



Coiled Tubing Safety Impact Firing Head (HP)

TC-031-1688-200

MAN-TC-031-1688-200 (R08)

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Owen Oil Tools pre-assembles its tools as per the field operating manual. It is the responsibility of the purchaser to insure that this tool is assembled as required, prior to use.

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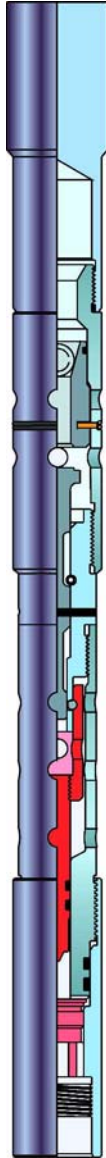
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Coiled Tubing Safety Impact Firing Head (HP)



CT Safety Impact Firing Head



Description

The Coiled Tubing Safety Impact Firing Head is designed to run perforating guns, jet cutters or severing tools on coil tubing. The system is actuated by dropping a ball and pressuring up the tubing. Once the ball is seated, a pre-determined pressure is applied to operate on the precision shear pins. After shearing, the firing pin strikes the detonator causing the gun to fire.

Features and Benefits

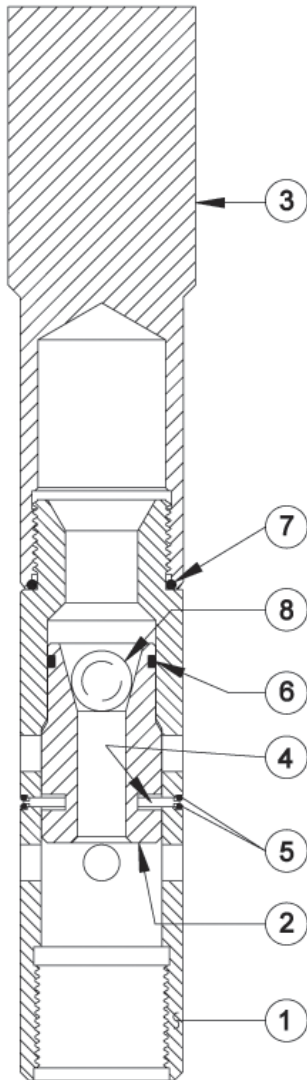
- Electrical currents, natural or man-made cannot detonate the
- Coiled Tubing Safety Impact Firing Head
- Used to initiate Owen Small Scalloped Gun Systems (1-11/16", 2-1/8", 2-1/2"), Tubing Cutters and Severing Tools
- Ideal for heavy mud and deviated wells
- High Pressure Wells

Specifications

OD	1.69 in.	43 mm
Max. Temperature ¹	250°F (121°C)	
Max. Hydrostatic (HP)	20,000 psi	137.9 MPa
Min. Hydrostatic (HP)	2,000 psi	13.8 MPa
Max. Tensile Strength	33,000 lbs.	14680 daN
Flow Area before firing	0.196 in ²	1.265 cm ²
Flow Area after firing	0.442 in ²	2.852 cm ²

¹The maximum temperature can be increased to 450°F (230°C) by substituting the 90 durometer Nitrile O-ring with 90 durometer Viton O-rings. Refer to the Time vs Temperature Chart for Explosives to confirm any explosives requirements.

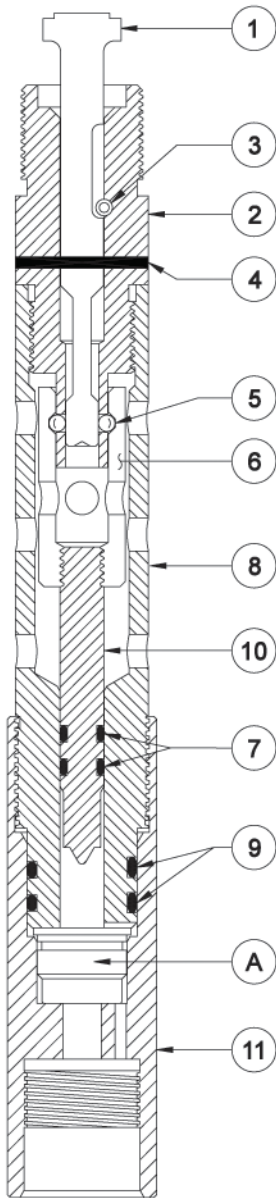
Ball Activated Differential Piston BOM and Schematic



