SIEMENS

Rail Automation

Safety Experts in Cab Electronics

usa.siemens.com/rail-automation

Siemens is an innovative supplier of products for railroad and mass transit applications

Siemens uses advanced design skills and tools under a distributed architecture approach to custom engineer and manufacture products that play an integral role in ensuring safe, reliable transportation on many of the busiest railroads and mass transit systems in operation today. Many of our onboard systems are used to protect safety-critical railroad operations on a daily basis, and have been for over twenty years.

Siemens offers an ever-expanding product line. Extensive experience in design, manufacturing, training, and service has allowed us to establish and maintain an outstanding industry reputation. The engineering staff brings over 150 years of collective cab related experience into every job. This level of experience is unmatched by any other company in the railroad industry.

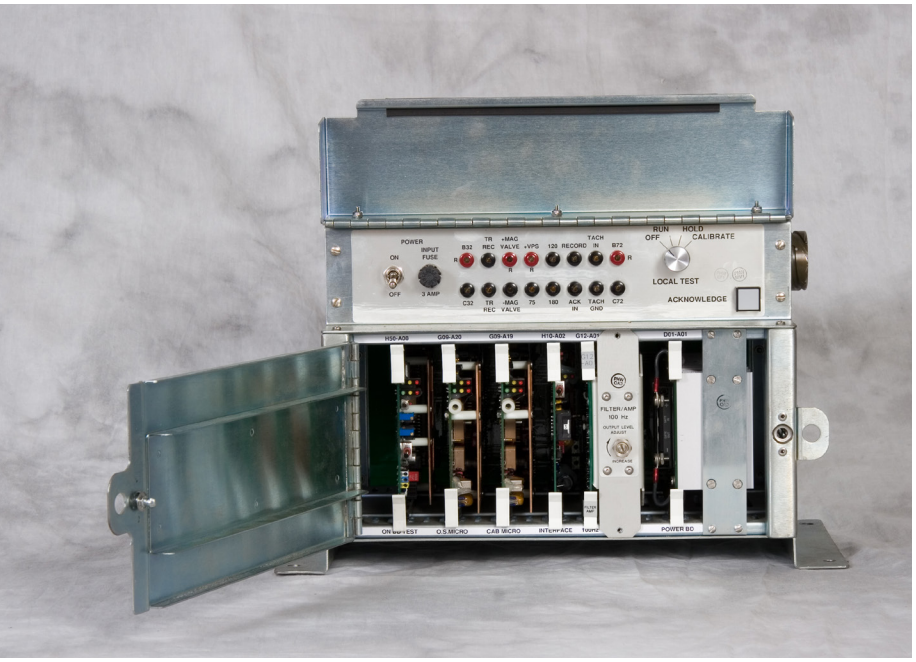
Siemens occupies a 40,000 square foot engineering and a 38,000 square foot manufacturing facility, both located near Pittsburgh, PA. The facilities allow us to take our products from conception to production.

Siemens customers consist of: Amtrak, LIRR, SEPTA, ConnDOT, CSX, MARC, MBTA, Metra, Metrolink, Metro-North, NJ Transit, P&W, Union Pacific, Virginia Railway Express and many others. This satisfaction also extends to the major car builders that we have partnered with over the years, such as Bombardier, MotivePower Ind., GE, Kinkisharyo and EMD.

Continuous Cab Signal Systems

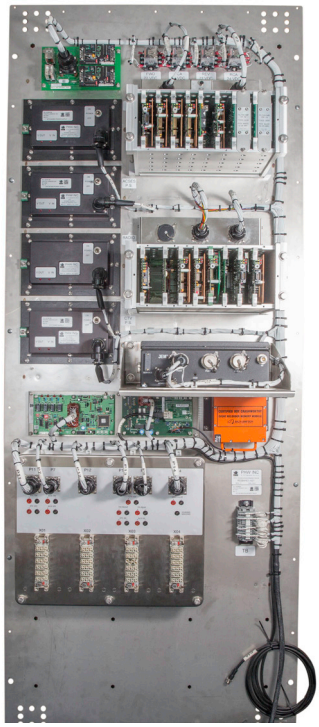
Continuous cab signal systems receive steady streams of signal aspect information from modulated carriers in the rails. This data is continually scrutinized by a safety- critical onboard computer which determines overspeed conditions and issues appropriate alerts and/or penalties.

