



Reaction Gate (Wireless)

RG-xW

Operation Manual



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Section 1 - System Description

“Reaction Gate” by PSI is a training and evaluation tool that enhances rider reaction time, strengthens focus, and improves riding skill. As a rider approaches multiple lanes, lights on all lanes but one illuminate red and the rider must make the split second decision to take the clear lane. This exercises a rider’s judgment in regard to how fast they approach the Reaction Gate and teaches rapid response to any obstacle or decision that a high performance rider will face.

Within 0.1 seconds of crossing an invisible threshold, the system randomly selects the clear lane and wirelessly triggers all remaining lanes to illuminate red. Easy setup, wireless operation, and internal batteries make the system not only functional but also trouble free and simple to operate.

PSI can configure the Reaction Gate for multiple channel and system operations such as EVOC (Emergency Vehicle Operations Course) or also setup for two lights per lane with green and red in each lane. Many applications may be served by variations in the system. Some applications have included motocross courses with multiple tracks and the Reaction Gate sends riders on the “high road” or the “low road” completely randomly.

Power supply options: The standard Reaction Gate system is configured for AA battery operation with each unit, Gate and each Light take eight AA batteries each. NiMH (Nickle Metal Hydride) batteries are recommended for maximum hours of operation. The Reaction Gate may also be upgraded for remote 12 Volt battery systems or 120 VAC power supplies utilized in more permanent situations.

Reaction Gate is a product of the U.S.A., developed and manufactured by PSI, Gold River, CA.

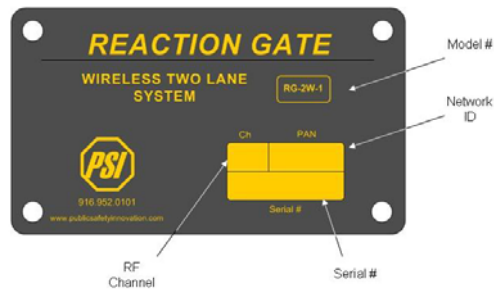


Figure 1: ID Plate Information

Serial Number Identification:

When a system is shipped, all units within the system share the first five characters of the serial number (xxxxx). The last digit of the serial number indicates whether a device is a Gate Unit or which particular Light Unit. Since the system is synchronized with an RF channel and a network ID, it is essential that units of the same base serial number operate together.

Table 1: Serial Number Identification

xxxxx-9	Gate Unit
xxxxx-1	Light Unit 1
xxxxx-2	Light Unit 2
xxxxx-{3-8}	Light Unit {3-8}

Section 2 - System Operation

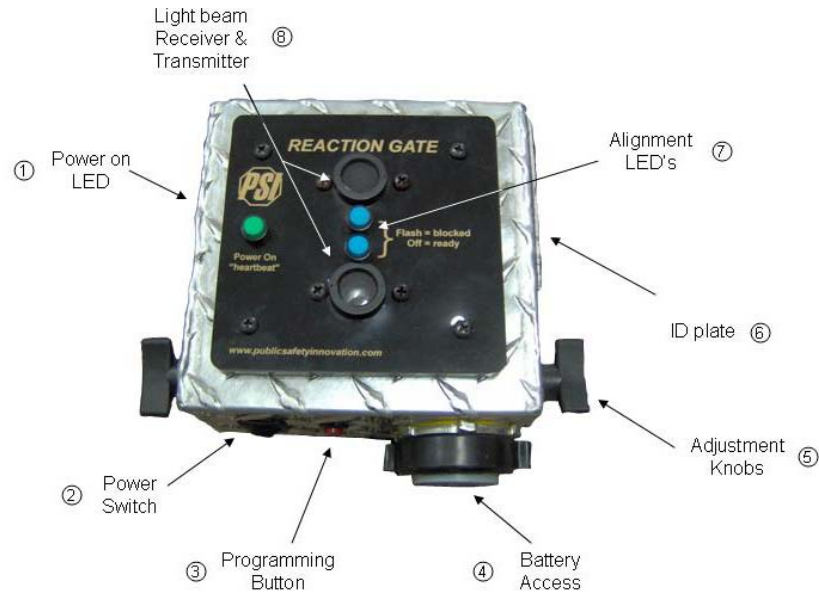


Figure 2: Gate Unit Overview

1	Power on LED	Heartbeat flash every two seconds to indicate power is on. Three flashes in succession indicate low battery voltage.
2	Power Switch	Provides power to the unit. White dot down is power on.
3	Programming Button	This momentary button is utilized to change the programming of the system. See programming section for more details.
4	Battery Access	Unscrew the knob to provide access to the AA batteries or to install optional power.
5	Adjustment Knobs	Knobs secure the Gate Unit onto a standard 28" traffic cone.
6	ID Plate	This plate includes model #, serial #, channel #, and network id
7	Alignment LED's	These LED's flash when the beam is broken. With the reflector in place and aligned properly, these LED's will remain off.
8	Beam Tx & Rx	The infra-red beam is emitted from the lower unit and received by the upper. These lenses must remain unobstructed for proper operation.



