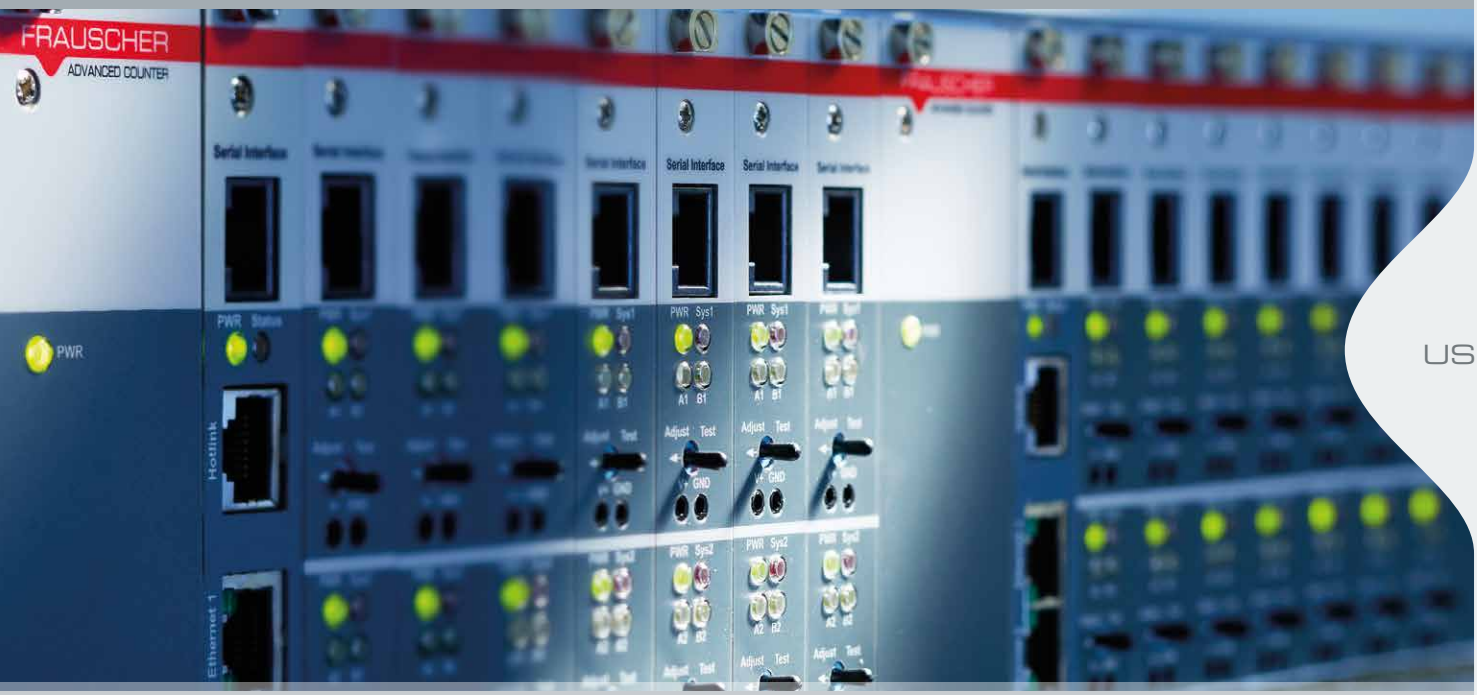
FRAUSCHER
SENSOR TECHNOLOGY

FAdC®

FRAUSCHER Advanced Counter



US

FAdC®

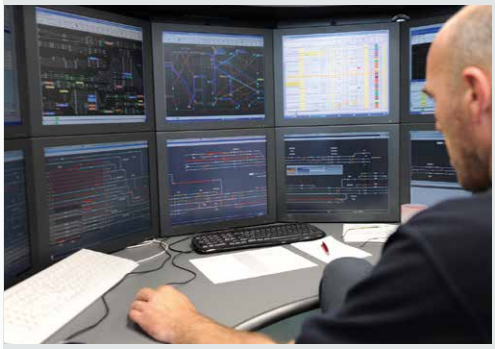
FRAUSCHER Advanced Counter

The train detection of the future

Frauscher Advanced Counter (FAdC) is the latest generation of axle counters with an Ethernet-based secure software interface. Thanks to this open communication interface, the system can be integrated into the signalling system in an optimum manner, using only a small number of components. The FAdC therefore offers a range of benefits with regard to functionality, required space and investment/operating costs.

