

# **USER MANUAL**

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Instant Close Multi Cycle Shut In Tool V2.7

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# 1 History of Changes

Version No,	Date	Description of Changes
V1.0	2007-09	Created Document
V1.1	2009-10	Updated to show 3.5" Valve redress items
V1.2	2010-01	Updated software screen shots
V2.0	2011-02	Added preferred program steps (immediate close and open), troubleshooting and investigation, battery power consumption, checklist.
V2.1	2011-08	Changed configuration settings default
V2.2	2013-02	Added pressure testing section & updated software to V2.9.3
V2.3	2014-01	Updated opening program sequence
V2.4	2015-01	Updated to show Version 2 of a 3.5" Valve and it's redress items
V2.5	2015-07	Updated with note about correct vice use.
V2.6	2016-01	Fixed valve size and updated recommended max pressure for pressure testing.
V2.7	2016-02	Updated recommended universal drive rotation direction for assembly and updated the estimated number of possible cycles/movements to 4/8.

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## 2 About This Guide

This document is intended as a supplement to formal training. DataCan is constantly working to improve its products. We must therefore reserve the right to change designs, materials, specifications and prices without notice. DataCan declines any liability that may arise out of the potential inaccuracies in this guide.

This guide assumes that you have some computing and tool knowledge. For more information, contact your local service representative.

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We thank you for any feedback or comments that will help us to continue to improve our products and service.

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## 3 Introduction

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### 3.1 DataCan

DataCan Services Corp. provides technology driven downhole measurement solutions that deliver productivity, quality and safety. We design, manufacture and service 200°C plus hybrid platform instruments, patent pending multi-cycle instant close shut-in tools, reservoir management systems and a suite of quartz and piezo-resistive pressure measurement instruments. We offer specialized solutions that will help you improve productivity in your applications.

We are the leader in ultra high temperature circuit design, manufacturing and packaging.

- Our part selection process ensures the best long term reliability is provided.
- Our fully automated surface mount assembly procedures ensure the highest quality circuit is constructed every time with minimal heat impact.
- Our Hybrid design and construction techniques will enable DataCan and its customers to reliably enter the 177°C to 225°C market.
- Our metal to metal seal and fully welded designs prevent potential leaks.

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### 3.2 Health and Safety

The greatest danger that exists from operating downhole tools is associated with the potential hazard of the lithium cells in the battery packs. Lithium is a highly reactive element and care must be taken when handling lithium cells and packs. **DO NOT:**

- Exceed the temperature rating of the cells.
- Short circuit the cells.
- Attempt to charge the cells.
- Crush, puncture or disassemble the cells.

For more detailed procedures refer to **Appendix A: Safe Handling of Lithium Batteries.**

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## 4 Product Description

The DataCan downhole shut in tool is a multi-cycle instant close downhole valve that is designed to run below a lock mandrel, bridge plug, or packer.

There is usually a pressure recording device below the valve which records the pressure response of the formation being tested as the valve is opened or closed. The formation is allowed to flow for a sufficient length of time to ensure that it is drawn down to a desired level. After this draw down period is complete the valve is used to shut in the well.

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### 4.1 Purpose

The down hole shut in tool will eliminate the wellbore storage effect and significantly reduce the shut-in time during pressure build up.

The wellbore storage effect results from fluids entering the wellbore from the formation even after the well is shut in at the surface. The pressure data collected during the wellbore storage period is not valid and because the period usually lasts a long time, it becomes necessary to shut a well in for extended periods to conduct a pressure build up test to ensure that the data collected is representative.

Finally, as wells age and the reservoir pressure declines, the data obtained from pressure build up tests is heavily affected by wellbore storage.

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## 4.2 Instant Close Valve Technology

The patent pending multi-cycle instant close down-hole shut-in tool includes a shuttle piston, which when moved, closes a relief port allowing a differential pressure to form across a sliding sleeve. This differential pressure forces a sliding sleeve in a direction which closes the valve.

With or without a differential pressure present, the shuttle valve will continue to force the sliding sleeve in the correct direction to close the valve. This same shuttle piston has the ability to move in the opposite direction thereby opening a relief port to remove the potential differential pressure across the sliding sleeve element and in turn causing the valve to open.

Two different sleeve profiles allow the valve to operate in both injection and production settings.

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## 4.3 Drive Circuit Technology

An electronic timer assembly and electric drive motor are provided for controlling the action of the shuttle piston. The operator pre-programs the timing circuit of the job to open, close and re-open the valve multiple times.

### Automated Surface Mount Assembly Line

To ensure that every timing circuit assembly is made to the highest standard, DataCan uses a fully automated commercial production line. An automated line ensures that:

- The correct amount of solder is used.
- Every part is placed correctly.
- Excessive heat is not introduced to the parts.
- Part and circuit handling is reduced.

The result of our designs and assembly procedures is a complete downhole assembly capable of withstanding temperatures up to 177°C.

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## 4.4 Components and Accessories

The following is a list of components for your down hole shut in tool:

- “Valve Assembly” - Available in:
  - 1.75" OD for 2-3/8" and 2-7/8" Tubing
  - 2.5" OD for 3-1/2" and larger Tubing
  - 3.5" OD for 4-1/2" Tubing
  - 5.0" OD for 7" Tubing
- “Universal Drive Section” – Contains your drive motor and timing assembly.
- “Kobe Equalizing Sub” – A crossover to your lock mandrel or packer.
- “Battery Pack” - Available in 3 X “D” in multiple temperature ranges.
- “Redress Kits” - Available in different materials.
- “Tool Kit” – Contains basic tools required for servicing.
- “Tool Communication Cable” – Connects the drive section to your computer.
- “Software Flash Drive” – Contains our software and manuals.



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## 5 Assembly and Operation

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### 5.1 Tool Inspection

Every DataCan downhole shut in tool is shipped in its assembled state without the battery pack. Ensure that the shipment includes all of the components and accessories that were requested.

Record the serial number of each tool making sure that the size, service and temperature rating of the tool match your job requirements.

It is very important that the operating temperature of the battery pack supplied exceeds the bottom hole temperature of the job.

Unless otherwise specified each shut in tool will be shipped with an Aflas 7182B redress kit. Refer to the “O-Ring Selection Guide” in Appendix C to ensure that the Aflas elastomer is suitable for your environment. If the O-Rings need to be replaced refer to the redress procedure below. Ensure that the O-Rings are adequately lubricated.

Inspect the male threads; they should be clean and undamaged.

It is a good idea to program the tool for a complete open and close cycle at surface. Ensure that each cycle occurs easily.

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## 5.2 Operating Sequence

In general, the following sequence of events is required to operate a DataCan shut in tool:

- Connect the tool to a computer using the DataCan Communication Cable.
- Program the tool using DataCan Download Software as outlined in Section 5.4.
- Disconnect the tool from the DataCan Communication Cable.
- Insert the battery pack directly to the tool. The LED located at the top of the battery pack should blink 16 times indicating that the tool is now running. This action powers the tool and initiates the tool program.
- Thread the battery housing onto the electronics housing.
- Run the tool down hole.
- Remove the tool from the well when the job is complete.
- Remove the battery housing and unplug the battery pack. This action stops the tool.
- You can reconnect the DataCan Communication Cable to the tool and computer to download the tool job and create a record of the opening and closing sequences.

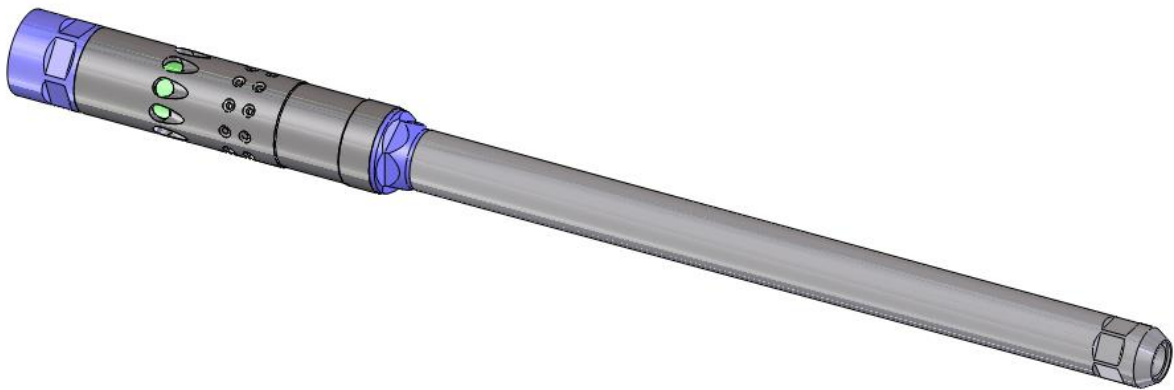
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## 5.3 Tool Redress Procedure

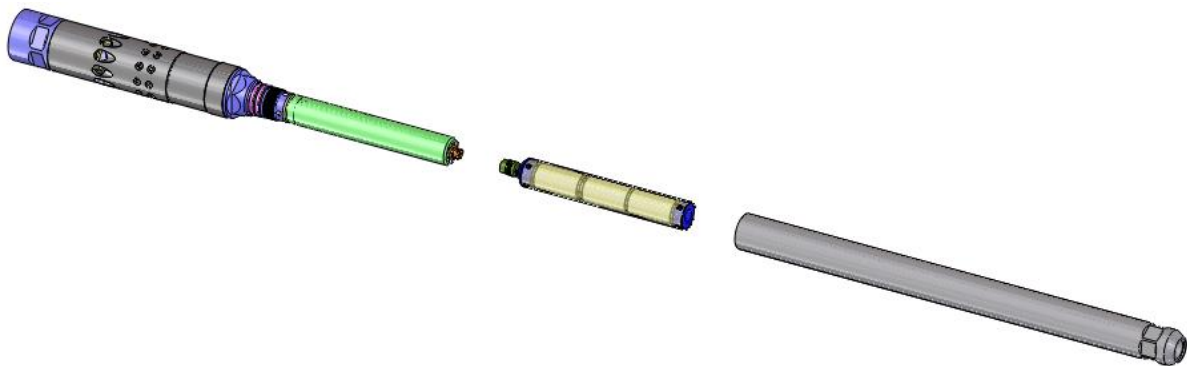
DataCan recommends redressing the tool after every job by following the procedure listed below. The o-rings should be replaced each time the tool is redressed while the back-ups can be reused if they've not been damaged.

### Disassembly

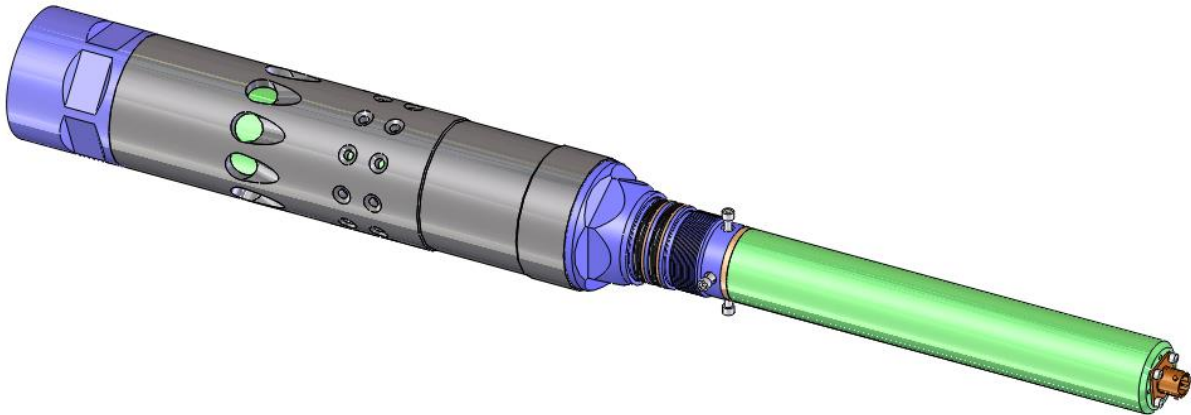
1. Begin with the fully assembled **Shut In Tool** and **Universal Drive**.



