Pressure Activated Firing Head-HP

TC-020-1688-200

MAN-TC-020-1688-200 (R06)

Owen Oil Tools LP

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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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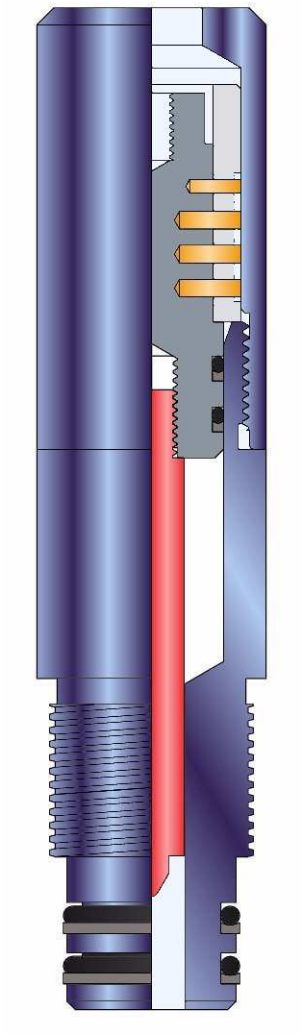
Pressure Activated Firing Head (HP)



Description

The Pressure Activated Firing Head (LP) was developed for use where pressure firing is required, including horizontal wells, well stimulation or as a backup firing system. These tools utilize our precision shear pin technology with an accuracy of +/- 5%. This low pressure system can be set to activate at predetermined pressures ranging from 2,000 psi to 25,000 psi, by utilizing two sizes of precision shears.

Features and Benefits

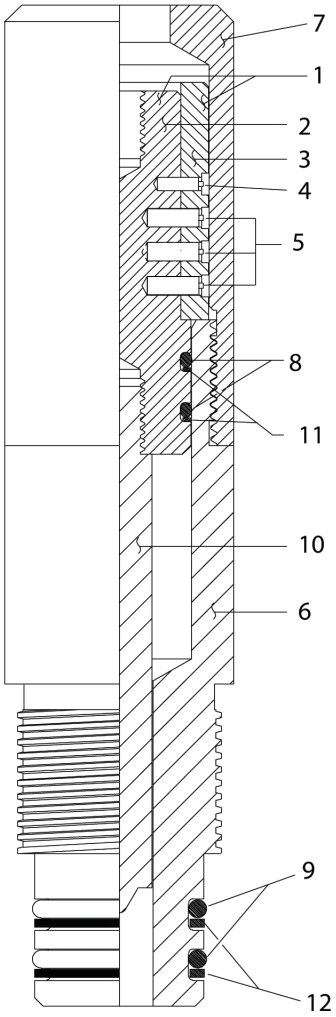
- Utilized with any of Owen TCP Firing Head Top Sub or an Automatic Release Firing Head
- Used with Owen Time Delay Fuses
- Can be placed top or bottom of all Owen TCP Guns
- Well Suited for highly deviated wells
- Can be run on Coil Tubing
- Can be run on Slick Line or Electric Line
- Requires 2,000 psi minimum to fire
  (Safe at surface - API RP-67)

Specifications

O.D.	1.69"	43 mm
Make-up Length	4.75"	121 mm
Max. Temperature [1]	250℉ (121℃)	
Max. Hydrostatic	25.000 psi	172.3 MPa
Min. Hydrostatic	2,000 psi	13.8 MPa

[1]The maximum temperature can be increased to 450℉ (230℃) by substituting the 90 durometer Nitrile o-rings with 90 durometer Viton O-rings. Refer to the Time vs Temperature chart for Explosives to confirm any explosives requirements.

