

## Introduction

### Standard Features:

- Latched shutdown for increased safety
- Powerful transmitter with 300 feet range
- Waterproof sealed transmitter
- User enabled/disabled query feature
- Remote ignition relay
- Receiver can respond to multiple transmitters (up to 15)

### RSD Description

The RSD system is designed to comply with D.O.T requirements for off-truck, remote shutdown capabilities for transport trucks. In the event of an unintentional product release, the operator may remotely kill the vehicle engine and close the internal valve, using a handheld, wireless transmitter.

When a button is pressed on the transmitter, the transmitter sends an encoded 32-bit ID number and commands to the receiver. Only receivers that have that transmitter's ID in its programmed list of transmitters will respond. Receivers can be easily programmed to respond to up to 15 different transmitters.

### Arming the System

Upon proper installation, the operator will arm the receiver and provide power to the internal valve solenoid simply by setting the parking brake with the truck engine running.

When the RSD receiver is armed, the wireless link to the transmitter is enabled. There is no change to the state of the channel relays. The ignition relay remains off and the ignition circuit is completed through the relay contacts allowing the engine to continue running. Power is routed through the channel 1 normally closed relay contacts to the internal valve solenoid, allowing the internal valve to be opened.

With the wireless link enabled, the ignition circuit complete, and the internal valve solenoid energized - the RSD system is armed and product transfer can begin.

### Emergency Shutdown (Channel 1)

When the red EMERGENCY SHUTDOWN button on the transmitter is pressed, the receiver channel 1 relay is latched ON. This removes power from the internal valve solenoid, closing the valve and energizing the ignition relay. The ignition relay opens the ignition circuit and stops the truck engine. Latching the relay ON prevents unintentional arming of the system using the transmitter.

### Query Operation (Channel 2)

The receiver channel 2 is used for the Query feature, ensuring compliance on installations where mandated by D.O.T. Even on installations where Query is not required, its use will ensure transmitter/receiver operation at every delivery. Without it, it would be possible to off-load product even if the transmitter is not functioning.



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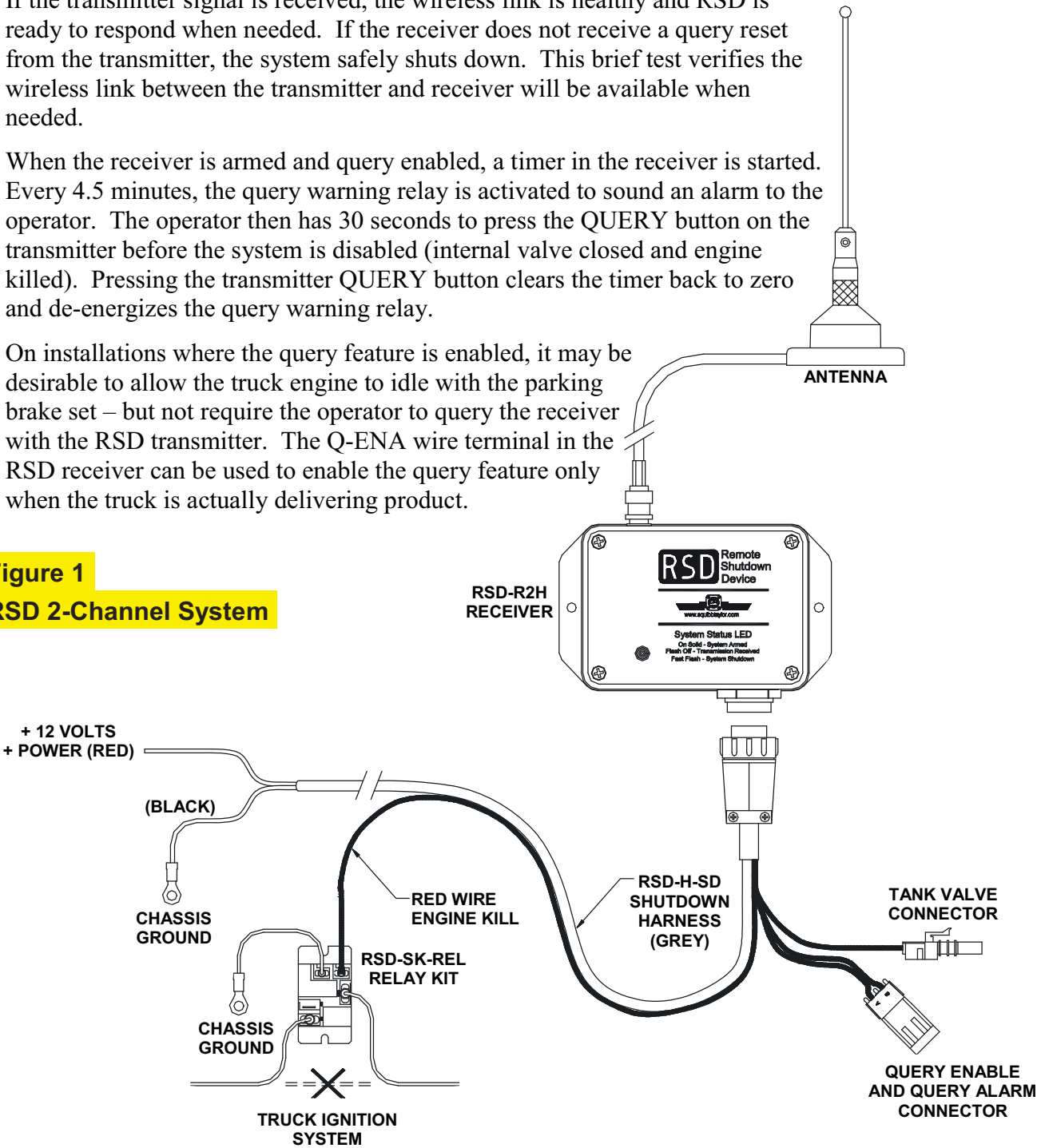
# System Overview

In the event of an unintentional product release, a transmitter with dead batteries would not provide the protection that it was designed for. The Query feature requires that the operator is attentive to the product delivery process. When Query is used, the operator is occasionally prompted for a transmitter button press. If the transmitter signal is received, the wireless link is healthy and RSD is ready to respond when needed. If the receiver does not receive a query reset from the transmitter, the system safely shuts down. This brief test verifies the wireless link between the transmitter and receiver will be available when needed.

