

## WIRELINER AND PERFORATING SERVICES

[Print Version](#)

### Modular Gun System - The Total Perforating Package

#### **Innovative Solutions to Complex Problems**

*Today's well completions are far more complex than in the past. At the same time, operators are continually looking for more economic and efficient completion methods, while still maximizing production.*

*In answer to some of today's complex completion problems, Halliburton introduces a new system for economical and efficient perforating - The Modular Gun System. Utilizing proven VannSystem® technology; rugged, reliable equipment; and innovative perforating techniques, Halliburton now allows you to get maximum production from your well, with the economy and efficiency you have come to expect from Halliburton.*

Halliburton presents another innovative solution with the introduction of the Modular Gun System. How does this new system work? A special arrangement of the perforating equipment allows a truly modular perforating system, permitting the optimum number of guns to be run so larger intervals can be perforated. In fact, the Modular Gun System method is so innovative, Halliburton has patented\* this unique device, proving once again our commitment to bring the latest technology to the wellsite.

The Modular Gun System is run by Halliburton perforating specialists who know the equipment, know your well, and know the best techniques to fit your particular application. And of course, the Modular Gun System is backed by Halliburton's world-wide network of technical support, reliable equipment, and innovative performance that are all ready to go wherever and whenever they are needed.

\* U.S. Patent Number 5,366,014

#### **Numerous benefits equal maximum production.**

- **Economical** No rig is required - the system is ideal for rigless completions.
- **Increased perforating interval** With the Modular Gun System, you are able to stack an optimum number of guns downhole for perforating the maximum interval.
- **Compatible** The Modular Gun System can be deployed via coiled tubing, electric wireline, or slickline, as well as with conventional tubing or drillstring.
- **Versatile** Several features make the Modular Gun System your best choice for perforating under a wide range of conditions:

- The guns are retrievable or can be left at the bottom of the hole.
- The system allows perforating in either underbalanced or overbalanced conditions over the entire interval.
- Wide range of gun sizes (2- to 7-inch OD) permits deployment over a wide range of casing, from 3 1/2 to 9 5/8 inches.
- Versatile Several features make the Modular Gun System your best choice for perforating under a wide range of conditions:
- **No Restrictions** The Modular Gun System allows a zone to be perforated and tested with no downhole restrictions below or above the packer.
- **Reliable Proven** VannSystem® guns and firing heads are used in the Modular Gun System.

## The Modular Gun System Process

The modular gun system allows operators to deploy extremely long gun sections into the well. The guns are loaded at the surface, deployed downhole individually, and stacked on each other at the perforating zone until the appropriate length is achieved, with the lowermost gun module being supported by the gun hanger. This method avoids any gun length restrictions caused by the lubricator. The auto release gun hanger positions the perforating assembly and allows it to remain adjacent to the desired interval. The guns are fired, via a pressure actuated firing head, and then automatically released to the bottom of the hole, where they can later be retrieved or left in the hole. Two applications in which the Modular Gun System is ideal for use include wells with rathole length restrictions and rigless completions.

### Rathole length restriction

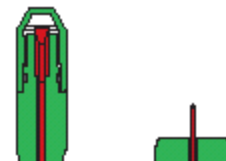
In this application, insufficient rathole length causes the uppermost gun modules to remain adjacent to the perforated interval after they are fired, where they may interfere with production from the well. The Modular Gun System allows the guns to be retrieved in sections without having to kill the well.

### Rigless completion

On wells where the completions are installed with wireline or coiled tubing, the Modular Gun System is the preferred method for perforating. No rig is required, saving both time and money.

### Auto Release Gun Hanger

One of the main features of the Modular Gun System is the Auto Release Gun Hanger. For high volume testing and production, the Auto Release Gun Hanger allows a zone to be perforated and



tested with virtually no downhole restrictions. The Auto Release Gun Hanger is deployed and set at the desired perforating depth. The lowermost gun is then lowered in the well, where it is supported by the gun hanger. The remaining guns are then lowered and stacked. The entire perforating assembly can be positioned and retained adjacent to the desired interval until the guns are fired. The assembly is then automatically released to the bottom of the well.