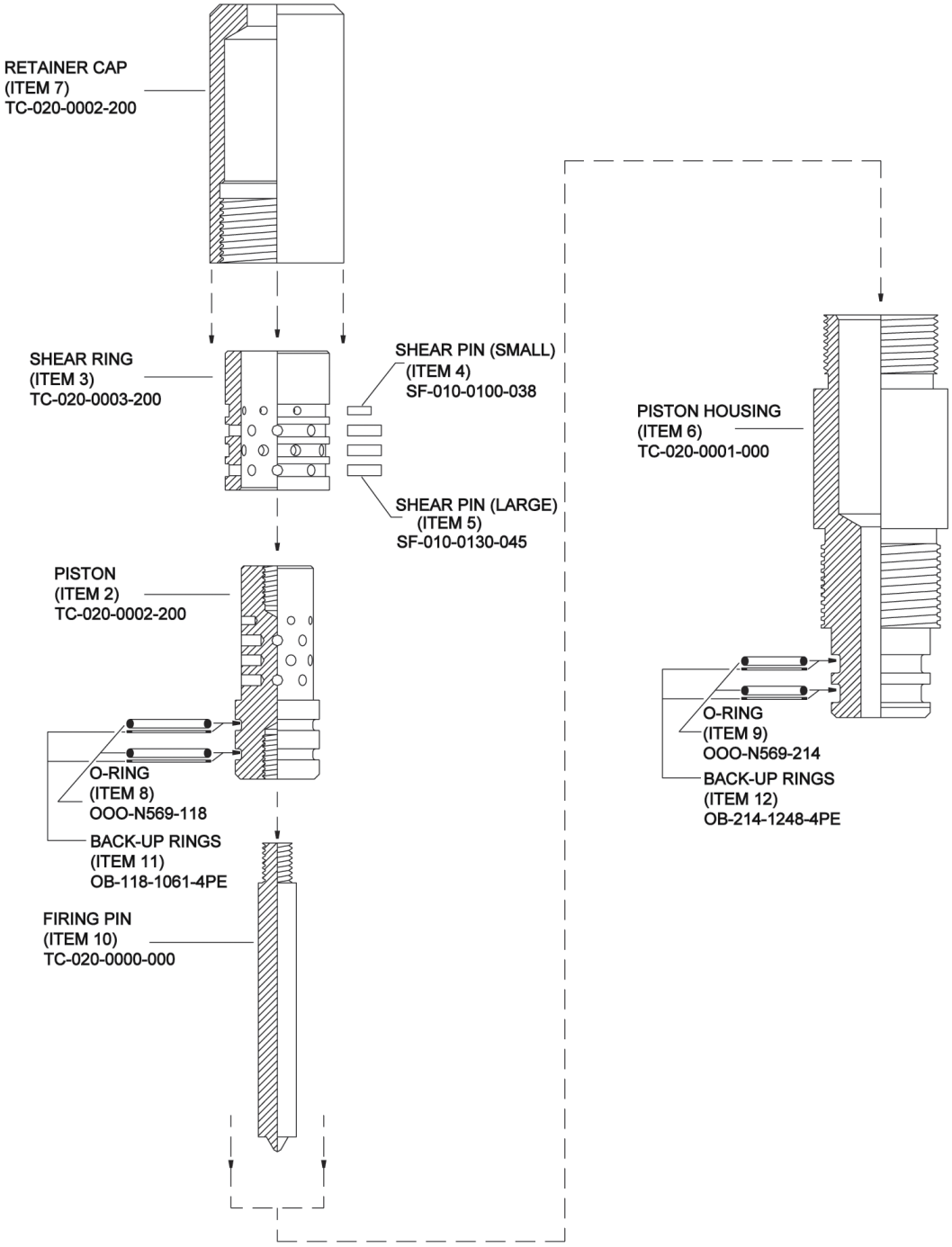
BOM and Schematic



Item	Part Number	Qty	Description
--	**TC-020-1688-200**	--	**Pressure Activated Firing Head, HP**
1	TC-020-0003-200	1	Piston/Shear Ring Matched Set - HP
2	TC-020-0004-200	REF	Piston - PAF (included in TC-020-0003-200 - not sold separately)
3	TC-020-0005-200	REF	Shear Ring - PAF (included in TC-020-0003-200 - not sold separately)
4	SF-010-0100-038	8	Shear Pin - small diameter
5	SF-010-0130-045	24	Shear Pin - large diameter
6	TC-020-0001-000	1	Piston Housing - PAF
7	TC-020-0002-200	1	Retainer Cap - PAF - HP
8	OOO-N569-118	2	O-Ring
9	OOO-N569-214	2	O-Ring
10	TC-020-0000-000	1	Firing Pin, C.P./TDF - Slim
11	OB-118-1061-4PE	2	Back-up Ring - Peek
12	OB-214-1248-4PE	2	Back-up Ring - Peek
--	TC-020-1688-299	--	Re-Dress Kit, PAF
--	MAN-TC-020-1688-200	--	Assembly Procedures Manual

Item	Part Number	Qty	Description
--	**TC-020-1688-299**	--	**Re-Dress Kit, PAF (HP)**
4	SF-010-0100-038	8	Shear Pin - small diameter
5	SF-010-0130-045	24	Shear Pin - large diameter
8	OOO-N569-118	2	O-Ring
9	OOO-N569-214	2	O-Ring
11	OB-118-1061-4PE	2	Back-up Ring - Peek
12	OB-214-1248-4PE	2	Back-up Ring - Peek