Item	Part Number	Qty.	Description
--	TC-031-1688-400	1	Ball Activated Differential Piston Assembly
1	TC-031-0002-000	1	Piston Housing, BD
2	TC-031-0003-000	1	Piston, BD
3	TC-031-0008-000	1	Retainer Cap, Special
4	SF-010-0100-038	12	Shear Pins, Owen's
5	OOO-N569-028	2	O-Ring, N-90
6	OOO-N569-119	1	O-Ring, N-90
7	OOO-N569-124	1	O-Ring, N-90
8	ST-040-0437-000	1	Drop Ball

Item	Part Number	Qty.	Description
--	TC-031-1688-499	--	Redress Kit - Ball Activated Differential Piston Assembly
4	SF-010-0100-038	12	Shear Pins, Owen's
5	OOO-N569-028	2	O-Ring, N-90
6	OOO-N569-119	1	O-Ring, N-90
7	OOO-N569-124	1	O-Ring, N-90
8	ST-040-0437-000	1	Drop Ball

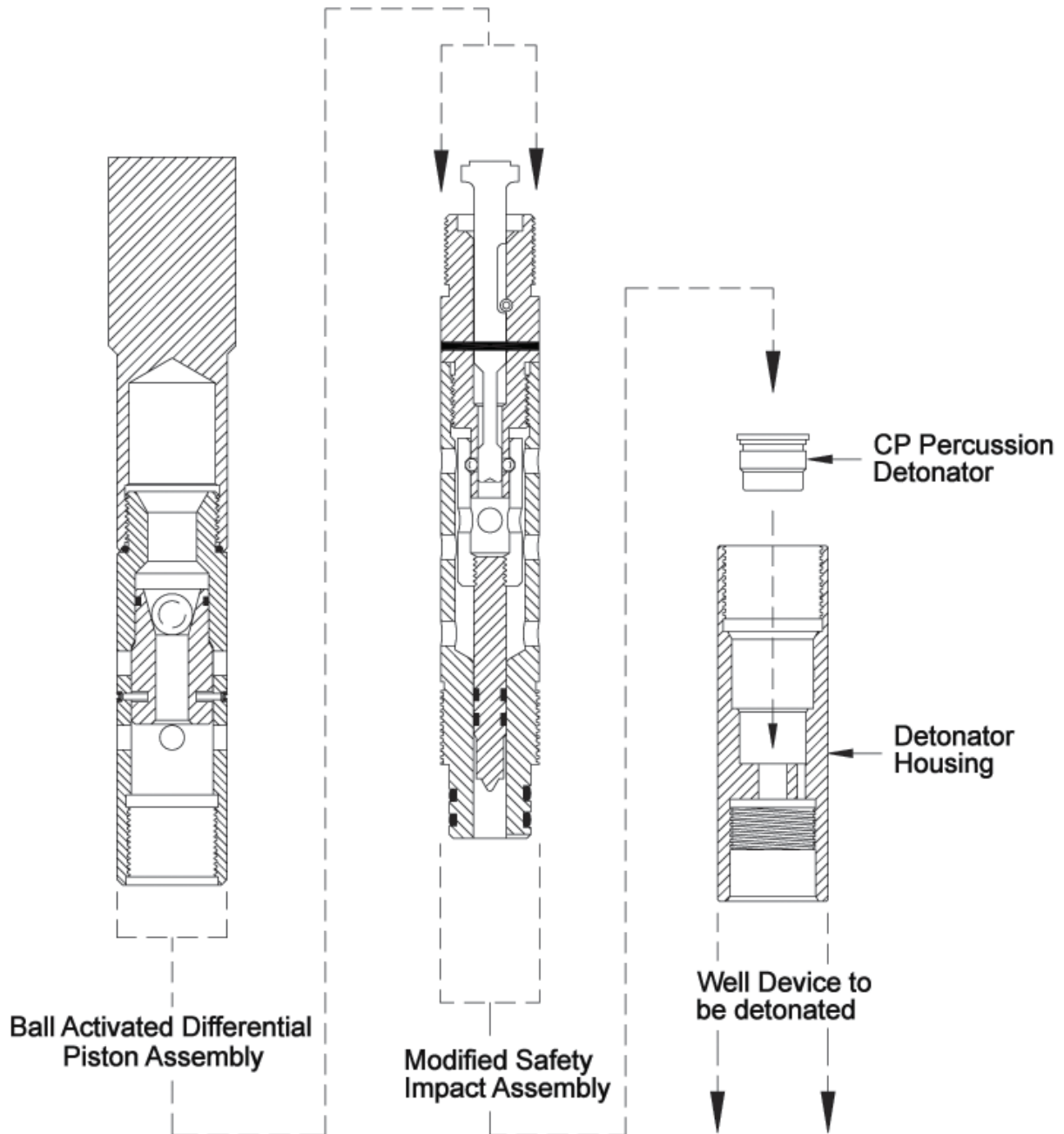
Modified Safety Impact Firing Head (HP) BOM and Schematic