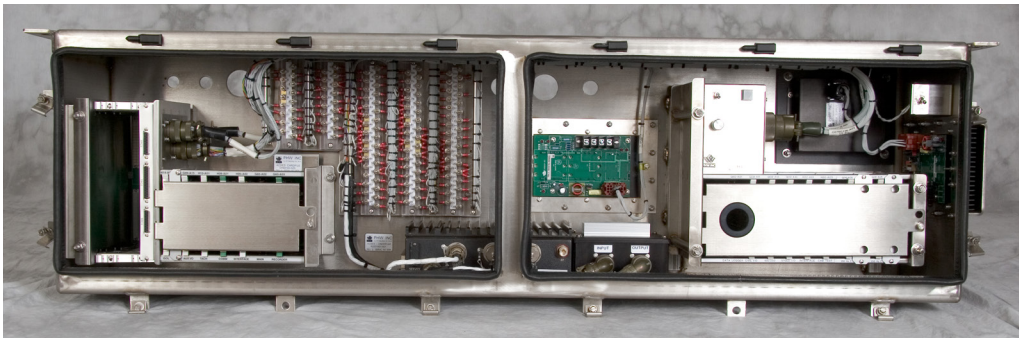
Siemens custom designs and builds these systems according to the specific territories and vehicles on which they will be used. Examples of basic configurations include 4- Aspect, 9-Aspect, and Composite (multiple aspects across multiple territories) systems. Typical system options include braking assurance, vehicle network interfacing, GPS, braking profile generation, etc.



Positive Train Control

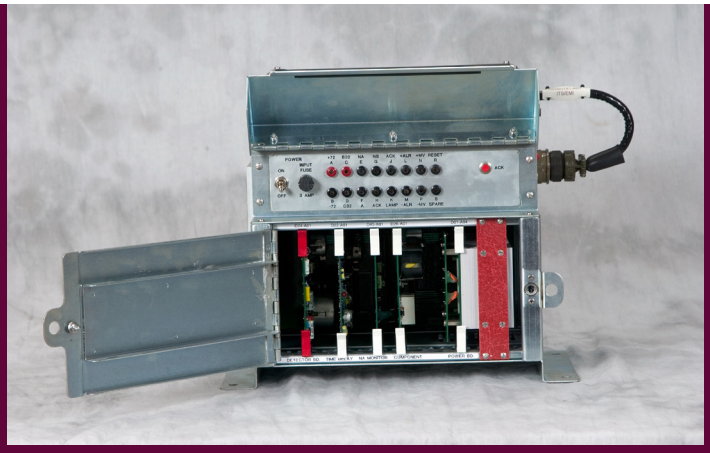
Positive train control systems provide an increased level of protection and Siemens offers a field proven PTC solution that has been in revenue service since 2001 on the NEC. Our 9-Aspect ATC and ACSES systems together provide an FRA compliant PTC implementation.





Intermittent Cab Signal Systems

Intermittent cab signal systems receive signal aspect information on a periodic basis as trains pass over wayside inductors. Siemens continues to supply equipment for the complete spectrum of intermittent applications – including the legacy ITS (Intermittent Train Stop).



Operator Displays

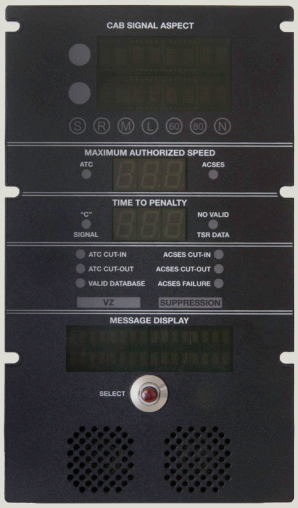
An Aspect Display Unit (ADU) is the primary visual interface between the vehicle operator and the cab signal system. It indicates the aspect being received at any given time. Speed displays or other vehicle status indicators are often integrated into the ADU. All displays use long life solid state indicators so as to minimize equipment failures and vehicle downtime.

Approx. 10.5”H x 6.5”W

Approx. 5”H x 6”W

Approx. 4.5”H x 9”W

Approx. 7”H x 5”W



Approx. 10.5”H x 6.5”W

Approx. 7”H x 11.5”W

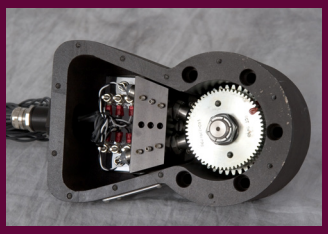
Direct replacement for 3.5” meter movements

Approx. 8”H x 4”W

Approx. 15”H x 7.5”W

Approx. 18”H x 4.5”W

Cab Signal Accessories

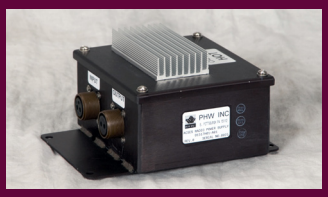


Axle Generators
Axle generators use internal speed sensors to count pulses related to specific gear rotations. This speed data is then relayed to the onboard computer for determination of potential overspeed conditions.