2. Unscrew the **Battery Housing** from the **Drive Sub** then disconnect the **Battery Pack**.



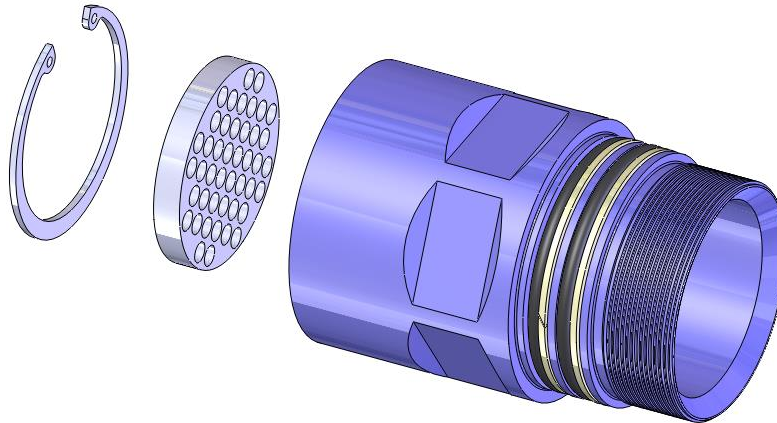
3. Remove the four **Socket Head Cap Screws** from the perimeter of the **Drive Sub** then remove the **Motor Assembly**. Keep the **Coupling** as it is required for future steps.



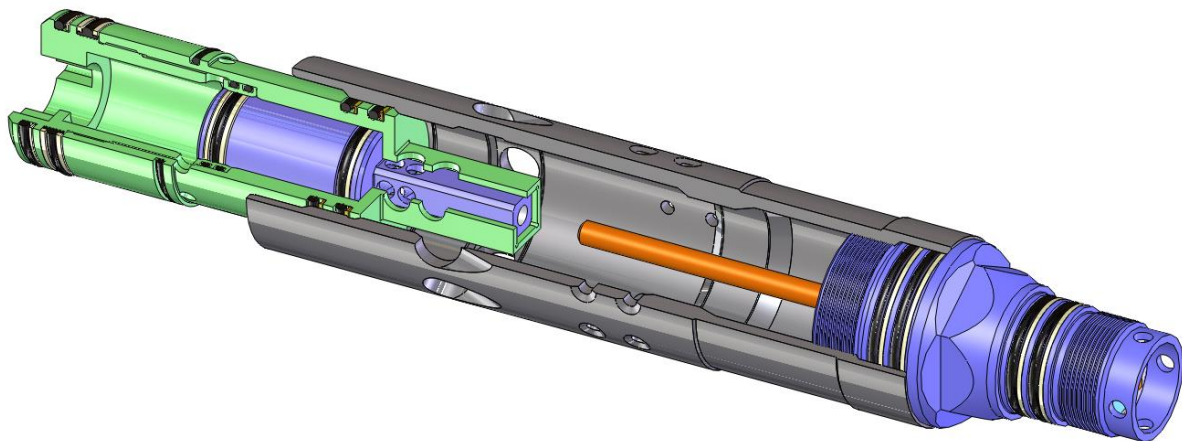
4. Place the **Main Sleeve** in a pipe vice, ensuring that the clamping point is away from the tool joints to avoid galling seal bores. Take care not to over tighten. Unscrew the **Top Sub** from the **Main Sleeve**.



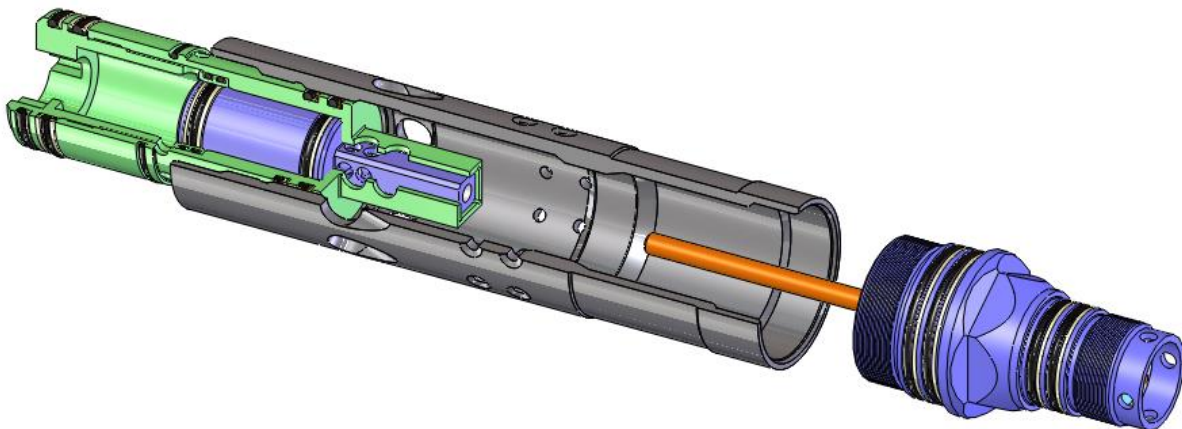
5. Remove the **Retaining Ring** and **Debris Screen** from the **Top Sub** using needle nosed snap-ring pliers.



6. Using a flat head screwdriver (or cordless drill), rotate the **Coupling** counter clockwise and move the **Piston Assembly** past it's fully closed position. The **Piston Assembly** will become unattached from the **Drive Screw** as shown below.

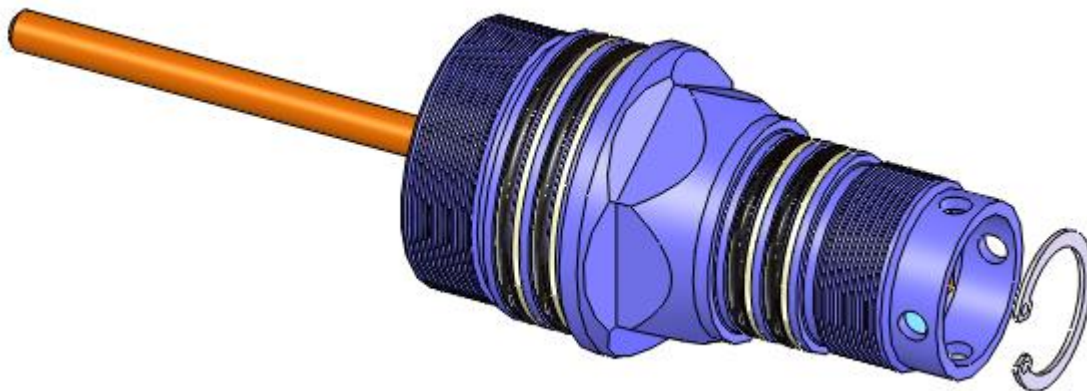


7. Unscrew the **Drive Sub** from the **Main Sleeve**.

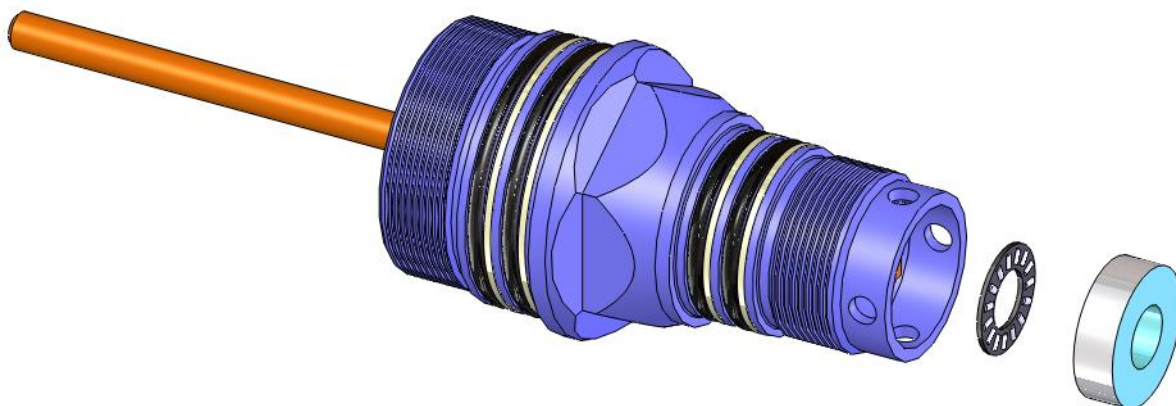




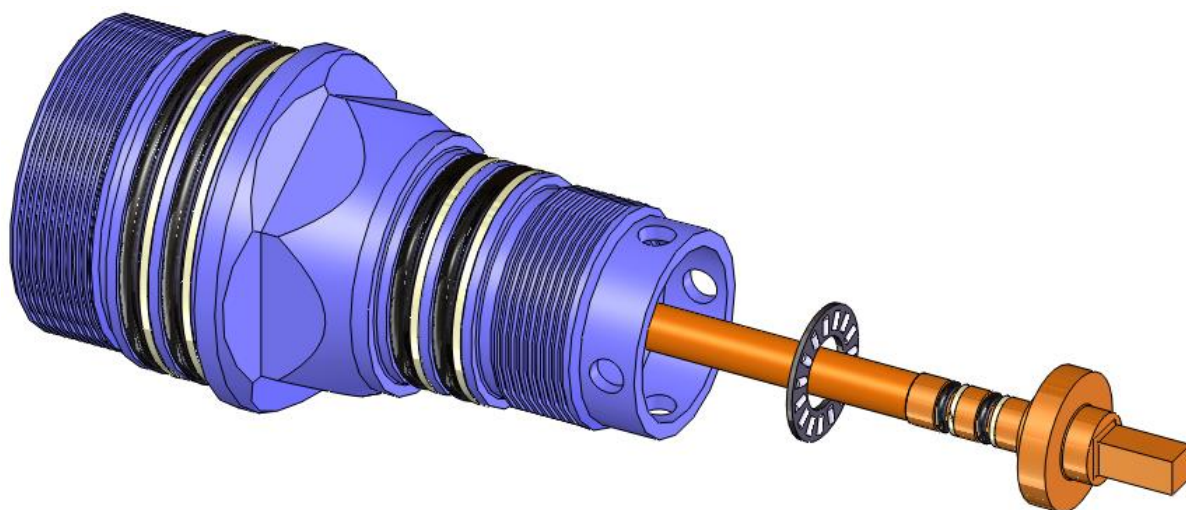
8. Using needle nosed snap-ring pliers remove the **Retaining Ring** from the **Drive Sub**.



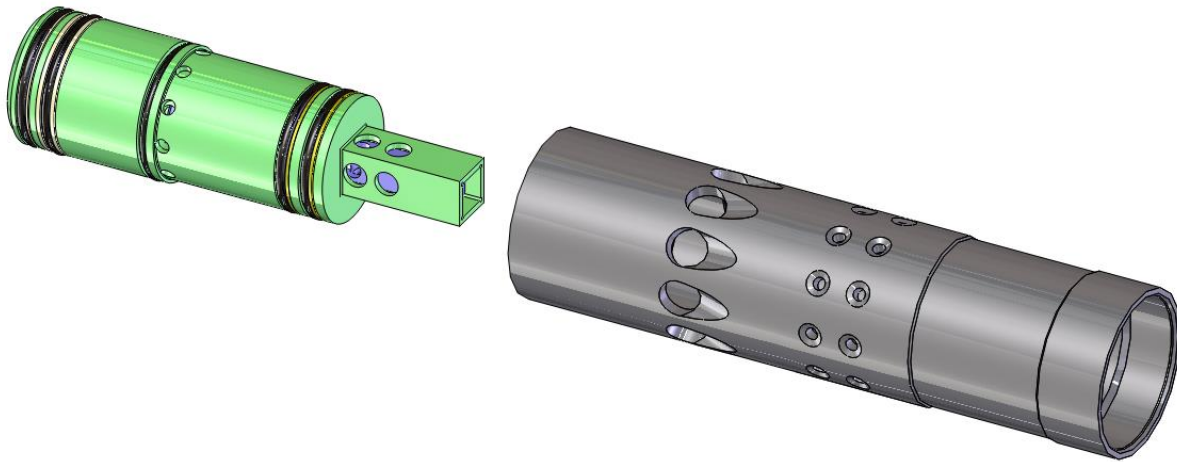
9. Remove the **Thrust Nut** and **Thrust Bearing**.