### Auto Release Gun Hanger Benefits

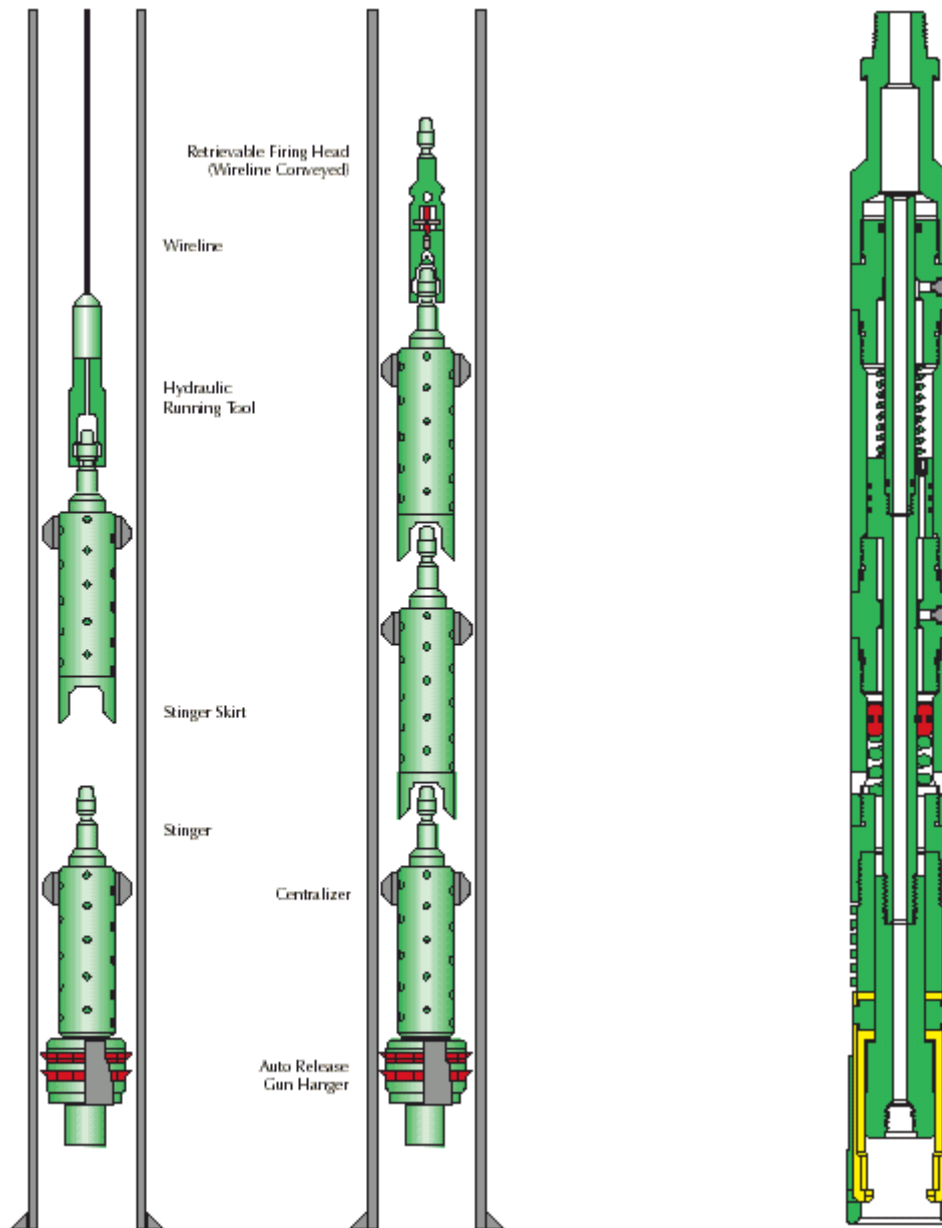
- No tubing is required between the guns and the packer.
- No wireline work is required to drop the assembly.
- Maximum desired underbalance or overbalance can be used.
- Additional perforations may be added through the tubing at a later date
- Production tubing can be run and tested independently from other tools.
- The gun hanger and guns are run on a workstring, wireline, or slickline.
- In big-bore monobore completions, the production tubing and permanent packer are installed before running the Monobore perforating assembly.
- Remedial work, such as setting bridge plugs, adding perforations, and running coiled tubing, can be performed without pulling production equipment.
- Lower-gun firing pressures can be used since all production equipment is pressure tested prior to deploying guns in the well. There is no need to exceed previous test pressures.