When the receiver is armed and query enabled, a timer in the receiver is started. Every 4.5 minutes, the query warning relay is activated to sound an alarm to the operator. The operator then has 30 seconds to press the QUERY button on the transmitter before the system is disabled (internal valve closed and engine killed). Pressing the transmitter QUERY button clears the timer back to zero and de-energizes the query warning relay.

On installations where the query feature is enabled, it may be desirable to allow the truck engine to idle with the parking brake set – but not require the operator to query the receiver with the RSD transmitter. The Q-ENA wire terminal in the RSD receiver can be used to enable the query feature only when the truck is actually delivering product.

**Figure 1**  
**RSD 2-Channel System**



## Shut-Down Harness

The RSD-R2H Receiver is outfitted with a Shut-Down Harness. The harness includes wiring for:

- Shut-Down Function
- Query Enable/Disable Feature
- Query Alarm Feature (requires an optional RSD-H-QE Harness)
- Valve Actuator (for use with RSD-SVH Air Solenoid Module or RSD-BV1H Cable Module)

# Receiver Installation

## WARNING!

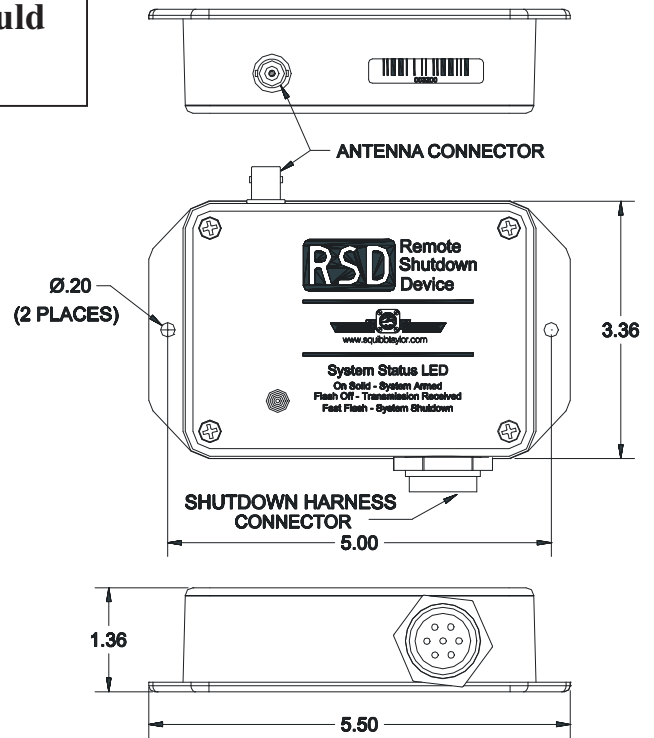
Disconnect the positive (+) cable from the truck battery prior to installing any electronic device. Failure to do so could result in injury or death.

### Receiver Location Considerations

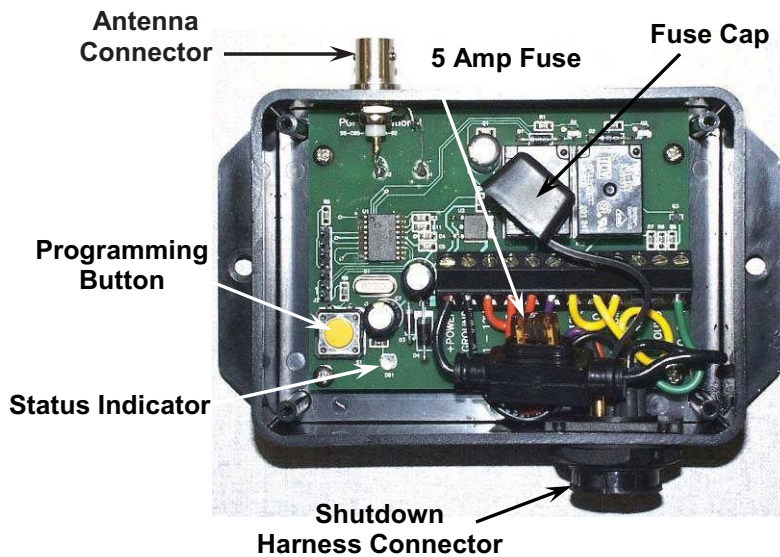
The RSD-R2H enclosure **MUST** be installed inside the truck cab in a location where it will be protected from water. The enclosure may be mounted using the two mounting holes or with the provided Velcro strips.

If possible, install with the antenna connector on top and the shutdown harness connector on the bottom.

Figure 2  
RSD-R2H Receiver



Choose a location that will allow access to the cover screws, the shutdown harness connector, the 5 amp fuse and the programming button.



