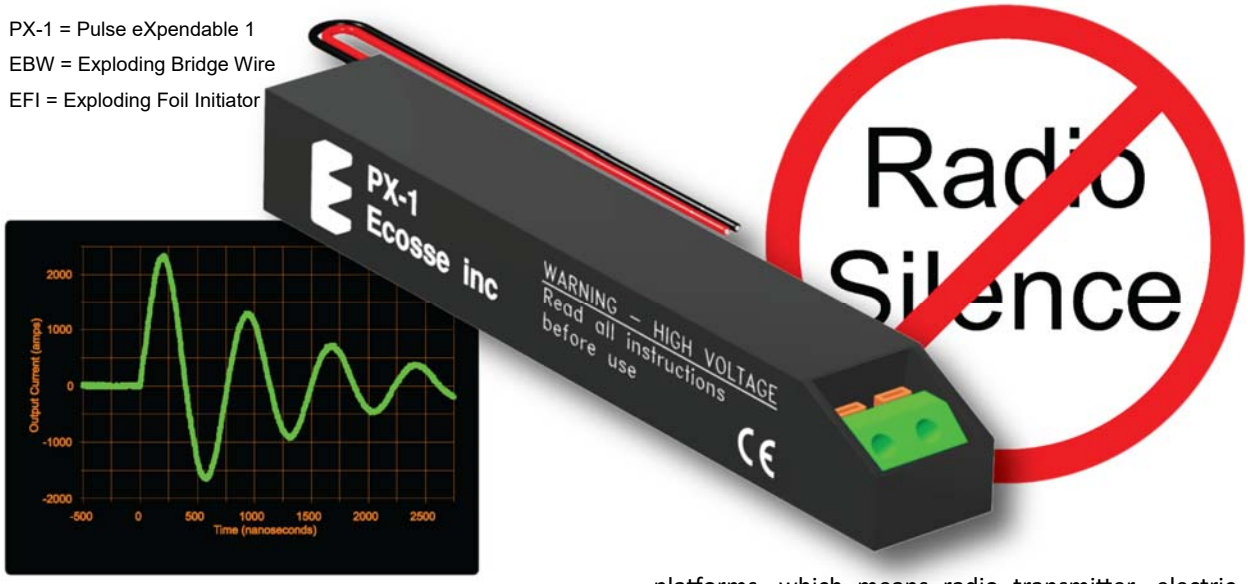
SAFE FIRE SYSTEMS
EBW AND EFI Expendable Firesets

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.

PX-1 = Pulse eXpendable 1
EBW = Exploding Bridge Wire
EFI = Exploding Foil Initiator



Product Overview

Designed primarily for oilfield applications, the PX-1 generates the high-current pulse needed to initiate EBW and EFI detonators. With features that complement the safety characteristics of these detonators, compact dimensions that allow it to be used in gun systems down to 1-3/8in OD, a low cost that allows it to be discarded after one use, and a temperature rating greater than any other system on the market, the PX-1 is a flexible and affordable tool that will immediately improve your bottom line and reduce safety risks.

EBW and EFI detonators were originally developed for use in military applications. They need a very fast rising, high-current pulse for successful initiation, such as the output provided by the Ecosse PX-1.

Unlike conventional hot-wire and hot-resistor detonators normally used in oilfield perforating operations, EBW and EFI detonators do not contain sensitive primary explosives such as lead azide.

The greatest advantage of EBW and EFI detonators for oilfield use is the fact that they are extremely insensitive to accidental initiation. They are effectively immune to the Radio Frequency (RF) sources and stray voltages found on well sites and offshore platforms, which means radio transmitter, electric welding and cathodic protection equipment need not be turned off during perforating and other wireline explosives operations.

Which type to use? EBWs are generally easier to initiate than EFIs, which makes them more tolerant of imperfect wiring methods and allows them to be fired over relatively long lengths of wire. EBWs are also less expensive than EFIs, typically costing about the same as conventional hot-wire detonators. Oilfield EBWs are available using RDX and CP explosives, giving them useful temperature ratings of 163°C (325°F) and 204°C (400°F) respectively.