Application fields

The FAdC R2 Axle Counters can be used in an extremely wide variety of segments, such as high-speed, mainline and secondary railways, metros or light railways and industrial railways, irrespective of the size or complexity of a project.
In addition to train detection, applications such as the securing of grade crossings or customer-specific triggering can be implemented easily and cost-effectively.



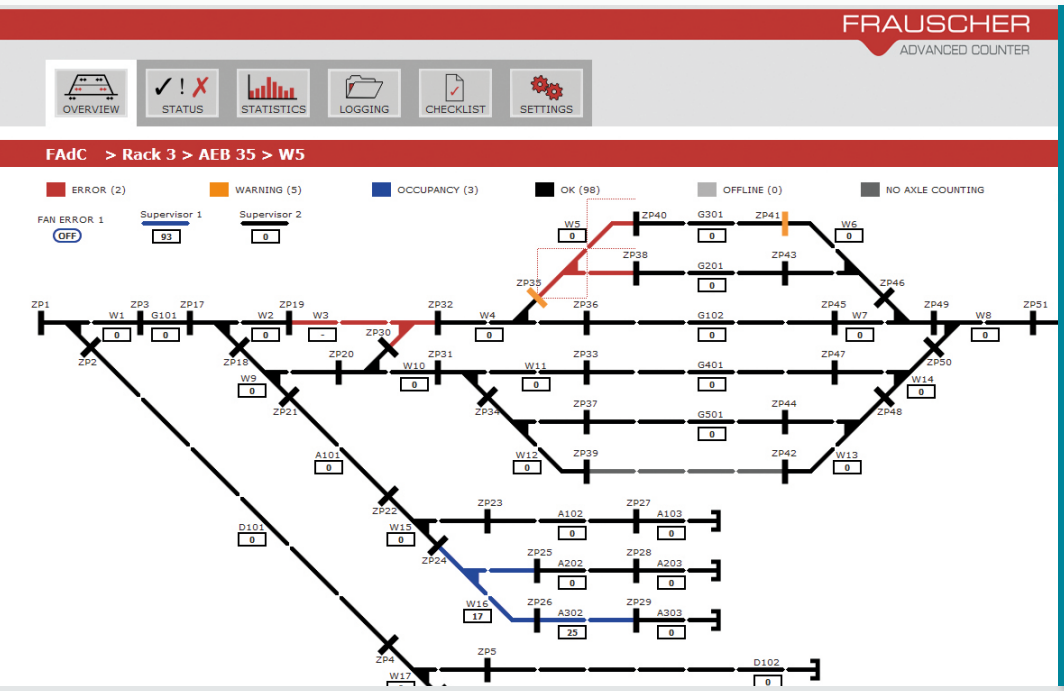
Control centre for transport service providers

Mainline railways

Metros or trams

Reliable and effective train detection

Tried-and-tested wheel detector components are a vital prerequisite for fail safe and cost-effective train detection.
As with all Frauscher Axle Counters, the RSR180, RSR181 and RSR123 wheel sensors once again form the basis for train detection that performs at the highest level.



ADVANTAGES:

- Customer-specific Ethernet-based software interface
- Flexible architectures
- Easy and flexible configuration
- Little space required
- Simple project management
- Lower investment costs
- Extensive diagnostics
- Highly reduced maintenance work

Maximum flexibility

Due to its functional modularity and simple scalability, combined with a software or hardware interface, the FAdC offers maximum flexibility when it comes to configuring a very wide range of requirements.
The possibilities range from small central systems with voltage-free relay contacts to complex systems located in decentralised clusters along the route and connected to one another via Ethernet. Based on a minimum need of hardware, savings on space, energy and investment cost increase with project scale.

Future-proof and optimal integration

When the FAdC is integrated into high-performance electronic interlockings, the benefits of this modern axle counter become clear: minimum equipment requirements, vital future-proof communication and maximum flexibility in terms of configuration.
The connection can be established either by developing a customer-specific interface or via the Frauscher protocol (FSE). On request, an individual software interface can also be developed in accordance with a customer's specifications. In any event, the higher-level application has access to all the functional and diagnostic information from the system for further processing.

