

NR-Tec Ltd.

S2S SMARTSHOT

Acoustic Fluid Level Instrument

The S2S SmartShot is a single shot, manually operated fluid level instrument with “next generation” SmartShot Technology. This new technology enhances accuracy in the interpretation of collar counts (using an automated rolling caliper count algorithm) and improves the efficiency in obtaining fluid level readings. Our proprietary SmartShot Technology and Wizard App ensure both efficiency and accuracy when obtaining acoustic fluid level measurements.



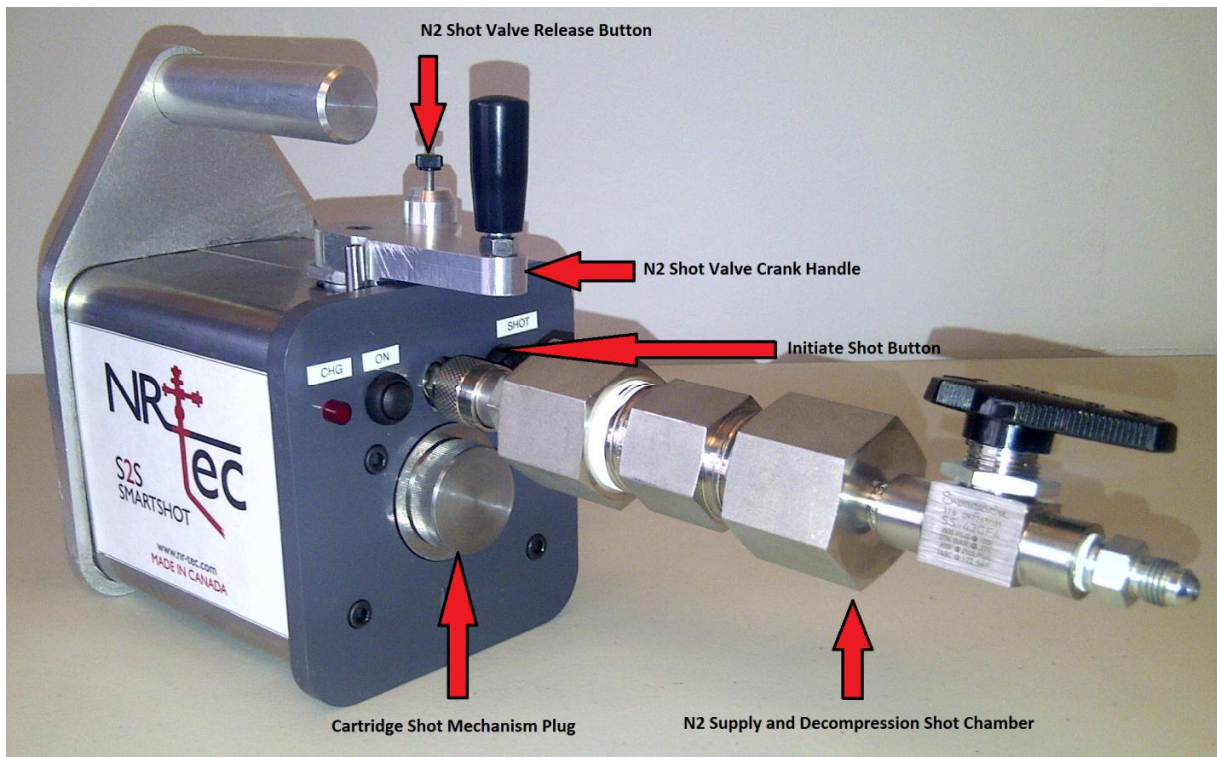
The S2S SmartShot uses the same wireless Bluetooth™ connectivity as the data logging S2S model, and allows multiple choices for shot generation (N2 cartridge, N2 supply, or decompression). A Bluetooth™ headset (earbud transceiver) provides voice recognition and audio feedback voice synthesis which allows the operator to interface with the software / instrument in highly efficient manner. This innovation removes the necessity of “back-and-forth” to the laptop/tablet and/or computer to verify shot results. Once the shot is taken, it is automatically downloaded and both the results and shot quality are analyzed. The results are immediately provided to the operator via the Bluetooth™ headset.

