



RedStorm™ System Product Requirements Guide

The RedStorm™ System is a stand-alone network of space available signs and RedStorm Controllers (differential-type counters) that integrates with commercially available vehicle detection equipment. The RedStorm System is flexible enough to support a small surface lot or a multi-level parking structure. It requires no tie-in with the main parking facility network and is the ideal system to integrate with existing loop detection.

The RedStorm Controllers keep a running count of the vehicles entering and exiting defined areas of the parking facility and communicate that information, in real-time, to our space available signs. Each loop detector or pair of sensors is hard wired to a RedStorm controller.

System Overview

As a vehicle enters the parking garage or lot it passes over a pair of in-ground loop detectors or between a pair of sensors that can detect direction of travel. At start up, a baseline for the number of spaces on each level is entered into each RedStorm Controller and from that number the count is adjusted and displayed on the corresponding sign display(s). The displayed number at the sign represents the number of spaces available on that level but is affected by the number of vehicles passing through the level. For example, if there were 3 open spaces on a level and 4 vehicles passing through the level, the sign will display that the level is **FULL**.

RedStorm is not an individual space counting system. The system does not recognize if a space is parked in or not. RedStorm only recognizes when a vehicle enters or exits a parking level and either subtracts one vehicle entrance or adds one vehicle exit.

In summary, the RedStorm System works by deducting a space from the available space count when a vehicle enters a level or area and adds an available space back on when a vehicle exits the level or area.

RedStorm™ System Requirements

• Planning and Site Preparation

Planning and Site Prep Considerations

1. Physical lane delineation should be installed by others at all vehicle count transition points, entrances and exits. When designing the traffic flow, ensure that all vehicles are directed to travel over loop detectors or within the sensing range of the sensor pairs. Clearly designate separate travel areas for pedestrian and vehicular traffic. Crossing pedestrian and vehicular traffic may interfere with vehicle counts.
2. When using sensors they should be mounted in pairs and protected from weather elements. Since sensors use A/B logic to detect vehicles and their travel direction; they should be installed in pairs a minimum of 48" to a maximum of 60" apart for proper vehicle detection. Sensors require a minimum voltage of 10.2V to operate. Output from RedStorm Controllers is 11.4 Volts. The maximum length of wire between a RedStorm Controller and sensor or loop detector pair should not exceed 350 feet. Connections between controller and sensors or controller and loop detectors must be hard wired. A pair of sensors or loop detectors should be installed at each vehicle transition point within the garage or lot. The scanning field for each sensor in a pair is 7 feet side to side and up to 9 feet above the finished floor; optimal scanning height is 7'- 0" to 7'- 6" above finished floor. Sensors **MUST NOT** be located adjacent to parking spaces. When sensors must be placed next to parking spaces, the adjacent spaces should be removed from use through permanent delineation to maintain count accuracy. Also to avoid vehicle count errors, sensor brackets must be securely fastened to structural supports to prevent sensors from shifting from ambient vibration during actual use.
3. Avoid placing sensor pairs in close proximity to fluorescent lighting fixtures. Reflected light and flickering from fixtures may cause sensors to trip which will affect vehicle count accuracy.
4. Each RedStorm Controller **MUST** be mounted inside a NEMA 4X enclosure or approved equal. RedStorm Controllers ship from the factory in an approved enclosure we strongly recommend using that enclosure during the installation. All conduit connections **MUST** be made through the bottom of the NEMA 4X enclosure to prevent water damage to the electronic components.
5. Communication and power wiring **MUST** be run through separate conduits to avoid cross-over interference. Communication network should be protected with transient voltage suppression.
6. RedStorm Controllers should be located at an accessible location for ease of maintenance.
7. For proper vehicular detection to occur maximum vehicle speed should be less than 20 mph.
8. Vehicle counts are updated in real-time. Updates are not instantaneous, delays up to 10 seconds may occur.
9. The RedStorm System can support a maximum of 32 devices per network section. If more than 32 devices are needed please consult Trans-Tech engineering department before proceeding. Each RedStorm Controller and sign is considered a separate device.
10. We recommend using a RS485 network-knowledgeable installer to run the cable for the system. Sensors require a minimum voltage of 10.2V to operate. Output from RedStorm Controllers is 11.4 Volts. At a minimum, a 3 conductor, 18 gauge cable must be used between sensor or loop detector and RedStorm Controller. Communication cabling lengths **MUST** be kept as short as possible. The length of the RS485 cable run **MUST NOT** exceed 4,000 feet. Use proper terminating and bias resistors. Refer to the TIA/EIA-485-A guidelines for additional requirements.
11. The RedStorm System **MUST** be connected to an uninterruptible power supply (UPS) to prevent vehicle count interruption during a power disruption. The UPS is not part of the RedStorm System and **MUST** be provided by others.
12. Due to their size, motorcycles will not be accurately detected.

