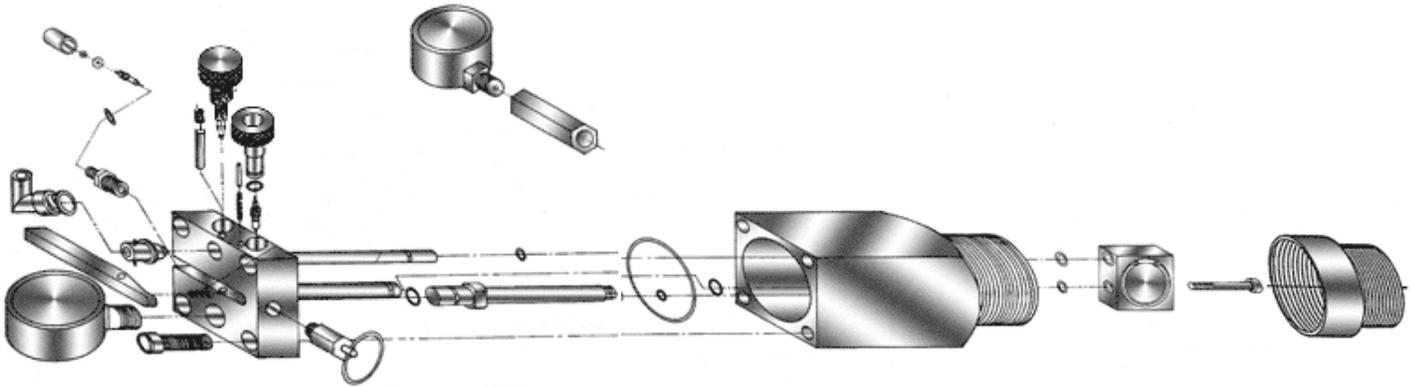


PREVENTIVE MAINTENANCE FOR COMPACT GAS GUN



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See Attached Dwg. 1 and Dwg. 2 for Part Numbers and Drawing Details

1. **Protect the compact gas gun housing threads from corrosion.** The threads on the gas gun can become damaged or corroded. Protect the threads with a light coating of grease or oil and place a plastic cap on the threads. The pressure rating of 1500 psi should be reduced if corrosion or worn threads exists. A corrosion protective coated steel 2" 11 ½ V male to female adapter (mic protector) is available for protecting the gas gun threads and microphone. The mic protector is supplied with new compact gas guns. The mic protector should be installed and replaced as needed.
2. **Lubricate O-ring on moving parts.** The O-ring on moving parts can wear out due to lack of lubrication. Lubricate the ¼ inch gas valve O-ring by placing approximately 20 drops of oil down the blast discharge tube while the gas gun threads are held in an upright position. Position the gas valve in the open position by firing the gun after charging the gun to 50 psi of pressure. Apply the oil with an eye-dropper or spray through a small tube attached to a can of pressurized lubricant. Allow the oil to fully saturate the ¼ inch O-ring that moves into and out of the discharged chamber port. Also allow the oil to lubricate the O-ring located at the lower end of the gas valve that moves in the top cap of the gas gun. The oil will also coat the volume chamber and reduce corrosion.

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3. **Do not fill the gas gun with liquid CO₂.** Occasionally, the valve core filler bleed chamber valve can stick open and blow CO₂ gas out of the volume chamber into the atmosphere. The gas leakage is caused by the CO₂ freezing, as it is discharged into the gas gun volume chamber. Filling the gun with gas instead of liquid CO₂ can prevent freezing of the valve core. When any type of CO₂ cylinder is used, the top of the cylinder should be above the bottom of the cylinder so that gas at the top is discharged from the cylinder into the gun instead of liquid CO₂ from the bottom of the cylinder. If the gas gun is filled with the cylinder located directly above the gas gun, the liquid CO₂ in the cylinder can freeze as it enters the gas gun and cause the gas gun bleed valve to leak when the filler connector is removed from the gun connector.
4. **Be sure to remove the old valve core plastic gasket when removing an old valve core.** When replacing the filler-bleed valve core that is underneath the filler-bleed connector, be sure that the plastic gasket on the old valve core is removed with the old valve core. The old valve core and old gasket must be removed before the gun will operate properly even though a new valve core is installed.
5. **Keep debris out of the filler bleed chamber.** If debris in the valve core filler bleed chamber valve causes the gas gun to leak, lubricate the valve core with light oil. Remove the filler bleed chamber valve and add light oil directly onto the valve core. Install the filler bleed chamber valve and then refill and discharge the gas gun with CO₂ a few times. Firing the gun multiple times will remove the debris from the valve core. Be sure that the valve core is properly tightened while the filler bleed chamber valve is removed.
6. **Replace filler bleed chamber when small fill tube is damaged.** When the 7.5 ounce CO₂ bottle is used to fill the compact gas gun, occasionally, the 7.5 ounce CO₂ bottle will be forced from the filler bleed chamber valve due to the pressure in the CO₂ bottle forcing the filler connector's nozzle away from the filler bleed chamber valve. A worn or bent or flattened small fill tube in the adapter prevents the CO₂ gas from being released into the gas gun volume chamber. The solution is to replace filler bleed chamber valve or exchange for a rebuilt filler bleed chamber valve.
7. **The compact gas gun can fire by itself when the gas valve is not properly locked down.** At approximately 150 psi when filling the volume chamber, the compact gas gun can fire by itself. When performing an implosion test, the compact gas gun can fire by itself when the differential pressure exceeds approximately 150 psi. If the trigger pawl pin does not travel behind the gas valve when the gas valve is closed and the gas valve is depressed but not locked down by the trigger pawl pin that is positioned behind the gas valve. The trigger pawl assembly must be properly cleaned and lubricated or replaced to ensure that the trigger pawl pin is positioned behind the gas valve when the gas valve is cocked.

