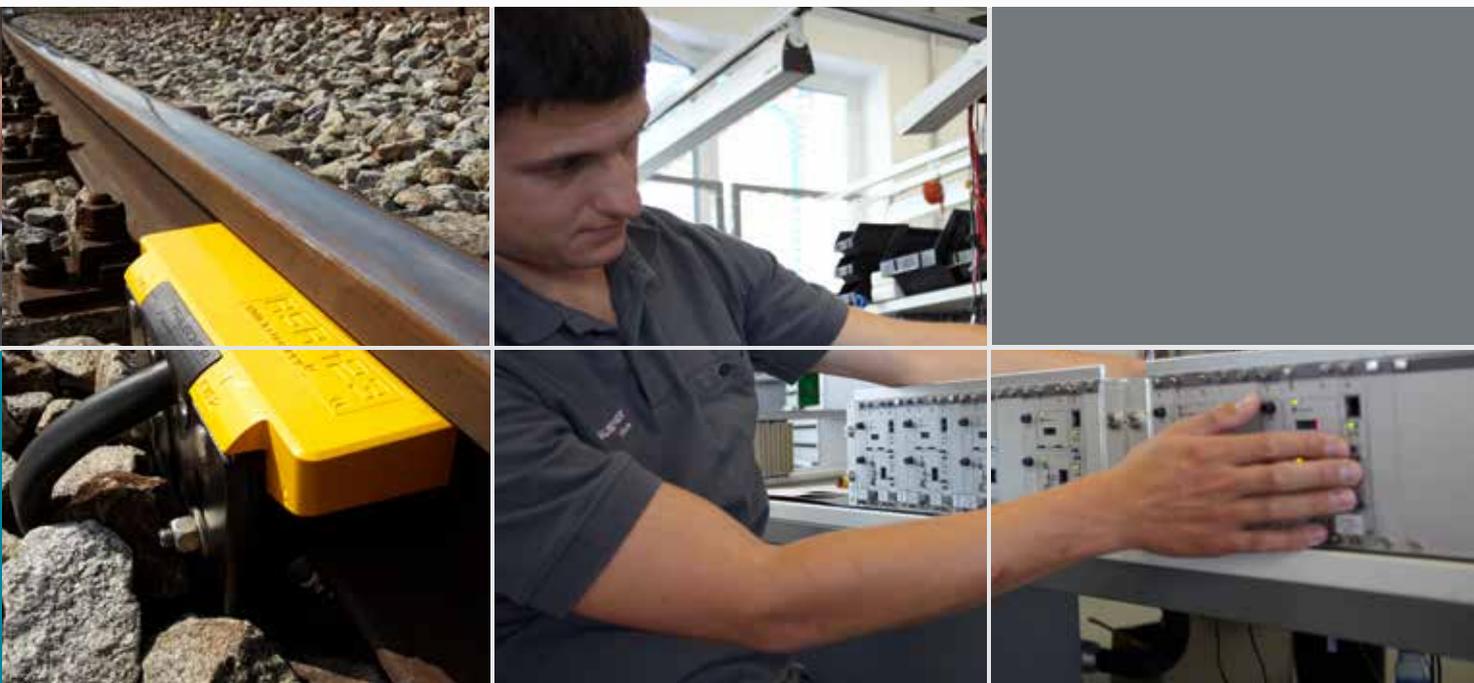
The technology of the future



Axle counting systems combined with inductive wheel sensors are already established as a reliable and economical track vacancy detection system with many rail operators throughout the world. Axle counting systems can be integrated into higher-ranking modern interlocking and signalling systems extremely well using software interfaces, which will further accelerate the change in technology from track circuits to axle counting with highly-available wheel detection.

One of the main arguments put forward in favour of track circuits is that, under certain conditions, rail breaks can be identified. Of the many investigations and studies that exist, the majority conclude that track circuits in no way guarantee reliable identification of rail breaks. In addition, practice amongst rail operators shows that the majority of possible rail faults (see UIC Catalogue 712) have already been detected and resolved before a rail break occurs.

With regard to availability and investment/operating costs, the axle counting system is clearly superior to existing track circuit technologies. The innovative axle counting systems from Frauscher offer a range of additional functions that provide operators with interesting opportunities to make their rail operations even more efficient. The systems can be adapted easily and individually to meet an extremely wide range of requirements set by rail operators and system integrators concerning environmental conditions, interfaces, reset procedures, direction and diagnostic information.



Higher availability

Under certain circumstances, the availability of track circuit technology can fall significantly at regular intervals. Due to low ballast resistance where there is dirt, leaves, moisture or flooding, it can be difficult to maintain the required rail insulation at the necessary level of quality. Insufficient electrical contact caused by light-weight vehicles on rails with a low frequency of trains can also lead to problems.