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!***

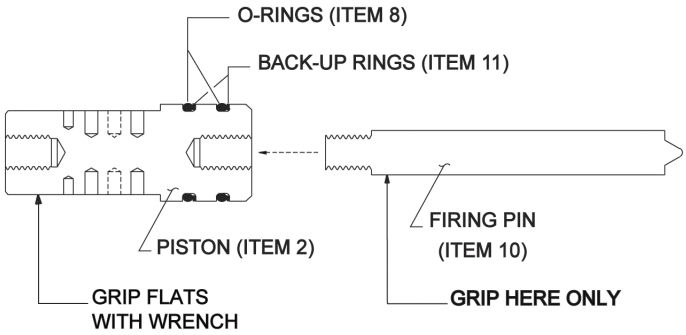
Caution: ***Correct shear pin values will vary between lot dates, always reference the data accompanying the pins!***

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

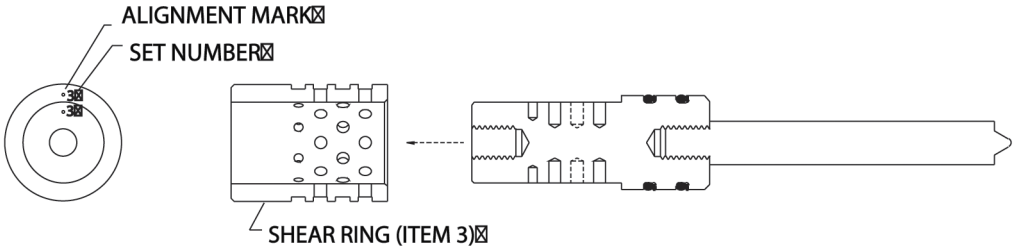
Note: *Check for any damage to the parts which would prevent the part from being assembled correctly, easily and safely.*

1.0 Assembly

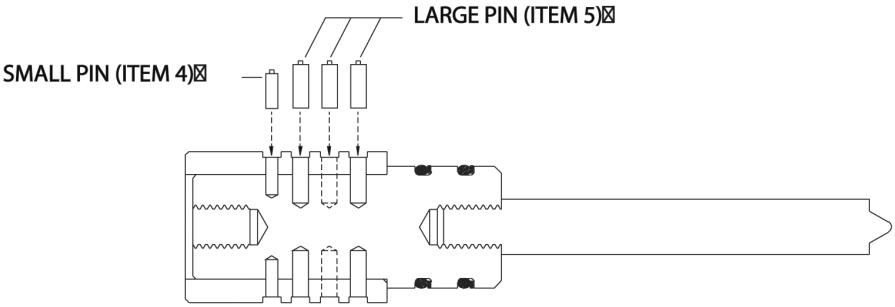
1.1 Install the O-rings (item #8) and Back-up rings (item #11) on the Piston (item #2). Apply one drop of Blue Loctite® on the threads of the Firing Pin (item #10). Thread Firing Pin into the Piston and tighten. Be careful not to mar the surface of the Shear Pin holes.



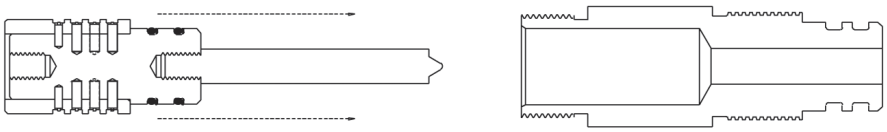
1.2 Slide the Shear Ring (item #3) over the Piston. Line up the alignment marks and numbers on the ring and Piston. This will align the holes that were matched drilled.



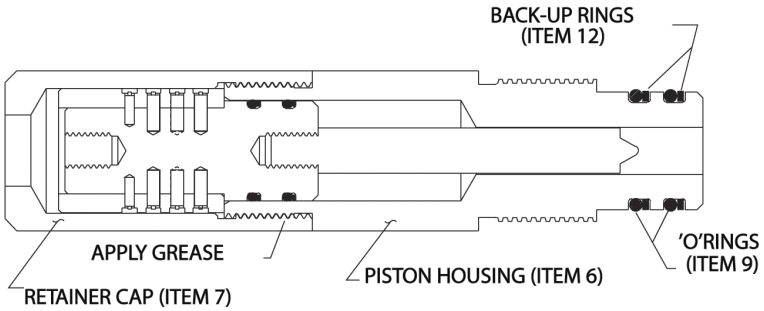
1.3 Insert the correct size and quantity of pins as per your job requirements (refer to the Pinning Procedures and Temperature Correction Charts). Owen recommends equally spacing the Shear Pins in ring and applying a small amount of grease to help retain pins.



