

# VELOCITY™ Perforating System

PLUG AND PLAY GUNS FOR PUMPDOWN OPERATIONS

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### OVERVIEW

Combining premier engineering with industry-trusted digital technology, the Halliburton Velocity™ perforating system provides safe, fast, efficient, and reliable perforating operations.

Continued evolutions in completions technology often require more guns to be deployed on each stage. The Velocity system can be prepared more easily and in less time than traditional guns, while at the same time reducing the overall weight and makeup length.

In the fast-paced environment of pump down perforating, minimizing equipment complexity and improving run rate efficiencies are vital for operational success. With its unique modular design, the Velocity gun system does not require any field wiring of guns, detonators, or igniters and can be fully verified on surface before making a trip in the well.

### FEATURES

- » Open architecture on digital switch technology. Our detonator module accepts most of the digital switch options available in the market.
- » Push-in detonator and igniter
- » Redundant ground paths for reliability
- » Reduced connections and leak paths
- » Accepts JRC MaxForce®-FRAC, FracJET and other industry standard perforating charges

### BENEFITS

- » Gun strings prepared in less time
- » Shorter overall length (OAL)
- » Eliminate errors associated with gun wiring
- » Improved stage efficiency and reduced nonproductive time (NPT)
- » Reduced HSE exposure and environmental impact



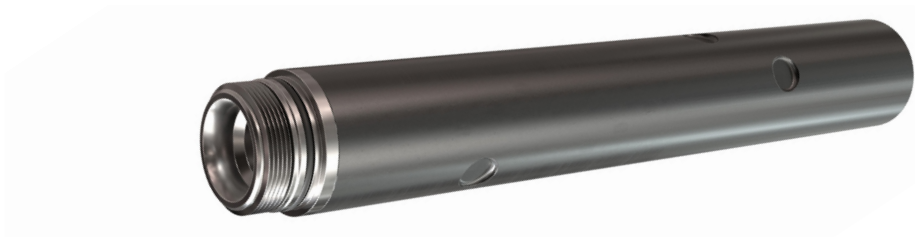
## PLUG AND PLAY GUNS FOR PUMPDOWN OPERATIONS

### GUN ASSEMBLIES

Description	Part No.	Nominal Length	Makeup Length	Phasing	Shots per Gun	Pressure Rating*
3/8-in. Velocity Carrier Assy V3-120	102952908	1.25 ft (38.1 cm)	13.56 in. (34.44 cm)	120	3	18000 psi
3/8-in. Velocity Carrier Assy V4-90	102952913	1.75 ft (53.34 cm)	18.59 in (47.24 cm)	90	4	18000 psi
3/8-in. Velocity Carrier Assy V6-60	102942196	1.75 ft (53.34 cm)	19.59 in (49.68 cm)	60	6	18000 psi
3/8-in. Velocity Carrier Assy V9-60	102942226	2.25 ft (68.58 cm)	25.56 in (64.92 cm)	60	9	18000 psi
3/8-in. Velocity Carrier Assy V12-60	102942227	2.75 ft (83.82 cm)	31.56 ft (80.16 cm)	60	12	18000 psi

Velocity™ Perforators feature integrated threads to allow fast and reliable gun assembly that require no field-wired connections.

\* Higher pressure rating Gun Assemblies are available.



### DETONATOR AND IGNITER

Description	Part No.	UN No	Shipping Class	N.E.C.	Exposive Load	Temperature	RF Safe
Velocity Detonator CF	102895443	0255	1.4B	0.49 g	RDX	350°F/1 hr	Yes
Velocity Detonator SRS	102947849	0256	1.4B	0.49 g	RDX	350°F/1 hr	Yes
Velocity Igniter CF	102848145	0454	1.4S	2.95 g	Black Powder	350°F/1 hr	Yes
Velocity Igniter SRS	102849145	0455	1.4S	2.95 g	Black Powder	350°F/1 hr	Yes

The Velocity Detonator and Igniter Cartridges have been tested by an independent third-party laboratory and are certified RF safe and Voltage safe up to 500V.



