



Time Delay HP Firing System

TC-040-1688-500

MAN-TC-040-1688-500 (R03)

Owen Oil Tools LP

12001 CR 1000

Godley, Texas, 76044, USA

Phone: +1 (817) 551-0540

Fax: +1 (817) 551-1674

www.corelab.com/owen

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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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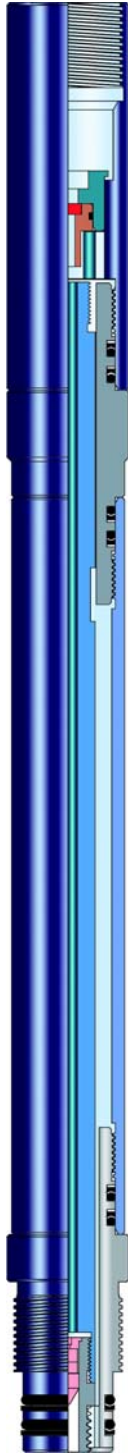
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Description

The High Pressure Time Delayed Firing System is used in conjunction with the Pressure Activated Firing Head-High Pressure. The time delay system consists of the time delay hardware, an ignitor, a pyrotechnical time delay fuse, and a firing pin cartridge. The single fuse system allows for a time of (8-9 minutes) between the activation of the firing head to the release of the firing pin cartridge into the main percussion detonator. This time interval allows the bleeding off of the pressure used to activate the firing head to establish an underbalance condition or to perform another needed operation pertaining to the perforation of the well. In the event that more time is required, extra fuses can be easily incorporated into the system.

Features and Benefits

- Obtain maximum use of under or overbalanced pressures
- Independently perforate selected zones
- Reduce costs by allowing the running of multiple guns without using gun spacers
- Work in heavy mud systems
- Be used in production completions, drillstem testing, and dual completions
- Increase operational time by the addition of time delay elements

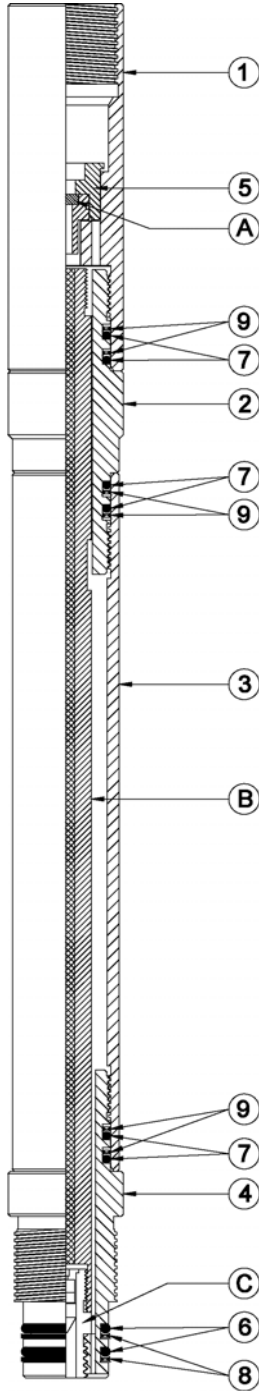
Specifications

OD	1.68 in	43 mm
Make-up Length	17.86 in	454 mm
Max. Temperature ¹	250°F (121°C)	
Max. Hydrostatic HP	25,000 psi	124.1 MPa

¹The maximum temperature can be increased to 450°F (230°C) 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.