# Antenna Installation

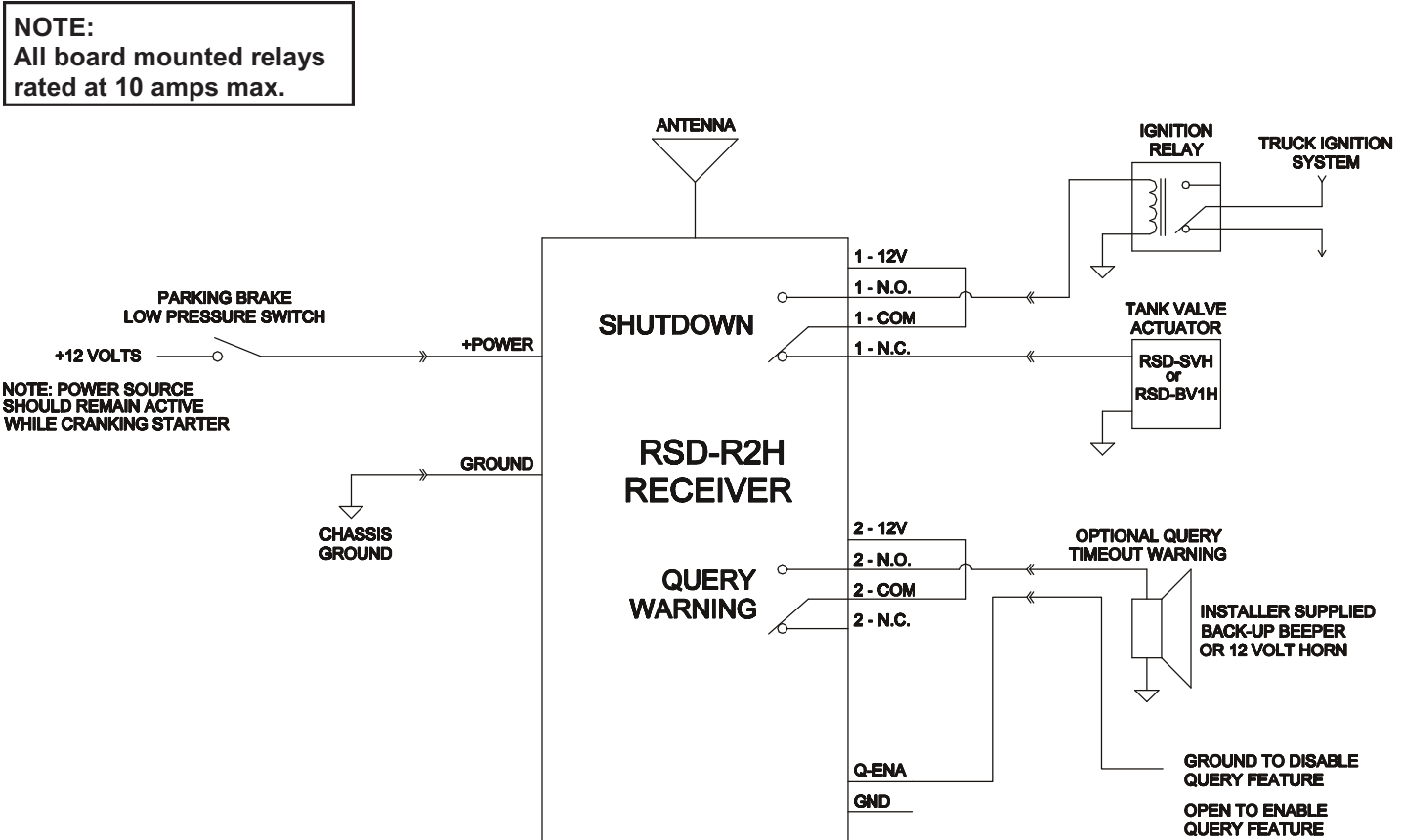
The antenna should be installed at the rear of the tank and as high as possible. If there is risk of damage to the antenna from low tree limbs, the antenna can be installed on the top of the meter cabinet.

Verify that the cable is long enough to reach the receiver and can be safely routed before mounting the antenna. Mounting brackets, magnetic mount bases, high gain antennas, and custom length cables are available.

Contact your local distributor or Squibb-Taylor for details and/or specification.

## RSD-R2H Receiver Schematic

The receiver, internal valve solenoid, and ignition relay should be installed before routing wires.



**Figure 3**  
**RSD-R2H Receiver Schematic**

# Arming the RSD System

## IMPORTANT:

The +12 volt power source to the receiver must be switched ON and OFF by the ignition key and remain 'hot' or live while cranking.

## WARNING!

It is extremely important that the power which arms the RSD device be routed in such a manner to make it impossible for the device to be armed while the vehicle is moving. Typically, this is done by routing the arming power such that power is supplied only when the parking brake is set. This **MUST** be done to eliminate the possibility that accidental actuation of the safety system would *kill the engine in a moving vehicle situation*.

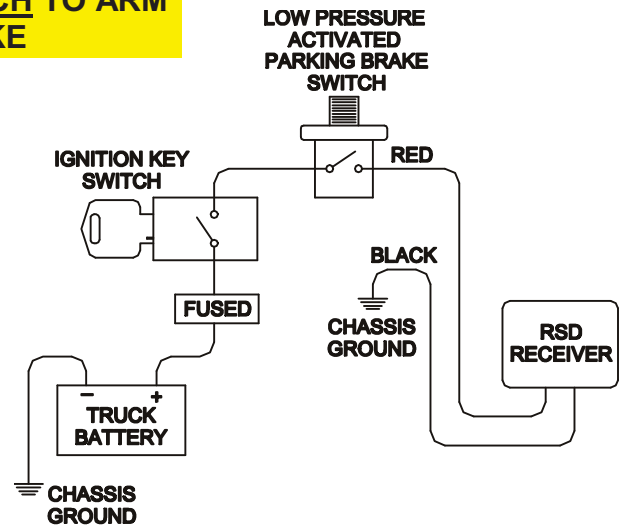
## WARNING!