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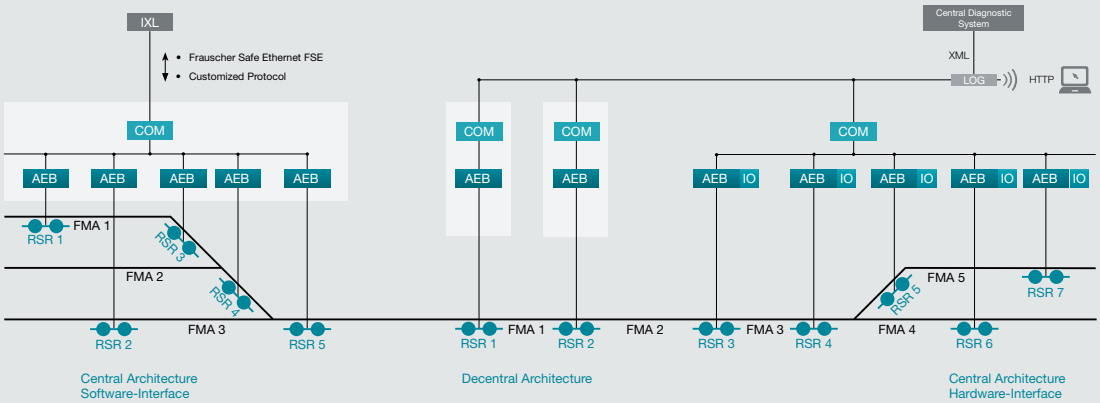
Operating principle

All boards of the FAdC conform to a proven format and are housed in 19-inch board racks. Evaluation boards AEB communicate with one another by means of an internal bus. The communication board COM that is also connected to the internal bus provides an Ethernet interface offering a fail-safe clear/occupied indication and traversing direction for further processing. Alternatively, this information can be output through the extension boards IO-EXB connected to the evaluation boards AEB.

In addition, the communication board COM offers the option of connecting the Frauscher Diagnostic System FDS to the Frauscher Advanced Counter FAdC. Thus diagnostic data can be logged and evaluated, displayed in a web browser, or passed to higher-level diagnostic systems via the XML interface.

Flexible architectures

The simple design of the FAdC ensures a wide range of configuration options. It is possible to establish both centralised and decentralised architectures, as well as various combinations.



Configuration of the track sections can be carried out using a configuration file. The interaction between the communication boards COM takes place via Ethernet – this connection can be set up using LWL or DSL modems, for example. However, existing communication networks can also be used, as long as they correspond to category 2, in accordance with EN 50159. With additional external measures, transfer of the FAdC data via networks of up to category 3 is also possible.

Evaluation board AEB

In addition to evaluating a wheel sensor, the central evaluation board AEB also carries out axle counting and supplies the clear/occupied indications and directional information for up to two track sections, which can be output either via a serial protocol or via relay interfaces. Using the evaluation board AEB, up to 16 counting heads can be evaluated per track section. Of course, double and multiple use is possible here.

Communication board COM

The main tasks of the communication board COM are to forward counting head data via Ethernet and to read and provide configuration data for the AEB boards. In addition, it provides vital axle counting data (clear/occupied indications, counting head data) to the interlocking and/or the higher-level signalling system via a customer-specific protocol, or the freely available Frauscher Safe Ethernet (FSE).

Power supply board PSC

The power supply board PSC provides the necessary voltage for the internal bus and protects the FAdC boards (up to 19 evaluation boards AEB) from excess voltages.


AEB


COM

PSC


IO-EXB

Optional extension board for digital input and output IO-EXB

The extension board IO-EXB is used for the fail-safe output of clear/occupied indications and directional information for up to two track sections by means of voltage-free relay contacts, for displaying the axle counter status and error codes from the track section or the evaluation board AEB. Moreover, the IO-EXB can also be used to input and output fail-safe digital arguments (data transfer).

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Simple design – maximum range of functions

The modularity and scalability and the wide range of functions offered by the FAdC R2 provide a range of benefits, particularly when it comes to carrying out the scheduling and project planning stages for complex train detection systems. This means that a special solution can be configured for all conceivable customer requirements.

Individual reset procedures

Reset management offers numerous reset procedures to choose from. These can be selected and combined as desired directly from the interlocking, in line with current and individual requirements. Irrespective of the reset selected, the FAdC is in constant contact with the interlocking and provides information on:

» Reset capability: Is a reset possible in principle?
» Execution: Has the reset been executed correctly?