EFIs are more difficult to initiate than EBWs, and they are typically 2-4 times more expensive. However, they use high-temperature explosives such as HNS, which means they can be used at higher temperatures than EBWs.

Features and Applications

- EBW and EFI detonator initiation.
- OM-1 compatible with Spartek Systems' Electronic Firing head, QCT [API-RP67 Certified].
- Safe, cost effective, premium performance for wireline operations.

SPARTEK SYSTEMS

Providing Our Customers With "Best In Class" Technology

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SPARTEK SYSTEMS
GEOPHYSICAL INSTRUMENTATION

Rev: 2/08/2020

Specifications:

Model	PX-1	OM-1
Operating Temperature	-13°F to 437°F / 2 hours (-25°C to 225°C / 2 hours)	-13°F to 330°F / 2 hours (-25°C to 165°C / 2 hours)
Dimensions		
Length (body only)	5 in (127 mm)	5 in (127 mm)
Width	0.82 in (20.8 mm)	0.82 in (20.8 mm)
Height	0.74 in (18.8 mm)	0.74 in (18.8 mm)
Effective Diameter	< 1.1 in (28 mm)	< 1.1 in (28 mm)
Weight	~3.18 oz. (90 gm)	~2.5 oz. (71 gm)
Input		
Voltage	200 - 230 VDC	120 VAC (rms) to 175 VAC (rms)
Current	150 - 250 mA	20mA
Power	30 - 60 W	2 - 3W
Frequency	DC	60,000 Hz
Connection		
Wire Type	20 AWG Stranded (Teflon)	20 AWG Stranded (Teflon)
Red Wire	14 in (35.56 cm)	10 in (25.4 cm)
White Wire w black stripe	14 in (35.56 cm)	10 in (25.4 cm)
Output Pulse[1]		
Voltage	5000 V ± 15%	1500 V ± 15%
Current	> 2000 A	> 1500 A
Duration	< 250 ns	< 500 ns
Connection Type	Green Socket or wired	Green Socket or wired
Rate Lifespan	1 x 1-sec test fire into 100ohm load and 1 x full discharge into detonator	1 x 6-sec test fire into 100ohm load and 1 x full discharge into detonator
Safety Features	Tested Immune to[2]:	Tested Immune to[3]:
Negative DC	- 600 VDC	- 600 VDC
Positive DC	+150 VDC	+ 600 VDC
AC	40 Hz - 20kHz @ 600VAC 32 kHz - 2 MHz @ 100VAC	0 to 240 VAC @ 60 Hz
RF Interference	260kHz - 500MHz @ 50V/m 500MHz - 1GHz @ 100V/m 1GHz - 18GHz @ 300V/m	1MHz - 1GHz @ ≤ 100V/m
Electrostatic Discharge	25kV 500pF 5kohm; 30kV 400pF 250ohm	
Lightning Strike	nearby: 20kA @ 100m direct strike: 70kA / 280A	

1. Output voltage pulse specification is based on a dead short;
   - PX-1: ~ 2MW peak 4 W average will fire RISI and Pacific Scientific EBW through 10 ft (3.048m) of twisted-pair wire; will fire RISI EFI detonator though 6 inches (15.24 cm) of twisted-pair wires.
   - OM-1: ; ~0.4MW peak, ~0.5W average will fire RISI and Pacific Scientific EBW detonators through 10in of twisted-pair wires. Will discharge within 3 seconds of being powered up.
2. Tested and certified at Sandia National Laboratories by Orion International Technologies Inc. All tests were done at ambient temperature, and all tests (excluding lightning strikes) were repeated at 200°F - 250°F (93°C - 121°C).
3. RF safety certification completed by Franklin Applied Physics on a standalone OM-1w. DC and low frequency AC testing completed by Ecosse Design Inc. OM-1 is not intended for standalone operations, it is the operators responsibility to ensure the system is safe for the environment used, such a system is the Quick Change Trigger (QCT) from Spartek Systems.

Specifications subject to change without notice

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