Section 3 - Batteries and Power

Battery Selection

The Reaction Gate system was designed for operation with AA batteries. In each Light Unit and the Gate Unit is a carrier that holds 8 AA batteries. While the system will operate with Alkaline, Nickel Cadmium (NiCad), Nickel Metal Hydride (NiMH), or Lithium Ion AA style batteries; performance will vary with the various types of batteries.

If using disposable batteries, a quality Alkaline battery (such as the Energizer E91) will provide approximately 50 hours of service. The Lithium battery will provide a longer run time and when used in the Light Unit, they will maintain maximum brightness throughout the operational time. This is superior to the Alkaline batteries which will gradually dim with use.

Table 2: Battery Types and Run Times

Battery Type	Reuse	Approximate Run Time	Notes
Lithium	Disposable	50 hours	<i>Preferred Battery</i>
Alkaline	Disposable	40 hours	Lights dim as batteries drain
Budget Alkaline	Disposable	15 hours	
NiMH	Rechargeable	40 hours	
NiCd	Rechargeable	10 hours	Batteries have memory

Low Battery Indication

Gate Unit: Power On heartbeat will flash three times in succession.

Light Unit: Only the center LED illuminates.

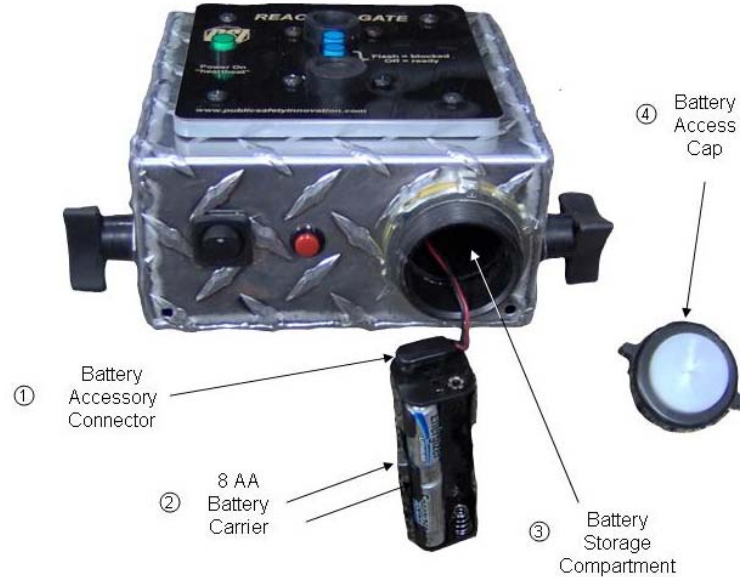


Figure 3: Battery Installation

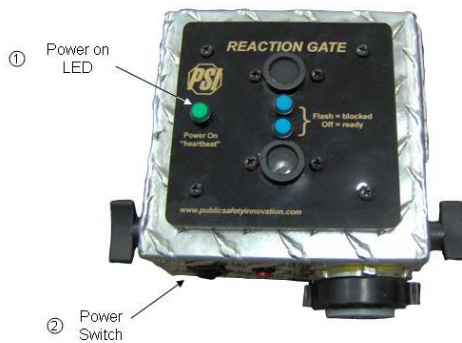
Battery Installation

Gate Unit or Light Unit

Unscrew the Battery Access Cap (4) and allow the Battery Carrier (2) to slide out. Exercise caution when opening the door to prevent the battery pack from falling out and dangling from the wires. This will cause pre-mature failure of the device.

Install eight new AA batteries (do not mix old and new batteries or various battery types) into the carrier while paying attention to the polarity indicators inside the carrier.

Push the loaded Battery Carrier back into the unit and reattach the Battery Access Cap.