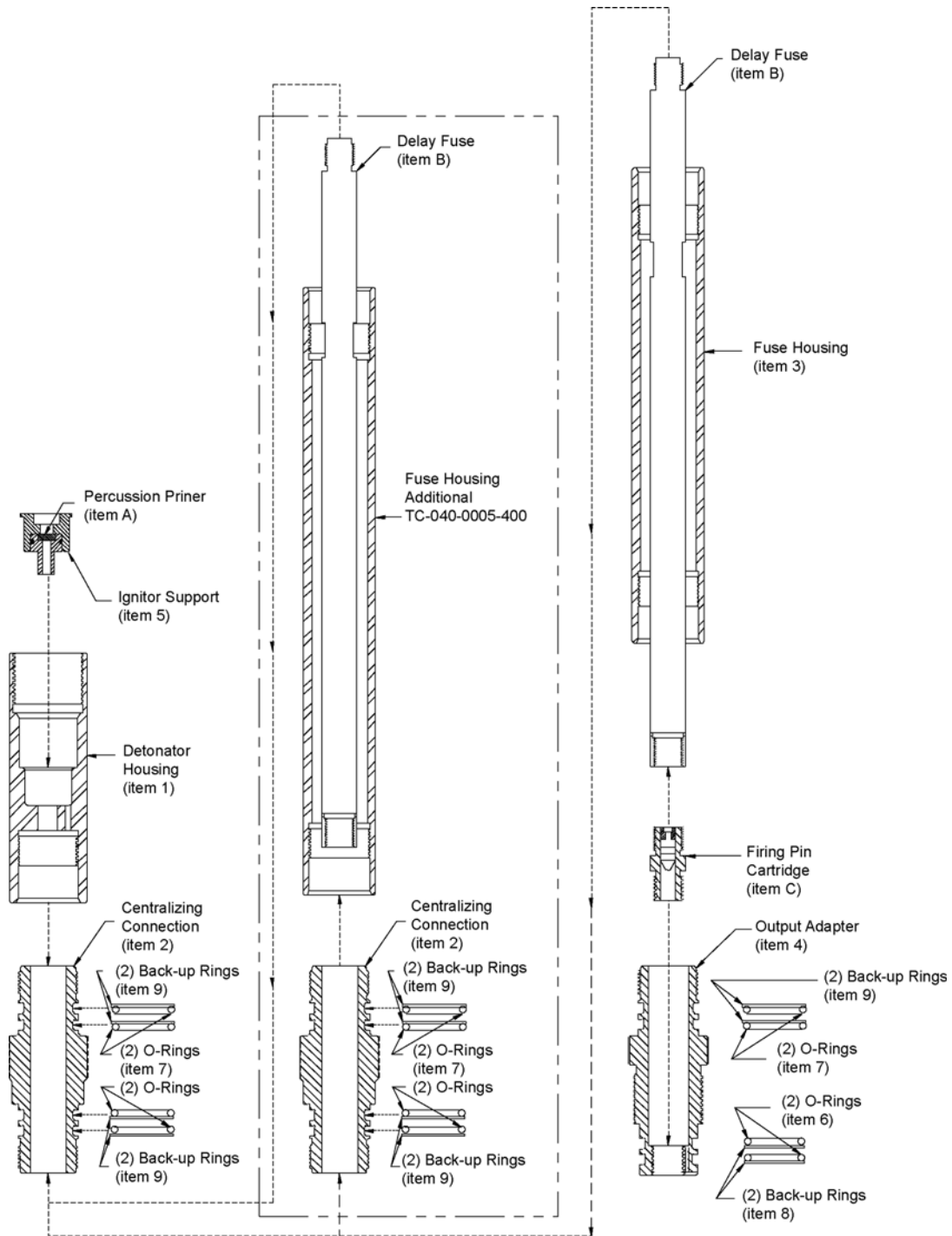


BOM and Schematic

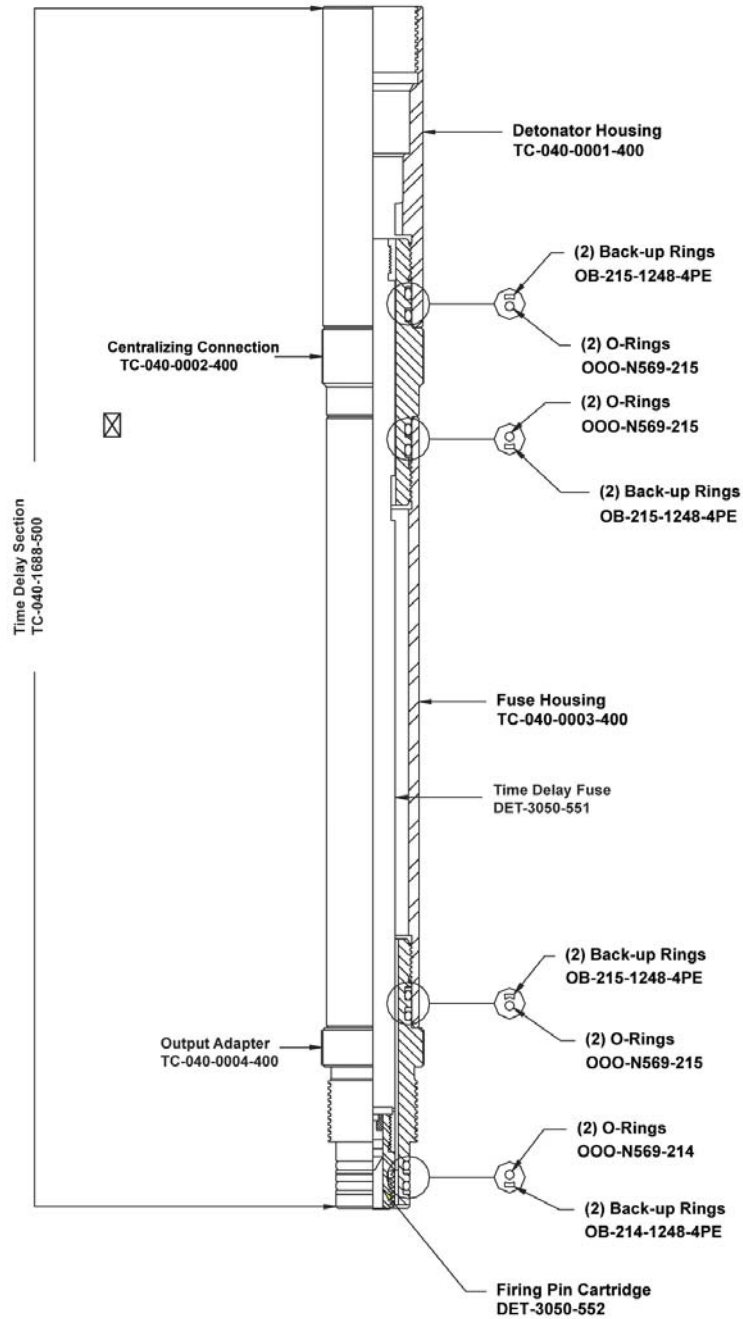


Item	Part Number	Qty	Description
--	TC-040-1688-500	--	Time Delay Hardware Section (HP)
1	TC-040-0001-400	1	Detonator Housing
2	TC-040-0002-400	1	Connector Sub
3	TC-040-0003-400	1	Housing, Fuse, (Single)
4	TC-040-0004-400	1	Output Adaptor
5	TC-040-0007-400	1	Igniter Support
6	OOO-N569-214	2	O-ring, N-90
7	OOO-N569-215	6	O-ring, N-90
8	OB-214-1248-4PE	2	Back-up Rings, PEEK
9	OB-215-1308-4PE	6	Back-up Rings, PEEK
--	TC-040-1688-098	--	Hardware Kit, Additional Fuses
--	TC-040-1688-299	--	Redress Kit, TD-HP Hardware (single)
--	MAN-TC-040-1688-500	--	Assembly Manual
The Explosive Components for this Assembly must be ordered separately			
A	DET-3050-550	1	Igniter, TDF
B	DET-3050-551	1	Time Delay Fuse
C	DET-3050-552	1	Firing Pin Cartridge, TDF
Item Part Number Qty Description			
--	TC-040-1688-299	--	Redress Kit, TD-HP Hardware (single)
5	TC-040-0007-400	1	Igniter Support
6	OOO-N569-214	2	O-ring, N-90
7	OOO-N569-215	6	O-ring, N-90
8	OB-214-1248-4PE	2	Back-up Rings, PEEK
9	OB-215-1308-4PE	6	Back-up Rings, PEEK
Item Part Number Qty Description			
--	TC-040-1688-298	--	Hardware Kit, Additional Fuses
2	TC-040-0002-400	1	Connector Sub
--	TC-040-0005-400	--	Additional Fuse Housing
7	OOO-N569-215	4	O-ring, N-90
9	OB-215-1308-4PE	4	Back-up Rings, PEEK

Exploded View



O-ring and Back-up ring Configuration Sheet







Warning: The assembly of this tool requires the use of an Explosive Device and all safety precautions must be adhered to and observed! Only personnel trained in explosive handling procedures should be allowed to arm this firing head assembly!



