

# HIGH PRESSURE 15000 PSI GAS GUN MANUAL

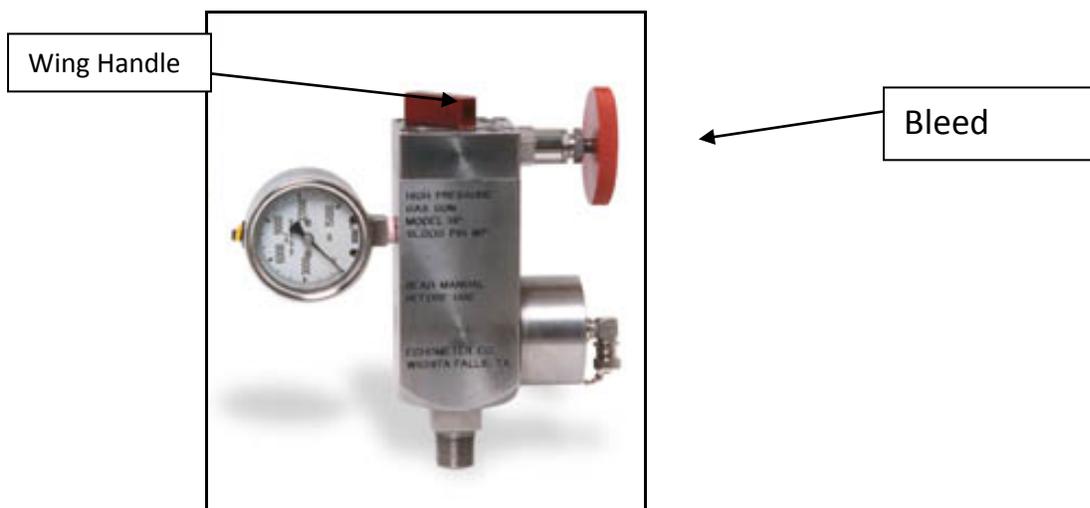
A High Pressure Gas Gun will operate up to 15,000 PSI. The test pressure is 30,000 PSI. The 15,000 PSI Gas Gun operates in the **implosion mode only**. The volume chamber in the gas gun is bled to a pressure less than the pressure existing on the well. Then, a poppet valve is rapidly opened to release gas from the well into the gas gun volume chamber to generate the pressure pulse. The microphone is not as sensitive or noise canceling as the microphone on the Compact Gas Gun, Remote Fire Gas Gun or the 5000 PSI Gas Gun. Best performance will be obtained when the 15,000 PSI Gas Gun is used at pressures exceeding 1500 PSI, but not exceeding 15,000 PSI. The gas gun is useful in determining liquid levels, bottomhole pressures, locating the liquid level of corrosion inhibitors, and locating other anomalies. Excellent results have been obtained at pressures above 1500 PSI (100ATM) through 1/8" orifice needle valves, which are standard on most high pressure wells. Minimum expense and trouble are involved in the use of this High Pressure Gas Gun.

<b>GAS GUN SPECIFICATIONS AND GENERAL INFORMATION</b>				
	<b>COMPACT GAS GUN</b>	<b>REMOTE FIRE GAS GUN</b>	<b>5000 PSI GAS GUN</b>	<b>15000 PSI GAS GUN</b>
VOLUME CHAMBER SIZE, IN	10	12.5	7	1
WORKING PRESSURE PSI (ATM)	1500 (10)	1500 (100)	5000 (333)	15,000 (1000)
BEST OPERATING PRESSURE PSI (ATM) MIN/MAX	0-1500 (0-100)	1-1500 (0-100)	0-200 (0-13) EXP 200-5000 (13-333) IMP	1500-15,000 (100-1000)
MODE OF OPERATION	EXPLOSION/ IMPLOSION	EXPLOSION ONLY	EXPLOSION/ IMPLOSION	IMPLOSION
TYPES OF OPERATION	MANUAL	AUTOMATIC/ SOLENOID	MANUAL	MANUAL
DIMENSIONS	2-3/8" SQUARE X 12" LONG	2-3/8" SQUARE X 12" LONG	2" SQUARE X 16" LONG	2-3/8" SQUARE X 8" LONG
WEIGHT	8 LBS.	12 LBS.	10 LBS	10 LBS
MICROPHONE	DUAL DISC NOISE CANCELING	DUAL DISC NOISE CANCELING	DUAL DISC NOISE CANCELING	SINGLE DISC
All gas guns are constructed from 303 and 316 stainless steel and are suitable for H <sub>2</sub> S and corrosive service.				