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8. **The internal wire on the compact gas gun microphone BNC connector can be broken.** Pulling the microphone BNC connector too far from the housing cap will break the internal wire. If the coax cable becomes stuck to the microphone BNC connector do not try to jerk it loose. Be sure to use a 90-degree “L” electrical BNC connector with the compact gas gun to protect the BNC connector on the gas gun. When attaching and removing a cable to the BNC connector or to the 90-degree “L” electrical BNC connector, use care. These connections must be maintained clean at all times.
9. **When switching the filler connector from an empty bottle to a full bottle, remove the filler connector from the empty bottle and wait 5 minutes for the swollen O-ring to reduce in size.** Generally, the filler connector on a 7.5-ounce bottle is removed when the bottle is empty and the filler connector is placed onto a full CO2 bottle in order to continue testing wells. When the filler connector is removed, the purple O-ring on the filler connector will swell. When the filler connector with the swollen O- ring is placed onto a 7.5 ounce CO2 bottle, the swollen O-ring is generally damaged when the filler connector is attached to the new bottle that causes the CO2 to leak from the bottle. When switching the filler connector from an empty 7.5 ounce CO2 bottle to a full 7.5 ounce CO2 bottle, remove the filler connector from the empty bottle and wait 5 minutes for the swollen O-ring to reduce in size. After it reduces to normal size, lubricate the O-ring with a few drops of oil and install onto the full 7.5-ounce CO2 bottle.
10. **The microphone cannot be repaired in the field, do not disassemble. If fluids enter the inside of the microphone, the microphone will be damaged.** Saltwater will cause immediate failure of the microphone if it is allowed to enter the inside of the microphone. Clean the lower threaded portion of the compact gas gun after each day’s use with a mild cleaner such as soapy water, alcohol, WD 40 or a pressurized electrical contact cleaner which can be obtained from an electrical supply store. Then, coat the inside of the gas gun lower chamber with grease or a light coating of oil. If the microphone is removed from the compact gas gun, be sure to clean the lower portion of the compact gas gun thoroughly and also the microphone before attempting to reinstall the microphone into the lower chamber. If the microphone is removed from the compact gas gun always replace the O-ring with a new O-ring that fits over the electrical connection between the microphone and the compact gas gun. Be sure to lubricate the O-ring with an O-ring lubricant, grease or oil.
11. **When operating in the explosion mode, close the gas valve on the compact gas gun before placing it on the well.** The compact gas gun will require less maintenance if the gas valve is closed before attaching the compact gas gun to the casing valve on the well and opening the casing valve to the well annulus. If the gas valve is open, well gas, debris, water vapor and other solids will be blown into the inside of the gas gun volume chamber. Prior to placing the gun on the

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well if liquid or debris is visible at the surface, then clean the threads on the well head. Closing the gas valve will prevent well gas and debris from entering the inside of the compact gas gun. Debris will cause additional wear on the gas valve O-ring. The O-ring will not last as long as the O-ring would last if clean gas were used to fill the volume chamber. Water vapor in the well gas can cause corrosion to the inside of the gas gun volume chamber.

12. **When operating in the impulsion mode, the compact gas gun will require additional cleaning.** When a compact gas gun is operated in the implosion mode, the gas valve is open before the casing valve to the well is opened. The volume chamber pressure is at atmospheric pressure. Pulling the firing pin ring will cause the gas valve to open and allow the gas from the well to be released into the gas gun volume chamber. This generates an acoustic pulse. Generally, wellhead gas, debris, sand and water vapor are all discharged into the inside of the compact gas gun when operating in the implosion mode. Prior to placing the gun on the well if liquid or debris is visible at the surface, then clean the threads on the well head. Impulse mode operation will require additional cleaning of the compact gas gun. Corrosion on the inside of the volume chamber may occur, and the O-ring on the gas valve will not last as long as operating in the explosion mode where clean gas is always discharged through the gas port. However, operating the compact gas gun in the implosion mode is routinely used when the well pressure exceeds 500 psi.

13. **When wells are chemically treated at the surface, the Echometer gas gun should be cleaned at the end of each day.** The gun and microphone are constructed from stainless steel and the microphone has mylar plastic coatings. Almost all hydrocarbon oils and water will not damage the microphone. Some wells are chemically treated at the surface for corrosion. High concentrations of some chemicals are corrosive and will cause corrosion to the stainless steel Echometer gas gun parts. If the wells to be acoustically tested are chemically treated at the surface, the Echometer gas gun should be cleaned at the end of each day because the chemical may be corrosive to gas gun parts. To clean the gas gun, first, pressurize the gas gun. Then use a hydrocarbon solvent, soapy water, alcohol or household cleaning agent to clean the portion of the gas gun that is exposed to well gases. Allow parts to drip dry or blow dry with compressed gas psi.

**Repair Personnel: Marvin Craft: Extension 20
Rusty Ham: Extension 19**

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ECHOMETER COMPACT GAS GUN
ASSEMBLY DRAWING

G6001 REV A

NOTE
ALL "O" RINGS ARE 1/16" SECTION
DIMENSIONS SHOWN ARE O.D.