Counting head information

When counting heads are traversed, the secure information about the traversing direction is recorded and transmitted. This function can be used for triggering or to determine the position of rolling stock.

STS - Supervisor Track Section

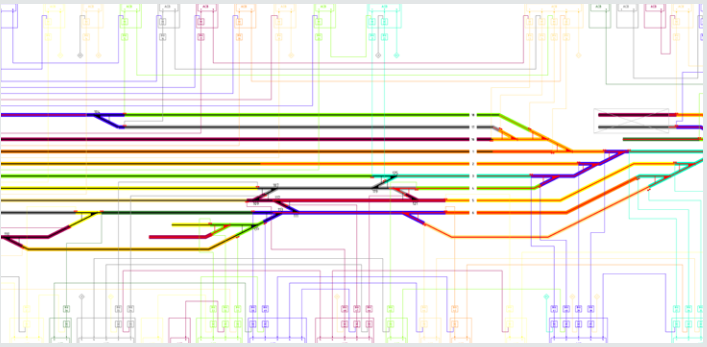
The optionally configurable STS procedure increases the availability of the system, in which faults that have been caused by external factors can be corrected in a fully-automatic manner.
Of course, the general conditions for reset are taken into account here. This means that safety of operation can be maintained with no noticeable restriction, without any negative impact on safety.

CHC - Counting Head Control

The patented “counting head control” function configures the stand-by mode for individual counting heads, meaning that interference (such as work on the track) is suppressed. Using configurable traversing criteria, the counting heads are safely activated again and are available for wheel detection.

Efficient configuration with software tools

The name FAdC R2 stands not only for a modern, flexible hardware and software platform, but also for an integrated solution that consistently supports all processes from scheduling, project planning/configuration, diagnostics to maintenance and adaptation, with the aid of innovative software tools. Based on extensive usability tests and design studies, the user interfaces are designed to be exceptionally user-friendly and intuitive to operate.



Configuration

Moreover, the newly-developed software tools offer enormous potential for saving, as configuration, diagnosis or simulation can be carried out independently. Track plans can be mapped easily and quickly using drag-and-drop functions. All other information such as the configuration files and design documentation is generated automatically. This considerably reduces the expenditure incurred for configuration and testing, and further changes can be made during the subsequent course of the project without incurring high additional costs.

Diagnostics

Preventative maintenance, the optimisation of fault rectification, unrestricted online access to data from the axle counter and the minimisation of maintenance work lead to a reduction in life-cycle-costs. The Frauscher diagnostics systems are designed for this. Using the software interface, it is possible to access all of the static and dynamic data from the individual boards. This means that all conceivable requirements of modern higher-ranking diagnostics systems can be met.

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Technical data – FAdC R2®

Output signal	
Interface	vital, customer-specific protocol via Ethernet and/or fail-safe output via optocoupler/relay interface
Signal types	Track section clear/occupied Traversing of the wheel sensor, including direction Reset Diagnostics
Safety level	CENELEC requirements in accordance with EN 50126, EN 50128, EN 50129, SIL4 and EN 50159 Category 2
Speed range	0 mph (static) to 280 mph (0 km/h (static) to 450 km/h)
Dimensions	
Format	19" housing for 3 $^{47}/_{50}$ inch x 6 $^{3}/_{10}$ inch boards (100 mm x 160 mm)
Width	Board rack with 42 or 84 modules
Height	3 height units
Power supply	
Voltage	+19 V DC to +72 V DC
Output	approx. 4.5 W per counting head
Insulation voltage	3100 V AC
Environmental conditions	
Indoor	-40 - +185 °F (-40 - +85 °C) ("outdoors" climate class TX of the EN 50125-3)
Outdoor	-40 - +158 °F (-40 - +70 °C) ("in cabinet" climate class T2 of the EN 50125-3)
Indoor equipment humidity	up to 100%, however without condensation or ice formation for the entire temperature range -40 °F to +158 °F. (-40 °C to +70 °C)
Outdoor equipment humidity	100%, IP68
Mechanical strain	3M2 in accordance with EN 60721-3-3, suitable for use in compact outdoor cabinets close to the track
Electromagnetic compatibility	EN 50121-4
Areas of use	High-speed railways, short and regional lines, transit and metros, freight lines, industrial lines, securing of grade crossings.

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