Lower life-cycle costs

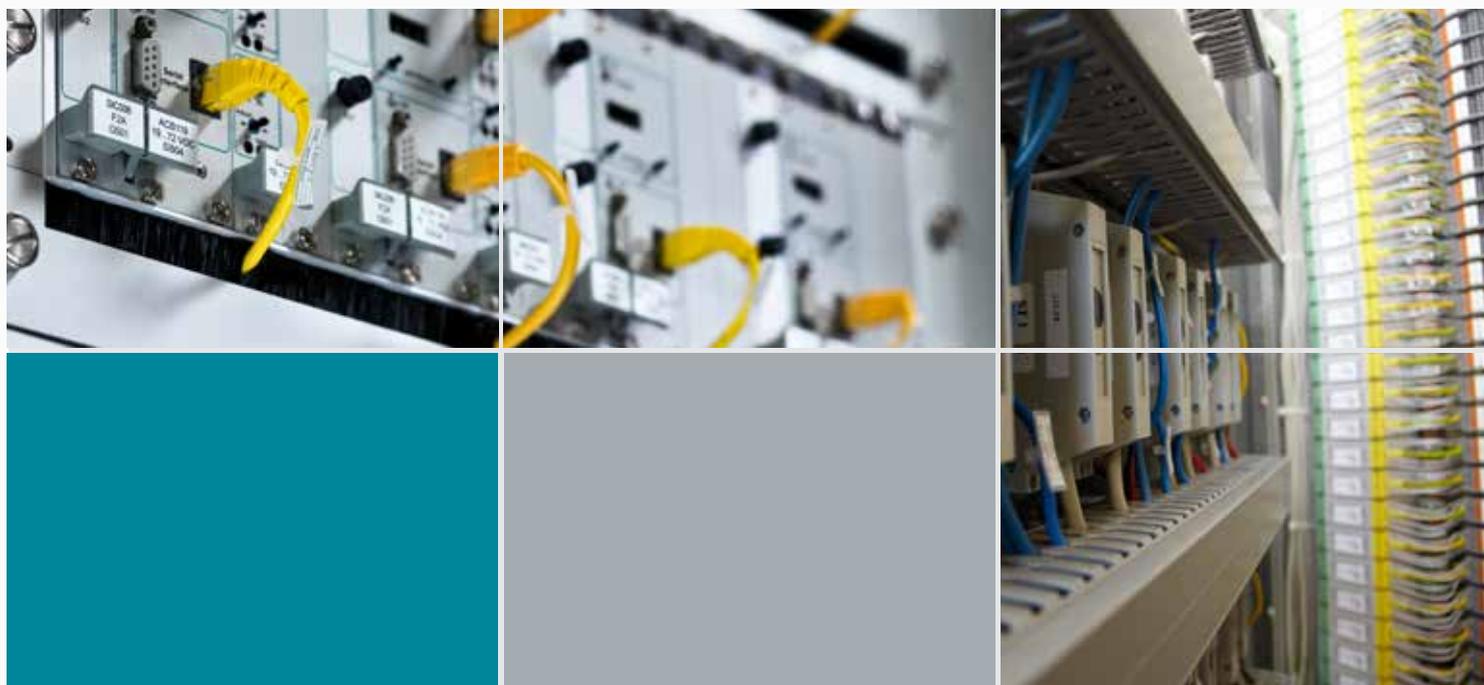
The investment costs of axle counting systems vary depending on the size and complexity of the systems, or depending on the interface. Purchasing costs, however, are generally lower or similar in comparison to track circuit systems. As maintenance and operating costs are considerably higher for track circuit systems, axle counting systems therefore offer lower life-cycle costs. Modern systems with a serial interface, such as the FAdC, can achieve additional savings on infrastructure thanks to a decentralised arrangement.

Additional functions

Besides the actual basic function, the clear/occupied notification, Frauscher axle counting systems provide additional information such as the direction and the number or speed of the axles or wagons. Special functions, such as counting head control, further increase availability by placing counting heads into a type of stand-by mode under certain circumstances.

AXLE COUNTING

Axle counting systems



Experience from many thousands of axle counting systems installed worldwide has shown that, above all, customer-specific adaptations of wheel detection and axle counting guarantee maximum availability whilst simultaneously ensuring optimum safety and low life-cycle costs. General frameworks in the individual rail segments and countries, and the system integrator and operator requirements, are often very different.

Frauscher offers a broad range of products that can be adapted to operators' specific requirements, both in the field of wheel detection – wheel sensors, evaluation boards and rail claws – and that of axle counting. Important objectives in developing Frauscher axle counting systems are always the modularity, ease of configuration and maximum cost-effectiveness of the systems with regard to investment and operating costs.

The axle counting system ACS2000, which has long been used in many parts of the world, has proven its worth in a very wide range of rail sectors and applications. Thanks to its relay interface, it offers particular advantages for integration in existing interlockings and the replacement of track circuits that are in place.