Item	Part Number	Qty.	Description
--	TC-012-1500-500	1	Modified Safety Impact Assembly (HP)
1	TC-031-0004-000	1	Release Rod, Modified
2	TC-031-0005-000	1	Body, Release Rod, Modified
3	SF-010-0187-125	1	Roll Pin
4	PF-120-0125-150H	1	Coiled Pin
5	ST-040-0188-000	4	Retaining Balls
6	TC-012-0004-200	1	Ball Retainer (HP)
7	OOO-N569-109	2	O-Ring, N-90 (HP)
8	TC-012-0003-200	1	Body (HP)
9	OOO-N569-214	2	O-Ring, N-90
10	TC-012-0005-000	1	Firing Pin, CP Style Detonator
11	TC-040-0001-400	1	Detonator Housing
A	Reference	1	Percussion Detonator
--	TC-031-1688-299	--	Redress Kit, (HP)
--	MAN-TC-031-1688-200	--	Assembly Manual, (HP)

Item	Part Number	Qty.	Description
--	TC-031-1688-299	--	Redress Kit - Coiled Tubing Safety Impact Firing Head (HP)
--	TC-012-1500-599	--	Redress Kit - Modified Safety Impact Assembly (HP)
3	SF-010-0187-125	1	Roll Pin
4	PF-120-0125-150H	1	Coiled Pin
5	ST-040-0188-000	4	Retaining Balls
7	OOO-N569-109	2	O-Ring, N-90 (HP)
9	OOO-N569-214	2	O-Ring, N-90

Exploded View





Warning: *The assembly of this tool requires the handling of an Explosive Device and all safety precautions must be adhered to and observed!*



Caution: *The shear pin values shown on the package accompanying this tool are valid ONLY for the tools listed in this manual!*



Caution: *Correct shear pin values will vary between lot dates, always reference the data accompanying the pins!*



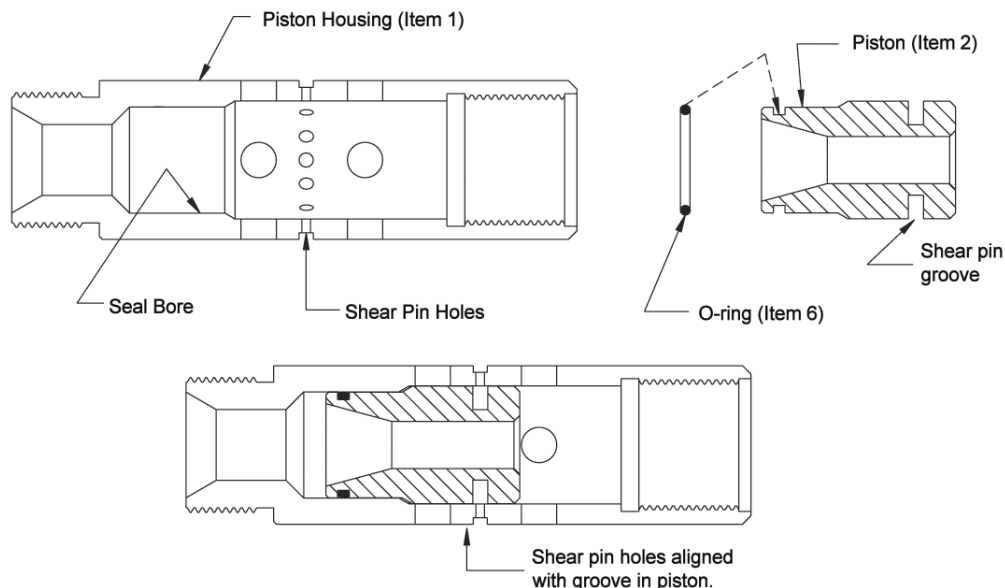
Note: *Check all items against the parts list to be sure of having the correct parts and quantities.*