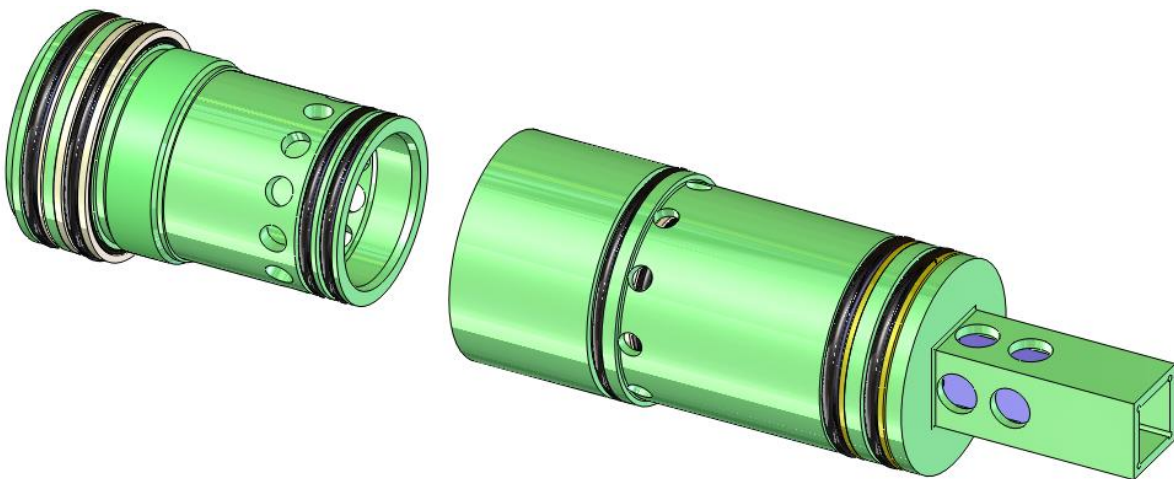
10. Push the **Drive Screw** and **Thrust Bearing** out of the **Drive Sub**.



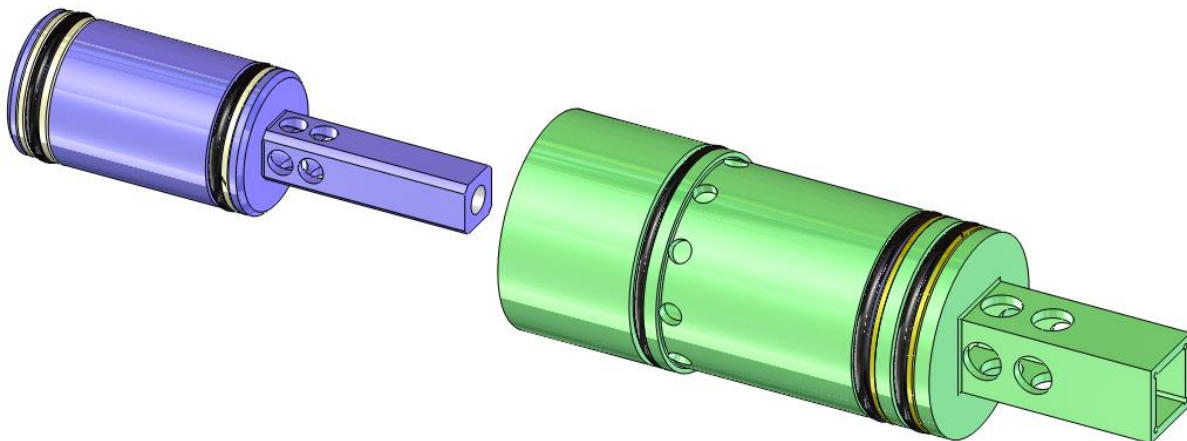
11. Push the **Piston Assembly** out the top of the **Main Sleeve**.



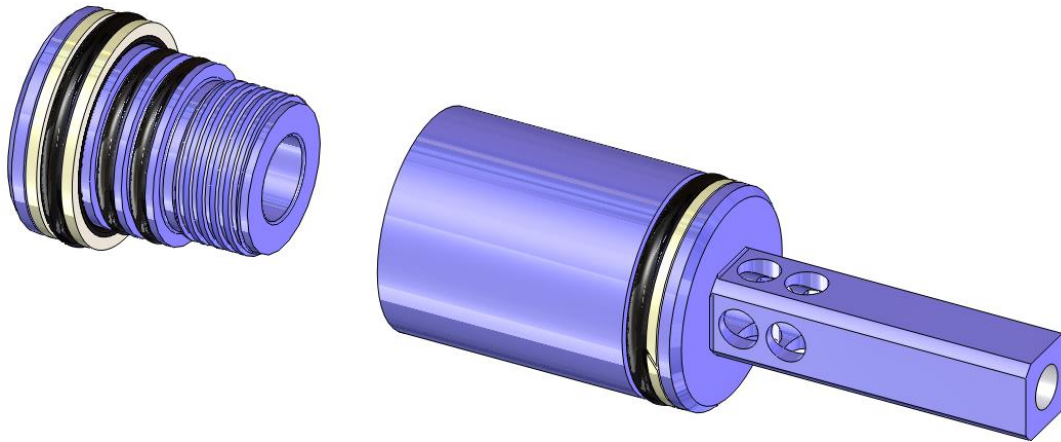
12. Unscrew the **Big Piston Top Cap** from the **Big Piston**.



13. Push the **Small Piston** out of the **Big Piston**.



14. Unscrew the **Small Piston Top Cap** from the **Small Piston**.

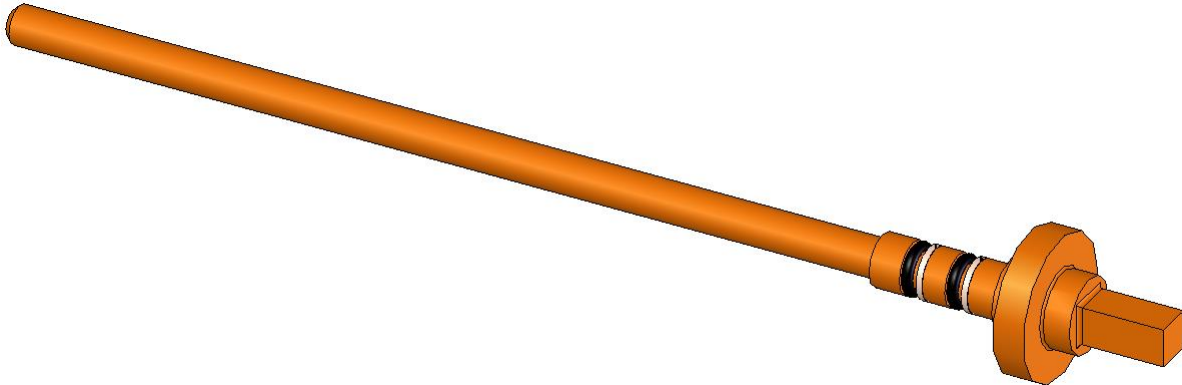


15. Using an o-ring pick remove all of the seals from the tool. Discard the used o-rings.

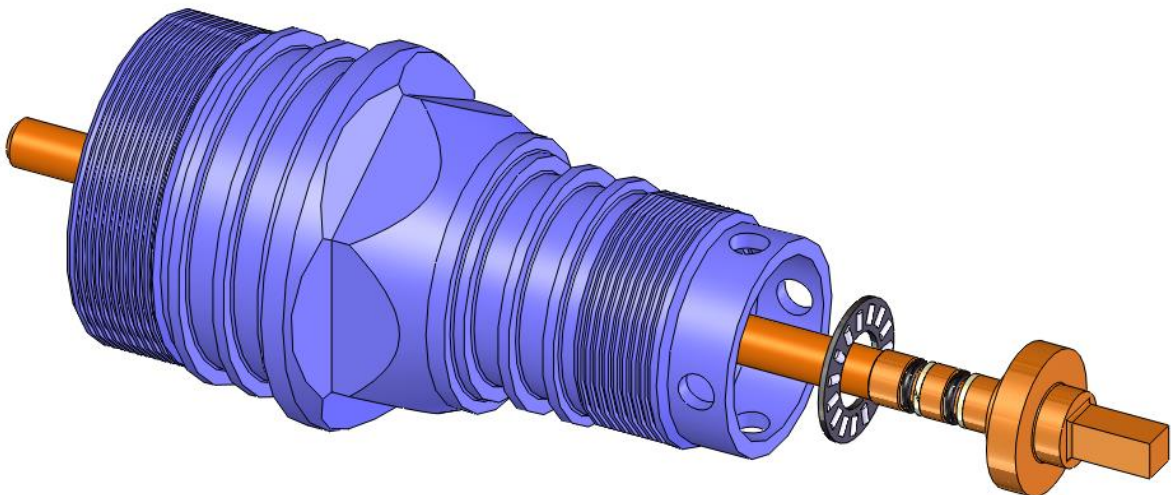


## Reassembly

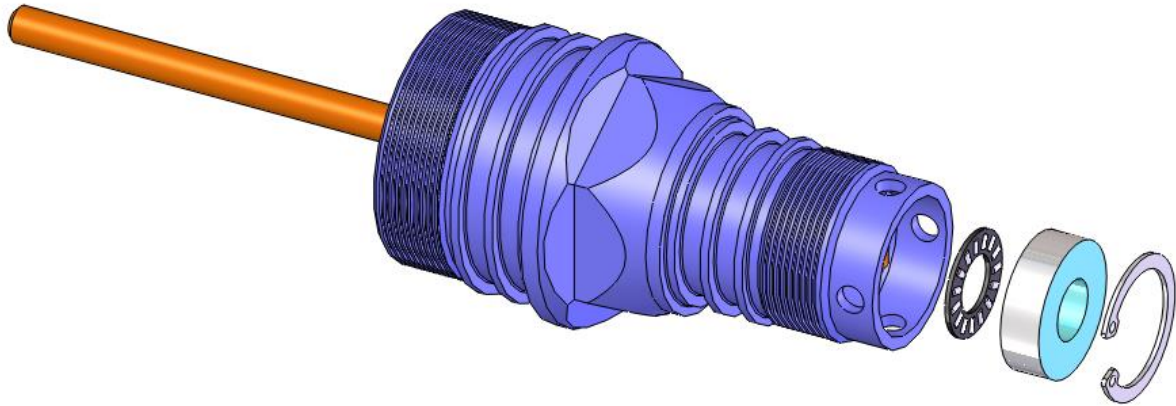
1. Clean and dry all parts thoroughly. Inspect parts for damage or excessive wear.
2. Install the **2-009 O-Rings** and **8-009 Back-Ups** onto the **Drive Screw** as outlined in Section 4.4. The back-ups should be on the bottom side (towards the square end). Apply o-ring grease liberally on the new seals.



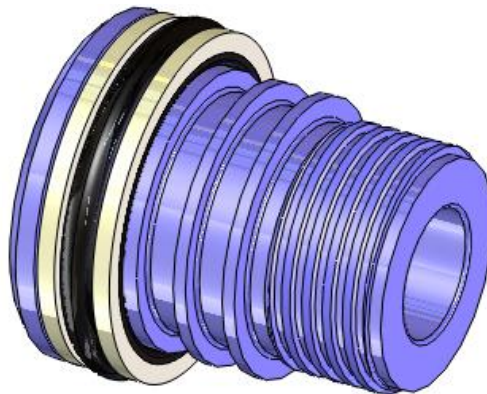
3. Insert a new **Thrust Bearing** in the **Drive Sub**. Push the **Drive Screw** into the **Drive Sub** as shown below.



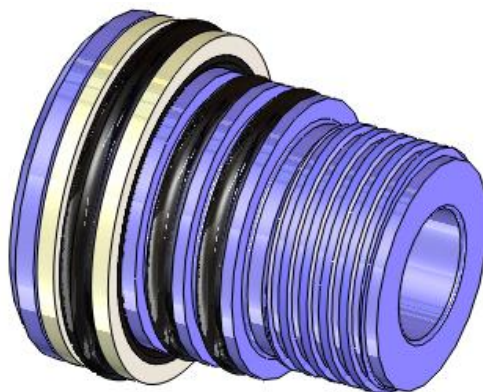
4. Install the second **Thrust Bearing** into the **Drive Sub** and place the **Thrust Nut** on top as shown below. Using needle nosed snap-ring pliers reinstall the **Large Retaining Ring**.



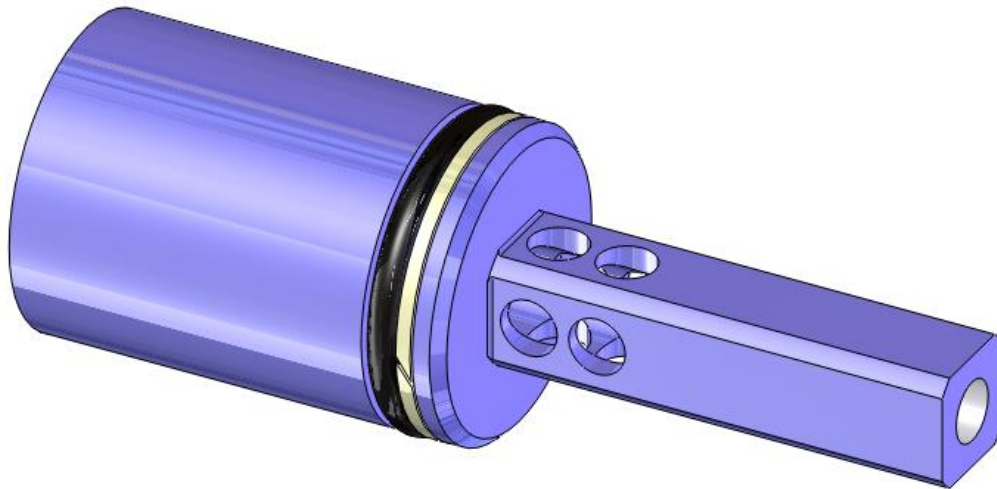
5. Install the **LPT 215-2 T-Seal** and the **TS-215 Back-Ups** onto the back gland of the **Small Piston Top Cap**.