Detonator Cartridge

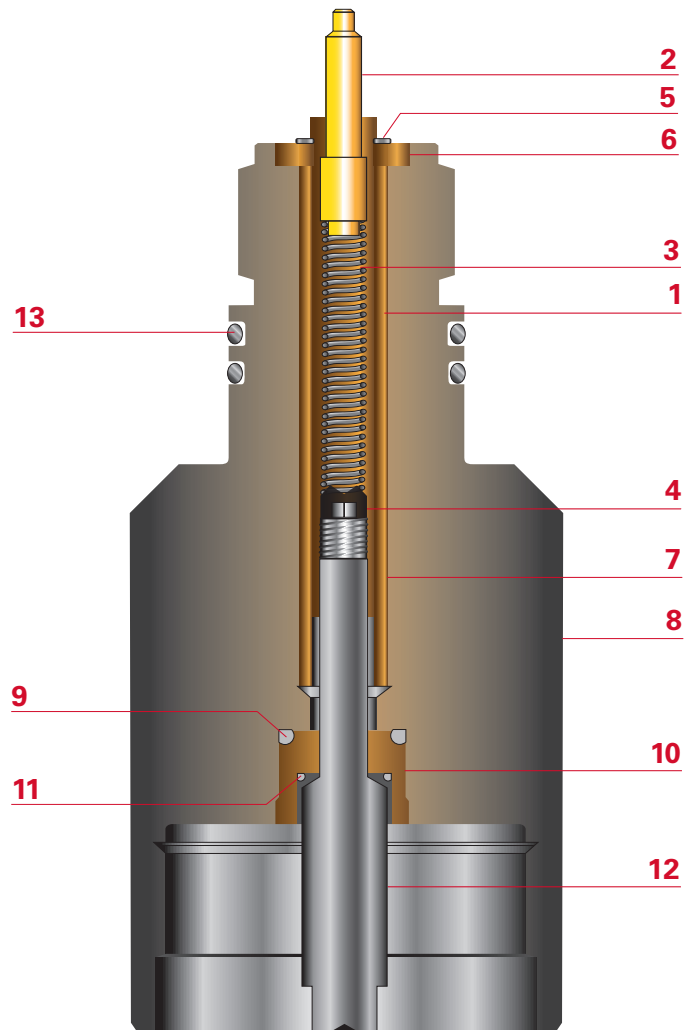


Igniter Cartridge

## TOP GUN ADAPTER – DIRECT CONNECT

Description	Part No.
Velocity 3-1/8in Top Gun Firing Head Adapter	102941504
(1) Contact Body	101965686
(2) Contact Plunger	101965682
(3) Contact Spring	101311658
(4) Set Screw	101258671
(5) Support Washer	101965683
(6) Insulator Washer	101965684
(7) Insulator Sleeve	101965685
(8) Cross Over	102941470
(9) O-Ring, 95 Duro, AS 568-116	100000202
(10) Lower Rod Insulator	133928
(11) O-Ring, 95 Duro, AS 568-014	100010190
(12) Contact Rod	102941467
(13) O-Ring, 95 Duro, AS 568-222 (2 req)	100000222

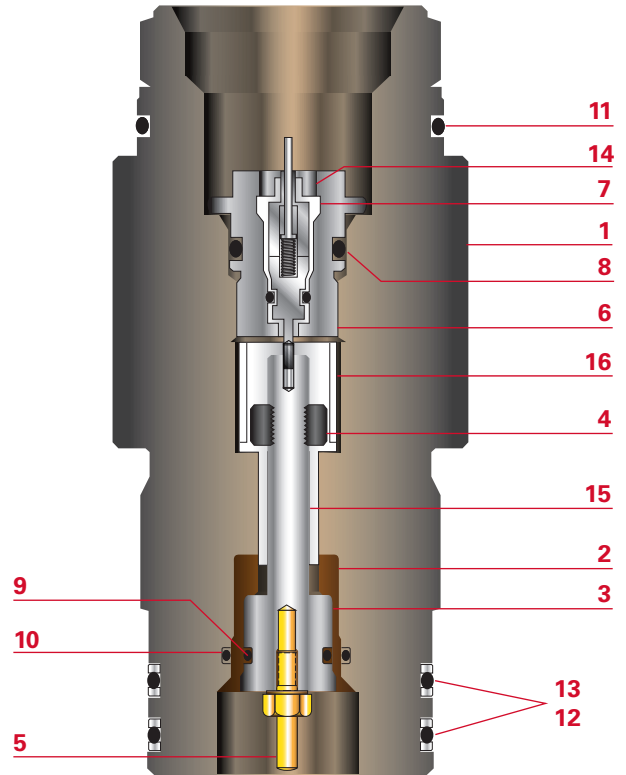
The Velocity Direct Connect is ideal for long gun strings as it eliminates high-bending moments on the neck of the quick change connections when picking up guns.



## PRESSURE ISOLATION SUB

Description	Part No.
Pressure Isolation Sub Assembly	102941472
(1) Cross Over	102941469
(2) Center Contact Insulator	102821696
(3) Center Contact Feedthru	102929446
(4) 3/8in HEX Nut	101869515
(5) Center Contact Rod	102780640
(6) Electrical Housing Nut	102942792
(7) Bulkhead Feedthru	102904619
(8) O-Ring, 94 Duro, AS 568-211	100064828
(9) O-Ring, 95 Duro, AS 568-113	100000200
(10) O-Ring, 94 Duro, AS 568-120	100064796
(11) O-Ring, 95 Duro, AS 568-230	100000230
(12) O-Ring, 94 Duro, AS 568-229	100012312
(13) Back Up O-Ring (4 req)	100157443
(14) Retainer Nut	102910078
(15) Isolation Washer	102819356
(16) Isolation Insert	102943110

The pressure isolation sub provides an effective barrier between the guns and setting tool and removes the need for a quick change.



