WHITEPAPER

Intelligent RFID Vehicle Access Control

Automatically identify vehicles. Centrally manage access permissions. Streamline vehicle access processes.

Manual vehicle access checks are time-consuming and can lead to delays, especially at sites with high traffic volumes. With **passive UHF RFID technology** and **RFline readers**, authorized vehicles can be identified automatically as they approach. Once the access has been successfully verified, the barrier opens automatically. The solution is ideal for industrial and logistics sites, construction site entrances, restricted urban areas, employee parking facilities, airports, toll roads and parking management applications.

Automatic Identification

Identify vehicles contactlessly from a distance.

Centralized Management

Manage vehicle access centrally and remotely.

Tamper Protection

Tamper-evident labels help prevent unauthorized transfer.

Different Vehicle Types

Suitable for cars, vans and trucks.

Different Access Points Require Different Solutions

Whether it is a single-lane industrial entrance, a logistics center or an employee parking facility, the RFID solution can be adapted to the lane width, vehicle types and required detection zones. The following three examples illustrate typical system configurations.

1

Single Lane for Entry or Exit

The **RFline E4** identifies vehicles via a UHF transponder attached to the windshield. MasterGate verifies the access authorization and controls the barrier. Where the same lane is used for both entry and exit, an additional reader can be installed to enable direction-dependent vehicle detection.

Recommended combination
RFline E4 · Windshield Label · MasterGate

2

Separate Lanes for Logistics Sites

Separate detection zones enable vehicles to be identified independently across different lanes. The **RFline U4** provides four antenna ports for flexible antenna positioning. MasterGate centrally manages access permissions and records vehicle movements.

Recommended combination
RFline U4 · External Antennas · MasterGate

3

Automated Vehicle Access Combined with Employee Identification

The **RFline E4** identifies authorized vehicles and enables automatic barrier control. With a hybrid card, employees can use the same credential for both vehicle access and access to the building.

Recommended combination
RFline E4 · Hybrid UHF + HF Card · MasterGate

Key Considerations in Real-World Applications

Optimal Read Zone
Antenna alignment determines the read zone and should be adapted to the direction of travel, vehicle speed and barrier position.

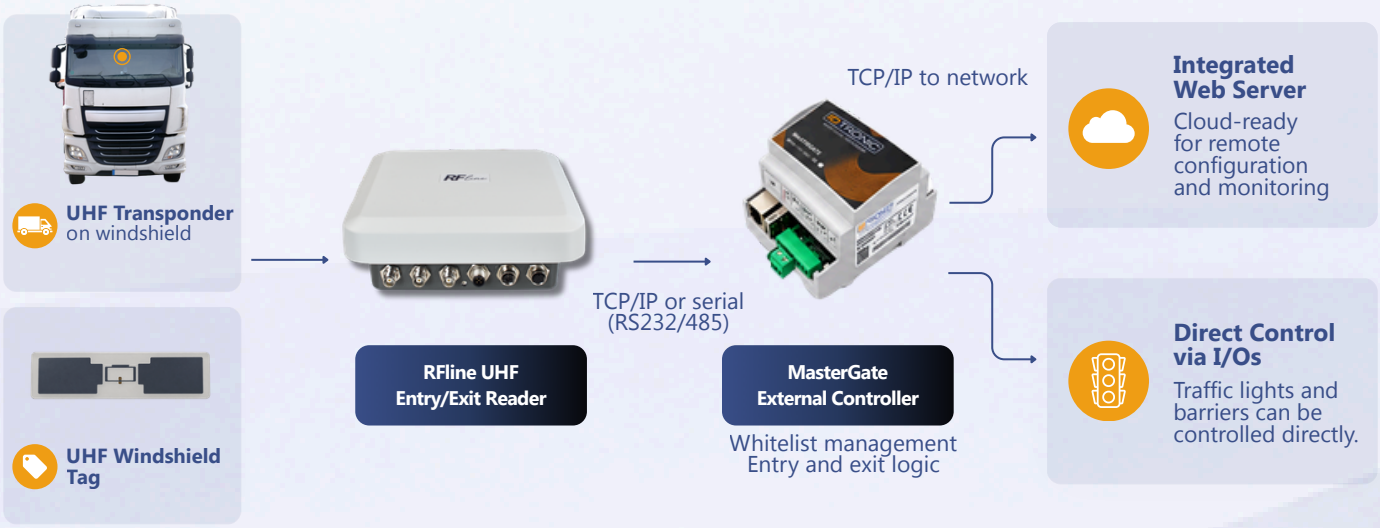
Adjacent Lanes
Precisely aligned antennas help separate individual read zones and ensure reliable vehicle assignment.