## 15000 PSI HIGH PRESURE GAS GUN

### WARNING

The MAXIMUM DIFFERENTIAL THAT CAN BE SUSTAINED BY THE POPPET VALVE IS 1000 PSID. HIGHER DIFFERENTIALS WILL FAIL THE "O" RING, THUS THE WING VALVE MUST BE IN THE **FREE** POSITION BEFORE EXPOSING THE GAS GUN TO WELL PRESSURE



### THE CORRECT SEQUENCE OF STEPS FOR ARMING AND FIRING THE GUN

1. Connect the 15000 PSI High Pressure Gun to the well. Typically connection is made at the tree's pressure gage shut-off valve (1/2 inch NPT connection).
2. **TURN THE WING HANDLE TO THE FREE POSITION. (NOTE: THE WING HANDLE MUST BE IN THE FREE POSITION BEFORE OPENING THE VALVE ON YOUR WELL.)**
3. Open the valve on the well tree to admit well pressure into the high pressure gas gun. Note the well pressure as indicated on the gun's pressure gage since the poppet valve is still open (**FREE**) position.
4. Rotate the **wing handle** to the **SHUT** position.

5. Slowly open the **bleed valve** on the gun and allow the **volume chamber** pressure to decrease by the amount desired (**Maximum Differential is 1000 PSI**). The gage on the gun now reads just the volume chamber pressure since the poppet valve is closed. The Higher pressure on the well tree can be read from the Pressure Transducer output that is displayed on the TWM screen before firing the gun. The difference between the well pressure and the volume chamber pressure is the differential pressure.
6. As soon as the Well Analyzer program displays the message "Gun Has Been Fired" **rotate** the **wing handle** to the **FREE** position. This releases the poppet valve and allows the pressure differential between the well and the gun to implode into the volume chamber. The differential pressure **cannot** be higher than 1000 psi. If this differential pressure is exceeded the O-ring on the poppet valve will dislodge (Replacement of the O-ring will require disassembly of the gun).
7. The 15000 psi Pressure Transducer is recording the well pressure and is displayed in TWM.

## TWM Basic Steps to Shoot a Liquid Level Using the High Pressure 15000 PSI Gun.

The 15000 psi High pressure Gas gun operates in the **Implosion Mode Only**. This gun performance is good, if the well casing pressure is greater than 1500 PSI. The Implosion method uses the well's pressure to generate a pulse by using the gas gun bleed valve to release gas from the volume chamber creating a differential between the well and the 15000 psi gas gun volume chamber. Operation in this mode forces sand, moisture and other debris into the gas gun volume chamber which will damage or cut the poppet valve o-ring. This necessitates disassembly of the gas gun to replace the o-ring and also requires the gun to be washed out more frequently or corrosion on the inside of the volume chamber may occur. **(Warning: Do not use Gasoline, Brake Cleaner or Carburetor Cleaner to wash out the gun with. Use a light oil like WD 40, Electronic Cleaner Degreaser, or any product that is safe on plastics and rubber is recommended. When the o-ring on poppet valve is replaced always apply a light grease or o-ring lubricant on poppet valve and o-ring prior to reassembly.**

1. Know the pressure on the Well Tree Valve where gas gun is to be installed. Close Well Tree Valve and bleed off the pressure where the gun is to be installed. Inspect the Well Tree Valve Connection where the gun will be installed (Replace the

connection if necessary to ensure a safe connection). Securely attach the Echometer 15000 psi Gun to the Well Tree Valve connection, using at least 4-1/2 turns.

2. Turn the Wing Handle on the 15000 psi gun to the **FREE Position** and Open the Bleed Valve on the side of the 15000 psi gun.
3. Connect the pressure transducer cable and the microphone cable to the gun.
4. Connect the pressure transducer cable and the microphone cable to the Input connectors on the Well Analyzer.
5. Ensure that the Well Analyzer USB connector is plugged into the computer.
6. Turn on the Lap Top Computer and wait until Windows complete the startup processes of the computer.
7. Turn on Well Analyzer and check to see if the **Green Battery Ok light is on.**
8. Start TWM. Select acquire mode "**F2**" **setup** and **Equipment Check** tab and make sure that the computer is communicating with the Well Analyzer's internal electronics and that sensor measurements may be acquired.
9. Select acoustic sensor tab and select the serial number of the pressure transducer. Use (**Create New**) if your serial number is not found in the list. Make sure all your coefficients are entered as typed on the transducer label. At the bottom of this screen under **Gun Parameters pick the pulse type Implosion and also enter the Gun Serial Number.**
10. The Well Valve on the Tree where the gas gun is installed has to be closed and the bleed valve on the gun has to be open. Start the process of zeroing transducer by selecting the **Obtain Zero Offset** button (**ALT-3**). Once the reading displayed in Present Zero offset has stabilized **press Update Zero Offset with Present Reading** button to update this value.
11. Open Base well file for the well where data is to be stored. Creating and setting up the base well file is usually completed in the office prior to going to well. Use **New** to create a **Base Well File** if one does not exist. Be sure to enter at least the formation depths.
12. From the "F4" select test screen pick the acoustic tab to indicate the acoustic test data is to be acquired.
13. From the "F5" Acquire Data Screen. At this point the graph is displaying background noise.

