



Gun Assembly

MAN-Gun Assembly

Owen Oil Tools

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Warning: Use of Owen equipment contrary to manufacturer's specifications or operating instructions may result in property damage, serious injury or fatality. If you are not trained in the handling and use of explosive devices, do not attempt to use or assemble any Owen perforating systems or Owen firing devices.

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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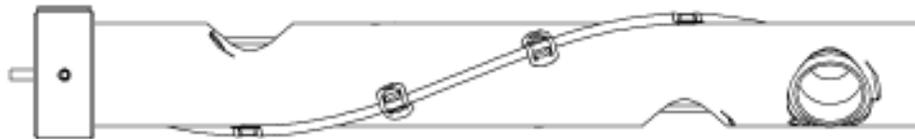
Assembly Instructions

The procedures in this manual are strictly a suggested method for loading Threaded Gun systems with explosive charges. This manual does not cover Slick Gun systems. It is understood that each customer or company may have their own rules, procedures, or recommended way of loading perforating guns. Owen Oil Tools does not want to contradict these procedures in any way or form. We strongly suggest that our customers observe and abide by all the rules and regulations pertaining to the handling and transportation of explosive components.

Once a gun system has been chosen for a particular job application, the loading procedures will be based on one of three basic styles: **External Wrap, Internal Wrap, and Internal Weave.**

External Wrap

With this system the shaped charge seats all the way through the tube strip. It is held in place by bend tabs and detonating cord clips. This system features a round back hole in the tube strip (no slot). The detonating cord wraps around the outside of the strip tube.



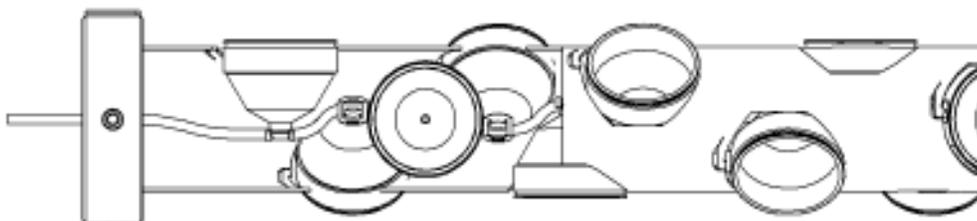
Internal Wrap

With this system the shaped charge seats all the way through the tube strip. It is held in place by bend tabs (no detonating cord clips required). This system features a round back hole with slots in the tube strip. The detonating cord wraps around the inside of the strip tube.



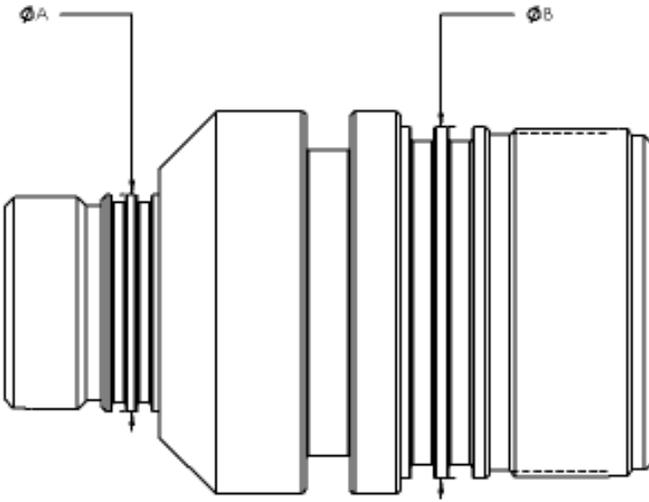
Internal Weave

With this system the shaped charge seats half way through the tube strip. It is held in place by bend tabs and detonating cord clips. The detonating cord runs down the middle of the strip tube.



Use of Subs with Threaded Gun Systems

There are many types of subs that can be used with Owen Threaded Gun Systems. Often these subs can be used several times without problems. However, over time, these subs can and will swell. Because of this, Owen recommends using the graphic and chart below to reference maximum sub dimensions.