Note: *Check for any damage to the parts which would prevent the part from being assembled correctly, easily and safely.*

1.0 Ball Activated Differential Piston Assembly

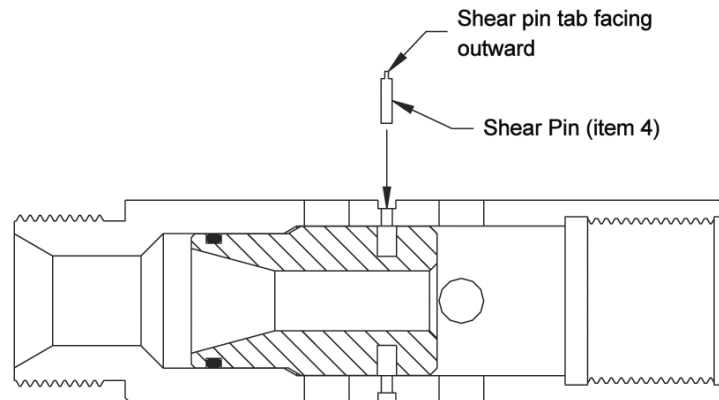
1.1 Install the O-ring (item #6) into the top groove of the Piston (item #2) and apply grease to the O-ring. Apply grease to seal bore of the Piston Housing (item #1), then insert the Piston into the Piston Housing until the shear pin groove is aligned with the shear pin holes in the Piston Housing.



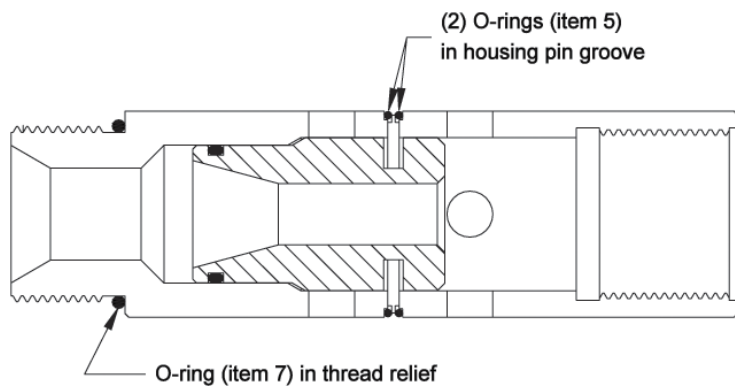
Coiled Tubing Safety Impact Firing Head (HP)



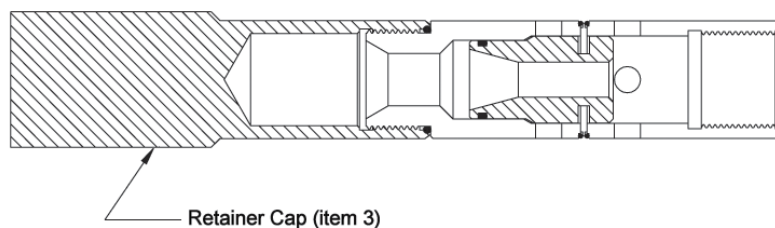
1.2 With the piston installed into the piston housing, insert the calculated number of shear pins required for the job application. Refer to the Pinning Calculations and Temperature Correction Charts. When installing shear pins, try to evenly space the pins around tool, with the tabs of the pins facing outward.



1.3 After the required number of pins have been installed, place the two (2) O-rings (item #5) in the housing pin groove. These O-rings will retain the pins in shearing position. Install the O-ring (item #7) into the thread relief groove of the pin end of the Piston Housing.



