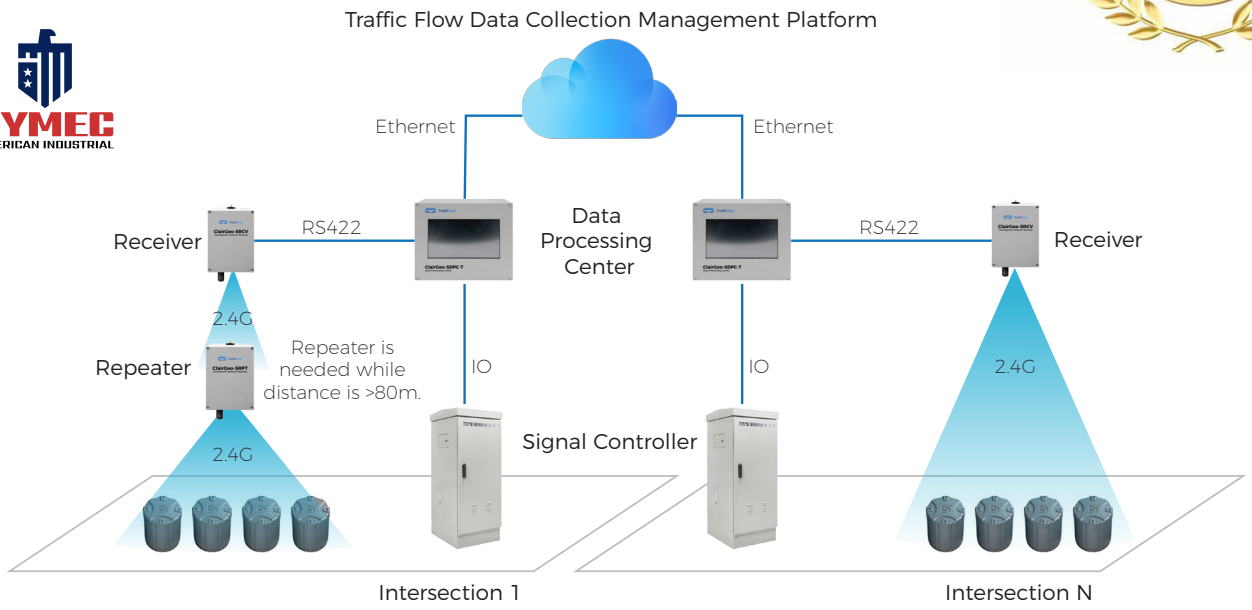
ClairGeo SSeries

Geomagnetic Vehicle Detection System

Verified in 20,000+ Intersections

DYMEC AMERICAN INDUSTRIAL



Overview

The Geomagnetic Vehicle Detection System is a widely adopted solution in urban traffic vehicle management due to its ease of installation and exceptional accuracy, even in challenging environmental conditions. Its core principle revolves around a wireless geomagnetic vehicle detector, known for its precision in capturing various traffic parameters with an accuracy rate exceeding 99%. These parameters include vehicle speed, traffic flow, headway time, and occupancy time. The system comprises a geomagnetic detector, a wireless receiver/repeater, and a data processing center.

A perfect substitute for inductive loop detectors

- It is fully capable of emulating the output mode of inductive loop detectors, offering a binary "presence" and "no vehicle" output. The occupancy time can be customized to match the length and width of the installed inductive loop and tailored to specific output requirements as needed.

99% traffic data accuracy

- It boasts the same high level of accuracy as a loop detector but surpasses it with its remarkably simpler wireless communication and installation process. Flexible deployment

Real-time data collection

- It adopts a collision avoidance mechanism for all detectors to report traffic data in real-time. If the channel is occupied, it will resend after a random multiple of 20 milliseconds to ensure that the traffic data is collected in real-time at the center.

360˚ wireless signal angle

- The detector generates signals with 360˚ wireless angle. Compared with directional antenna, our solution saves the quantity of needed receivers. As a result, the detector can be freely rotated within the installation hole, making installation and removal straightforward and reducing construction and maintenance costs.

Self-adaptive position learning

- After installation, removal should not affect the normal operation of the geomagnetic system, and it can be reused after road maintenance.

Expected 10 years battery life

- The battery life can extend to 10 years for regular usage. Considering extreme conditions, with daily single-lane vehicle traffic exceeding 10,000 vehicles in a megacity, the battery life can still last for at least 5 years.

ClairGeo-SDET

Geomagnetic Vehicle Detector

This state-of-the-art device features an ultra-low-power microcontroller as its core, along with a magnetic sensor chip optimized by algorithms for precise road condition insights, including traffic volume, speed, following distance, and occupancy time. Notably, this detector simplifies construction with streamlined factory configuration through geomagnetic identification and blueprint-based planning. Its integrated power control module allows easy management of the device's operational state. With 360° signal coverage, installation and removal are hassle-free, reducing construction and maintenance costs. Moreover, self-adaptive position learning ensures uninterrupted operation, making it a cost-effective solution for road maintenance.