Gun OD (in)	Max Diameter (in)		Max Diameter (mm)	
	(A)	(B)	(A)	(B)
2.875	2.817	2.562	71	65
3.125	2.817	2.814	71	71
3.375	2.817	2.869	71	72
4.000	2.817	3.495	71	88
4.500	2.817	3.996	71	101
5.000	2.817	4.559	71	115

Safety

Warning: Explosives are destructive by nature. Do not attempt to disassemble or alter explosive products in any manner. Do not crush, hammer, pinch, impact, pull wires or abuse any explosive product.

Warning: Always be sure to follow safe operating practices as found in API RP-67 in accordance with governmental regulations, company policies and manufacturer’s recommendations.

Note: Before loading, visually inspect the carrier and components for any defects and make sure that all threads and seal bores are clean.

Prior to assembling guns for tubing conveyed perforating applications, it is suggested that technical manuals MAN-TC-251 and MAN-TC-261 be read thoroughly to become familiar with the various components included in the booster transfer kits.

Prior to assembling guns for wireline operations (including select fire), it is suggested that technical manuals MAN-30-XXX-0002-96 and MAN-WT-440 be read thoroughly to become familiar with the various components and assembly procedures.

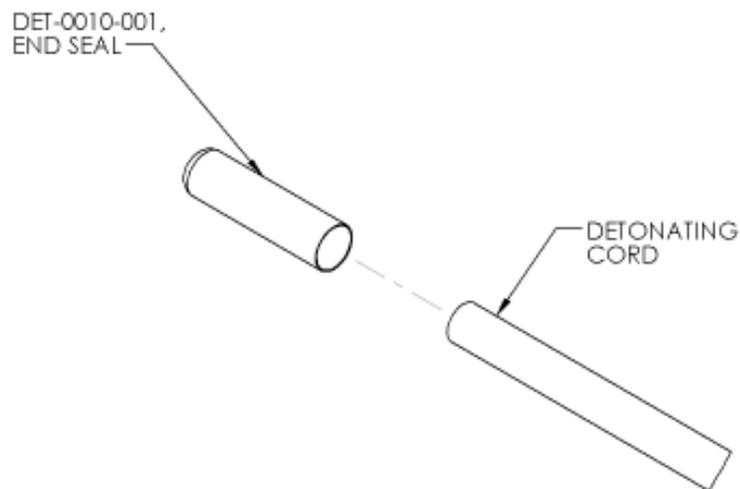
Before the gun is assembled, it is important to determine the approximate downhole temperature anticipated, as well as the wellbore fluid so that the correct O-ring elastomer may be selected.

Remove the charge tube from the carrier. Verify that the phasing and shot density of the carrier and tube match prior to loading the strip.

Installation of Charges in Charge Tube

External Wrap

1. Using Owen Super Cutters cut a length of detonating cord that will completely load your tube strip. Refer to the MAN-Gun Systems manual for the approximate length of detonating cord required. Cover the ends of the detonating cord with masking tape or the proper end seal. The end seal should be crimped in place using Owen Super Crimpers.