Power 'On' Test – Gate Unit

Once the unit is powered on, the green front panel LED will flash, once every two seconds as a heartbeat indication that power is on and that the batteries have sufficient capacity. As the batteries drain to a low level, this LED will flash three times in succession to indicate the batteries should be recharged or replaced.

Power 'On' Test – Light Unit

When power is switched on the light will flash briefly to indicate that power is on. If only the center light flashes briefly or no lights are observed at all, then the batteries should be recharged or replaced.



Additional Power Options:

AC Power Kit (PSI part number RG-AC-1): Replaces the AA battery pack with an external power cable and wall transformer for fixed installations.

DC Power Kit (PSI part number RG-DC-1): Replaces the AA battery pack with an external power cord that connects to an external battery for longer run times.

Section 4 - System Field Setup

Gate Unit

The “gate” is typically setup between two 28” traffic cones. The Gate Unit has a bracket on the back that will slide over the top of the cone and attach securely. The beam must travel out and reflect off of a highly reflective surface. The Reaction Gate specifications are based upon reflection from a second 28” traffic cone equipped with reflective material. Regardless of the reflective surface, always ensure that it is clean and in good condition.



Turn the Gate Unit power on. The blue alignment LED’s should flash unless the beam is reflecting off of another surface. Align the Gate Unit so that the face is roughly pointed toward the reflecting surface. When the unit is aligned and the beam reflected back to the Gate Unit, the blue alignment LED’s will stop flashing and go blank.

Sweep the ‘reflective cone’ side to side to determine the center of reflection. Place the reflective surface in this center position for maximum possible reflection. If the blue alignment LED’s continue to flash then the reflection is not sufficient. Move the reflective surface closer and try again. If false triggers occur after the beam alignment is complete and the blue alignment LED’s flash without an object breaking the path, then adjust the vertical tilt of the Gate Unit and re-align.

Since the system operates at maximum power for maximum operating distance, trigger failure may occur if an object is placed within 5 ft (1.5 m) of the Gate Unit. For safety of the Gate Unit and to prevent trigger failure, the Gate Unit should be set back from the traffic lane by this distance.