**DO NOT ARM THROUGH ANY FUNCTION OTHER THAN SETTING THE PARKING BRAKE.**

**Figure 4**

### CONNECTION DIAGRAM USING A PRESSURE SWITCH TO ARM THE RSD SYSTEM BY SETTING THE PARKING BRAKE

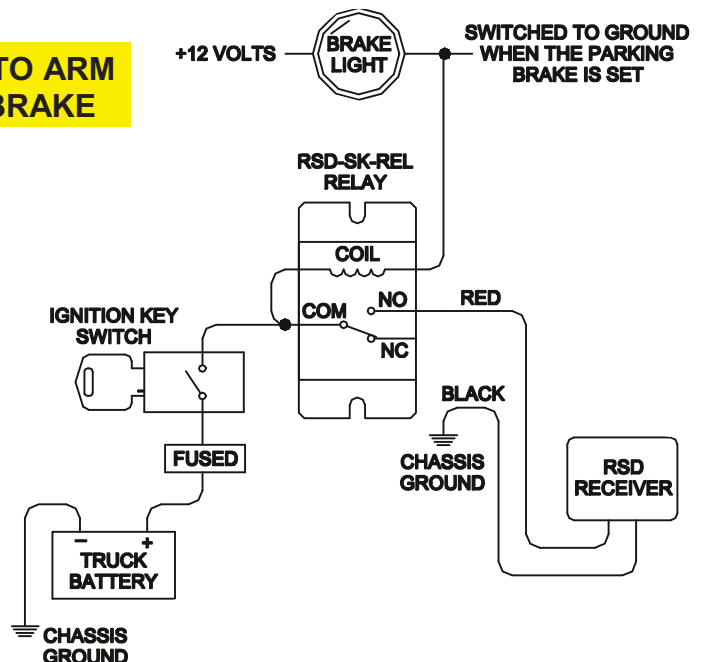
If the truck is equipped with air brakes, a normally closed pressure switch installed in the air line can be used to detect when the parking brake is set. Power to the receiver can be routed through the pressure switch. By doing so, the RSD receiver will only be powered on, or armed, when the parking brake is set.



**Figure 5**

### CONNECTION DIAGRAM USING A DASH LAMP TO ARM THE RSD SYSTEM BY SETTING THE PARKING BRAKE

A brake dash light provides a convenient way to detect when the brake is set. This diagram shows connection to a brake dash light using an additional RSD Relay Kit, RSD-SK-REL.



## Emergency Shutdown Function (Channel 1)

As mandated by D.O.T., the RSD system includes an Emergency Shutdown feature that will kill the engine and close the tank valve when the red EMERGENCY SHUTDOWN button on the transmitter is pressed.

When the red EMERGENCY SHUTDOWN button on the transmitter is pressed, the channel 1 receiver relay is latched ON. This removes power from the internal valve solenoid, closing the valve and energizing the ignition relay. The ignition relay opens the ignition circuit and stops the truck engine. Latching the relay ON prevents unintentional arming of the system using the transmitter.

### Engine Kill Ignition Relay

The ignition relay must be installed in-line with the ignition HOT wire. This wire is in a normally closed circuit. When the EMERGENCY SHUTDOWN button on the transmitter is pressed:

- the circuit will be broken
- the truck engine will stop
- the internal valve will close

For optimal performance, the relay should be installed as close as possible to the ignition wire, preferably under the truck dash. If installed under the hood, keep the relay and wires clear of engine parts that run hot, such as the exhaust manifold. The dealer service department or truck service manuals will help determine which wire to use for your specific truck make and model. Some common applications are shown in Figure 7.

Wires are attached using crimp-on spade terminals. Use two .187" wide terminals for the coil connections and two .250" wide spade terminals for the relay switch connections.

#### To install the relay . . .

- 1) Verify that the battery's HOT (+) cable is disconnected.
- 2) Cut the ignition HOT wire.
- 3) Connect one end of the ignition HOT wire to the relay COMMON terminal.
- 4) Connect the other end of the ignition HOT wire to the relay N.C. terminal.
- 5) Connect one relay COIL terminal to chassis ground.
- 6) Connect the other relay COIL terminal to the RED wire bundled with the Grey Power Cable. (Refer to Figure 1 and the diagrams that follow.)

**Figure 6**  
**RSD-SK-REL Relay**

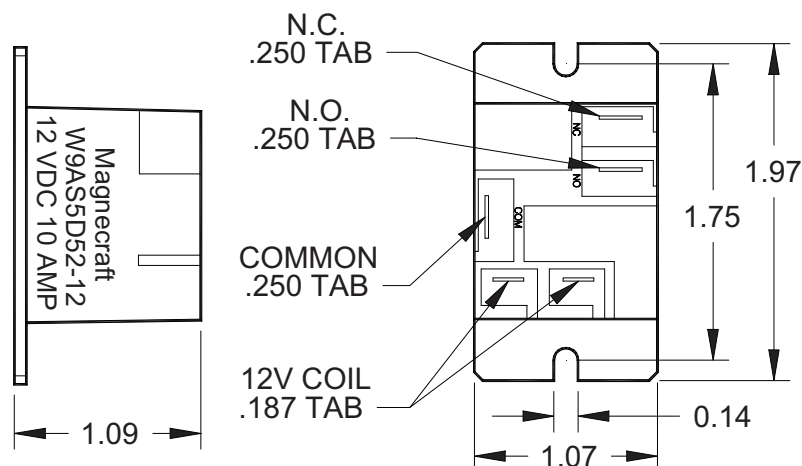


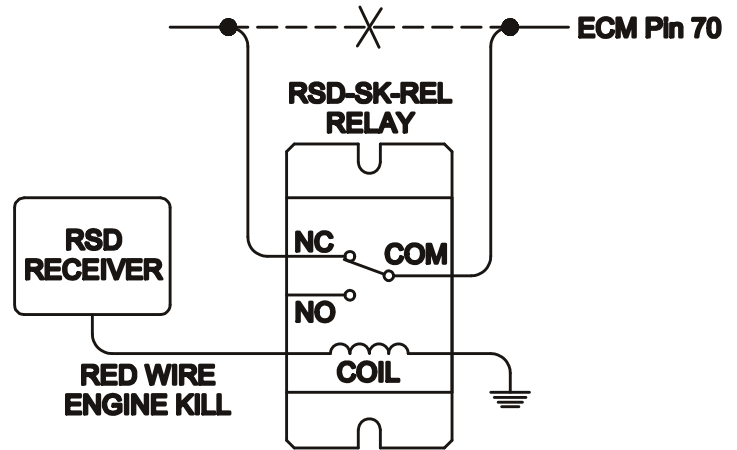


Figure 7

Ignition Relay Installation

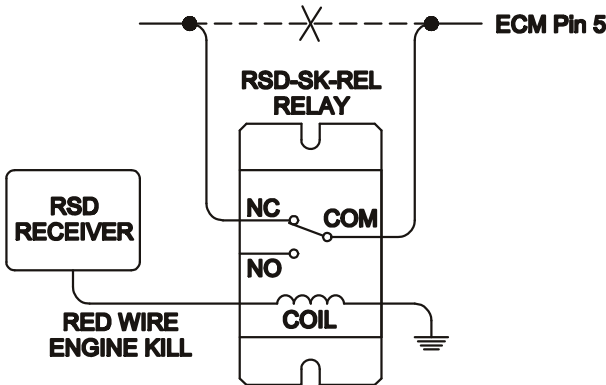
CAT 3126B

Open wire to pin 70 on ECM to kill the engine on shutdown.