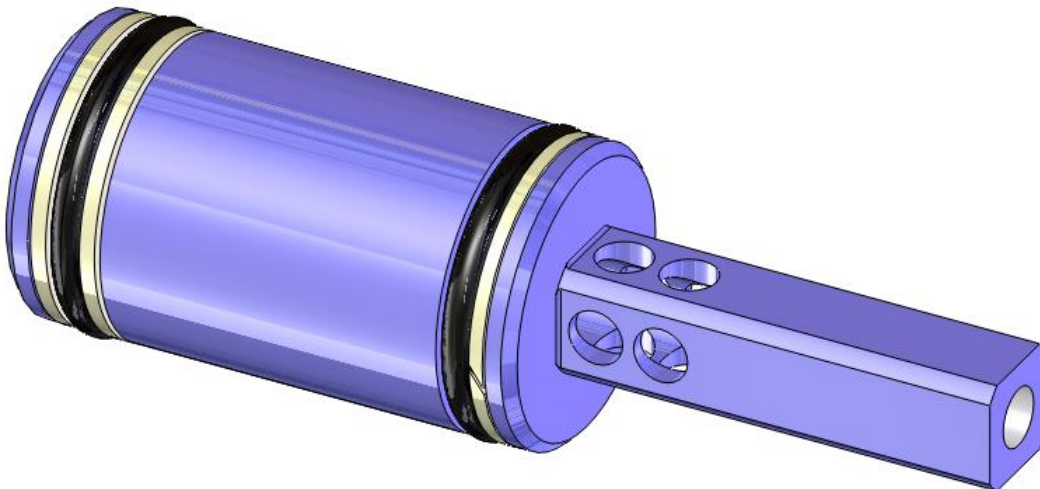
6. Install the **2-118 O Rings** onto the **Small Piston Top Cap**.



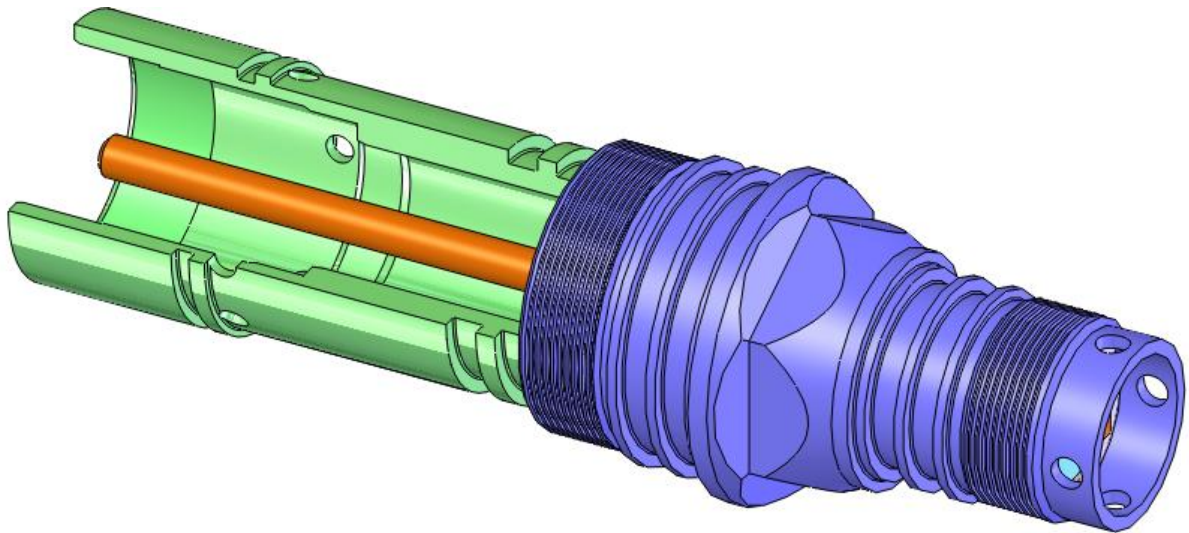
7. Install the **2-215 O-Ring** and the **8-215 Back-Up** onto the **Small Piston**. The back-up should be on the outside (closest to the square end).



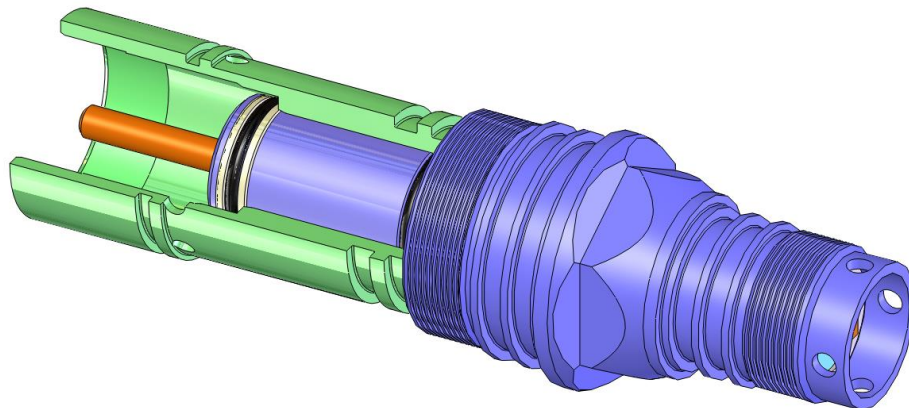
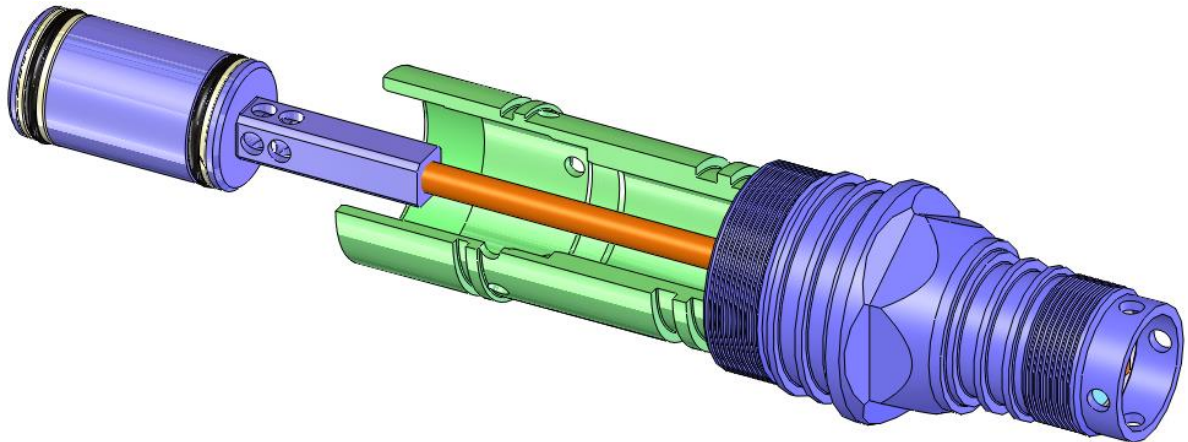
8. Thread the **Small Piston Top Cap** onto the **Small Piston**.



9. Position the **Big Piston** in the **Drive Sub**.

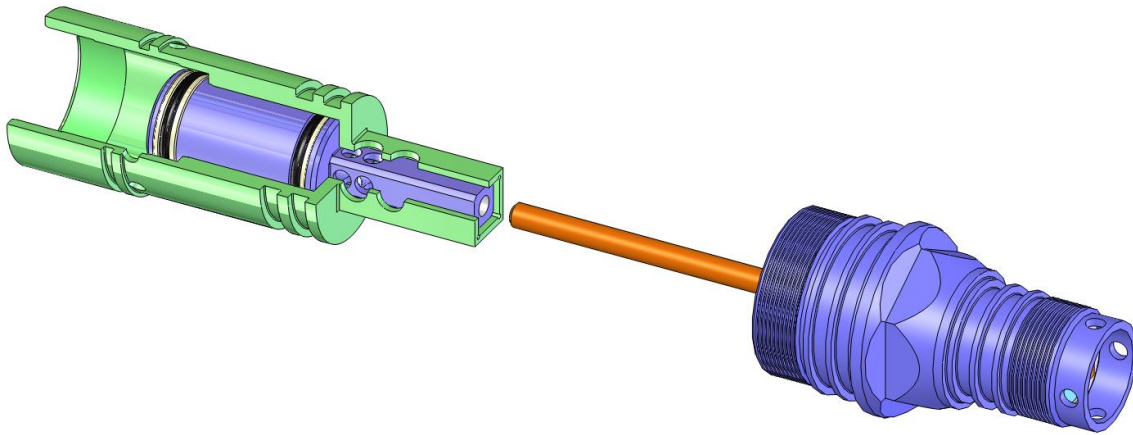


10. Thread the **Small Piston** onto the **Drive Screw**. Using the **Coupling** and a screwdriver (or cordless drill) turn the **Drive Screw** clockwise and pull the **Small Piston** into the **Big Piston**. To fully insert the **Small Piston** you'll have to align the male square end of the **Small Piston** with the internal square key of the **Big Piston**.

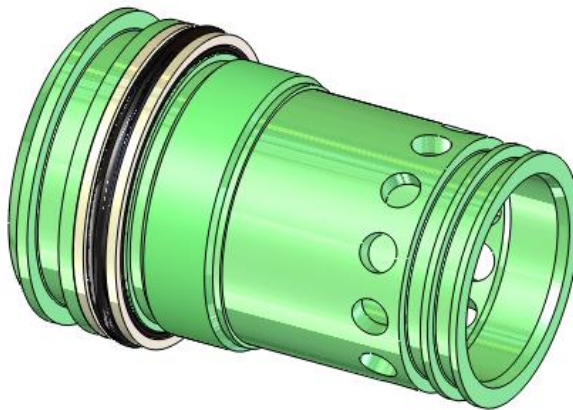




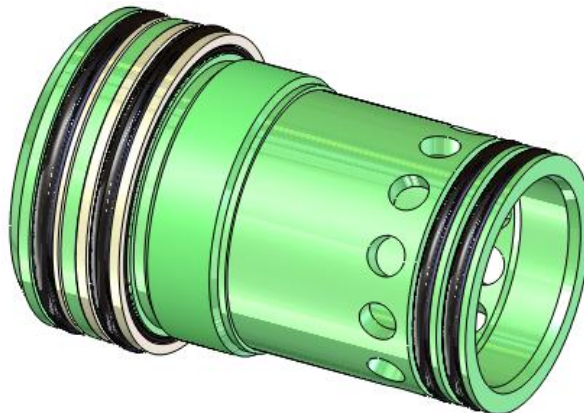
11. Remove the **Piston Assembly** from the **Drive Sub** by turning the **Coupling** counter-clockwise. Gently press against the **Small Piston** while rotating the **Coupling** so that it remains fully inserted inside the **Big Piston**.



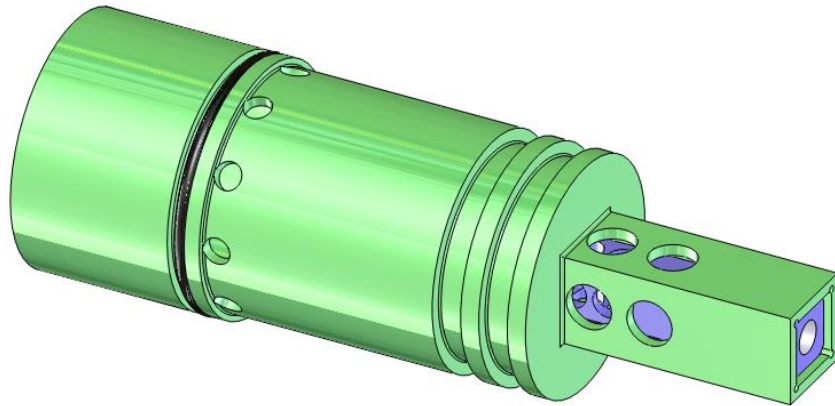
12. Install the **LPT 224-2 T-Seal** and **TS-224 Back-Ups** onto the **Big Piston Top Cap**. Apply o-ring grease liberally on the new seals.