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RedStorm™ System Requirements

• Environmental Factors • Critical Factors

Controlled Document Version 2.1 1:006:006f January, 2012

Environmental Factors Which May Interfere With Proper Vehicle Counts

1. The flow of pedestrian traffic through the vehicular sensing zones. Large moving objects such as a person pushing a wheelchair or shopping cart, large group of people or a person pulling luggage may be counted as a vehicle. Single individuals will be detected but not counted due to the RedStorm Controller's filtering capabilities.
2. Disruption of power. A power disruption will stop the counting of vehicles. To maintain accurate counts during these periods we recommend connecting the RedStorm System to an uninterruptible power supply (UPS) installed by others.
3. Fluorescent lights in the sensor detection field. The flickering of fluorescent bulbs may interfere with accurate vehicle counting. We recommend installing sensors away from fluorescent fixtures.
4. Dirty sensors. Sensors should be cleaned routinely with soap and water; sensors must not be pressure washed.
5. Standing water directly in the sensing field may cause a sensor to trip and affect vehicle counts. We recommend adjusting the angle of the sensing field slightly away from the floor to avoid reflective miscount situations.
6. Vehicles traveling faster than 20 mph in the parking facility.

Critical Factors for Proper Operation of The RedStorm System

Failure to address these factors in the planning and installation of the system will directly affect the accuracy of the system.

1. Proper sensor placement

- a. Sensors **MUST** be installed in pairs and placed at least 48" apart but no more than 60" apart.
- b. Sensor height **MUST NOT** exceed 9'- 0" above the finished floor; ideal height is 7'- 6" above finished floor.

2. Adequate lane delineation

- a. Physical lane delineation must be present at all sensor and loop detector locations to ensure that vehicles travel within the sensing range of the sensor. Vehicles that travel outside the sensing range will not be counted.
- b. Clearly designate separate travel areas for pedestrian and vehicular traffic. Crossing pedestrian and vehicular traffic may interfere with vehicle counts.

3. Proper RedStorm Controller placement

- a. Each RedStorm Controller **MUST** be mounted inside a NEMA 4X enclosure or approved equal.
- b. Conduit **MUST** enter through the bottom of a NEMA 4X enclosure to prevent water damage to the electronic components. All connection points **MUST** be properly sealed to prevent moisture from entering the controller box.
- c. The maximum length of wire between a RedStorm Controller and sensor or loop detector pair is 350 feet when using 3-conductor, 18 gauge wire.

4. Proper network communication installation

- a. Daisy chain (series connection) network topology is required.
- b. The length of the RS485 cable run should not exceed 4,000 feet. Refer to the RS-485 guidelines TIA/EIA-485-A guidelines for additional requirements.
- c. Communication wiring **MUST NOT** be run in same conduit as power. All wiring **MUST** be grounded.
- d. Communication network **MUST** be protected with transient voltage suppression and UPS to prevent vehicle count interruption.