Track Receivers
Track receivers inductively receive coded signals from the rails. These signals are then processed by the onboard computer as continuous signal aspects.

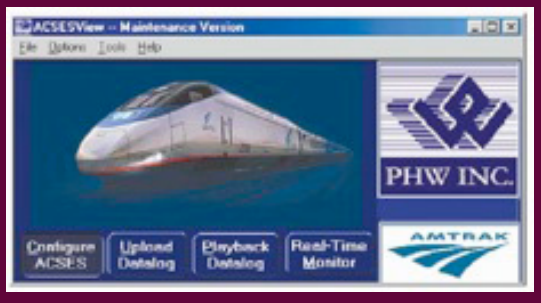
Siemens offers a variety of track receiver bars, including both conventional and patented, high AC traction immunity versions.

Decelerometers
Decelerometers are vital, microprocessor controlled devices that can be used to determine a vehicle's deceleration rate. Fail-safe design principles ensure that a computed deceleration rate cannot be erroneously obtained.

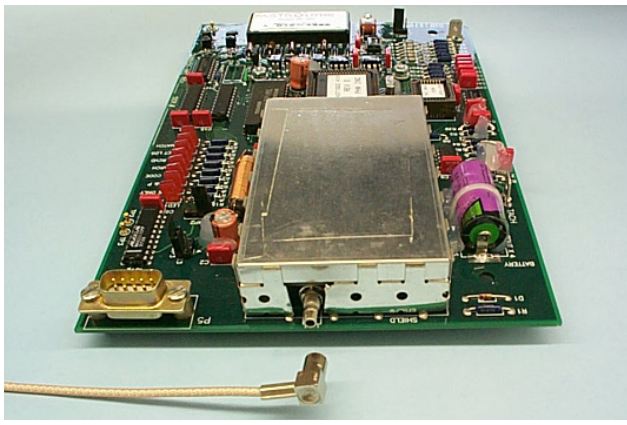


Power Supplies
Siemens builds power supplies for our own cab signal systems. We also custom build power supplies to serve most any existing onboard electronics application.

Cab Signal Diagnostic and Test Software
In addition to the software that is the logic behind our onboard computers, Siemens software engineers custom develop cab signal diagnostic and test software packages to provide solutions for system diagnostics, performance monitoring, and wayside troubleshooting. These tools provide answers to situations that would otherwise go unresolved and be reported as "No defect found".



Misc. Vehicle Equipment/ Services

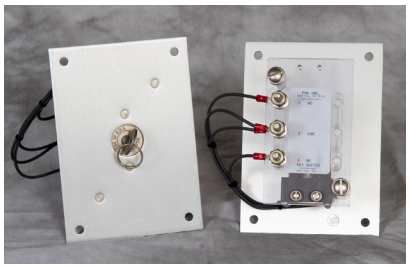


GPS Monitoring System
Siemens's GPS monitoring system works by continually comparing satellite-derived coordinates to coordinates in the cab signal system's onboard database. Warnings and brake applications can then be initiated if, for instance, a cab signal territory switch has been placed in the wrong position.

Bench Test Equipment/ Services

Relay Calibration Unit
Siemens designs and builds calibration test units to allow customers to perform simple Go/No-Go testing of a variety of industry-standard relays. The computer-controlled test bench provides for complete test control and automatic test documentation.

Bench Test Unit
Siemens designs and builds printed circuit board (PCB) bench test units to allow customers to perform detailed PCB testing and repair of it's circuit boards.



Key Lock Switches

Siemens offers key lock switches for a variety of on and off-vehicle applications. Each one is made according to a customer's unique requirements.

Floor Heater Fault Detectors

This unit helps prevent hazardous vehicle fires and features:

- Dual channel fault current monitoring for AC or DC loads up to 30A.
- Programmable trip threshold settings in .1A increments from .1 to 2A.
- Automatic reset capability after a tripping with a programmable number of resets.
- Testability by maintenance personnel using a plug-in external portable test unit.
- Both internal and external trip indicators.
- Small size (Approx. 6.5"H x 2"W).

Junction Boxes

Siemens supplies junction boxes for a variety of vehicle applications. These junction boxes are ruggedized castings that provide durable protection for connections to track receivers or speed sensors.

Bench Test Equipment

The computer-controlled bench provides fixturing, automatic and semi-automatic test, documentation and report generation.

Services

Siemens repairs, inspects, calibrates, and rebuilds wayside equipment (including older, relay-based products) according to the original manufacturer's specifications.

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The information in this document contains general descriptions of the technical options available. The required features should therefore be specific in each individual case at the time of closing the contract. For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action and integrate each component into a holistic, state-of-the-art security concept. Third-party products that may be in use should also be considered.