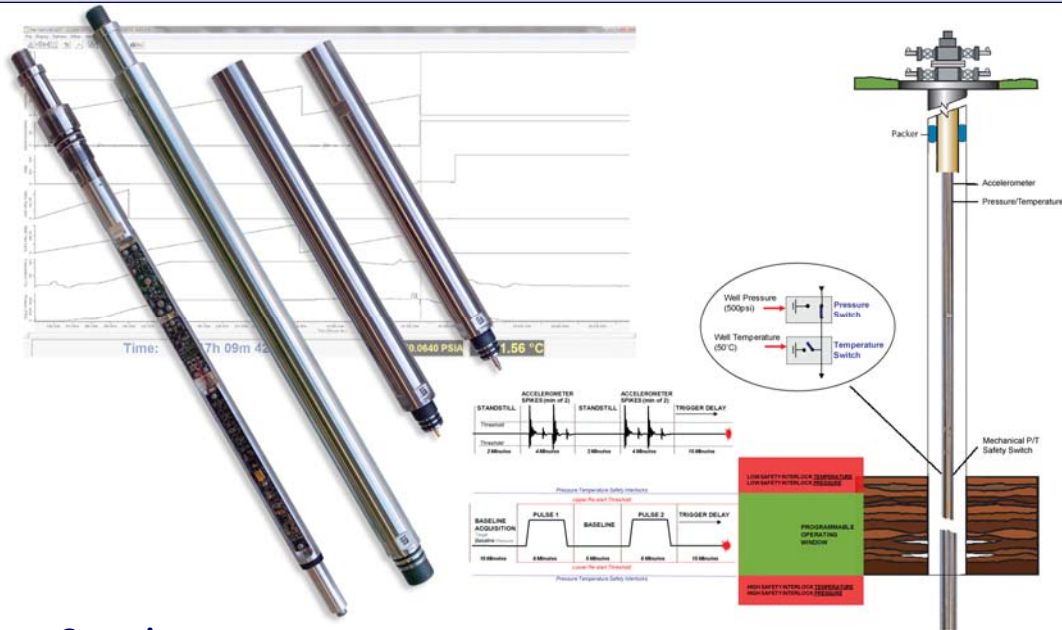




SAFE FIRE SYSTEMS Electronic Firing Head - QCT

Spartek Systems specializes in providing the oil and gas industry with high quality data to monitor well performance and diagnose potential problems. Founded in 1994, Spartek Systems leads the industry in providing cost effective solutions for acquiring reliable well integrity data.



Product Overview

The Quick Change Trigger (QCT) is the next generation electronic firing head, designed to fulfill the need for a cost-effective triggering device, without compromising on safety or quality. The QCT is a memory based electronic trigger system specifically designed for initiating ballistic firing heads. The flexible design allows for multiple deployment options including Slick-line, TCP and Coiled Tubing.

The design concept is based on a field replaceable control cartridge. If required, this cartridge can be replaced quickly and easily at the well site. No special tools are required and training requirements are minimal.

The QCT firing sequence is programmable at surface for the relevant ballistic operations:

- ▶ Casing perforating
- ▶ Tubing punching
- ▶ Tubing cutting
- ▶ Plug/Packer setting
- ▶ Various other downhole operations

The QCT has redundant Failsafe capabilities!

Features and Applications

- ▶ Field replaceable control cartridge
- ▶ Quick & easy re-dress between runs
- ▶ Can be activated with positive or negative pressure pulse code e.g. TCP or Coiled Tubing Operations
- ▶ Program sequence can be aborted and restarted while downhole
- ▶ Can be activated with pre-programmed accelerometer burst e.g. Slickline Operations
- ▶ Accelerometer can be disabled for TCP operations
- ▶ Option available for long duration TCP battery pack
- ▶ Deploy and initiate industry standard ballistic devices
- ▶ API-RP67 Certified
- ▶ Vibration & Shock tested to 40G

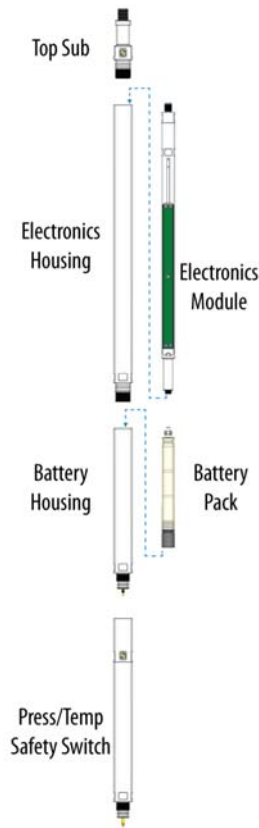
SPARTEK SYSTEMS

Providing Our Customers With "Best In Class" Technology

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Specifications:



NGE Quick Change Trigger (QCT)	
Operating Range Pressure Temperature Material	15,000 psi (103.4 MPa) 347°F (175°C) NACE
Dimensions Outer Diameter Total Makeup Length	1.688 in (42.9 mm) 4.69 ft (1.4307 m)
Connections Top Bottom	5/8" Sucker Rod [15/16 in 10 UNS-2A] Male GO [1 3/16 in 12 UN-2A]
Pressure Measurement Sensor Type Range Accuracy Resolution	Strain 0 to 15,000 psi (103.4 MPa) ± 0.1 % of Full-Scale 0.00066% of Full-Scale
Temperature Measurement Range Accuracy Resolution	0 to 347°F (175°C) ± 0.9°F (± 0.5°C) 0.0036°F (0.002°C)
Data Acquisition Memory Communication Sample Rate	16 MByte (>1.5 million data sets - Trigger Mode) 5-way "LEMO" connector for Battery and PC Communication 0.1 second fastest, 2 seconds minimum for Trigger mode
Electronic Cartridge Available Modules	JRC RIG ENVIRONMENT DETONATOR (RED) DYNAenergetics ELECTRONICS RF-SAFE IGNITER OM-1 and EBW FIRESETS BP-3 IGNITERS IN BAKER SETTING TOOLS OWEN RF-SAFE GREEN DETONATOR
Power Requirements Battery Packs—Standard Battery Pack—Long Duration	3 x "C" cells, 11.7 V, 6.2 Ah (-20°C to 165°C) 3 x "CC" cells, 11.7 V, 13 Ah (-20°C to 165°C)

Specifications subject to change without notice

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