Metal-Coated Windshields
Coated windshields can affect RFID performance, making correct tag positioning essential. Special-purpose tags or bumper tags provide suitable alternatives.

Unauthorized Transfer
Self-adhesive windshield labels are damaged when removed, helping prevent unauthorized transfer to another vehicle.

How RFID Vehicle Access Control Works

A passive UHF transponder installed on the vehicle is detected by the **RFline reader**. The vehicle ID is transmitted to the **MasterGate Controller**, which verifies the access authorization and controls the barrier when access is approved. The control logic is securely located in the separately installed MasterGate Controller rather than in the externally accessible reader.



RFID Hardware for Automated Vehicle Access

RFline E4

Stationary Long-Range UHF Identification

The RFline E4 reliably identifies vehicles from a distance. Its integrated circular antenna enables a compact installation directly alongside the traffic lane. Combined with MasterGate, access permissions can be verified centrally and vehicle access can be controlled automatically.

- Integrated antenna for compact installation
- Long read range for vehicle identification
- Rugged industrial housing for outdoor applications

RFline U4

Stationary UHF RFID Solution with 4 Antenna Ports

The RFline U4 enables flexible read zones using four external antenna connections. Precise antenna positioning makes the system particularly suitable for multi-lane access points and more complex installation concepts. Combined with MasterGate, access permissions are verified centrally and vehicle access is controlled automatically.

- 4 antenna ports for flexible read zones
- Suitable for multi-lane access points
- Flexible antenna positioning

MasterGate Controller

Centralized Vehicle Access Control with Remote Management

Cloud Connectivity
Connect sites and systems

Remote Management
Adjust access permissions remotely

Up to 8 Systems
Centrally manage multiple access points

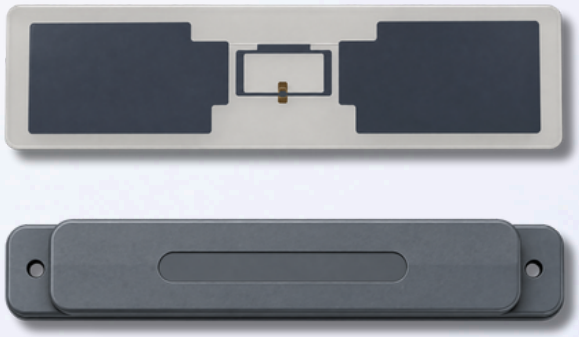
The **MasterGate Controller** connects the RFID reader to the existing vehicle access infrastructure and handles centralized authorization management. Its web-based dashboard allows multiple access points to be managed centrally while providing visibility into vehicle movements.

- Manage access permissions
- Assign vehicles
- Track events

Windshield Labels / Bumper Tags

Passive UHF Transponders for Vehicle Identification

Windshield labels and bumper tags enable reliable long-range vehicle identification. Windshield labels are attached to the inside of the windshield, while bumper tags can be mounted on suitable exterior vehicle surfaces. Tamper-evident labels help prevent unauthorized transfer between vehicles.



- Contactless vehicle identification
- Tamper protection
- Flexible mounting depending on vehicle type

Hybrid UHF + HF Card

One Card for Vehicle and Building Access

The hybrid card combines UHF and HF technologies in a single credential. UHF enables long-range vehicle identification, while HF provides identification at building entrances. This allows employees to use the same card for both parking access and building access.

- UHF and HF combined in one card
- One credential – two applications
- Can also be used as an employee ID card

ID ACCESS 2500

RFID Access Reader for Building Identification

The ID ACCESS 2500 enables contactless identification of individuals at building entrances. Combined with a compatible hybrid card, vehicle access and building access can be integrated into a single identification solution.

