

WIRELINE PERFORATION | REVOLVE+™ GUN SYSTEM

# Revolve+™ gun system

Industry's most accurate, compact, and versatile system to orient perforations in fiber-optic completions

## FEATURES

- Orients charges within 5° of the desired angle
- Orientation unaffected by wellbore conditions
- Modular, disposable platform
- Shorter length than competitive systems
- Broader portfolio of charge options than traditional gun systems

## BENEFITS

- Provides the most accurate and efficient internally oriented system within the industry
- Offers the lowest total perforating cost for fiber-optic completions
- Eliminates need to redress and clean equipment
- Reduces equipment and personnel on location

## Overview

With the increase of fiber-optic installations in unconventional wells to better understand well completions and production, the need to accurately orient perforations to avoid damage to fiber-optic cable is critical. Unintentional damage to the fiber-optic hardware can be a negative impact during well treatment and production diagnostics. While oriented perforating is not a new concept, common solutions have been unreliable, inefficient, or uneconomic.

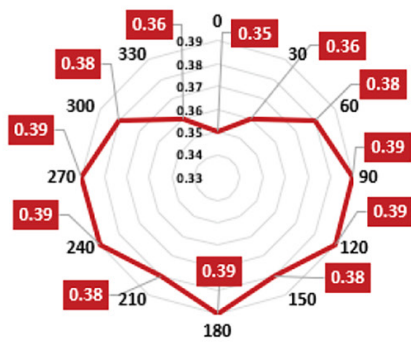
The Halliburton Revolve+™ gun system provides operators the capability to confidently orient perforations within 5° of the desired perforating azimuth, which is more precise than the most competitive system on the market. The capability to align the perforating charge tube using internally oriented components eliminates the need for externally oriented hardware, such as eccentered weight bars, which can also increase complexity and unreliability.

As the first internally oriented, fully modular guns on the market, Revolve+ gun systems eliminate the need for additional hardware and failure-prone components. Traditionally, oriented perforating operations require additional equipment and personnel on location to prepare the gun string and clean hardware in between each run, and this can have a negative impact on overall fracture efficiency. Revolve+ gun system are pre-loaded and aligned before they are shipped and can be delivered directly to a wellsite. Upon arrival of the Revolve+ gun system, a wireline crew only needs to insert a detonator and assemble the final bottomhole assembly (BHA) before it is run in hole (RIH).

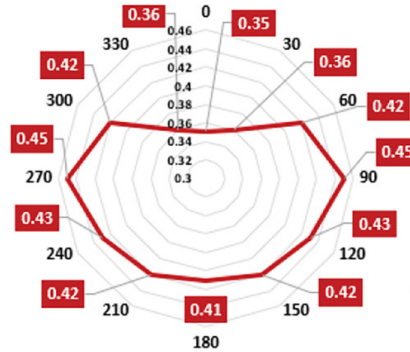
Legacy oriented perforating methods can decrease the overall efficiency of a fracture operation by as much as 67%, which can increase the cost of the completion spread by USD hundreds of thousands over the course of a well. Another gap in legacy oriented systems is the additional hardware length that is often required, along with potential limitations of the perforating charge performance specifications. Oriented Revolve+ gun systems are up to 35% shorter than competitive gun systems and are better suited for more common industry-standard perforation charges, with a wider range of entry hole diameter specifications.



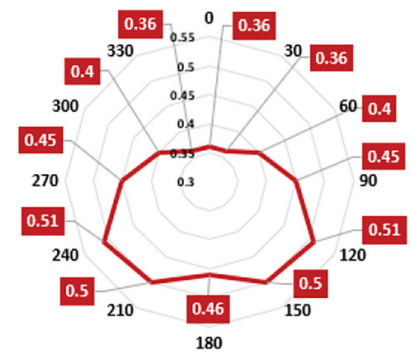
FracJet 2103-S EHD by Phase



FracJet 2300-S EHD by Phase



FracJet 2100-S EHD by Phase



Revolve+ gun system shaped charge entry hole diameters by phase. Specifications are in 5.5-in. 23# casing

## Revolve+™ gun system specifications

REVOLVE+™ GUN SYSTEM	LEGACY ORIENTED	BENEFITS OF REVOLVE+™ GUN SYSTEMS
Internally oriented mechanism	Reliance on eccentric weight bars and subs	<ul style="list-style-type: none"> <li>More reliable orientation method and shorter BHA than in traditional systems</li> <li>Unaffected by wellbore conditions</li> </ul>
Modular platform	Loading, assembly, and/or wiring required on location	<ul style="list-style-type: none"> <li>More efficient surface operations</li> <li>Elimination of human-caused failure</li> <li>Fully disposable</li> <li>Eliminates the need to clean and redress equipment</li> </ul>
Accurate within 5° of desired angle	Accuracy known to be more than 60° off in some cases	<ul style="list-style-type: none"> <li>Provides confidence in fiber-optic avoidance</li> <li>Eliminates downhole variables in the completion design</li> </ul>
Shortest BHA in the industry	Requires longer guns and additional hardware	<ul style="list-style-type: none"> <li>Capability to run more guns without additional surface equipment</li> <li>More easily conveyed downhole</li> </ul>
Multiple perforation charge specifications	Often limited to a single perforation charge specification	<ul style="list-style-type: none"> <li>Completion design flexibility</li> <li>More limited entry options</li> </ul>



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