1.4 Apply grease to the O-ring and threads of pin end of Piston Housing. Thread into the Retainer Cap (item #3) and tighten. The Ball Activated Differential Piston Assembly is now complete.





2.0 Imperial Pinning Calculations

2.1 Correct for bottom hole temperature (BHT). Refer to the Temp. Correction Chart.

_____ deg. F Correction factor = _____

2.2 Calculate actual shear value at bottom hole temperature.

_____ psi/pin (@ 72° F) X (correction factor) = _____ psi/pin @ BHT

Refer to the pin shipping bag for listed pin value to use.

2.3 Re-calculate required number of pins for proposed shear value.

(differential shear value) psi ÷ (step 2.2) psi/pin = _____ pins

You must use a minimum of four (4) shear pins with this Firing Head, for safety and design reasons.

2.4 Either round up or down the number of pins depending on operational conditions.

2.5 There is a ±5% operating tolerance on the tool.

2.6 Calculate an average, high, and low operating pressure.

Average: _____ pins x _____ psi/pin = _____ psi

High side: 1.05 x _____ (average psi) = _____

Low side: .95 x _____ (average psi) = _____

3.0 Metric Pinning Calculations

3.1 Correct for bottom hole temperature (BHT). Refer to the Temp. Correction Chart.

_____ deg. C Correction factor = _____

3.2 Calculate actual shear value at bottom hole temperature.

_____ kPa/pin (@ 22° C) X (correction factor) = _____ kPa/pin @ BHT

Refer to the pin shipping bag for listed pin value to use.

3.3 Re-calculate required number of pins for proposed shear value.

(differential shear value) kPa ÷ (step 3.2) kPa/pin = _____ pins

You must use a minimum of four (4) shear pins with this Firing Head for safety and design reasons.

3.4 Either round up or down the number of pins depending on operational conditions.

3.5 There is a ±5% operating tolerance on the tool.

3.6 Calculate an average, high, and low operating pressure.

Average: _____ pins x _____ kPa/pin = _____ kPa

High side: 1.05 x _____ (average kPa) = _____

Low side: .95 x _____ (average kPa) = _____



4.0 Temperature Correction Charts

Imperial Temperature Correction Chart

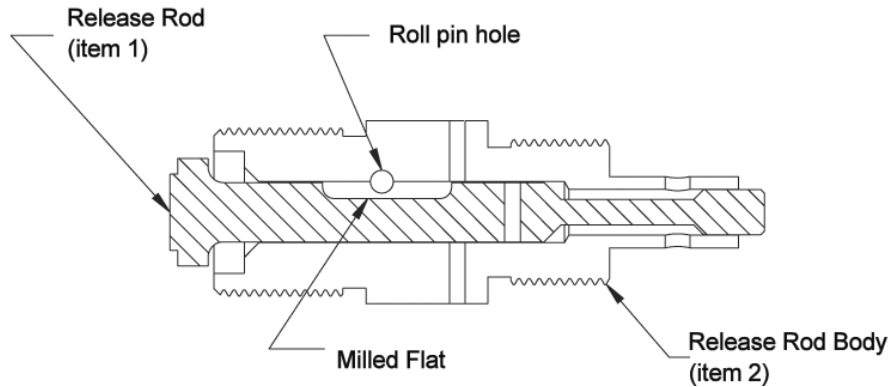
	Correction		Correction		Correction		Correction
Deg. F	Factor	Deg. F	Factor	Deg. F	Factor	Deg. F	Factor
70	1.00000	180	0.9440	290	0.9025	400	0.8820
80	0.9950	190	0.9395	300	0.8980	410	0.8840
90	0.9880	200	0.9350	310	0.8970	420	0.8850
100	0.9825	210	0.9315	320	0.8945	430	0.8860
110	0.9775	220	0.9275	330	0.8925	440	0.8880
120	0.9725	230	0.9235	340	0.8900	450	0.8900
130	0.9675	240	0.9195	350	0.8880	460	0.8940
140	0.9620	250	0.9165	360	0.8870	470	0.9000
150	0.9570	260	0.9125	370	0.8860		
160	0.9530	270	0.9090	380	0.8845		
170	0.9485	280	0.9060	390	0.8835		