Streamlined Factory Configuration

- Construction becomes more straightforward by relying on geomagnetic identification and blueprint-based planning, minimizing complexity.

Integrated Power Control Module

- The device's operational state is easily managed by positioning the label either facing upward to power off or facing downward to enable operation, a simple feature that extends the device's lifespan.

360° Wireless Signal Coverage

- The geomagnetic device emits signals from the installation hole in all directions, even when rotated freely, ensuring uninterrupted signal transmission. Consequently, there's no need to enclose the geomagnetic device within the installation hole, simplifying both installation and removal processes, which, in turn, reduce construction and maintenance expenses.



Self-Adaptive Position Learning

- After installation, removal should not affect the normal operation of the geomagnetic system, and it can be reused after road maintenance.

Dimension	Diameter: 87 mm (3.43 inches) Height: 96 mm (3.78 inches)	**Flash Memory**	256KB
Wireless Channel	2.4GHz	**Flow Accuracy**	99%
Channel Bandwidth	2MHz	**Protection Rating**	IP68
Channels	16	**Operating Temperature**	-45 to +85°C (-49 to 185°F)
Receive/ Transmit Rate	250kbps	**Humidity**	93%
Antenna Type	Omni-directional antenna	**Receive Sensitivity**	-110dBm
Antenna Range	360°	**Firmware Upgrade**	Remote firmware upgrade
Detection Mode	Presence/Passing	**Wireless communication distance**	150m
Background Magnetic Field Range	±70Gs	**Detected Vehicle Types**	Common vehicle models including iron tricycles, trucks, trailers, buses, cars, etc.
Detection Method	Earth's magnetic field, adjustable threshold, automatic calibration for background magnetic field changes	**Continuous Working Time**	5 years (under extreme conditions with daily single-lane vehicle traffic exceeding 10,000 vehicles in a megacity)

sales@trafficlair.com /// sales@dymec.com

ClairGeo-SRCV & SRPT

Geomagnetic Detector Receiver & Repeater

The ClairGeo-SRCV detector receiver utilizes 2.4GHz wireless communication technology and adopts existing short-range communication protocols. Its primary role is to act as the central hub where wireless data converges, and it subsequently transmits this data to the data processing center via an RS422 interface. The receiver is powered through the data processing center and serves as the network coordinator, effectively managing communication between all wireless geomagnetic vehicle detectors within the network and the data processing center. It has the capacity to accommodate a maximum of 16 geomagnetic detectors directly within the network, and if more than 16 detectors are required, additional infrastructure must be added.

The ClairGeo-SRPT detector repeater will be needed to ensure reliable communication while the distance between the detector and receiver exceeds 80 meters. It utilizes 2.4GHz wireless communication technology and adopts existing short-range communication protocols. Its primary role is to extend the communication distance between the receiver and the wireless geomagnetic vehicle detectors. Simultaneously, it serves to enhance the capacity of the short-range wireless network terminals. It can be powered through various means, including AC power, solar power, and lithium battery power.

Not subject to installation angle constraints

- Requiring no on-site adjustments, it offers a quick and convenient installation process, ultimately saving on labor costs.

Flexible installation height

- No need for L-rod cross-arm installations, eliminating the requirement for elevated vehicle operations and reducing construction costs.

Versatile power supply options

- It can be powered using solar energy, 220V, or lithium batteries, providing flexibility and adaptability to various power sources.



	ClairGeo-SRCV	ClairGeo-SRPT
Dimension	200mm*150mm*75mm (7.87 inches*5.91 inches*2.95 inches)	
Wireless Channel	2.4GHz	
Channel Bandwidth	2MHz	
Channels	16	
Receive/Transmit Rate	250kbps	
Antenna Type	Omni-directional whip antenna	
Antenna Range	360°	
Receive Sensitivity	-110dBm	
Wireless Communication Distance	700m (between Receiver and Repeater)	
Wired Communication Interface	RS422 (between Receiver and Data Processing Center)	None
Power Supply	DC5V (supplied by the data processing center)	AC220V/Solar Battery/Lithium Battery
Protection Rating	IP68	
Operating Temperature	-45 to +85°C (-49 to 185°F)	
Storage Temperature	-55 to 120°C (-67 to 248°F)	
Humidity	93%	

ClairGeo-SDPC

Data Processing Center

The receiver collects data from the geomagnetic detectors, and send them to data processing center, and then transmits it to the signal control unit or central platform through Ethernet, serial, or I/O interfaces. The data processing center also provides web-based access to communication information, wireless geomagnetic detector data, and status information, allowing for system time and parameter adjustments. Additionally, local data can be stored for over 5 years.

LCD screen displays geomagnetic operational status:

- Green dots indicate no vehicles, and red dots indicate vehicle presence.

On-site access to parameters

- Such as battery level and signal strength, reducing maintenance complexity.

Quickly pinpoint maintenance device locations

- Based on geomagnetic identifiers, minimizing maintenance challenges and saving on maintenance costs.