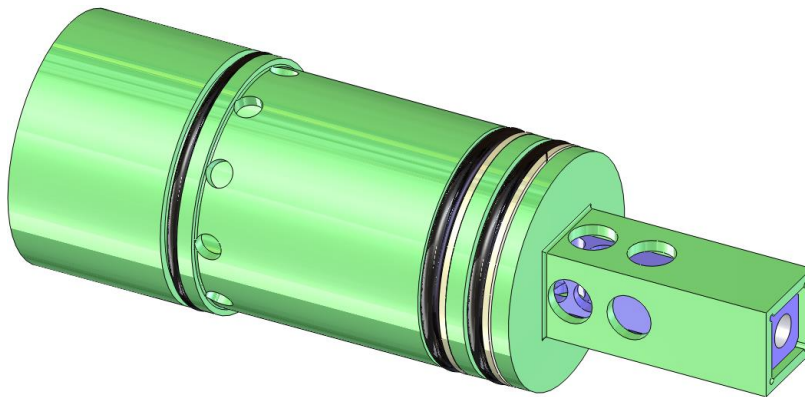
13. Install the remaining O-Ring seals onto the **Big Piston Top Cap**. The **2-127 O-Rings** go on the front glands, farthest from the T-Seal. The **2-224 O-Ring** and **8-224 Back-Up** go on the back gland, next to the T-Seal.



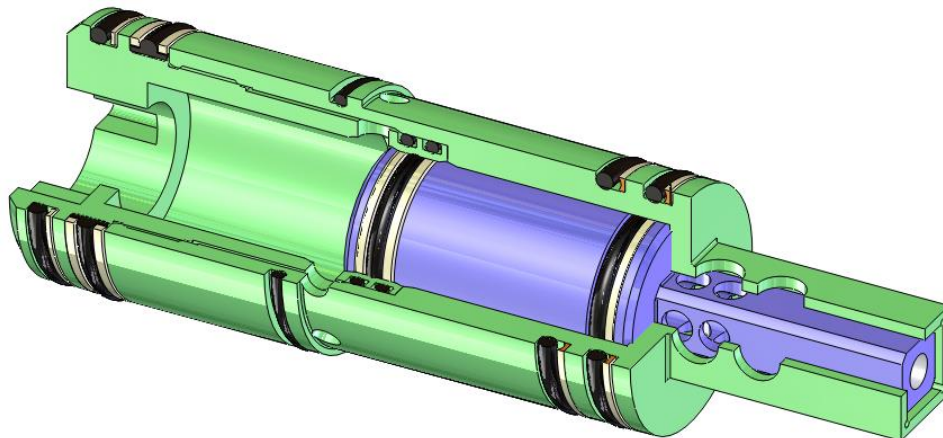
14. Install the first seal onto the **Big Piston** in the gland shown below. Use the **2-133 O-Ring**.



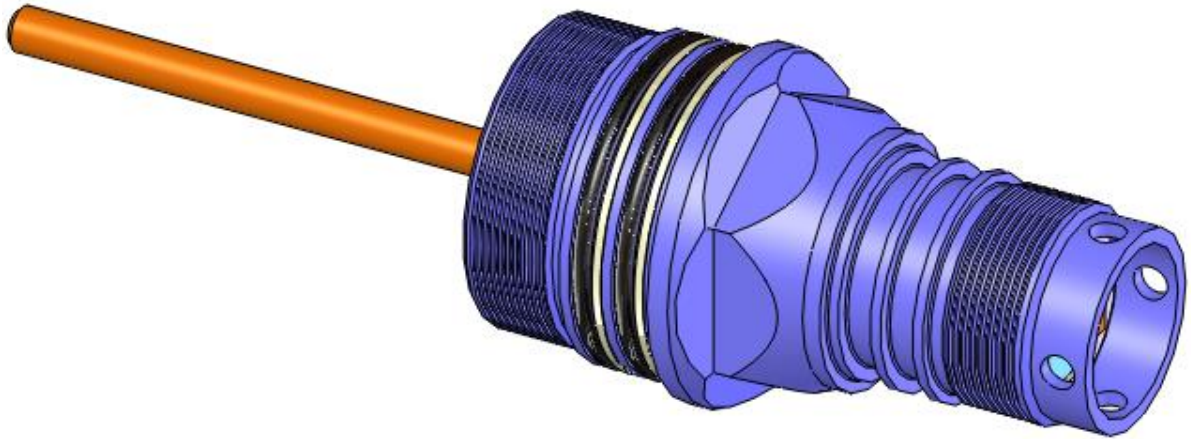
15. Install the second seal onto the **Big Piston**. Use the **2-223 O-Ring** and **8-223 Back-Up**. The Back-Up should be closest to the square end of the part. Apply o-ring grease liberally on the both of the new seals.



16. Thread the **Big Piston Top Cap** into the **Big Piston**.



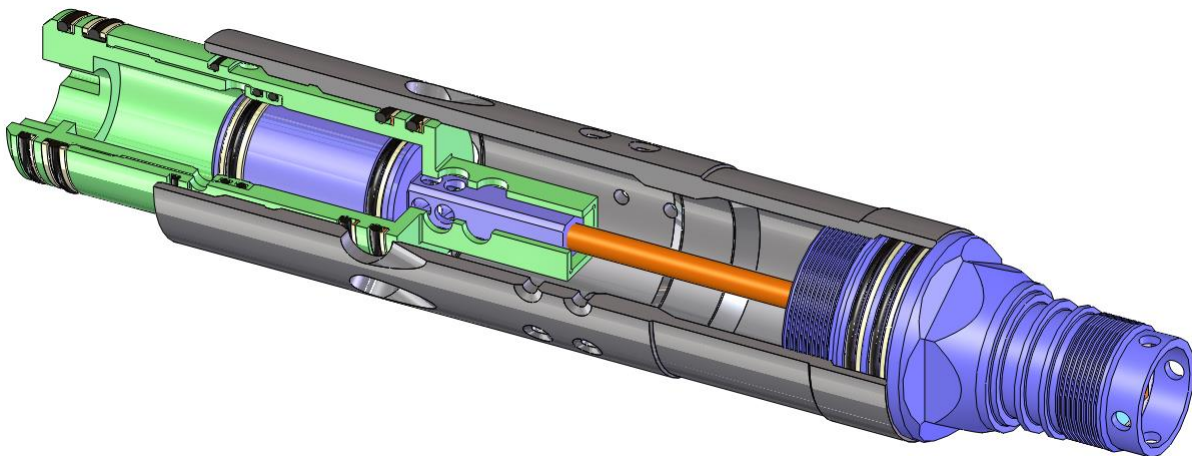
17. Install the **Drive Sub** seals in glands shown below. For the 2-1/2" Valve use the **2-226 O-Rings** and **8-226 Back-Ups**. Apply o-ring grease liberally on the new seals.



18. Thread the **Main Sleeve** onto the **Drive Sub**.

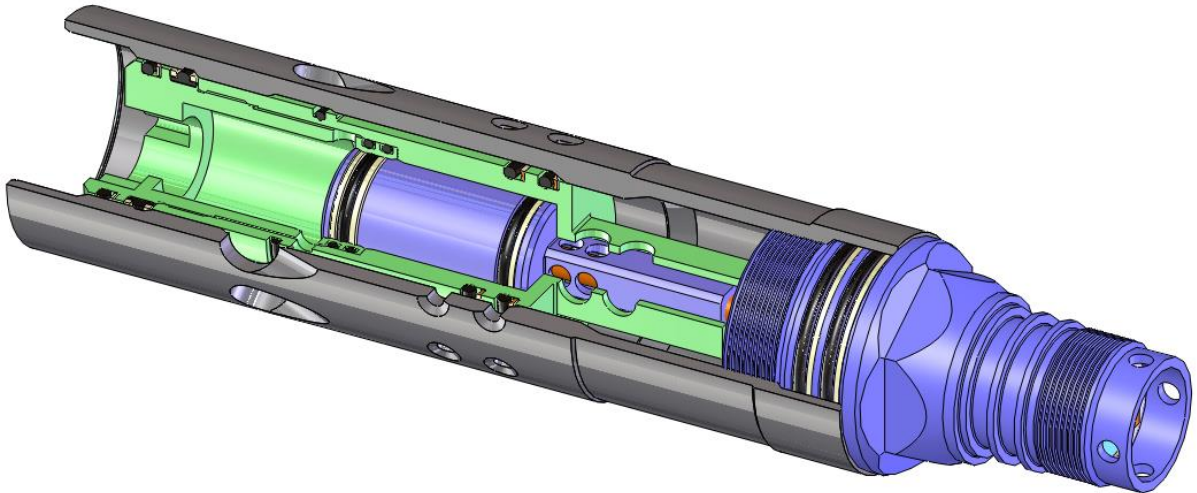


19. Insert the **Piston Assembly** into the **Main Sleeve**.

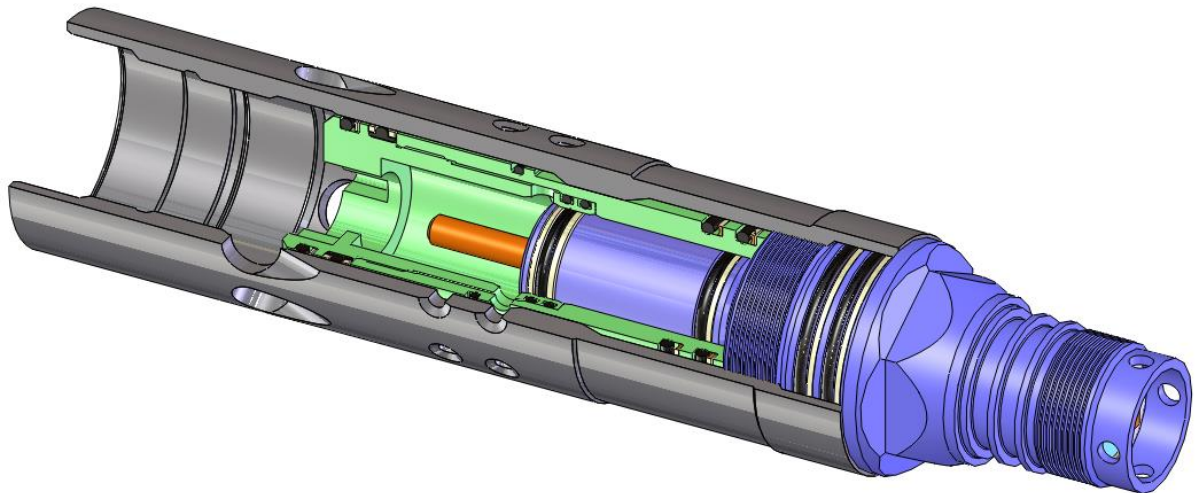




20. Thread the **Drive Screw** into the **Small Piston**. Turn the **Coupling** clockwise using a screw driver (or cordless drill) to pull the **Piston Assembly** into the **Main Sleeve**.

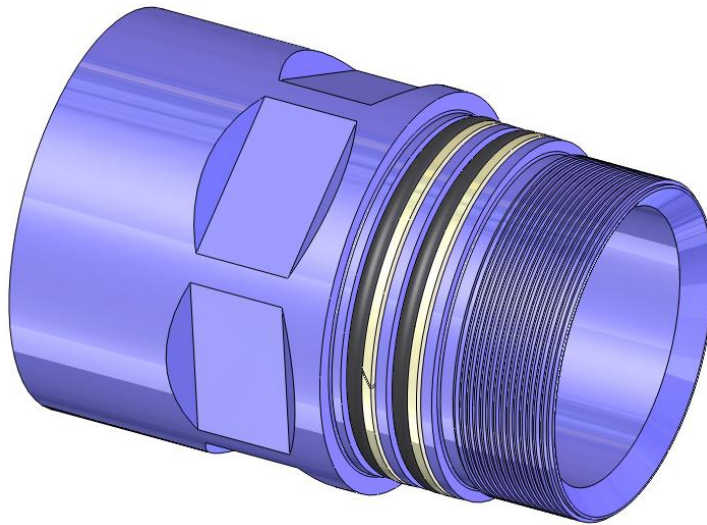


21. Use a socket wrench on the **Big Piston Top Cap** to align the **Piston Assembly** with the square cut out on the **Drive Sub**. The **Piston Assembly** will move past the flow ports on the **Main Sleeve** when it is fully inserted.