CUMMINS ISB/ISC

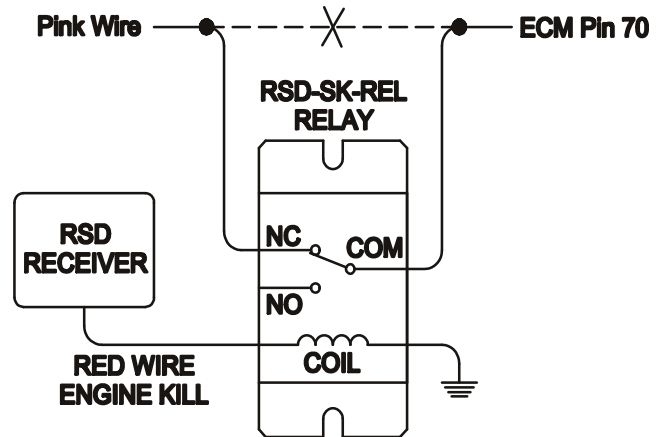
Open wire to pin 5 on ECM to kill the engine on shutdown.



The relay normally-closed contacts should be wired into the wire from pin 5 of the ECM connector. Cut the wire on the engine side, not the chassis side, of the connector.

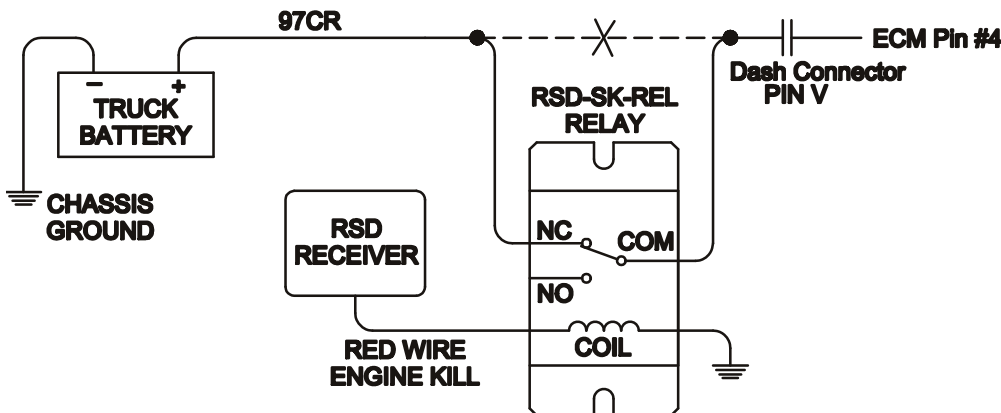
GM 7.4 Liter

Open the pink wire under the fuse cover on the upper right side of the engine firewall to kill the engine on shutdown.



International Navistar DT 466E

Open wire 97CR from battery to Pin #4 on ECM to kill the engine on shutdown.



# Internal Valve Closure

The type of internal tank valve will determine how it is connected to the receiver . . .

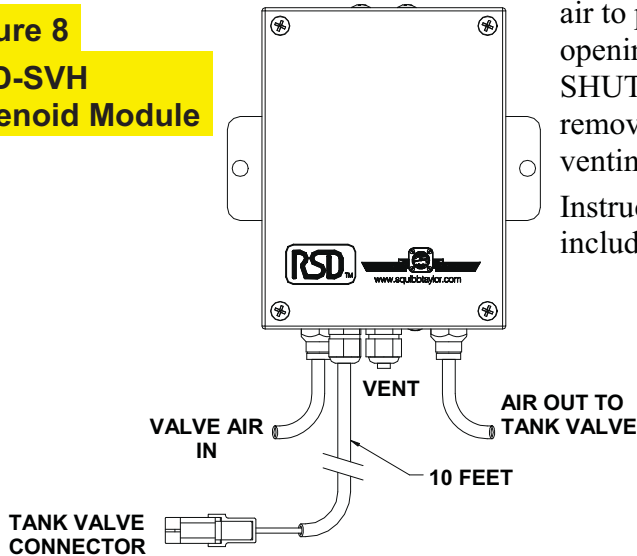
## Rego Flomatic Valves

The Flomatic valve opens when the pump starts and closes when the pump stops. For this type valve, only the ignition relay is required. When the engine is stopped, the pump will also stop, allowing the valve to close.

## Air Operated Valves

To operate air actuated valves; a 3-way air solenoid valve must be installed in the airline to the valve actuator. When the receiver is armed (power applied), the 3-way solenoid will be energized allowing air to pass through the solenoid valve to the valve actuator, opening the internal valve. When the EMERGENCY SHUTDOWN button on the transmitter is pressed, power is removed from the 3-way solenoid, blocking the air supply and venting the air in the valve actuator, closing the internal valve. Instructions for installing the 3-way solenoid valve are included with RSD-SVH Air Solenoid Module.