Metric Temperature Correction Chart

	Correction		Correction		Correction		Correction
Deg. C	Factor	Deg. C	Factor	Deg. C	Factor	Deg. C	Factor
21	1.00000	82	0.9440	143	0.9025	204	0.8820
27	0.9950	88	0.9395	149	0.8980	210	0.8840
32	0.9880	93	0.9350	154	0.8970	216	0.8850
38	0.9825	99	0.9315	160	0.8945	221	0.8860
43	0.9775	104	0.9275	166	0.8925	227	0.8880
49	0.9725	110	0.9235	171	0.8900	232	0.8900
54	0.9675	116	0.9195	177	0.8880	237	0.8940
60	0.9620	121	0.9165	182	0.8870	243	0.9000
66	0.9570	127	0.9125	188	0.8860		
71	0.9530	132	0.9090	193	0.8845		
77	0.9485	138	0.9060	199	0.8835		

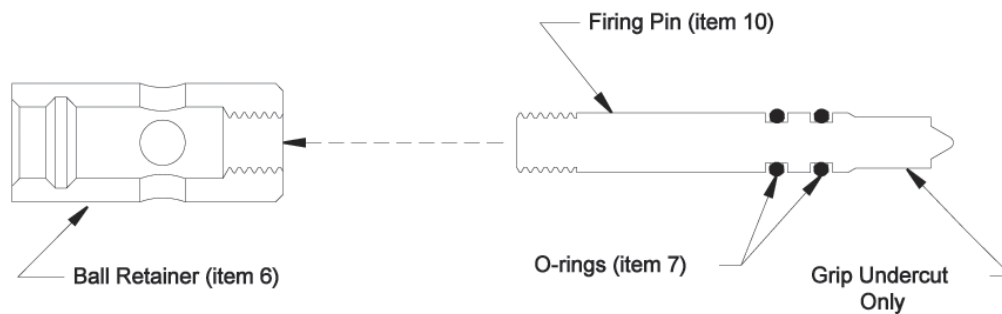
5.0 Modified Safety Impact Assembly

5.1 Insert the Release Rod (item #1) into the Release Rod Body (item #2) so the milled flat on the Release Rod is in alignment with roll pin hole.

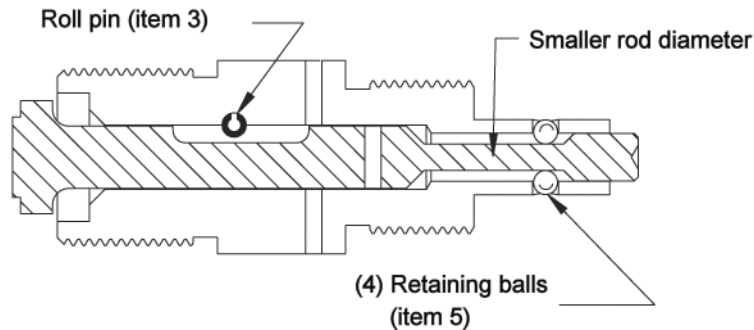


5.2 Insert and hammer in Roll Pin (item #3) until pin end is flush with the rod body. The Release Rod should slide easily without binding. Set aside.

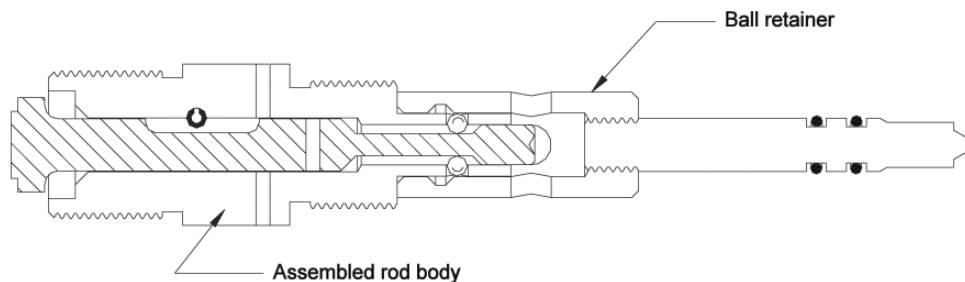
5.3 Thread the Firing Pin (item #10) into the Ball Retainer Piston (item #6) and tighten. Install the O-rings (item #7) onto the Firing Pin. Set aside.