- Contactless personnel identification
- Supports compatible RFID employee credentials
- Can be combined with UHF vehicle identification

Cables and Accessories

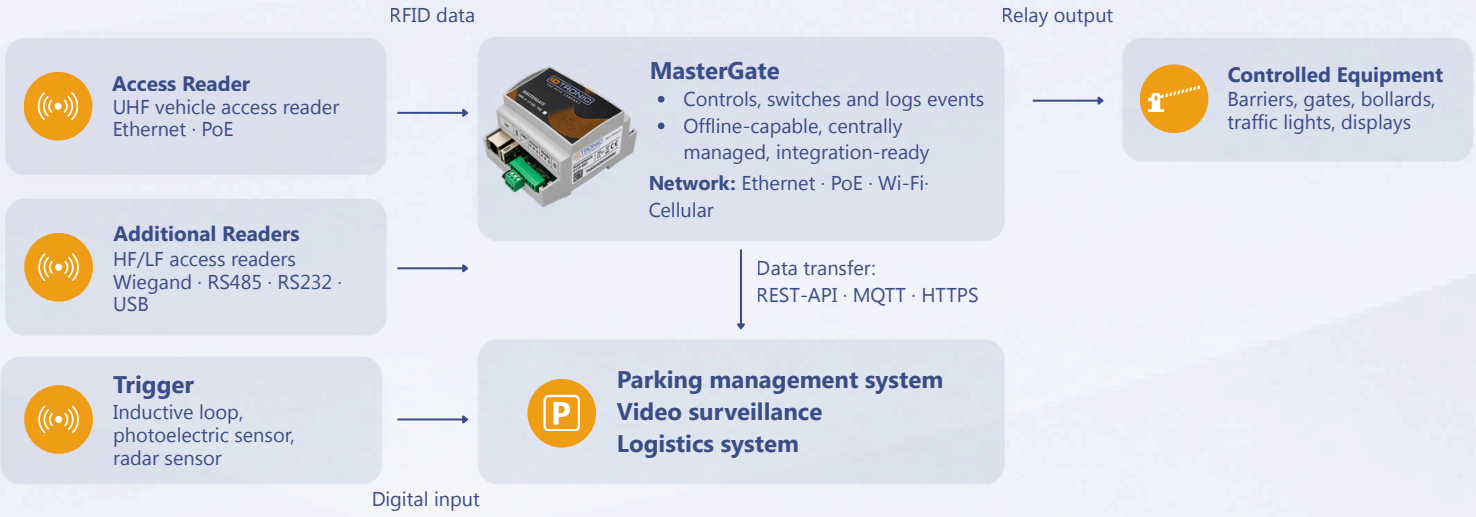
Suitable Components for Reliable Installation

Suitable connection and mounting components support a reliable installation of the RFID vehicle access solution. Ethernet and antenna cables connect the individual system components.

- Mounting accessories for customized installations
- Simplified cabling with PoE

Integration into Existing Infrastructure

MasterGate integrates into existing systems rather than replacing them.



Integrate Access Readers

Continue using existing HF/LF readers and RFID cards.

Trigger the Reading Process

An inductive loop, photoelectric sensor or radar sensor activates vehicle detection.

Control Gate Equipment

Control barriers, gates, bollards and traffic lights via relay outputs.

Grant Visitor Access

Provide temporary access via license plate recognition, QR code or release button.

Transfer Data

Transmit events to third-party systems via REST or MQTT.

Network Integration

Connect via TCP/IP, Wi-Fi or optional cellular communication.

Additional Applications

Industrial & Logistics Site Access

Authorized vehicles are automatically identified as they approach the access point. Access permissions for employees, suppliers and service providers can be managed centrally and, where required, restricted to specific time periods.

Employee Parking

Vehicles can enter contactlessly without the need to manually present a card. With a hybrid UHF + HF card, employees can use the same credential for both parking access and building access.

Construction Site Access

Construction vehicles and external contractors can be assigned temporary access permissions. This allows authorizations to be adapted flexibly to project schedules and changing service providers.

Parking Management

Access to parking areas can be automated and managed centrally. Permissions can be assigned to individual vehicles or user groups, while entry and exit events can be tracked.

About iDTRONIC

Since 2003, iDTRONIC has been developing professional RFID solutions for identification and access control. From selecting the right products to system integration, we support companies throughout the implementation of their RFID projects.

Experience since 2003 | Consulting & integration | Customized RFID solutions

Your Access. Your Solution.

Would you like to automate your vehicle access control or expand an existing system? We support you in selecting the right components and integrating them into your infrastructure.

Discuss your RFID project

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