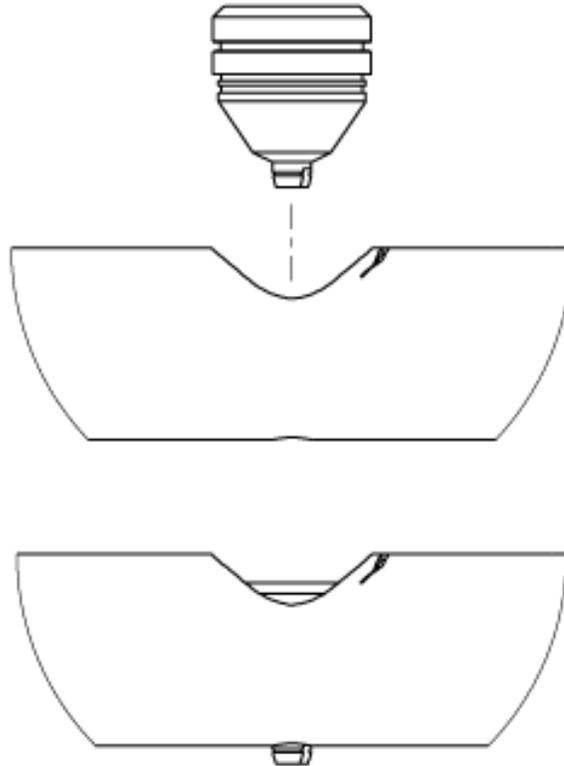


Note: the end of a detonating cord should never be left exposed

Note: To determine the next length of detonating cord to be cut, measure the first cut length before loading, then measure the scrap length when finished. Subtract the scrap length from the original cut length to determine the length of the next piece of detonating cord.

Warning: Never load a tube strip when the detonating cord is still attached to the roll. Cut the necessary length of cord and then remove the roll from the loading area.

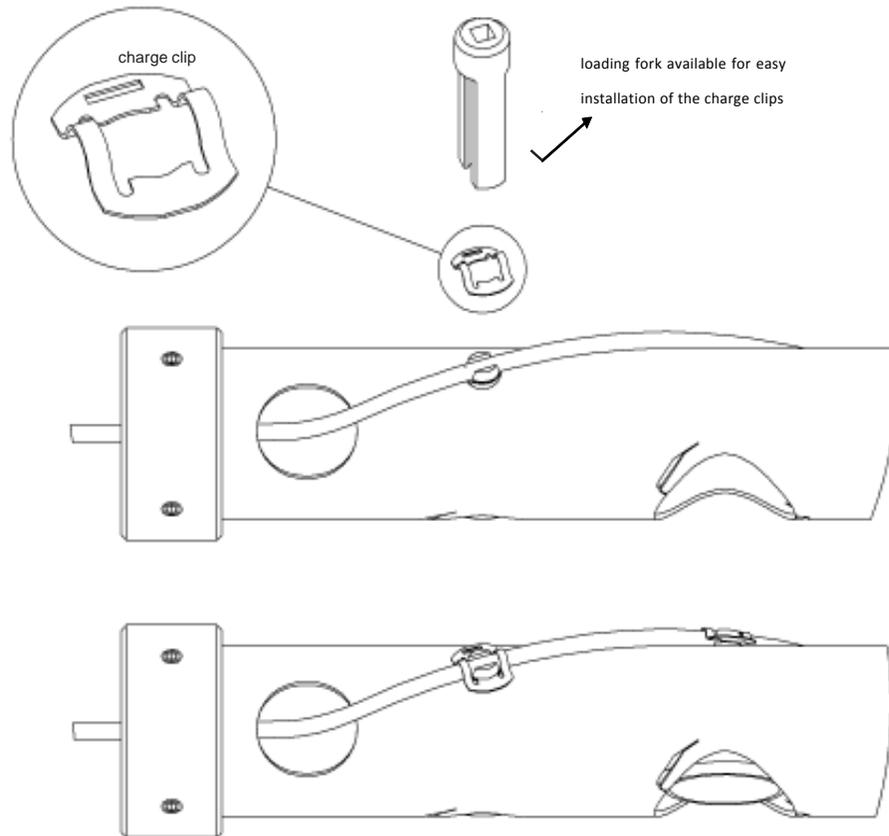
2. Place a charge in the top hole in the charge tube so that the tabs on the back of the charge protrude from the charge tube back hole. Secure in place using the bend tab on the tube strip. The charge should not be able to move side to side.



3. Rotate the charge tube to the next charge hole and repeat this procedure until the charge tube is loaded with the required number of charges.
4. Slide the free end of the detonating cord, cut in Step 1, through the slot provided in the charge tube from the outside to the inside. Leave enough detonating cord hanging out the top end of the charge tube for your operational requirements as shown in the image below.



5. Press the detonating cord between the two tabs on the back of the charge and install the charge clip as shown in the image below. A loading fork is available for purchase for easy installation of the charge clips.