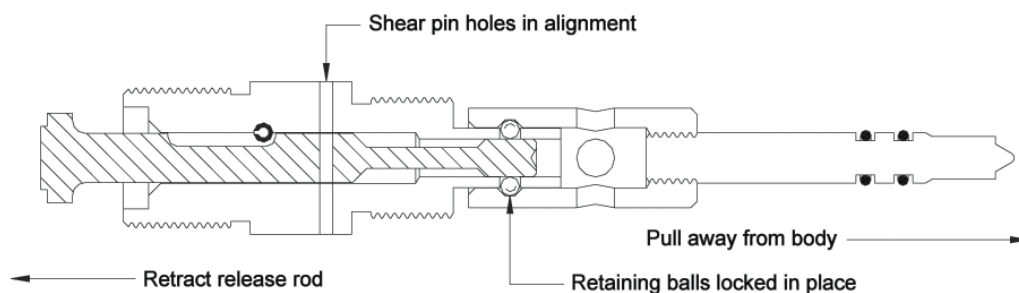
5.4 Slide the Release Rod so the smaller diameter is visible through the four (4) holes of the body. Place a small amount of grease in the holes and insert the four (4) Retaining Balls (item #5). The Retaining Balls should be flush with the surface of the body.



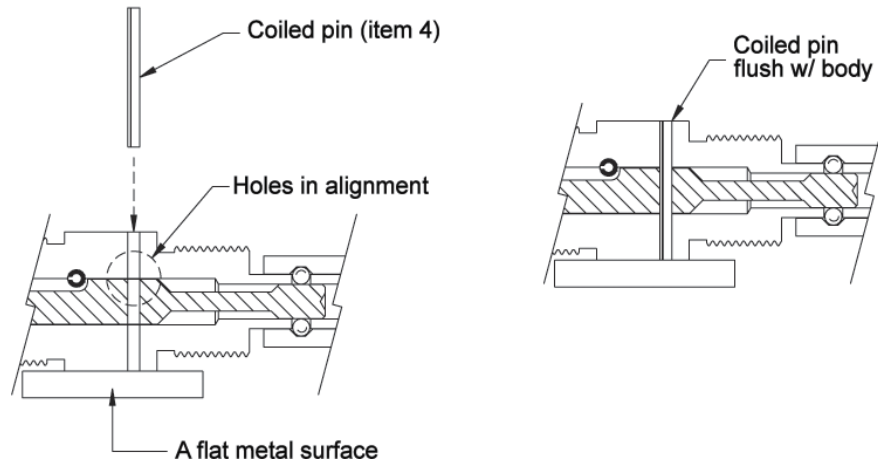
5.5 Holding the Release Rod in the rod body, slide the Ball Retainer Piston/Firing Pin all the way onto the rod body. Make sure that the Retaining Balls remain in place.



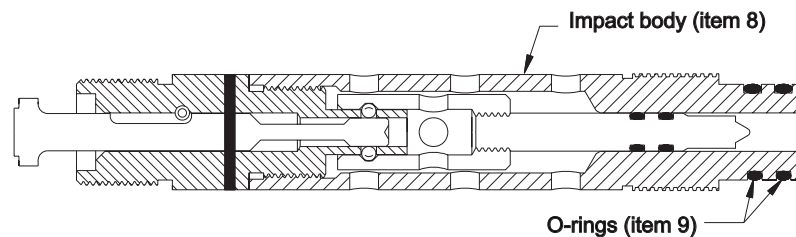
5.6 Retract the Release Rod and pull ball retainer away from the body at the same time. This procedure will lock the Retaining Balls into the Ball Retainer Piston and align the coiled pin holes in the rod body and Release Rod.



5.7 With the holes of the Release Rod and the body aligned, insert the Coiled Pin (item #4) and tap it into the body and through the Release Rod until flush with the body OD.



5.8 Apply grease to the O-ring on the Ball Retainer Piston and the threads of the rod body (Firing Pin side). Insert and thread the assembly into the Impact Body (item #8) and tighten. Install the O-rings (item #9) on the Impact Body. The Modified Safety Impact Assembly (HP) section is now complete.