ClairGeo-SDPC
LED version



ClairGeo-SDPC-T
Touchscreen version

Dimension	213mm * 173mm * 86mm (8.39 inches * 6.81 inches * 3.39 inches)
CPU Type	ARM series CPU
System Type	Embedded Linux system
Storage Type	On-board eMMC storage chip
Storage Capacity	8GB (optional 32GB)
Storage Expansion	microSD card/USB drive
Storage Expansion Capacity	32GB
Local Data Storage Time	5 years
Local Data	Flow, average speed, occupancy, maximum speed, minimum speed, headway, spacing, average vehicle length
Interfaces	RS232, RS485, dual Ethernet ports, IO (digital/analog), USB interface
Output Interfaces	I/O, RS232, RS485, Ethernet port
Output Detection Mode	Presence/Passage
I/O Output Channels	32 channels, expandable through cascading
Configuration	Configuration and continuous 24-hour monitoring of device operation status through touch screen, with parameter setting and device monitoring accessible through IE browser via Ethernet port
Firmware Upgrade	Firmware upgrade via USB drive Remote firmware upgrade for detectors via USB drive
Management Platform	1. Includes a management platform for uploading traffic parameters such as vehicle flow, speed, occupancy, and average spacing at detection points 2. The platform allows real-time monitoring of field status and remote modification of field parameters, device reboot, firmware upgrade, and detector firmware upgrade 3. Automatically resumes data transmission after network restoration in the event of network interruption
Power Supply	AC220V
Operating Temperature	-45 to +85°C (-49 to 185°F)
Humidity	93%

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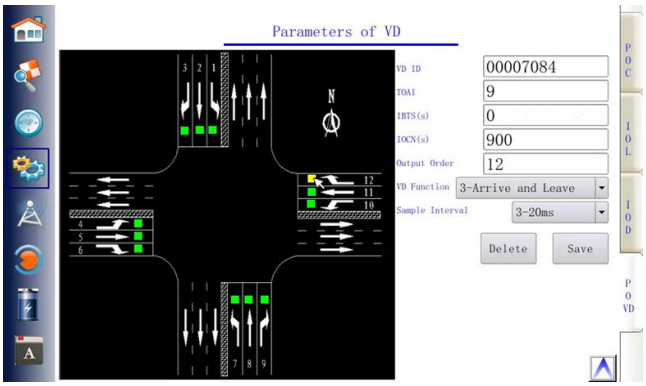
ClairGeo-SMGT

Traffic Flow Data Collection Management Platform

Using Socket programming and TCP/IP communication protocol, the system receives business requests from intersections and management clients. Simultaneously, it efficiently stores and organizes the vast amount of collected traffic data using Oracle or SQL Server databases. The management clients have centralized control and oversight of intersection hosts, relays, and detectors via the city center server.

Key functions:

- Subarea Management
- Intersection or Road Segment Management
- Detector Installation Position, Lane Mapping, and Parameter Configuration
- Intersection Host Device Synchronization
- Traffic Statistics Data Retrieval
- Geomagnetic Status Query
- Geomagnetic Packet Loss Rate in the Last 24 Hours
- Geomagnetic Fault Query
- Data synchronization between server database and local database



Bidirectional Synchronization	The system supports bidirectional synchronization between the client's local database and the server database, allowing on-site personnel to conduct equipment installation, debugging, and maintenance even in the absence of a network.
Equipment Management	Configuration of areas, intersections, road segments, lanes, and their corresponding devices. Real-time remote monitoring of device operational parameters and statuses. Remote modification of system parameters and device restarts.
Real-Time Equipment Fault Alert	Instant notification of device faults through email or SMS to relevant personnel.
Real-Time Traffic Data Upload	When vehicles pass through geomagnetic devices, relevant traffic information is uploaded in real-time to the server. It supports automatic data retransmission in case of network recovery. This information accurately reflects real-time or historical traffic parameters.
Traffic Flow Queries	Retrieval of traffic flow on various road segments, intersections, sections, and lanes, with the flexibility to select specific criteria.
Statistical Data	Compilation of traffic parameter statistics for the entire road network's detection points within specified time frames, including traffic flow, speed, occupancy time, and average vehicle spacing.
Traffic Flow Reports	Generation of statistical reports for different time periods (hourly, daily, monthly, and yearly) with the option to choose time slots of 5 minutes, 15 minutes, 30 minutes, or 1 hour.
Report Export	Capability to export reports in TXT or Excel format, with corresponding chart-based statistics.
Integration	Providing interfaces to integrate traffic information with third-party platforms.

Ordering Information

Model	Description
ClairGeo-SDET	Geomagnetic vehicle detector
ClairGeo-SRCV	Geomagnetic detector receiver
ClairGeo-SRPT	Geomagnetic detector repeater, needed while distance is >80m
ClairGeo-SDPC	Data processing center, without touchscreen
ClairGeo-SDPC-T	Data processing center, with touchscreen
ClairGeo-SMGT	Traffic flow data collection management platform (optional)