6. At the last charge position, pass the detonating cord through the cord hole and out the end of the charge tube before installing the final charge clip.
7. After the last charge has been installed in the charge tube, remove the tape applied in Step 2 and follow the instructions in TC-251 and TC-261 to install the booster transfer kits, if desired.
8. The fully loaded external wrap style charge strip is now complete and is ready to be installed in its accompanying carrier.



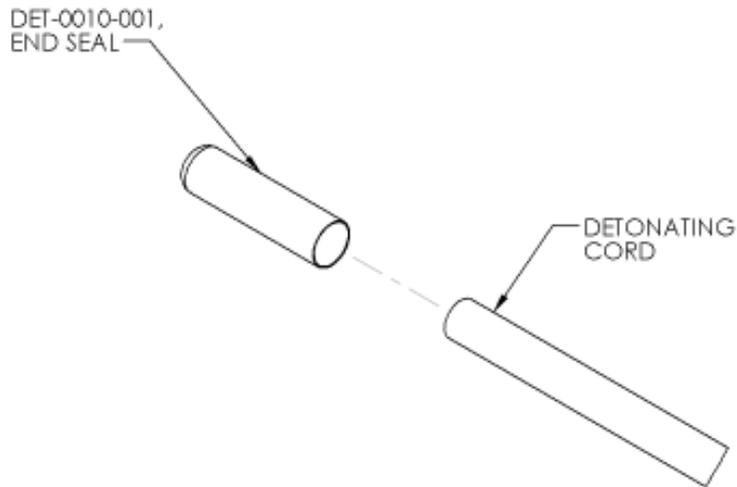
loaded strip with Booster Transfer Kits



loaded strip with no Booster Transfer Kits

Internal Wrap

1. Using Owen Super Cutters cut a length of detonating cord that will completely load your tube strip. Refer to the MAN-Gun Systems manual for the approximate length of detonating cord required. Cover the ends of the detonating cord with masking tape or the proper end seal. The end seal should be crimped in place using Owen Super Crimpers.

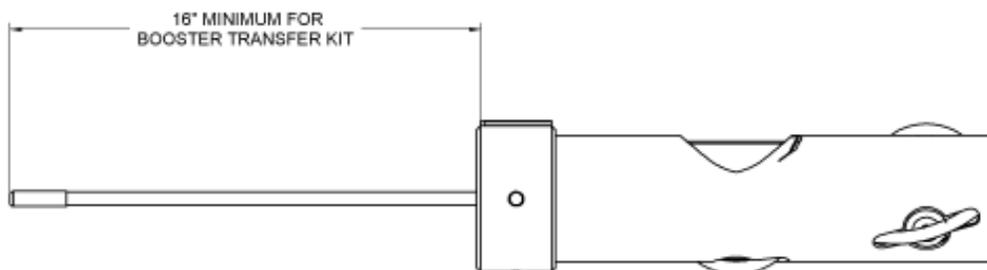


Note: the end of a detonating cord should never be left exposed

Note: To determine the next length of detonating cord to be cut, measure the first cut length before loading, then measure the scrap length when finished. Subtract the scrap length from the original cut length to determine the length of the next piece of detonating cord.