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



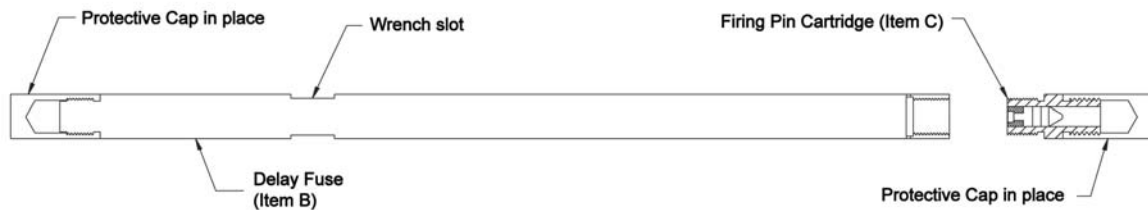
Note: Check for any damage to the parts which would prevent the part from being assembled correctly, easily and safely.



Note: Each Time Delay Fuse has a burn time of approximately eight to nine (8 - 9) minutes @ 72°F. For extended burn times, additional fuses can be added to the system.

1.0 Assembly

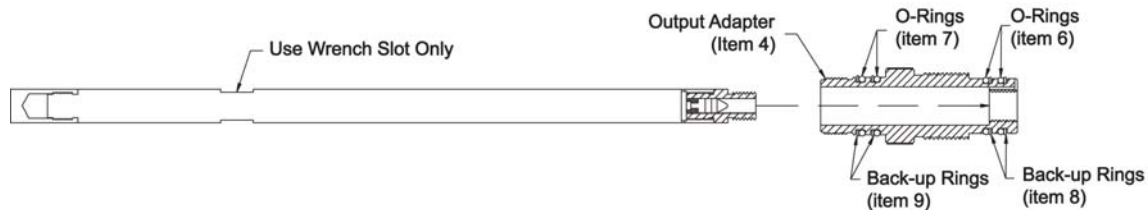
1.1 Remove the Delay Fuse (item B) and Firing Pin Cartridge (item C) from their sealed shipping packages. Remove the bottom seal plug from the Delay Fuse and the top seal cap from the Firing Pin Cartridge. Wipe threads with a clean, dry cloth and thread together without applying grease. Use wrench slots provided on fuse housing to tighten. Do not use a pipe wrench for this task.



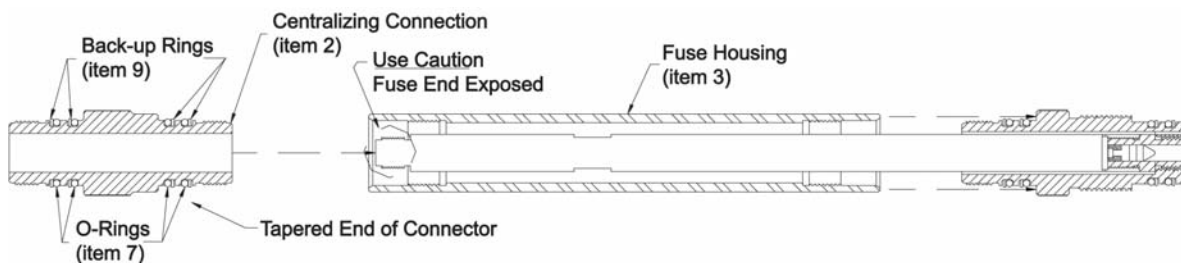
1.2 Install O-rings (item #6 and #7) and Back-up rings (item #8 and #9) on the Output Adapter (item #4). Remove seal cap from bottom of Firing Pin Cartridge and apply a

Time Delay HP Firing System

small amount of grease to threads. Thread the fuse/firing pin assembly into the output adapter and tighten just enough to so that removal is easy.