## SETTING TOOL FIRING HEAD ADAPTERS

Description	Part No.
3.5-in. Shorty Setting Tool Adapter	102805079
2.5-in. Shorty Setting Tool Adapter	102832083
Baker 20 Setting Tool Adapter	102806346
Baker 10 Setting Tool Adapter	102801430
3/4-in. Compact Setting Tool Adapter	102807810

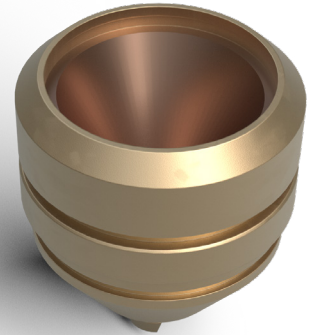
Velocity perforating guns are compatible with most setting tools, including high-power disposable setting tools.



## RECOMMENDED PERFORATING CHARGES

### FracJET PERFORATING CHARGES

Gun Size (in.)	Charge Name	Explosive Load (g)	Explosive Type PN	Target Casing Specifications	EHD	EHV
3½-inch 6spf 60°	FracJET 35	21	RDX-103002358	4½-inch 13.5ppf P-110	0.37	7.1%
				5½-inch 20ppf P-110	0.35	2.55%
				5½-inch 23ppf P-110	0.35	3.37%
3½-inch 6spf 60°	FracJET 36	21	HMX-103002357	5½-inch 20ppf P-110	0.35	3.3%
				5½-inch 23ppf P-110	0.36	5.3%
3½-inch 6spf 60°	FracJET 39	21	PETN-102771488	4½-inch 13.5ppf P-110	0.47	4.0%
				5½-inch 23ppf P-110	0.39	10.8%
3½-inch 6spf 60°	FracJET 39	21	PETN-102771488	5½-inch 23ppf P-110	0.42	11.24%



### MaxForce®-FRAC PERFORATING CHARGES

Gun Size (in.)	Charge Name	Explosive Load (g)	Explosive Type PN	Target Casing Specifications	EHD	EHV
2¾-inch 6spf 60°	150 MaxForce®-FRAC	15	RDX-102745134	4½-inch 13.5ppf P-110	0.35	2.4%
			HMX-102740045	4½-inch 13.5ppf P-110	0.35	2.4%
3½-inch 6spf 60°	230 MaxForce®-FRAC	23	RDX-102736069	4½-inch 13.5ppf P-110	0.41	2.3%
			HMX-102732983	5½-inch 23ppf P-110	0.40	5.9%
	210 MaxForce®-FRAC	21	RDX-102045430	4½-inch 13.5ppf P-110	0.42	3.0%
			HMX-102732983	5½-inch 23ppf P-110	0.42	3.8%
3½-inch 6spf 60°	210 MaxForce®-FRAC	21	RDX-102045430	4½-inch 11.7 L-80	0.46	4.7%
			HMX-102127122	5½-inch 23ppf P-110	0.43	11.7%
	230 MaxForce®-FRAC	23	RDX-102736069	4½-inch 11.7 L-80	0.49	5.8%
			HMX-102127122	5½-inch 23ppf P-110	0.45	13.8%
3½-inch 6spf 60°	230 MaxForce®-FRAC	23	RDX-102736069	5½-inch 23ppf P-110	0.40	3.5%
			HMX-102732983	5½-inch 23ppf P-110	0.40	4.3%
	210 MaxForce®-FRAC	21	RDX-102045430	5½-inch 23ppf P-110	0.43	13.1%
			HMX-102127122	5½-inch 17ppf L-80	0.45	11.7%

MaxForce®-FRAC and FracJET perforating charges optimize flow distribution of treatment fluids during hydraulic stimulation.

## FINAL ASSEMBLY

Velocity Perforating Guns provide up to 16 in. less makeup length (MUL) per carrier, allowing more guns to be run in the same footprint as standard guns.

Number of V3-120 Guns	Make-up Length	
	in.	ft
2	41.7	3.48
4	68.94	5.745
6	96.12	8.01
8	123.3	10.275
10	150.48	12.54
12	177.66	14.805
14	204.84	17.07
16	232.2	19.35
18	259.2	21.6
20	286.32	23.86

The Velocity ISO Sub connects directly to the setting tool firing head, eliminating the bottom quick change.



### Top Sub Assembly

#### Direct Connect

(10941504)

### 60 Degree Phase, 2.00 Spacing,

#### 6 Shot Loaded

(102957396)

### 90 Degree Phase, 3.00 Spacing,

#### 4 Shot Loaded

(102957397)

### Detonator Insert Assembly

(102895443)

### 120 Degree Phase, 2.00 Spacing,

#### 3 Shot Loaded

(102957398)

### Pressure Isolation Sub

(102941472)

### Igniter Insert Assembly

(102848145/102751633)

### Setting Tool Firing Head

#### 3-1/2 Shorty

(102805079)

### Power Charge

(102805079)

### 3-1/2 Shorty

(101974666)



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