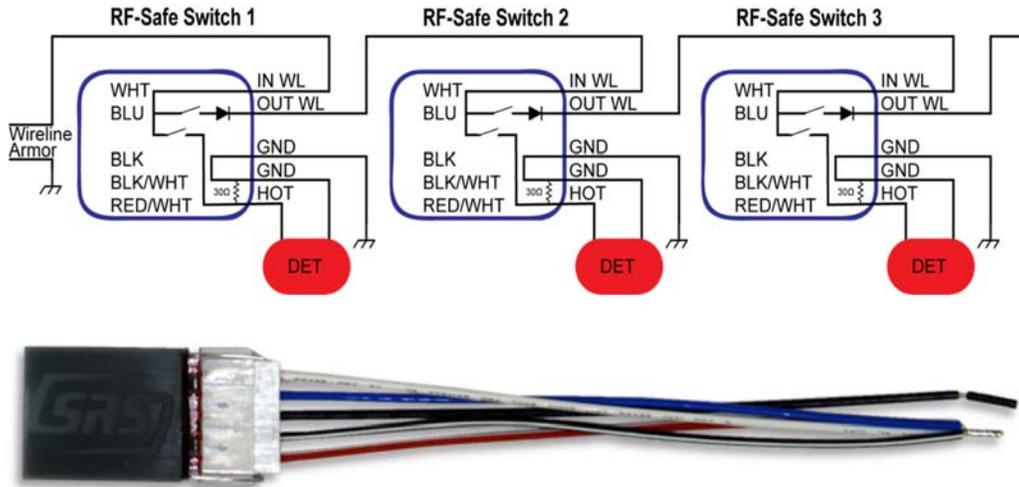




# SAFE FIRE SYSTEMS RF-Safe Addressable Switch

**Spartek Systems** strives to aggressively research and develop state of the art technologies to enhance our customers ability to evaluate, monitor, and exploit oil and gas assets. Founded in 1994, Spartek Systems leads the industry in providing outstanding technical support and high quality products at competitive prices.



## Product Overview

The Spartek's RF-Safe (SRS) Addressable Switch combined with advanced ARM/FIRE control systems, provide a low cost, efficient, RF Safe solution where one or multi-level gun systems are deployed.

- ▶ Plug setting and perforating
- ▶ Selective perforating
- ▶ Tractor-conveyed perforating
- ▶ Multistage perforating

The Switches can be combined with 50 ohm resistorized detonators to form an API RP 67 Group 2 electronic detonator. Combined with Spartek's PX-1

fireset and an EBW/EFI detonator a Group 3 electronic detonator system is formed. Group 3 safety benefits are especially critical in high value offshore operations and multi-stage fracing operations.

The RF-Safe Tester is available for quickly and safely confirming the gun system prior to going downhole. A simulator is available for training purposes. With over 500,000 units successfully deployed, the technology is sound and proven.

## Features

- ▶ Radio Frequency (RF) Safe per API RP67
- ▶ Pre-arming in gun loading shop with Shunted Detonators.
- ▶ Robust advanced two way communication
  - Live 'Inventory' of downhole gun systems
  - Encrypted ARM/FIRE electronic control of gun detonation
  - Support for >100 switches
  - Event Logging and Job Audit of perforating operations
- ▶ Simple setup - Reliability designed in



RF-Safe Tester



Simulator Trainer

# SPARTEK SYSTEMS

Providing Our Customers With "Best In Class" Technology

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### RF-Safe Addressable Switch Specifications:

Parameter	Minimum	Typical	Maximum
<b>Operating Temperature</b>	-40°F -40°C	- - -	347°F 175°C
<b>Operating Voltage</b>	-600 VDC	-30 VDC	600 VDC
<b>Communication</b>			
Voltage	-200 VDC	-30 VDC	-10 VDC
Current Receive	3.5 mA	4.0 mA	4.5 mA
Current Transmit	8.0 mA	10.0 mA	14.0 mA
Inactive	150 uA	200 uA	250 uA
<b>Firing</b>			
Voltage	-600 VDC	-	-75 VDC
Current Pre-Detonation	1.25 mA	1.75 mA	2.25 mA
Current For Detonation	-	0.8 A	1.5 A
<b>Shunt Resistance</b>	20 Ohms	30 Ohms	40 Ohms

Specifications subject to change without notice

### Electric Detonators

Spartek Systems is a leading developer and supplier of advanced systems to improve the safety of wellsite perforating operations. Working in accordance with API RP-67, we offer a wide range of solutions to improve both wellsite safety and efficiency.

**Group 1** - allows the use of 50 ohm resistorized detonators containing primary explosives, with a minimum no fire current of 200 mA, and requires a significant RF exclusion zone.

**Group 2** - allows the use of 50 ohm resistorized detonators containing primary explosives, with a minimum no fire voltage of 25V ac/dc, no single point failure, and still requires a RF exclusion zone, per manufacturer guidelines.

**Group 3** – requires the use of detonators which **do not** contain primary explosives, such as EBW and EFI. Detonators in this group must have a no-fire voltage of 120 v ac/dc, no single point failure, and be immune to RF energy. Perforating systems certified for use in this group **do not** require an RF exclusion zone.

**Electronic Firing Head ‘Quick Change Triggers’ - QCT** provides a means of electronic initiation of a range of detonators in Groups 2 and 3, using pre-programmed **wireless** control (pressure, time, movement). Electronic cartridges can be selected to match the detonator characteristics .

**PX-1 & OM-1 Firesets** provides a safe, economical solution for EBW or EFI detonators used in Group 3 operations (no primary explosive) . PX-1 fire-sets are activated using industry standard ‘shooting’ panels applying DC power through an electric wireline. They can be used with Spartek’s RF-Safe Addressable Switch.

### For More Information, Pricing, and Technical Support Contact:



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