**Figure 8**  
**RSD-SVH**  
**Solenoid Module**



## Cable or Manually Operated Valves

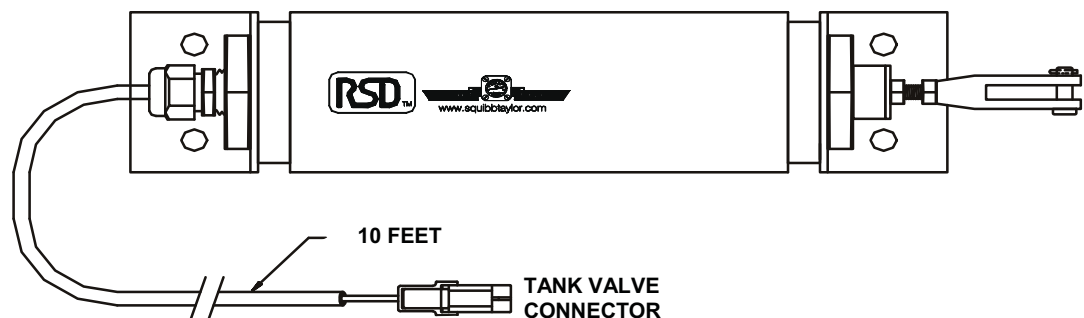
The RSD-BV1 Manual Tank Valve Actuator is designed to be used with a radio controlled safety shutdown system on bobtail delivery vehicles equipped with cable operated internal valves, allowing the operator to remotely close the internal valve, as mandated by D.O.T. The heart of the BV1 is an internal electromagnet which may be disarmed remotely in an emergency situation, closing the internal valve.

The electromagnet is mounted on a shaft connected to the valve cable at the clevis. When disarmed, the BV1 generates over 55 pounds of cable pull force on the Safety Trip Lever to trip all the manual levers to the CLOSED or OFF position.

Power is applied to the magnet only when the system is armed. When properly connected, the system is armed simply by setting the vehicle's parking brake, but the strength of the magnet alone is not enough to pull the shaft to the "cocked" or OPEN position. However, when the system is armed and the internal valve lever is "cocked" by the operator, the magnet has the power to **hold** the valve in that position. *Without* power to the magnet, all the manual levers remain operational, but the spring will pull the levers to the CLOSED position.

Instructions for installing the actuator for manually operated valves are included with the RSD-BV1 valve actuator.

**Figure 9**  
**RSD-BV1**  
**Manual Tank**  
**Valve Actuator**



## Query Operation (Channel 2)

Receiver channel 2 is used for the Query feature and ensures compliance to D.O.T. requirements where query features are mandated. Even on installations where Query is not required, its use will ensure transmitter/receiver operation at every delivery. Without it, it would be possible to off-load product even if the transmitter is not functioning.

In the event of an unintentional product release, a transmitter with dead batteries would not provide the protection that it was designed for. The Query feature requires that the operator is attentive to the product delivery process. When Query is used, the operator is occasionally prompted for a transmitter button press. If the transmitter signal is received, the wireless link is healthy and RSD is ready to respond when needed. If the receiver does not receive a query reset from the transmitter, the system safely shuts down. This brief test verifies the wireless link between the transmitter and receiver will be available when needed.

If the query feature is used, the query warning relay should be connected to a buzzer, horn, or the reverse beeper to warn the operator that the system is about to shut-off. If your installation does not require a query feature, it can be disabled by shorting the Q-ENA terminal to the GND terminal in the receiver with a short piece of wire, as described in *Disabling the Query Function* (Figure 11). If the Q-ENA terminal is “open” the Query feature is enabled.

When the receiver is armed and query enabled, a timer in the receiver is started. After 4.5 minutes, the query warning relay is activated to sound an alarm to the operator. The operator then has 30 seconds to press the QUERY button on the transmitter before the system is disabled (internal valve closed and engine killed). Pressing the transmitter QUERY button clears the timer back to zero and de-energizes the query warning relay.

On installations where the query feature is enabled, it may be desirable to allow the truck engine to idle with the parking brake set – but not require the operator to query the receiver with the RSD transmitter. The Q-ENA wire terminal in the RSD receiver can be used to enable the query feature only when the truck is actually delivering product. The following instructions and illustrations will aide installation to meet your requirements.

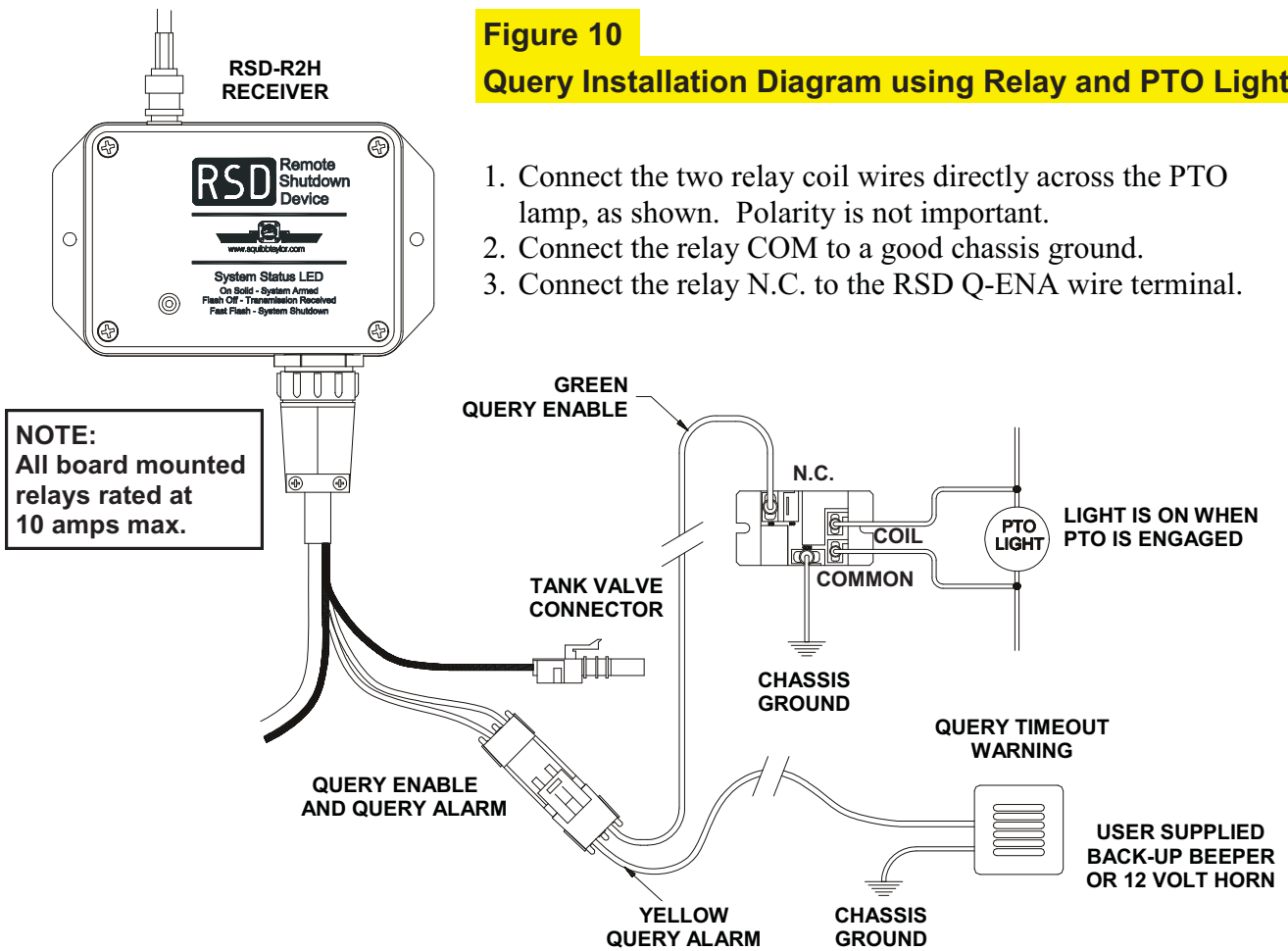
Choose a function that is only active while transferring product. Some examples of functions that may be used to enable/disable the query feature are listed below.