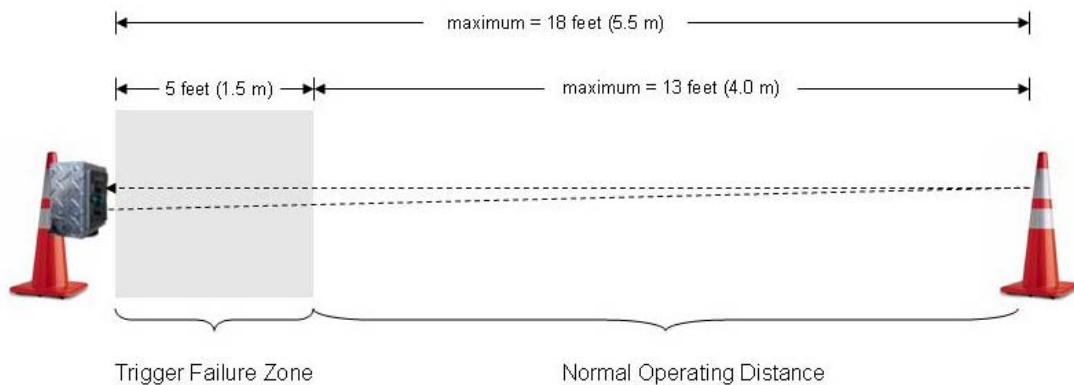


Figure 4: Gate setup distances

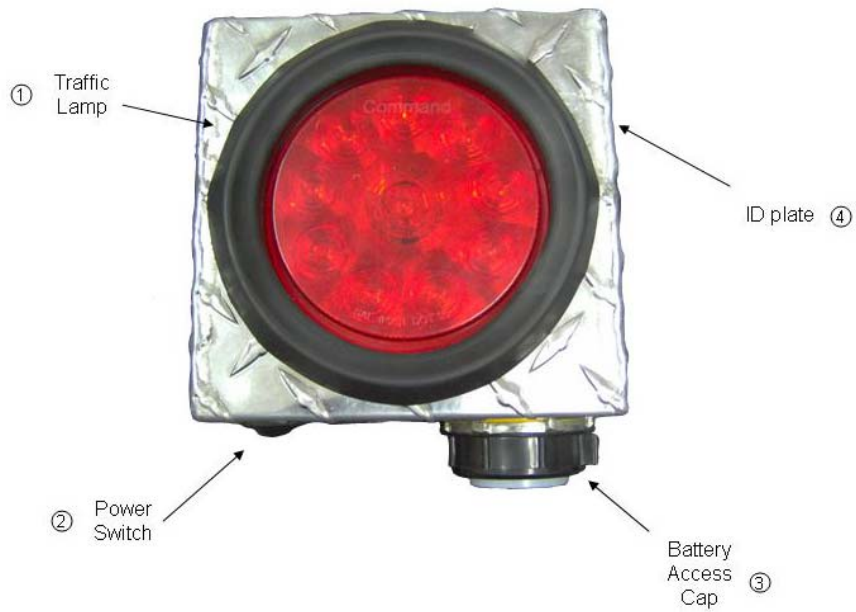


Figure 5: Light Unit Overview



Light Units

Light Units are equipped with mounting hardware that allows for attachment to a 1 ¼” or 1 ½” mast. This mast is standard in the Tripod Kit (TRI-2). Locate the tripods and Light Units down the course in the manner that suits the test. Maximum range between the Gate Unit and the Light Unit is 1,800 ft (550 m); however most suitable locations are much closer.



Section 5 - Programming



Figure 6: Gate Unit Programming

Light 'On Time'

Light 'On Time' : The default time for how long the light remains on after a trigger is 8 seconds. The systems returns to the default time each time the power is turned off and back on.

To change the on time press and release the *Program Button* located on the bottom of the Gate Unit. Both LED's will illuminate to indicate a change to the 'On Time' parameter. Each consecutive press of the *Program Button* will change the 'On Time' as shown in the table below.

Table 3: Programming Modes

On Time duration (seconds)	
2	
4	
8	default
12	
18	



Section 6 - Course Setup Examples

Brake & Escape

Reaction Time

Appendix A - Engineering's Operating Instructions

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Operating your Reaction Gate:

Battery check:

Make sure transmitter unit and receiver units have fully charged rechargeable batteries or fresh alkaline batteries:

When you switch the Transmitter unit ON observe the green 'Power' LED. Ignore blue 'Align' LEDs. If batteries are OK the 'Power' LED will flash ONCE every 6 seconds. The 'Power' LED will flash 3 TIMES every 6 seconds if the batteries need to be recharged or replaced.

When you switch the Receiver unit ON the light on the unit will flash once indicating batteries are OK and the unit is ready. If the light does not flash once OR the light looks dim OR only the center of the light flashes, batteries need to be recharged or replaced. For maximum brightness we recommend using alkaline batteries on the receiver units.

Field Setup:

Place the transmitter unit on a 28-inch traffic cone perpendicularly to the ground with its back towards the sun if possible.

Tighten adjustment knobs.

Place receiver units (lights) on tripod poles at desired positions.

Tighten adjustment knobs.

Turn Transmitter and Receiver units ON.

Make sure the reflective label on the 28-inch 'reflective cone' is clean and in good condition.

Move a 28-inch 'reflective cone' between 8 to 18 feet away from the transmitter unit.

Sweep the 'reflective cone' side to side to find the center of reflection ('Align' blue LEDs not flashing). Place the 'reflective cone' in optimal position.

Watch receiver lights for false triggers.

If triggers occur with no beam interruption make sure Transmitter unit is perpendicular to the ground and reposition the 'reflective cone' by moving it closer to the transmitter unit while sweeping it side to side to find the center of strongest reflection.

Due to the amplified power of the Infra Red beam the unit may reflect off objects in its path that are 5 feet or closer. To avoid false triggers place a 'gate cone' at least 5 feet away from the transmitter making sure not to block the beam's path to the 'reflective cone'.

This will also help the riders avoid hitting the transmitter unit.



Direct traffic between the 'reflective cone' and the 'gate cone'.

Use 'Program' button on the Transmitter unit to set the Receivers' light 'ON time' duration. The unit defaults to 8 seconds 'ON time' when power to the transmitter is initially turned on. To change the 'ON time' press 'Program' button on the transmitter. Both Blue LEDs on the transmitter unit will come on to indicate a change in 'ON time' parameter. Each press of the Program button will change the 'On Time' to 2,4,8,12,18 and loop back to 2 seconds. (Setting the 'ON time' to shorter intervals will increase the receivers' battery life). Once the gate is triggered it will ignore all other triggers until the 'ON Time' has lapsed.

www.publicsafetyinnovation.com/reaction_gate/manual



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