The axle counting systems Frauscher Advanced Counter FAdC and FAdCi with serial interface are the optimal technologies for integration in modern electronic signalling systems such as interlockings, automatic block systems or level crossings.



ACS2000



FAdC®



FAdC®i



ACS2000

Even at the planning stage, the benefits of the simple, clear design are apparent. Once the track plan is available, project planning and configuration for the axle counting system can be completed within a very short period of time. The fact that the system is extremely easy to handle over its entire life cycle makes it very popular worldwide, both among rail operators and with customers in industrial and public transportation.

FAdC®

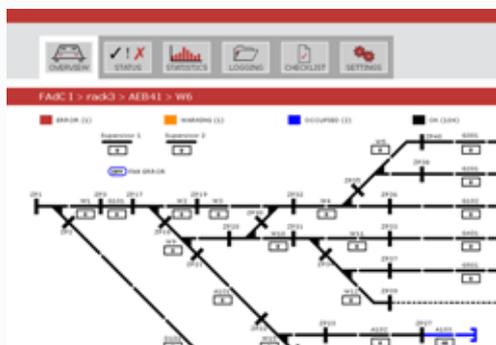
The Frauscher Advanced Counter (FAdC) system forms the core of the system family of axle counting systems with a serial interface to higher-level applications. This open communication interface permits a reduction in components and therefore offers a range of benefits with regard to functionality, space required and investment and operating costs. The integration can be carried out both through a customer-specific protocol and through the Frauscher FSE protocol. The system integrates all the important functions of wheel sensor assessment, axle counting and section vacancy detection on a standard board and is therefore particularly compact and flexible to use.

FAdC®i

The FAdCi is a variant of the Frauscher Advanced Counter (FAdC) for reduced requirements in simpler operating conditions. This system has been specially designed for railway applications in accordance with the CENELEC standards up to SIL 3 and for maximum speeds of 80 km/h. Nevertheless, it offers full functionality and all the benefits of the FAdC.

AXLE COUNTING

Project planning and maintenance



Experience pays off – for many years now, our wheel sensors and axle counting systems have been used successfully by our clients in more than 60 countries, on all continents. Each year, around 10,000 wheel sensors are installed. The operational experience we have gained, together with global data collection regarding environmental conditions on site, combined with analysis of the vehicles and rail systems, form the basis for efficient and reliable project planning and implementation.

Detailed analysis of the conditions on site and measurement of the wheel sensor signals and possible interference takes place as part of a test installation. Based on this, we define the principles for the system with you and select the best possible technology and system architecture. In the next stage, we create a comprehensive system concept and a quotation for your specific requirements, based on the track plan.

A comprehensive range of training options ensures that system integrators and operators are able to install the systems independently, operate them on a long-term basis, maintain them and even configure or adapt them where necessary. As well as support with installation and commissioning, we offer our clients an efficient After-Sales service with a service hotline, a repair service and on-site deployment.

These are the prerequisites for a future-proof, highly-available and cost-effective solution.



Configuration

Frauscher axle counting systems are designed to be modular and scalable, therefore both the configuration and subsequent adaptation can be carried out by both the system integrator and independently by the operator. Software tools support configuration in the new axle counting systems with a serial interface. This allows the track layout to be designed quickly and simply in the system, using its parameters. All other information, such as configuration files or design, is generated automatically.

Diagnostics

Preventive maintenance, the optimisation of fault rectification, unrestricted online access to data from the axle counting system, the minimisation of maintenance work and the reduction of life-cycle costs are important aspects that are possible using the Frauscher diagnostic systems.

Services

The Frauscher range of services includes consulting, training, commissioning and assembly, as well as the After-Sales service. All Frauscher components can be mounted, adjusted and commissioned simply and rapidly, without the use of special tools.

Frauscher Sensortechnik GmbH
Gewerbestraße 1 | 4774 St. Marienkirchen | AUSTRIA | T: +43 7711 2920-0 | F: +43 7711 2920-25
www.frauscher.com E: office@frauscher.com

Frauscher Sensor Technology India Private Limited
Level 1, Nitesh Timesquare No. 8, M.G. Road | Bangalore-560 001 | INDIA
www.frauscher.in E: office@in.frauscher.com

Frauscher Polska Sp. z o.o.
ul. Przemysłowa 10 | 40-020 Katowice | POLAND
E: office@pl.frauscher.com

Frauscher UK Ltd.
Quatro House | Frimley Road | Camberley | Surrey | GU16 7ER | UNITED KINGDOM
E: office@uk.frauscher.com

Frauscher Sensor Technology (Beijing) Co. Ltd.
2610 Full Tower | No. 9 Dongsanhuanzhonglu | Chaoyang District | Beijing 100020 | CHINA
E: office@cn.frauscher.com