- **An air pressure switch in the internal valve air hose.** The switch should “open” when air pressure is applied to the valve actuator to open the internal valve. Query is enabled only while the internal valve is “open”.
- **A limit switch that is activated by the valve or PTO pull cable on cable operated trucks.** When the lever is operated or “pulled” at the rear of the truck, the switch should “open”. When the lever is in the valve “closed” or PTO “OFF” position, the switch should be “closed” to disable the query.
- **Any electrical event which is active only while transferring product.** For example, an indicator light on the dash for valve “open” or PTO “engaged” could enable the query when the light is ‘ON’. Typically, one side of the light is connected to 12 volts and the other side is grounded to turn on the light. If so, a relay must be installed as shown on the following page.

On some installations it may be possible to locate a source that is at 12 volts only while pumping, and grounded when not pumping. If not, then a relay must be used to enable/disable the query feature. Figure 10 illustrates connections to a PTO indicator lamp that is ‘ON’ when the PTO is “engaged”.

**Figure 10**

**Query Installation Diagram using Relay and PTO Light**

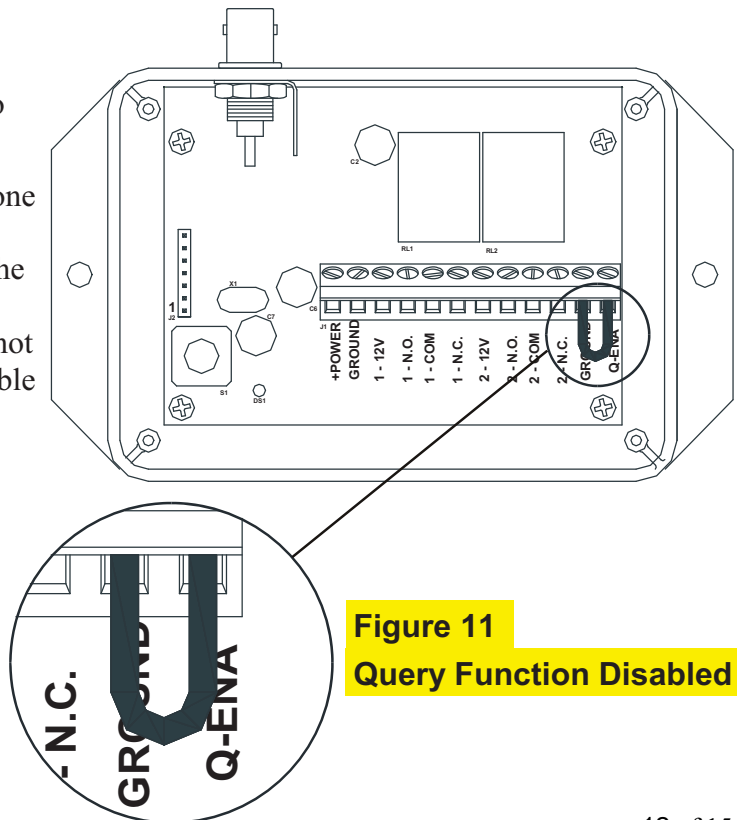


When the lamp is on, the relay will switch, removing the short to chassis ground on the Q-ENA terminal. When the PTO is “engaged” the RSD query feature is enabled. With the PTO light off, the Q-ENA terminal will be shorted to ground through the relay, disabling the query feature.

**Query Disable Jumper**

Your RSD-R2H Receiver has been shipped with a jumper wire looped into the GROUND terminal.

To **disable** the Query Function, leave one end of the jumper in the GROUND terminal and connect the other end to the Q-ENA terminal, as shown. With the jumper connected in this manner, it is not necessary to disconnect the Query Enable (Green) Wire inside the receiver.



**Figure 11**

**Query Function Disabled**

# RSD-R2H Operation

## IMPORTANT

Receivers are shipped with the transmitter table cleared. At least one transmitter must be added to the receiver's list before it can be used.

## Programming the Receiver

The receiver keeps a list of transmitters that it will recognize and respond to.

Each time the receiver decodes a valid received packet, it compares the received 32-bit transmitter ID code to those that are in the receiver's list. If the code is in the list, the receiver will process the received packet, activating the required channel.