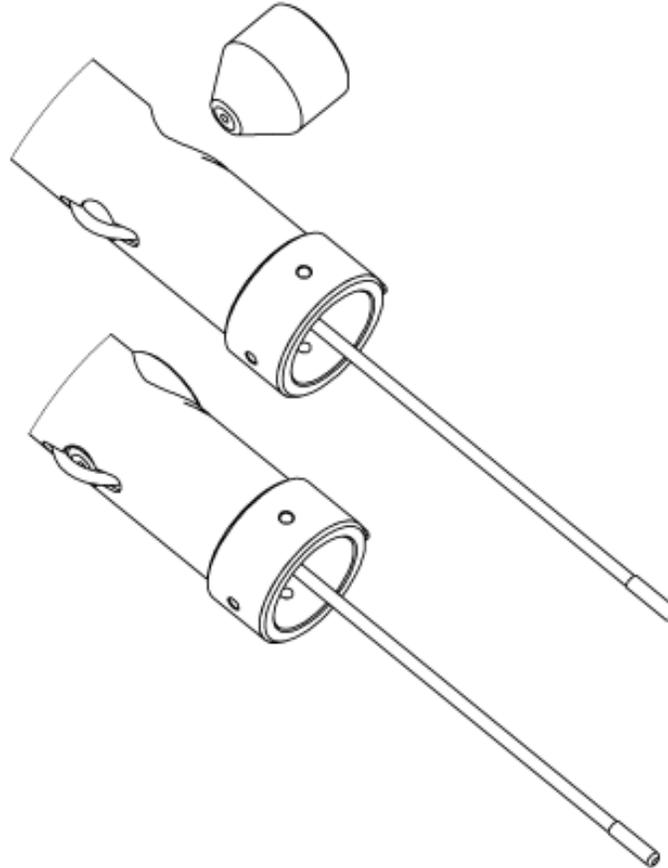
Warning: Never load a tube strip when the detonating cord is still attached to the roll. Cut the necessary length of cord and then remove the roll from the loading area.

2. Slide the detonating cord, cut in step 1, through the charge tube. Leave enough detonating cord hanging out the top end of the charge tube for your operational requirements as shown in the image below.



Note: To help run the cord through the tube strip, use a non-sparking fish tape or fish tape leader (used by electricians and plumbers). Insert the fish tape through the charge tube and attach the detonating cord to its end using electrical tape, then withdraw the fish tape, pulling the detonating cord through the charge tube. Be careful not to scrape the outer covering of the detonating cord as the fish tape is retracted.

- Place a charge in the top hole in the charge tube so that the charge presses the detonating cord out through the charge tube back hole. Secure in place using the bend tab on the tube strip. The charge should not be able to move side to side.



- Rotate the charge tube to the next charge hole and repeat this procedure until the charge tube is loaded with the required number of charges.
- After the last charge has been installed in the charge tube, remove the tape applied in Step 2 and follow the instructions in TC-251 and TC-261 to install the booster transfer kits, if required.
- The fully loaded internal wrap style charge strip is now complete and is ready to be installed in its accompanying carrier.



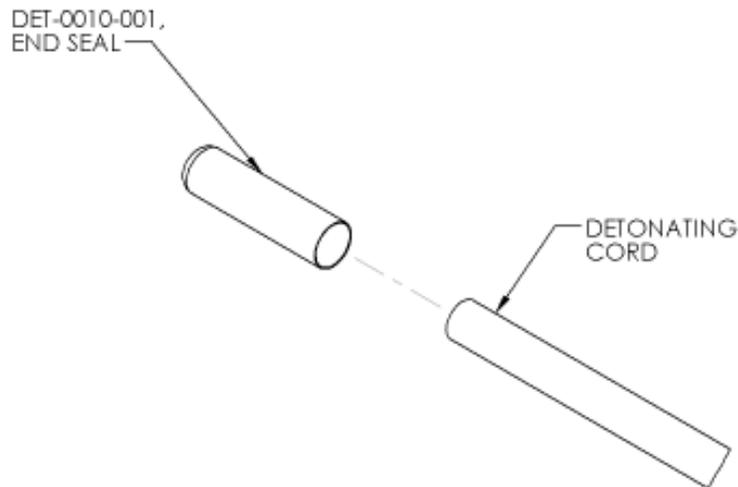
loaded strip with **Booster Transfer Kits**



loaded strip with **no Booster Transfer Kits**

Internal Weave

1. Using Owen Super Cutters cut a length of detonating cord that will completely load your tube strip. One method of doing this is to add about 24" (0.61m) to the length of the tube strip. Cover the ends of the detonating cord with masking tape or the proper end seal. The end seal should be crimped in place using Owen Super Crimpers.