SHOT TYPES AND OPERATIONAL INSTRUCTIONS

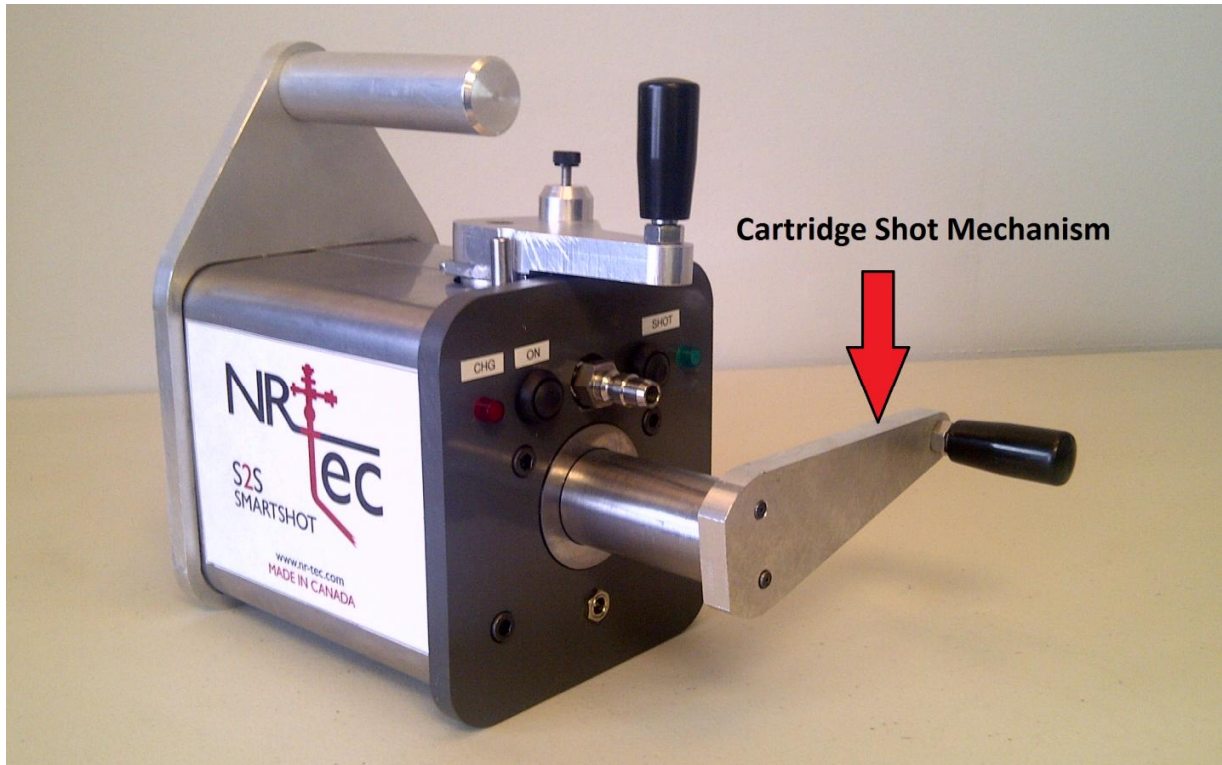
Warning: Do not attach this instrument to wells with more than 21000 kPa (3000 psi). Do not charge the instrument in a hazardous area. Laptop or tablet device must not be used in a hazardous area.

Note: When the N2 Shot Valve is un-cocked the valve is open – this open mode is required to bleed off the instrument. To determine if the valve is un-cocked there should be resistance in the spring when turning the valve handle counterclockwise. If it is cocked it can be un-cocked (released) by depressing the valve release button.

SMARTSHOT SHOT ACTUATION COMPONENTS



CARTRIDGE SHOT MECHANISM



Rig-In

- Install the shot chamber to the SmartShot Instrument (the shot chamber valve should be closed). When conducting an N2 Cartridge shot the shot chamber is not necessary while conducting the shot (the shot valve must be closed). The shot chamber and valve can be installed before depressuring the well (see Rig-Out).
- Relieve pressure in wellhead access valve fittings
- Remove the plug in the wellhead access fitting and install adaptors as required to mount the instrument. Use Gas Seal Teflon Tape to seal NPT threads.
- Install SmartShot Unit.

Rig-Out

- Close the valve leading to the wellhead access point.
- If an N2 supply cylinder is used for the shot the N2 cylinder valve must be shut off and the N2 hose pressure released by loosening the flare fitting to bleed off the pressure. Remove the N2 hose.
- Ensure the Shot valve is uncocked (open) and bleed off the wellhead pressure through the shot chamber valve.
- Disconnect SmartShot instrument and remove any adaptors and reinstall plug into access point.
- Return all valves to their normal operating state (open or closed).

1. N2 Supply (N2 Cylinder) Shot:

- Rig-In
- Ensure the Shot Valve is closed by turning counter-clockwise until it clicks (this is the cocked / closed position).
- Attach Quick Connect Shot Chamber and Valve (Valve must be closed).
- Open wellhead valve and demand "PRESSURE" (optional).
- Hook up N2 Supply hose (regulator) and set the shot size (usually set at least 500 psi above well pressure). Open shot chamber valve to fill and close before the shot.
- Initiate the shot by pushing the "Initiate Shot" Button. The SmartShot instrument will "beep" and then two seconds later there will be a continuous "beep" for up to 10 seconds (during this time the shot needs to be taken). The "beep" will stop when the instrument detects the acoustic pulse and starts recording.
- Actuate the shot by pushing the "Shot Valve" Release Button. There will be a final "beep" when the shot is finished recording.
- Within approximately 15 seconds of the shot being recorded the shot is downloaded and counted (using NR-Tec Ltd.'s proprietary RCC algorithm). The results and shot quality are relayed to the operator via Bluetooth™ headset.
- If shot quality is acceptable the instrument can be depressurized and rigged out (refer to Rig-Out procedures).
 - While in "Shot Wizard" mode the pressure can be demanded again to ensure the unit has been depressurized before rig-out.
- If shot quality is unacceptable another shot can be taken (i.e. with a larger shot size – greater N2 Supply pressure - or after shutting down the pumping unit for instance) and the steps above repeated until an acceptable shot is obtained.