### To add a transmitter to the receivers list . . .

- 1) Remove the cover on the receiver.
- 2) Apply the parking brake.
- 3) Switch the ignition key on, to supply power to the receiver.  
**NOTE:** The status indicator inside the receiver should be ON.
- 4) With the status indicator ON, press and hold the programming button until the status indicator blinks (about 5 seconds). Release the button when the indicator starts blinking.
- 5) Press and hold one of the transmitter buttons until the status indicator stops blinking.
- 6) The receiver has added the transmitter to it's list and is ready to be used.

The receiver's status indicator will flash each time a valid packet is received from a transmitter that is in the receiver's list of programmed transmitters. Press the QUERY button on the transmitter and verify that the status indicator flashes while the button is held down. This will confirm that the receiver has been correctly programmed.

### To clear all transmitters from the list . . .

With the status indicator ON, press and hold the programming button. After 5 seconds the indicator will flash. Keep holding the button for an additional 10 seconds until the indicator stops flashing and is on solid. Release the button when the status indicator stops flashing. All transmitters will be cleared from the list. The receiver will need to learn at least one transmitter before it can be used.

If the transmitter list in the receiver is full, (it already has 15 transmitters) the oldest transmitter in the list will be overwritten with the new transmitter ID code.

The list is saved, even when power is removed from the receiver.

## Resetting the Receiver after a Shut-Down

After a shutdown the receiver must be reset manually:

- 1) With the parking brake set, turn off the ignition key.
- 2) Re-start the truck.

## Testing the System

### IMPORTANT: Test the System Daily

To comply with D.O.T. requirements, the system must be tested before the first delivery each day at a distance of 150 feet from the cargo vehicle from a location where there is an unobstructed view of the cargo vehicle.

After completing the installation, the system should be thoroughly tested to confirm that all channels perform correctly.

After the initial installation, verify that the shutdown system closes the internal valve and stops the truck engine from a distance of 300 feet.

This test must be done with an unobstructed view between the transmitter and the receiver antenna.

Subsequent shutdown system tests should be performed from a distance of 150 feet before the first delivery each day.

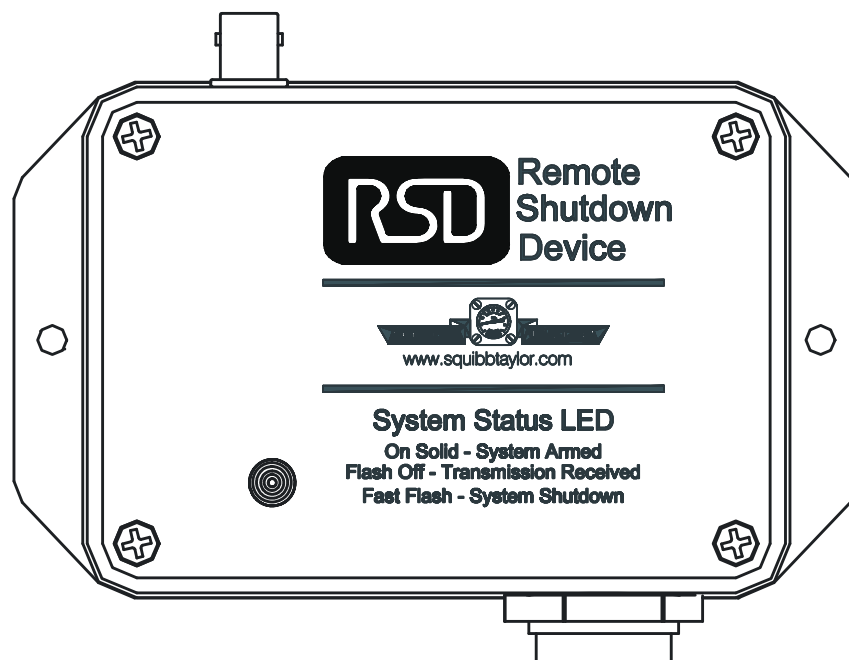
### NOTE!

#### **The transmitter will not reset the receiver after shutdown.**

All RSD functions will be disabled after a remote shutdown. To reset the receiver, the ignition key switch must first be turned off, and then the truck restarted. With the parking brake set and the engine running, the system is re-armed.

The System Status LED operating modes are listed on the RSD-R2H Receiver cover.

- **SOLID ON** — System is armed and ready to receive commands from the transmitter.
- **FLASH OFF** — The Status LED will flash off for each valid packet received from the transmitter. The flash rate should match the transmitter flash rate while a transmitter button is held down.
- **FAST FLASH** — The receiver is in shutdown. To reset, turn off the ignition key switch and re-start the engine.



## V. Warranty

Squibb-Taylor warrants the product identified herein to be free from defects in material and workmanship under normal use and service for **four years** from the date of purchase.

The owner's responsibility is for normal maintenance and any servicer's travel and labor charges.

This warranty applies only when the product is used for consumer use within the United States and Canada and is installed and used in accordance with all applicable national, state, and local codes, regulations, and laws.

This warranty shall not apply if the product has been subjected to unreasonable use, negligence, accident in transit, alteration, improper installation or misapplication.

Squibb-Taylor shall not be liable for any default or delay in performance under this warranty caused by any contingency beyond its control including without limitation to war, government restrictions or restraint, strikes, fire, flood, or a shortage or reduced supply of raw material.

There are no expressed warranties other than set forth above. All implied warranties, including the implied warranties of merchantability and fitness for a particular purpose, are limited to the duration of the expressed warranties set forth above. Liability for consequential damages under this warranty is excluded to the extent exclusion is permitted by law. This warning gives you certain rights and you may have other rights which vary from state to state.

While this information is presented in good faith and believed to be accurate, the manufacturer does not guarantee satisfactory results from reliance upon such information. Nothing contained herein is to be construed as a warranty or guarantee, expressed or implied, regarding the performance, merchantability, fitness or any other matter with respect to the products, nor as a recommendation to use any product or process in conflict with any patent. The manufacturer reserves the right, without notice, to alter or improve the designs or specifications of the products described herein.