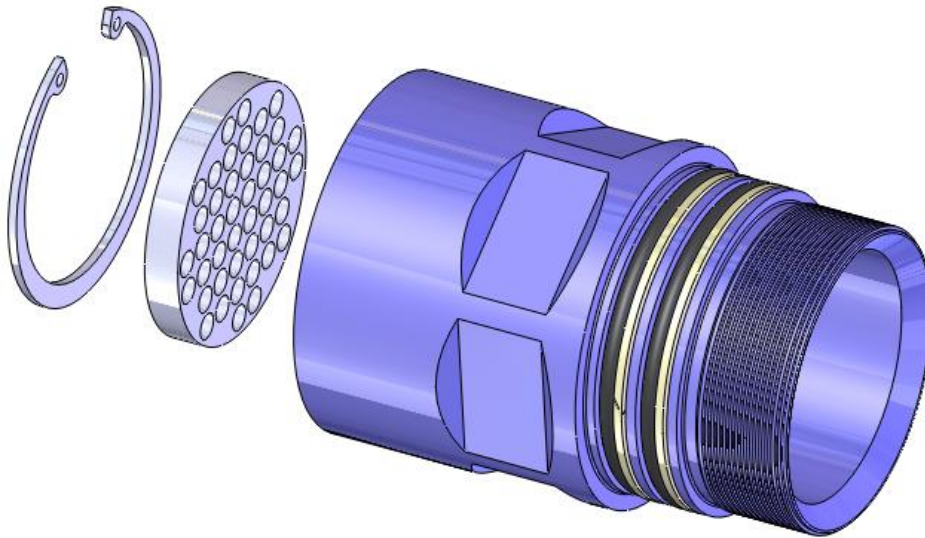


22. Install the seals on the **Top Sleeve** in the glands shown below. For the 2-1/2" Valve use the **2-226 O-Rings** and **8-226 Back-Ups**. Apply o-ring grease liberally on the new seals.

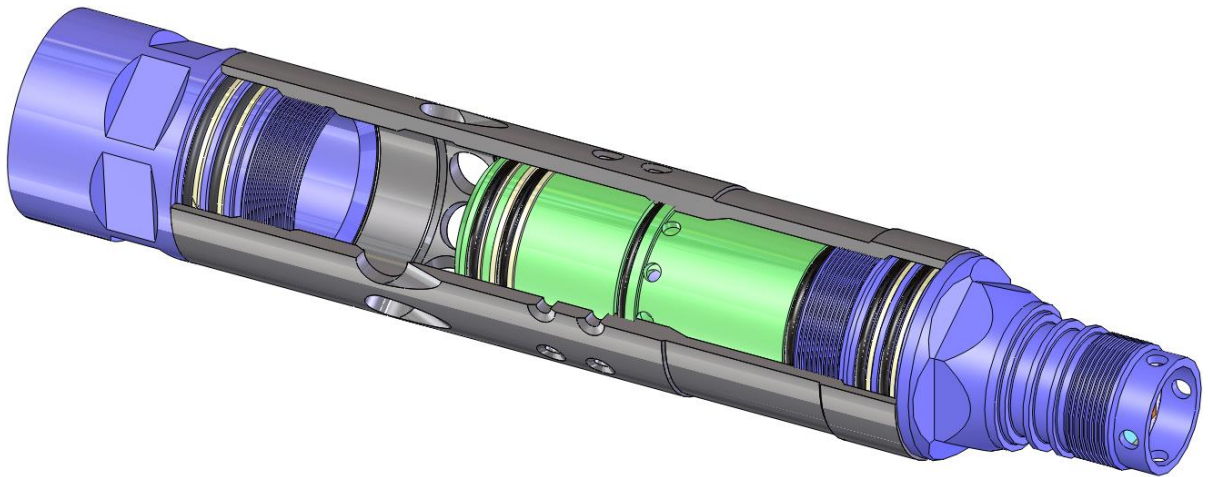




23. Using needle nosed snap-ring pliers reinstall the **Debris Screen** and **Retaining Ring** in the **Top Sleeve** as shown below.



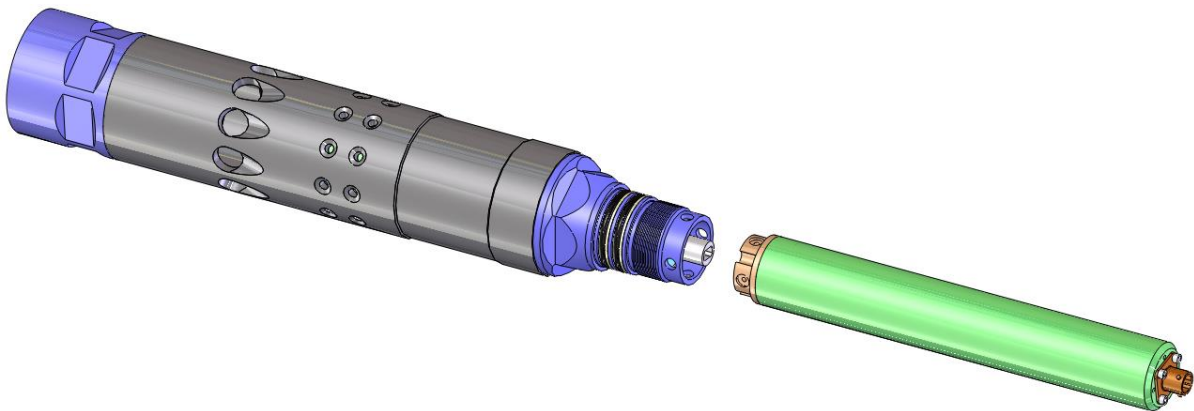
24. Thread the **Top Sleeve** into the **Main Sleeve**.

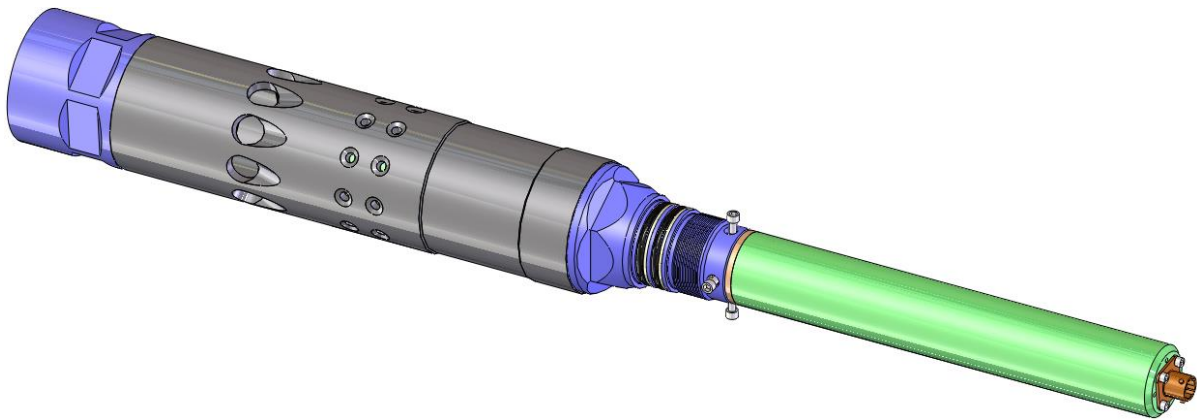


25. Install the **2-219 O-Rings** and **8-219 Back-Ups** onto the **Drive Sub** in the glands shown below. Apply o-ring grease liberally on the new seals.

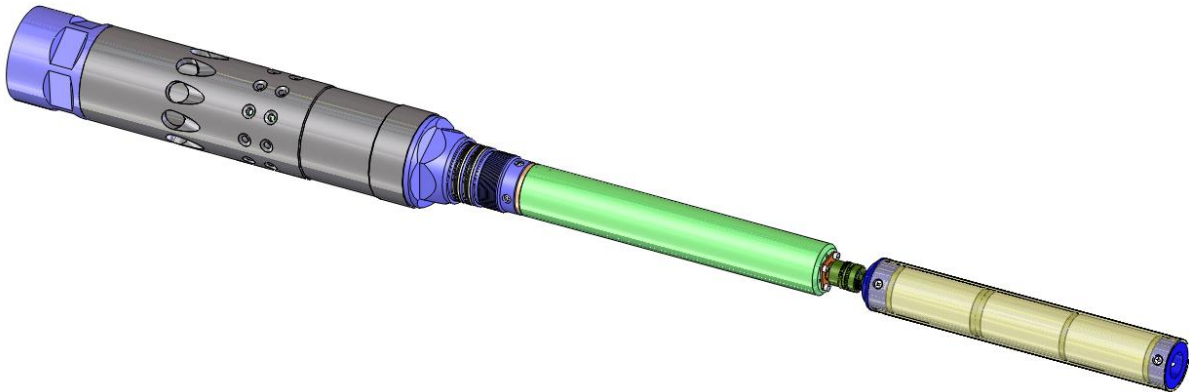


26. Using the four **Socket Head Cap Screws** reattach the **Universal Drive**. Ensure the **Coupling** is in place. To align the 4 screw holes, rotate the Universal Drive in a clockwise direction.

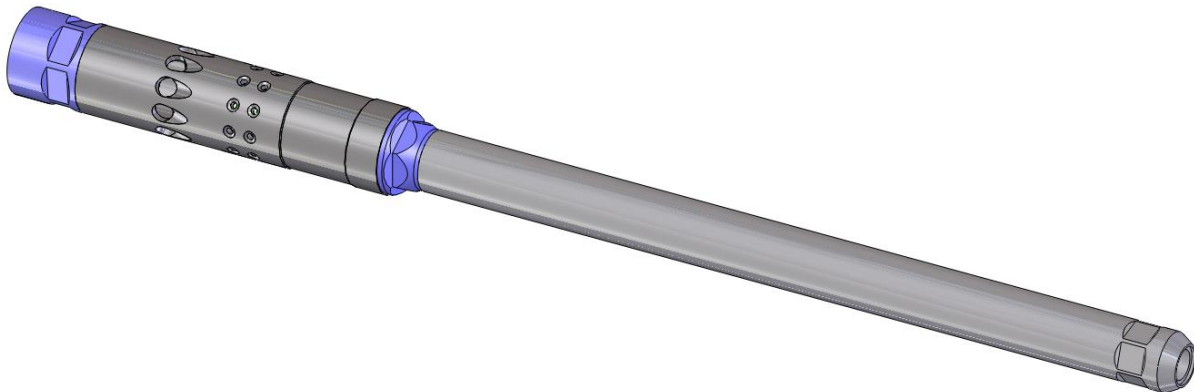




27. When the tool has been programmed install the **Battery Pack** as outlined in Section 4.5.



28. Thread the **Battery Housing** onto the tool. 30ft.lbs of torque is recommended which is similar to the force applied when holding the end of a 12" long wrench with two fingers.



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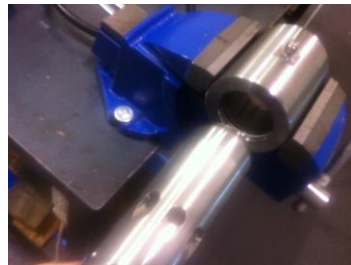
## 5.4 Pressure Testing

Following the redress procedure, the valve should be pressure tested to ensure the seals are installed correctly.

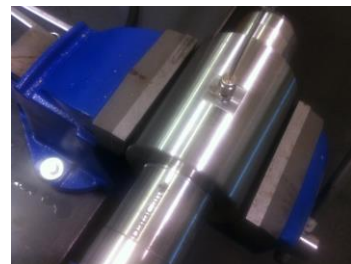
1. Install the test chamber guide onto the top of the valve housing. The test chamber guide helps to guide the chamber o-rings over the valve housing.



2. Push the housing into the test chamber with guide entering the chamber first.



3. Align the chamber over the valve ports. The side of the test chamber should be next to the valve engraving ring.



4. Close the valve on the hand pump.



5. With the shut in tool in the fully closed position, pressure up the chamber. DataCan recommends pumping to 1,000psi, and opening the pumps valve several times. This will remove some of the air in the chamber. Although the valve is rated to 10,000 psi, only pressure up the valve to the working pressure of the next job. This will prevent adding any unnecessary stress to parts.



6. Ensure the valve maintains pressure, and open the downhole shut in tool valve using the drive section and a battery pack, or using the drive section and a power supply. DataCan recommends placing a rag in the top of the shut in tool valve, as high pressure fluid may be sprayed out of the top when the shut in tool opens.