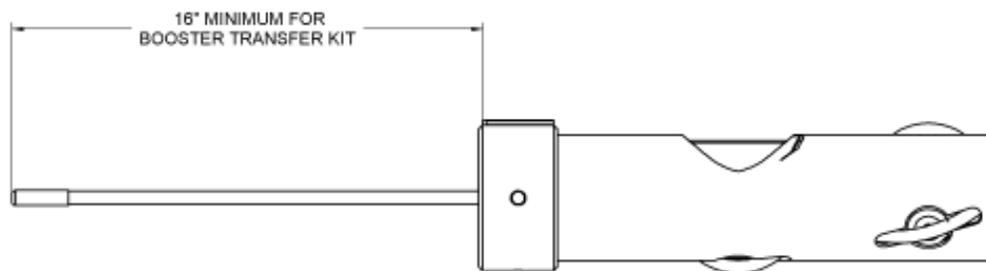


Note: the end of a detonating cord should never be left exposed

Note: To determine the next length of detonating cord to be cut, measure the first cut length before loading, then measure the scrap length when finished. Subtract the scrap length from the original cut length to determine the length of the next piece of detonating cord.

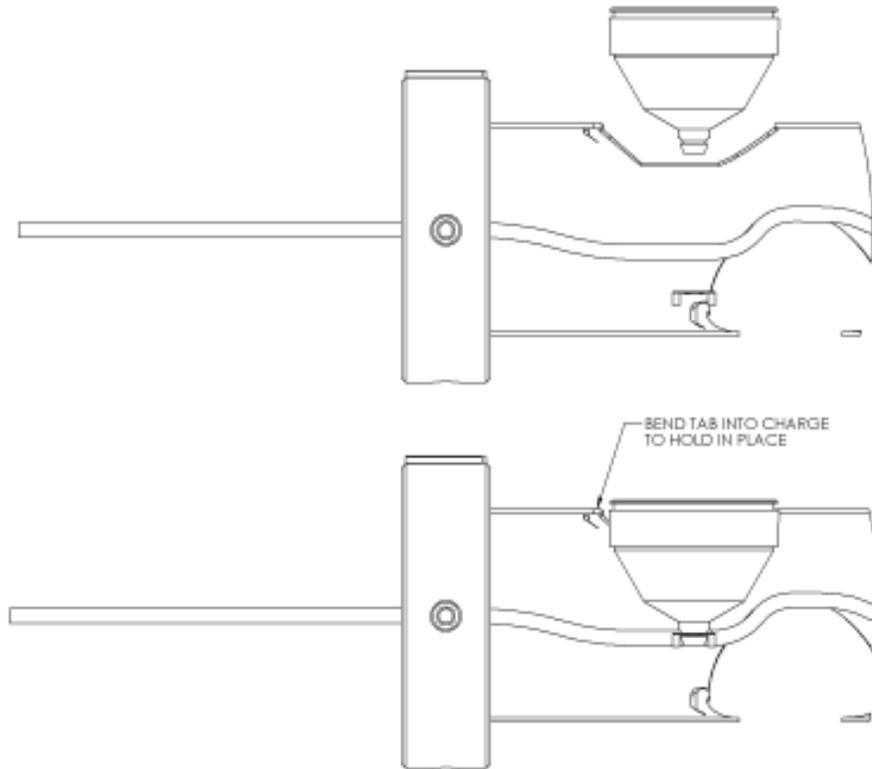
Warning: Never load a tube strip when the detonating cord is still attached to the roll. Cut the necessary length of cord and then remove the roll from the loading area.

2. Slide the detonating cord, cut in Step 1, through the charge tube. Leave enough detonating cord hanging out the top end of the charge tube for your operational requirements as shown in the image below.



Note: To help run the cord through the tube strip, use a non-sparking fish tape or fish tape leader (used by electricians and plumbers). Insert the fish tape through the charge tube and attach the detonating cord to its end using electrical tape, then withdraw the fish tape, pulling the detonating cord through the charge tube. Be careful not to scrape the outer covering of the detonating cord and when fish tape is retracted.

- Place a charge in the top hole in the charge tube so that the tabs on the back of the charge straddle the detonating cord. Install a detonating cord clip over the cord and charge tabs, snapping in place. Allow a little slack in the cord so when fully seated in tube strip the cord is not stretched or in tension.