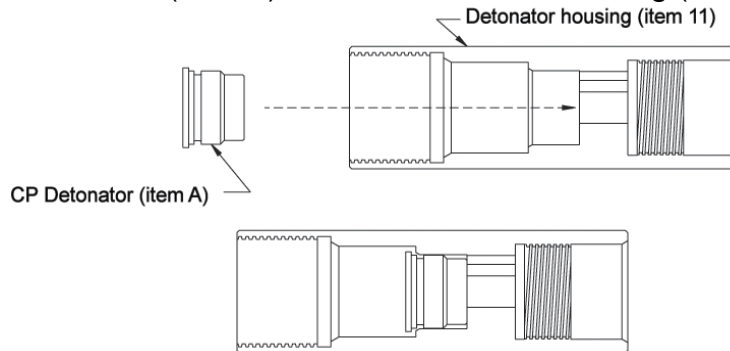
5.9 Apply grease to the threads on the Release Rod end of the impact assembly, thread into the Ball Activated Differential Piston assembly and tighten.



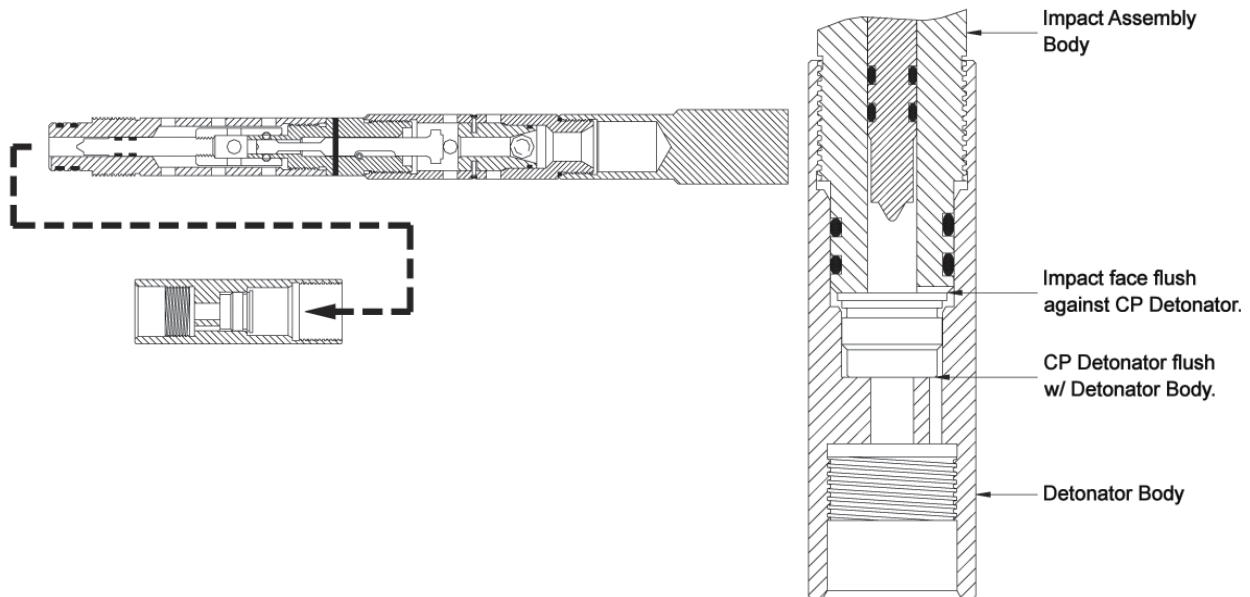
Caution: Be careful not to shear the brass pin on the Release Rod while handling!

6.0 Detonator Installation

6.1 Insert the CP Detonator (item A) into the Detonator Housing (item #1).



6.2 Apply grease to the O-rings and threads of the impact assembly and carefully thread the assembly into the detonator housing. **Make sure** that the detonator remains in the recessed area while threading the parts together. Tighten just enough to firmly hold the detonator in position. For ease of assembly, thread the components together in a vertical position.



Warning: *The firing head assembly is now ARMED, and caution must be used when handling and installing it on the main well device to be used!*