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## 5.5 O-Ring Installation

DataCan recommends that each seal in the shut in tool be replaced after every job. Refer to **Appendix C: O-Ring Selection Guide** to ensure that your current seal elastomer is suitable for your upcoming job conditions. To install an O-Ring without damaging the O-Ring or seal gland the following procedure should be followed:

- Cut a 1-2 foot length of wax string (dental floss).
- Place the wax string through the O-Ring as shown below.
- Use the wax string to “walk” the O-Ring over the threads and into the O-Ring glad.
- Ensure that the O-Ring is placed on the pressure side of the Back-Up.
- Apply some O-Ring lubrication to the O-Rings. DataCan recommends using Parker® O-Lube or Lubriplate L-461.



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## 5.6 Battery Pack Basics

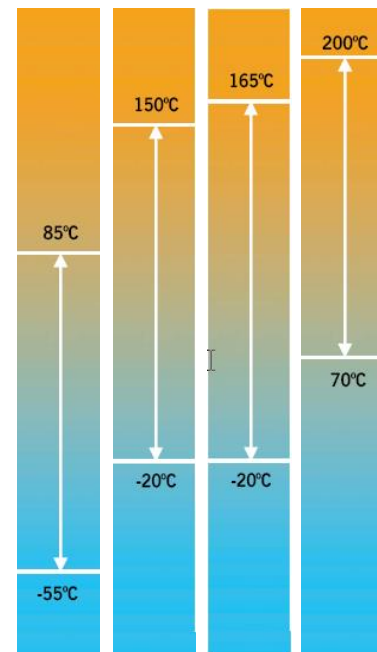
### Battery Pack Safety

Lithium batteries are dangerous, care should be taken when handling, storing, and shipping lithium battery packs. Please refer to Appendix A – Safe Handling of Lithium Batteries for more information.

**It is very important to not exceed the temperature rating of the battery pack. Lithium is a volatile chemical. Overheating a battery pack can result in an explosion. Refer to Appendix A: Safe Handling of Lithium Batteries.**

**Do not drop, dent, or short circuit batteries.**

**THEY CAN EXPLODE**



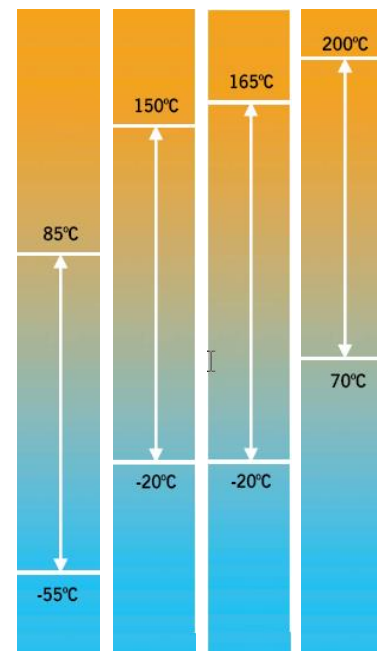
### Battery Pack Options

DataCan offers a wide variety of lithium battery pack options for all of its products. The shut in tool battery packs is a 3 X “D” cell pack. This battery pack allows you to open and close the valve 8 times (8 open and 8 close movements).

This pack is available in, 150°C (103584), 165°C (103585) and 180°C (103586) temperature ratings.

### Temperature Limits

Each lithium cell has a lower and upper temperature limit as shown in the graphs to the left. It is important to note that the 200°C packs have a lower limit temperature rating of 70°C. The poor low temperature performance is due to the construction of the cell. The 200°C cells are manufactured using solid-state lithium. Solid-state lithium allows the cells to operate at higher temperatures. At high temperatures above 70°C, the solid-state lithium



melts and turns into liquid lithium. Lithium in its solid state does not react as well as it does in its liquid state.

### **Power Consumption**

DataCan's unique tool is designed to generate the lowest power consumption on the market. The power consumption of the tool differs between a low rate sleep current and a higher consumption during an open/close cycle. The low rate sleep current draws such a small amount of energy that DataCan considers this negligible.

There are two significant factors which effect cell life for the downhole shut in tool. Firstly, the number of times and the duration that the motor is turned on. Secondly, is the self-discharge rate of the battery cell.

Significant power draw occurs during the time when the motor is turned on and is cycling the piston assembly. Given a 3 X "D" cell battery pack, DataCan estimates that 8 valve movements or 4 complete valve open and close cycles can be completed.

It is also important to consider the self discharge of the battery pack. Lithium cells, when stored at 20°C or below will develop a layer of passivation between the anode and the cathode. This passivation layer acts as a barrier and prevents the chemical reaction with the cell from occurring. The passivation layer allows us to store lithium battery packs for years without significant losses in energy. However, as the lithium cell is heated, physically vibrated, and used (current is drawn from the cell) this passivation layer is lost and the cell begins to self discharge.

The following rule can be used to calculate the self discharge of a lithium cell.

Self Discharge = 2% per month per 10°C over 20°C

DataCan's software has a built in battery calculator utility. Under "Utilities" – "Battery Calculator", from the drop down menu, select Shut In Tool and Valve Size. Enter your expected Bottom Hole Temperature (BHT), enter the battery capacity of your battery pack, which should be printed on the battery pack label, enter the number of valve movements, and the days downhole, hit the connect button.

**Battery Calculator**

Change these details:

Tool Type: Shut-In Tool - 1.75" OD Valve

Expected BHT: ☒ °C ☐ °F 110

Battery Capacity (Ah): 30

Valve Movements (Program Steps): 8

Days Downhole: 30

**Calculate**

Remaining Battery Capacity (Ah):

18.909 Ah

Note:

Battery Calculator takes self-discharge and tool current draw into account.

WARNING: This calculator is accurate for the first run of a battery cell. Battery results for subsequent jobs cannot be guaranteed.

## Battery Pack Connection

To connect the battery pack to the tool;

- Align the male key or lugs on the battery pack to the female key on the tool connector.
- Twist the collar on the battery pack until it “snaps” into place.
- Connect the battery housing to the tool.





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## 6 Tool Software Instructions

DataCan's program and download software operates and controls all of DataCan's down-hole and surface products. The development of DataCan's software is ongoing. New releases are available for download on our website <http://datacan.ca/support.php>.

Before installing DataCan Software, you should have your computer ready with one of the following Microsoft Windows supported operating systems: Windows 98/Me/2000/XP/Vista.

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### 6.1 Installing the Software

Each tool shipment comes with a DataCan USB Flash Drive which contains all of the files you need to install the software program and USB drivers.

To install DataCan Software from the Flash Drive:

- Insert the Flash Drive into a USB Port
- Open the **DataCan Download Software** folder.
- Double click the **setup.exe** file to launch the DataCan Software installation.
- Follow the instructions leading to the completion of the software installation.

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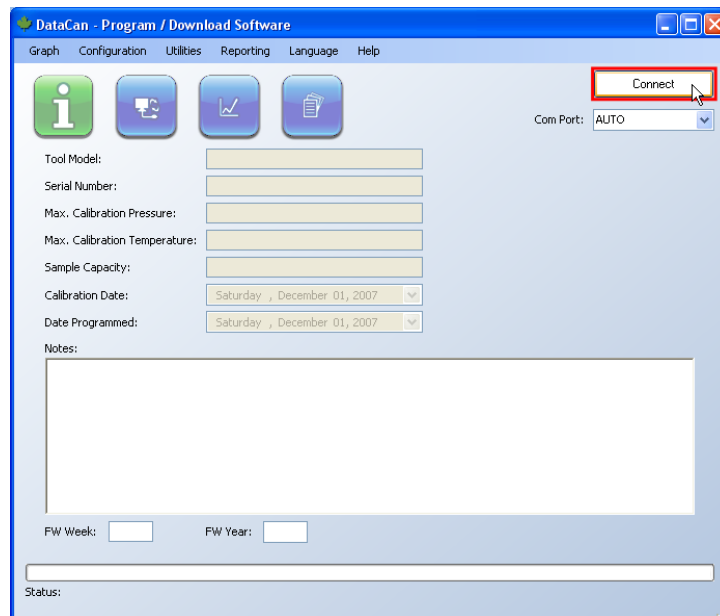
## 6.2 Connect to Tool

Once the DataCan Download Software and the USB drivers have been installed you are ready to initiate communication with the tool.

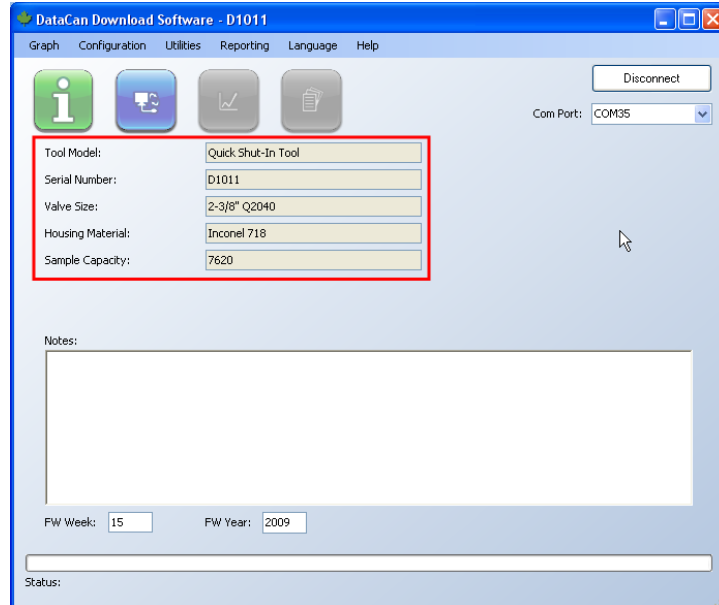
Connect the green tool connection end of the DataCan Communication Cable to the gauge.  
Connect the USB end to a receptacle on your computer.



Open DataCan Download Software. You will be directed to the info page shown below. Click on the **Connect** button to initiate communication with the shut in tool drive.

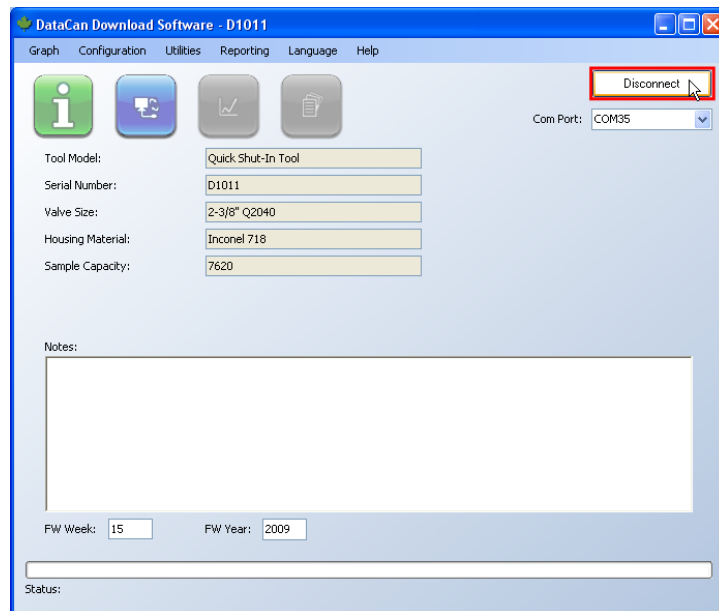


The **Tool Model**, **Serial Number**, **Valve Size**, **Housing Material** and **Sample Capacity** fields will fill with information.



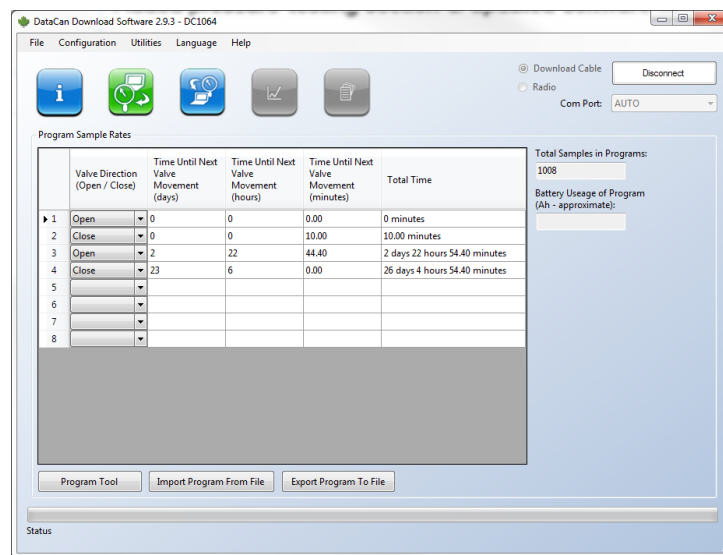
The **Notes** section was added for the operator to manually capture other information such as job details, job location or reminders. To save your notes to the tool memory you must click the **Program Tool** button (see next section).