14. Follow the instructions on the “F5” Acquire Data Screen.

- a) First: Charge the gas gun. This is done by closing the bleed valve on the side of the 15000 psi gun.
- b) Second: Make sure that the wing valve on the top of the 15000 psi gun is in the **FREE Position**.
- c) Third: Open the Valve on the Well (Tree) slowly to admit well pressure into the 15000 psi gas gun. While the Wing Valve is in the **(FREE Position)** the poppet valve is open. The well pressure is indicated on the 15000 psi gas gun pressure gage and also on the 15000 psi pressure transducer. The accurate pressure from the well should be read on the TWM acquire data screen and verified with the 15000 psi pressure gage on the gas gun.
- d) Fourth: Rotate the Wing Valve clockwise to the **(SHUT Position)** the poppet valve is closed.
- e) Fifth: Slowly open the Bleed Valve on the 15000 psi gun to allow the volume chamber of the 15000 psi gun to decrease by 500 psi for the first shot, more pressure can be used but do not exceed a 1000 psi differential pressure **(WARNING maximum differential pressure between the well and the gun volume chamber is 1000 psi DO-NOT EXCEED IT. When the pressure differential is to high the O-ring on the poppet valve is designed to fail to avoid damage to the poppet valve and or the gun).**
- f) Sixth: If you are shooting down the tubing casing annulus close the casing valve to the separator. Plus any other valves attached to the well annulus.

15. Acquire the shot by pressing the **Fire Shot Button (alt-s)**. TWM will display the message **“Automatic Gun Has Been Fired, If Present.”** Along with a beep sound.

16. Wait at least 1.5 seconds after pressing the fire shot button at the computer before manually firing the gun. To fire the gun, rotate the Wing Valve in a clock wise motion from **SHUT to FREE**. The message **“Shot Pulse was detected from the gun”** is displayed once the gun is properly fired. The shot data is acquired for a predetermined numbers of seconds based on the wells input formation depth. **Note:** If the shot pulse was not detected after the gun was fired press abort (stop acquisition of shot data button and repeat the above instructions 13-16). Once a shot has been acquired a Dialog Box appears. At this point the data can be saved. Inspect the record and repeat the shot if the signal quality is not satisfactory. A brief comment can be entered into the description field, (press OK) to save the data set. **NOTE:** Once the shot has been saved TWM continues to acquire casing pressure every 15 seconds for a maximum of 15 minutes or until manually stopped.

17. From the “F6” Analyze button navigate to the liquid level tab. Note, TWM has calculated and selected a candidate for the best kick. Use the Left and Right buttons to fine tune the selected kick. The graph in the lower right hand corner of the screen shows a close up view of the kick.
18. Navigate TWM to the Depth Determination Tab. Here TWM displays the calculated depth to the previously selected kick. The depth is calculated using an acoustic velocity determined by the automatic spreader analysis, shown in the graph on lower left of the screen. Note, Filter type, Analysis method and the section of the shot (gray box) box used for the spreader analysis are defaulted.
19. Navigate to the casing Pressure Tab. Pressure data is being displayed that TWM has been acquiring every 15 seconds. Press the **End Buildup Button** to stop the acquisition when the data makes a fairly straight line.
20. Finally, go to the BHP Tab. Here TWM displays results based on the determined fluid level, acquired casing pressure, and well file data. Please refer to the Echometer TWM manual for a more detailed discussion of the analysis and calculated results
21. Echometer recommends that you shoot the well at least twice. This is accomplished by repeating steps 13 through 21 in this document. After done shooting the well. Turn off the Laptop Computer and Well Analyzer. Remove the cables from the input connectors.
22. Close the Valve on the well (Tree) between Echometer 15000 psi Gas Gun and the well. The wing valve on the gun must be in the **FREE Position**.
23. Open the Bleed Valve on the Echometer 15000 psi gas gun to release the pressure.
24. Remove the cables and the Echometer 15000 psi Gas Gun from the Well Tree Valve connection.
25. Open the Valve or Valves that you closed to isolate the well while shooting the fluid level on the well.
26. Inspect well head valves and connections to make sure that they are left the same way as they were before you shot the fluid level on the well.