2. Decompression Shot:

- Rig-In
- Ensure the Shot Valve is closed by turning counterclockwise until it clicks (this is the cocked / closed position).
- Attach Quick Connect Shot Chamber and Valve (Valve must be closed).
- Open wellhead valve and demand "PRESSURE". Once the pressure is determined to be adequate to attempt a decompression (usually at least 1000 kPa (145 psi)) - a shot can be initiated.
- Ensure Shot Valve is closed / cocked and Shot Chamber valve is closed (with no pressure in the shot chamber). Optional - Valve may be left open and quickly closed when decompression shot is initiated to allow more volume to be displaced.
- Initiate the shot by pushing the "Initiate Shot" Button. The SmartShot instrument will "beep" and then two seconds later there will be a continuous "beep" for up to 10 seconds (during this time the shot needs to be taken). The "beep" will stop when the instrument detects the acoustic pulse and starts recording.
- Actuate shot by pushing the "N2 Shot Valve" Release Button. There will be a final "beep" when the shot is finished recording.
- Within approximately 15 seconds of the shot being recorded the shot is downloaded and counted (using NR-Tec Ltd.'s proprietary RCC algorithm). The results and shot quality are relayed to the operator via Bluetooth™ headset.
- If shot quality is acceptable the instrument can be depressurized and rigged out (refer to Rig-Out procedures).
 - While in "Shot Wizard" mode the pressure can be demanded again to ensure the unit has been depressurized before rig-out.

3. N2 Cartridge Shot:

- The N2 cartridge is a 2700 psi mini cylinder and is suitable for taking shots on wells with casing pressures up to approximately 2400 psi.
- Before rigging in – remove the Cartridge Shot Mechanism (CSM) plug. Install a cartridge into the CSM and thread in to the SmartShot instrument. The CSM is threaded in until the step on the diameter of the CSM is flush with the body. At this position the O-ring seal is in place and there is adequate thread engagement to handle the internal pressure.
- Close the Shot Valve by turning counter clockwise until it clicks (this is the cocked / closed position).
- Rig-In
- Open wellhead valve and demand “PRESSURE” (optional).
- Initiate the shot by pushing the “Initiate Shot” Button. The SmartShot instrument will “beep” and then two seconds later there will be a continuous “beep” for up to 10 seconds (during this time the shot needs to be taken). The “beep” will stop when the instrument detects the acoustic pulse and starts recording.
- Actuate shot by cranking the Cartridge Shot Mechanism. There will be a final “beep” when the shot is finished recording.
- Within approximately 15 seconds of the shot being recorded the shot is downloaded and counted (using NR-Tec Ltd.’s proprietary RCC algorithm). The results and shot quality are relayed to the operator via Bluetooth™ headset.
- If shot quality is acceptable the instrument can be depressurized and rigged out (refer to Rig-Out procedures).
 - While in “Shot Wizard” mode the pressure can be demanded again to ensure the unit has been depressurized before rig-out.
- If another shot is required the instrument must be depressurized. This can be done by closing the wellhead access valve and installing the Quick Connect shot chamber and Valve on the N2 Supply fitting. With the valve closed the Shot Valve can be opened by pushing the “Shot Valve” Release Button, and then the pressure can be released through the shot chamber valve. While in “Shot Wizard” mode the pressure can be demanded again to ensure the unit has been depressurized before rigging-out CSM to insert a new cartridge. Repeat shot steps above.

RESULTS

It is more difficult to auto-detect the fluid level and / or accurately count collars in the following scenarios:

- 1) High Fluid Level
- 2) Noisy well
- 3) Deep well / low pressure
- 4) Multiple events in well
- 5) No tubulars
- 6) Micro annulus of dual string completions
- 7) Tubing shots

All fluid level test results should be confirmed by qualified personnel. Wellbore conditions, multiple kicks, well noise, etc., can increase the difficulty in auto-assessing the fluid level results of a shot.

A larger shot pressure can increase the shot quality.

With the new SmartShot Wizard the shot chamber can be reconfigured easily to add volume to the shot chamber which can also increase shot quality.

In most normal operating scenarios the ShotWizard will give accurate results.

Avoid moving the instrument or causing any external noise to the piping during a shot as this may cause a false kick reading.

Know your instrument – know your wells. As you become familiar with both the SmartShot Instrument and the wells you are testing, confirming or validating results becomes easy.

When using the Audio Notes feature the information should also be confirmed before leaving location.

WARNING: Check with the operating company in regards to using Bluetooth™ headsets on location as each company may have differing safety regulations.