1.4 Apply grease to O-rings on the Piston and insert the assembly into the Piston Housing (item #6) until the Shear Ring is flush with the housing.



1.5 Apply grease to threads of the Piston Housing, then thread on the Retainer Cap (item #7) and tighten. Install the O-rings (item #9) and the Back-up rings (item 1#2) on the Piston Housing. The Pressure Activated Firing Head is now complete.



2.0 Imperial Pinning Calculations

Step 1 (Data)

A. Well Temperature (BHT) at perforating depth _____℉

B. True Vertical Depth (TVD) _____ ft

C. Max. fluid weight in well when tripping _____ ppg (lb/gal)

D. Fluid Weight in tubing when ready to fire _____ ppg (lb/gal)

Step 2 (Calculate Pressures)

A. Max. Hydrostatic at depth

(0.05195 * 1C * 1B) = _____ psi

B. Tubing hydrostatic when ready to fire

(0.05195 * 1B * 1D) = _____ psi

C. Greater of 2A or 2B = _____ psi

D. Absolute Firing Pressure

(2C + 2000 psi (minimum safety factor)) = _____ psi

Step 3 (Calculate number of pins)

A. Reduction Factor

Refer to the Temperature Correction Chart with the temperature from 1A = ___

B. Adjusted Large Pin rating (.130 dia.)

(_____ psi * 3A) = _____ psi / pin @ BHT

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

C. Adjusted Small Pin rating (.100 dia.)

(_____ psi * 3A) = _____ psi / pin @ BHT

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

D. Number of Large Pins

(2D / 3B) = _____

A. Number of Small Pins = _____

Take fractional amount of 3D and determine if one small pin is required (for example 11.5 pins 11 large + 1 small).

Step 4 (Calculate nominal absolute firing pressure)

A. 3D x 3B = _____ Large pin psi @ BHT

B. 3E x 3C = _____ Small pin psi @ BHT

C. 4A + 4B = _____ Total absolute pressure @ BHT

Step 5 (Calculate pressure tolerance)

A. Tolerance (4C * 0.05) = _____ psi

Step 6 (Calculate surface pressure) - Pressure applied on tubing.

A. Nominal pressure (4C - 2B) = _____ psi

B. Max. pressure (6A + 5A) = _____ psi

C. Min. pressure (6A - 5A) = _____ psi

3.0 Metric Pinning Calculations

Step 1 (Data)

A. Well Temperature (BHT) at perforating depth _____℃

B. True Vertical Depth (TVD) _____ m

C. Max. fluid weight in well when tripping _____ kg/m3

D. Fluid Weight in tubing when ready to fire _____ kg/m3

Step 2 (Calculate Pressures)

A. Max. Hydrostatic at depth

(0.0098 * 1C * 1B) = _____ kPa

B. Tubing hydrostatic when ready to fire

(0.0098 * 1B * 1D) = _____ kPa

C. Greater of 2A or 2B = _____ kPa

D. Absolute Firing Pressure

(2C + 13790 kPa (minimum safety factor)) = _____ kPa

Step 3 (Calculate number of pins)

A. Reduction Factor

Refer to the Temperature Correction Chart with temperature from 1A) = _____

B. Adjusted Large Pin rating (.130 dia.)

(_____ kPa * 3A) = _____ kPa / pin @ BHT

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

C. Adjusted Small Pin rating (.100 dia.)

(_____ kPa * 3A) = _____ kPa / pin @ BHT

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

D. Number of Large Pins

(2D / 3B) = _____

E. Number of Small Pins = _____

Take fractional amount of 3D and determine if one small pin is required (for example 11.5 pins 11 large + 1 small).

Step 4 (Calculate nominal absolute firing pressure)

A. 3D x 3B = _____ Large pin kPa @ BHT

B. 3E x 3C = _____ Small pin kPa @ BHT

C. 4A + 4B = _____ Total absolute pressure @ BHT

Step 5 (Calculate pressure tolerance)

A. Tolerance (4C * 0.05) = _____ kPa

Step 6 (Calculate surface pressure) - Pressure applied on tubing.

A. Nominal pressure (4C - 2B) = _____ kPa

B. Max. pressure (6A + 5A) = _____ kPa

C. Min. pressure (6A - 5A) = _____ kPa

4.0 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		

5.0 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		