1.3 Apply grease to fuse side O-rings and threads of the Output Adapter, then thread the Fuse Housing (item #3) onto the Output Adapter and tighten. Install O-rings (item #7) and back-up rings (item #9) on the Centralizing Connector (item #2). Remove the protective cap from the top of the fuse. Apply grease to the Centralizing Connector tapered end O-rings and threads. Slide over the fuse end and thread into fuse housing, then tighten.

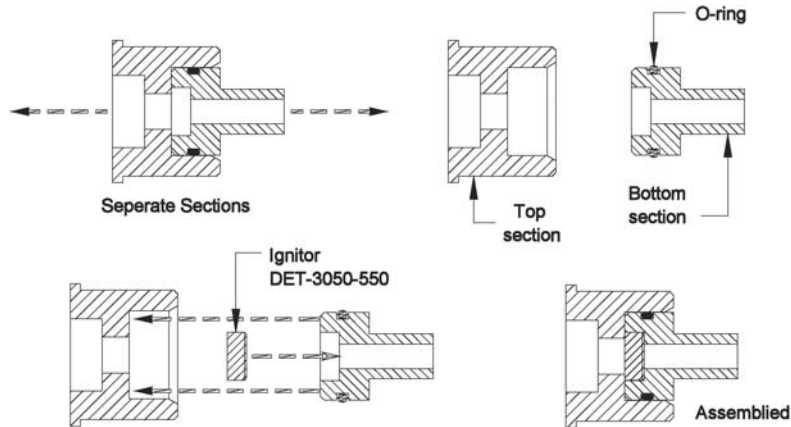


Warning: Explosive end of fuse is exposed!

1.4 Apply grease to the O-rings and threads of centralizing connector. Thread on the Detonator Housing (item #1) and tighten.

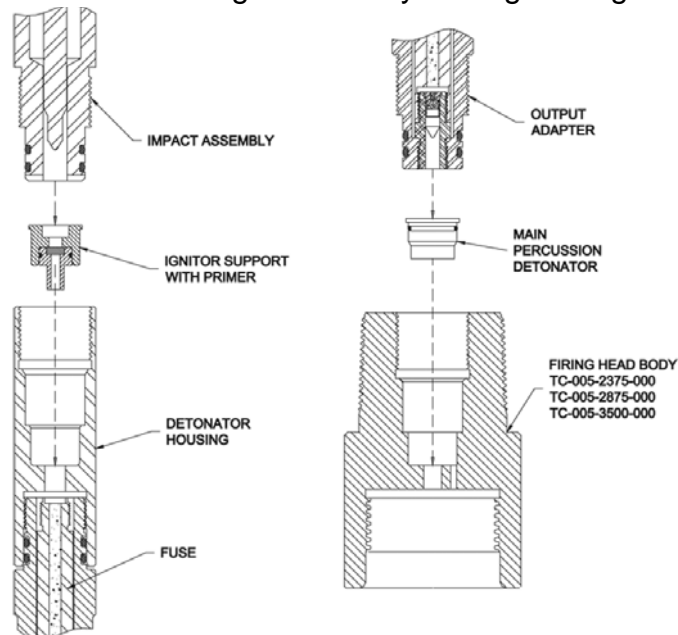
1.5 Separate the two pieces that make up the Ignitor Support (item #5). Insert the Percussion Ignitor (item A) into the Ignitor Support bottom section, making sure the

welded seam of the ignitor is facing towards the bottom of the support. With the ignitor in place, re-combine the two support sections.



Warning: Use extreme caution when handling the explosive primer!

1.6 The following step illustrates the complete assembly of the Time Delay System to the Firing Head Body. Insert the Ignitor Support with primer into detonator housing of fuse assembly. After applying grease to the O-ring and threads of impact assembly to be used, thread into detonator housing and tighten. Insert the main percussion detonator into Firing Head Body (TC-005-XXXX-000), then apply grease to O-Rings and threads of fuse assembly and thread into Firing Head Body and tighten against main detonator.



1.7 If the job requirements call for additional delay time, extra delay fuses can be added to the system. For this addition use the Additional Fuse Housing (TC-040-0005-400) when any extra fuses are used. This housing is longer in length and built specifically for this purpose. Do not get the housings mixed up. The extra housing and Centralizing Connector are added between the Detonator Housing Connector and the Fuse Housing (TC-040-0003-400).