### Auto Release Gun Hanger Specifications

Casing O.D. - in. (mm)	2-7/8" (73.1)	3-1/2" (88.9) 4" (101.6)	4-1/2" (114.3) 5" (127)	5-1/2" (139.7)	7" (177.8) 7-5/8" (193.7)	9-5/8" (244.5)
Casing Range - lb/ft (kg/m)	6.4-6.50 (9.52-9.67)	3-1/2"- 5.75-12.95 (8.56-19.27) 4"-14.40 (21.43)	4-1/2"- 9.5-13.5 (14.14-20.09) 5"-15.0-18.0 (22.32-26.78)	15.50-23 (23.06-34.22)	7" - 20-38 (29.76-56.54) 7-5/8"-24-39 (35.71-58.03)	29.3-53.5 (43.6-79.61)
Max OD - in. (mm)	2.25 (57.2)	2.75 (73.0)	3.75 (95.25)	4.50 (114.3)	5.5 (123.2)	8.0 (203.2)
Length - ft. (m)	4.49-4.87 (1.349-1.47)	4.87-5.28 (1.47-1.59)	7.95-9.28 (2.40-2.80)	9.31-10.29 (2.80-3.10)	9.26-10.44 (2.79-3.14)	7.08 (2.16)
Min Tensile Rating - lb (kg)	25,000 (11,300)	25,000 (11,300)	85,000 (38,500)	120,000 (54,400)	120,000 (54,400)	120,000 (54,400)
Min BHA Weight - lb (kg)	150 (68)	300 (136)	1000 (450)	1500 (680)	1500 (680)	2000 (905)
Max Gun Weight - lb (kg)	9000 (4050)	12,300 (5580)	18,000 (8100)	40,000 (18140)	40,000 (18140)	40,000 (18140)

**Modular Gun System Configuration**

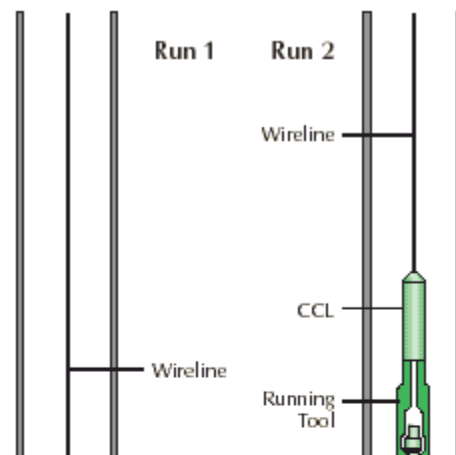
**Hydraulic Running Tool**



**On-The-Job-Performance**

**Well Conditions** A customer wanted to perforate a 46 ft interval in a well in central Texas. TD was 14,500 ft and included a BHT of 370° F and 10-lb brine fluid in the well. Pipe included 7 5/8-in. casing, with 5-in. 23.2 lb/ft liner PBR at 12,000 ft. The top of the liner was isolated with a 4-in. bore drillable packer set inside the 7 5/8-in. casing.

**Perforating Equipment** consisted of 3 3/8-in.



perforating guns, loaded four shots-per-foot, with 32-gram PYX charges and 100-grain PYX aluminum clad prima cord.

**A Standard 4 1/2-in. Auto Release Gun Hanger** was adapted for hostile environment use. Preparations included dressing the tool with PYX explosives and using water in place of silicone oil inside the hanger. The hanger was fitted with an auto-J-latch to allow setting and un-setting with the wireline. A 300-lb weight was installed on the bottom of the gun hanger to permit running on electric wireline.

**Two 3 3/4-in. Pressure-Operated Running Tools** were used to deploy the gun hanger and gun module. Crossover subs were used to adapt the running tool threads to the electric wireline.

**Running Procedure** The gun hanger was attached with a modular stinger onto the running tool, CCL, and electric wireline and run into the well. After reaching the approximate setting depth, gun hanger position was verified by checking the casing collars with the CCL. The gun hanger was set by up and down movement of the wireline. A decrease in wireline weight at the surface verified that the hanger had set. Additional weight was then slacked off. This caused oil to meter through an orifice in the hydraulic running tool. Five minutes later the tool released from the gun hanger.

Next, a running tool was installed onto the gun module firing-head handling stinger. The CCL and electric wireline were attached to the running tool, and the entire assembly was run into the well. The gun module assembly was lowered to the top of the gun hanger and the casing collars were again checked with the CCL to verify hanger position. Weight was slacked off to release the running tool. Decrease in weight at the surface verified that the running tool had separated from the gun module. The running tool was then pulled out of the well. The entire deployment, from the time the first running tool was lowered into the well until the last running tool was removed, took about 5 hr.

Five days later, Halliburton was called to the wellsite to fire the guns. Tubing was pressured to 7000 psi and released back to zero. Approximately four minutes later, the detonation was both felt and heard at the wellhead, indicating that the guns had fired. The well immediately began unloading 10-lb brine. A weighted slickline run was made to verify that the gun module and auto release gun hanger had dropped into the rathole. There were no problems encountered during the entire operation. The customer was very pleased with the efficiency of the operation and the performance of the Halliburton crew.

**[www.Halliburton.com](http://www.Halliburton.com)**

3/5/2009

Send questions or comments about this site  
to [Halliburton Service Center](#) or  
call U.S. (877) 263-6071 or outside U.S.  
(281) 983-4900.  
Copyright © 2009 Halliburton. All Rights  
Reserved.  
[Terms and Conditions](#) [Privacy](#)

**HALLIBURTON**