Note: Owen recommends installing a detonating cord clip on every charge.

- Once the charge is seated, slide the charge groove onto the stationary tab of the tube strip hole and secure it in place using the bend tab.
- Rotate the charge tube to the next charge hole and repeat this procedure until the charge tube is loaded with the required number of charges.
- After the last charge has been installed in the charge tube, remove the tape applied in Step 2 and follow the instructions in TC-251 and TC-261 to install the booster transfer kits, if required.
- The fully loaded internal weave style charge tube is now complete and is ready to be installed in its accompanying carrier.



loaded strip with Booster Transfer Kits



loaded strip with no Booster Transfer Kits

Installation of Loaded Charge Tube into Carrier

1. After the charge tube has been fully loaded with charges and prepared for the type of operation being performed, the strip tube may be loaded into the carrier.
2. The carrier to be loaded must be on sturdy supports and at an elevation such that it is convenient and safe to insert the loaded charge tube.

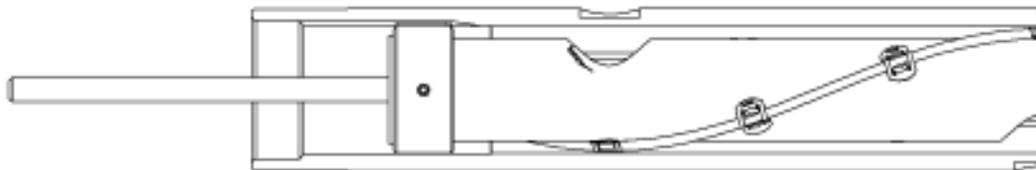
Warning: A loaded charge tube can be very heavy, especially the larger diameter charge tubes, and must be handled accordingly to prevent personal injury, dropping or bending the charge tube.

Caution: Do not damage or break the booster transfer tube (if applicable) during insertion. Do not pinch the detonating cord or booster during insertion.

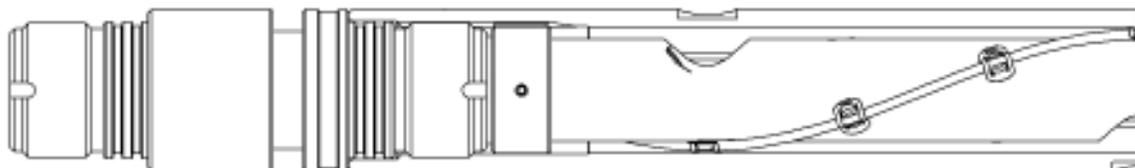
Note: Confirm the top shot lines up with the alignment tab on the collar before inserting the strip all the way into the carrier.

3. Slide the bottom end of the tube into the top end of the carrier. The top end of the charge tube may be identified by the alignment collar, while the top of the carrier has an internal slot through the threads and is also painted "TOP" on the outside of the carrier. Push the charge tube all the way into the carrier by hand until the alignment collar bottoms out on the internal shoulder of the gun. This can be verified by comparing the length of the pin on the sub to the distance from the end of the gun to the top of the strip assembly.

Note: Do not push the strip in place by threading the sub in against it. If the strip does not slide easily into place by hand, remove the strip and check for obstructions.



4. A top or tandem sub should be threaded into the top of the carrier after the strip has been loaded to hold the strip in place.





Recommended Equipment

Optional Recommended Equipment	
Part Number	Description
DET-0100-053	Owen Super Crimpers
DET-0000-036	Owen Super Cutters
PUR-0000-005	Razor Blades (special for use with Owen Super Cutters) Box of 100
TCP-0010-010	Detonating Cord Cutting Block
TCP-0010-013	Razor Holder (special for use with Cutting Block)
TCP-0010-014	Single Edge Razor Blades (Box of 5) (req'd for Cutting Block TCP-0010-010)
TAG-4000-119	Loading Fork, for Low Profile Detonating Cord Clip
TCP-0010-030	High Temperature Grease
TCP-0010-011	Common Razor Knife
TCP-0010-012	Replacement Blades - Common Razor Knife
DET-0010-001	Detonating Cord End Seal