To disconnect the tool from the PC simply press the **Disconnect** button and unplug the tool.



## 6.3 Program Tool & Download Data

Enter the Program/Download section by clicking on the following icon. Here you can view recorded jobs, download data, create programs and store programs to the tool memory.



DataCan recommends starting every program with the following two steps:

	Valve Direction (Open / Close)		Time Until Valve Movement (days)	Time Until Valve Movement (hours)	Time Until Valve Movement (minutes)
► 1	Close	▼	0	0	0.00
2	Open	▼	0	0	5.00
3		▼			

This ensures that as soon as you connect the battery pack to the drive assembly, the valve will start to close. This sequence ensures that the battery pack, drive, and valve are functioning properly prior to the test. The pre-job close/open sequence should ALWAYS be completed prior to running in hole. This surface test ensures that the battery pack and drive are working correctly. Design your program to include the surface test. You NO NOT want to run in hole without knowing that your battery pack is functioning correctly.

DataCan also suggests having multiple open commands. When the valve is instructed to open, the shuttle piston will retract and pre-equalize the valve. However, the time to equalize is

dependent on the flow rate and size of your well. Therefore, DataCan suggests adding multiple open commands into the program.

## New Program

To program the shut in tool enter the desired steps in the **Program Sample Rates** section shown below. Toggle between an open or close cycle in the **Valve Direction** field and specify the **Time Until Next Step** in days, hours and minutes. The Time Until Next Step is the desired time, measured from the beginning of the previous cycle, to execute the open or close cycle on that line of the program. You can create up to 8 steps in the program.

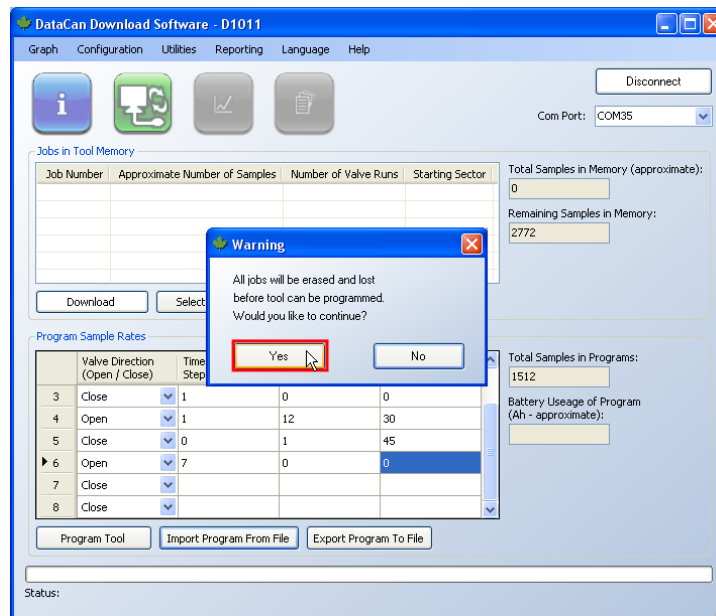
Once your program is defined you need to save these steps to the memory of the tool. Click on the **Program Tool** accomplish this.

The screenshot shows the 'DataCan Download Software - D1011' window. The 'Program Sample Rates' section is active, displaying a table with 8 steps. The 'Valve Direction' column has dropdown menus for 'Close', 'Open', 'Close', 'Open', 'Close', 'Open', 'Close', and 'Close'. The 'Time Until Next Step' columns are for days, hours, and minutes. The 'Program Tool' button is highlighted with a red box. The 'Jobs in Tool Memory' section shows a table with 4 columns: Job Number, Approximate Number of Samples, Number of Valve Runs, and Starting Sector. The 'Total Samples in Memory (approximate):' is 0, and 'Remaining Samples in Memory:' is 2772. The 'Total Samples in Programs:' is 1512, and 'Battery Usage of Program (Ah - approximate):' is 30.

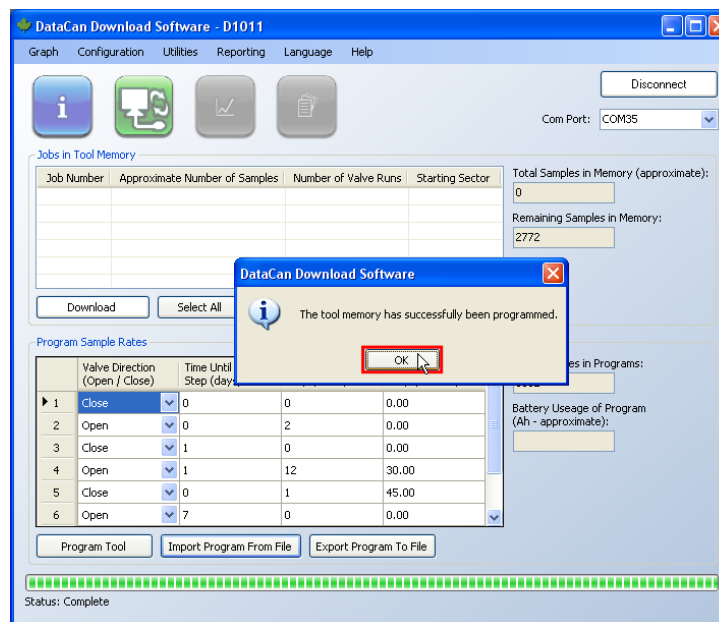
Job Number	Approximate Number of Samples	Number of Valve Runs	Starting Sector

Valve Direction (Open / Close)	Time Until Next Step (days)	Time Until Next Step (hours)	Time Until Next Step (minutes)
3 Close	1	0	0
4 Open	1	12	30
5 Close	0	1	45
6 Open	7	0	0
7 Close			
8 Close			

A pop up window will warn you that all jobs stored in the tool memory will be lost before the tool is programmed. If this is okay click the **Yes** button. **Do not disconnect the tool or USB cable when programming the tool.**



When the programming is complete a pop up window will tell you the tool memory has been programmed successfully. Press **OK**.

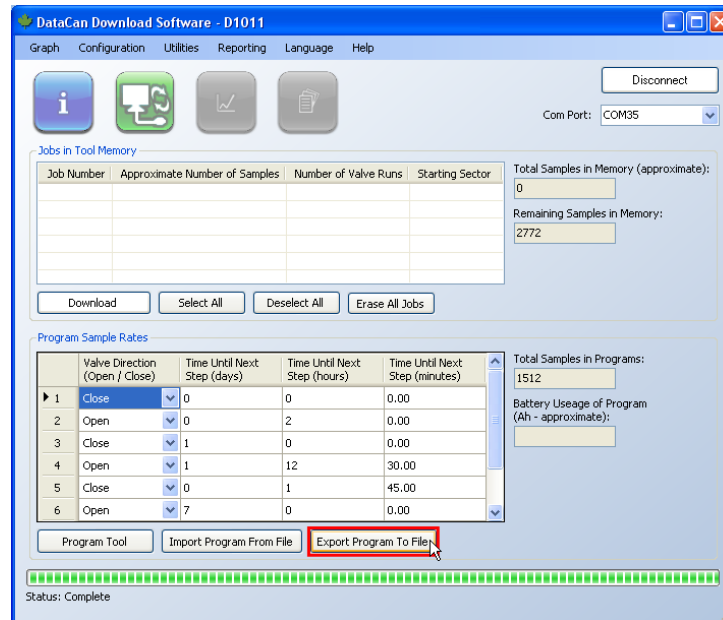


We recommend a surface test cycle at the beginning of every job. Program the valve for one open and close cycle at the surface before running the tool down hole.

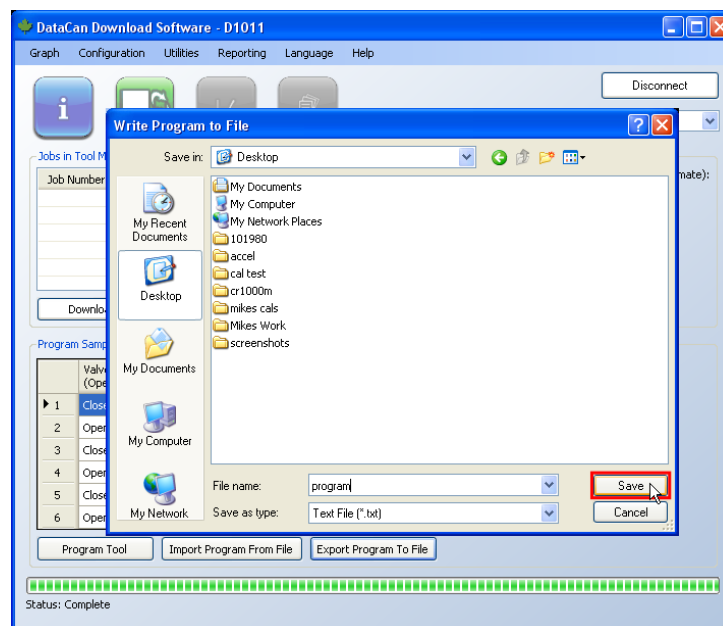
## Save Program To PC

You can save a program to your PC for future use. This function is useful when a program is to be entered into an entire fleet of tools and the programmer does not want to rewrite the program for each individual tool.

After creating the program, click on the **Export Program To File** button.



Enter a file name and location and press the **Save** button. It will be saved as a text file.

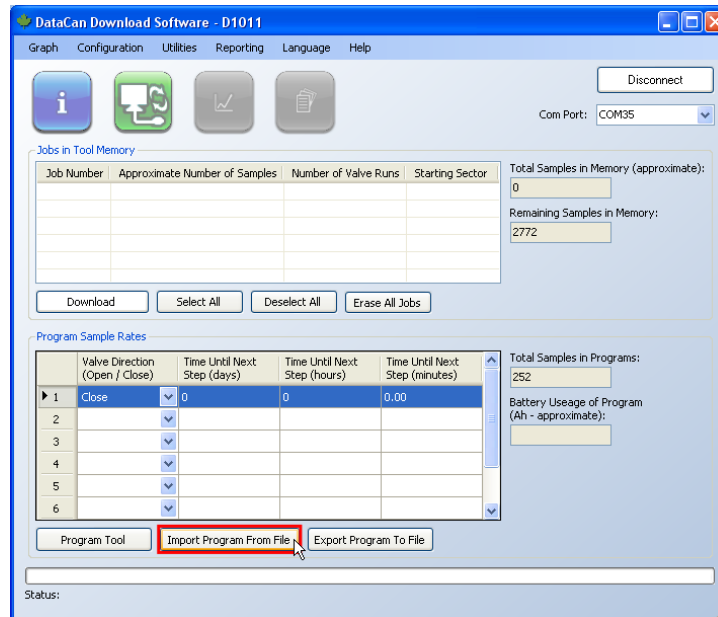




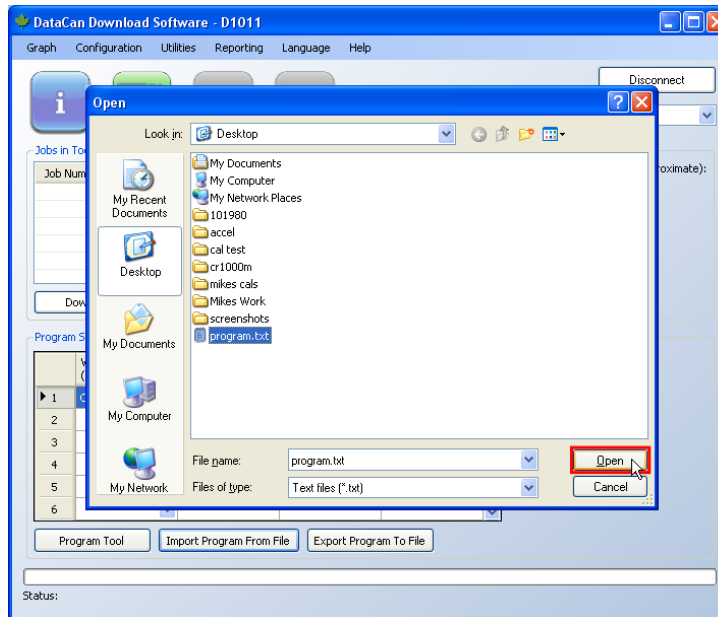
## Import Program

Programs saved to the PC can be imported into DataCan Download Software so they can be loaded into the tool memory.

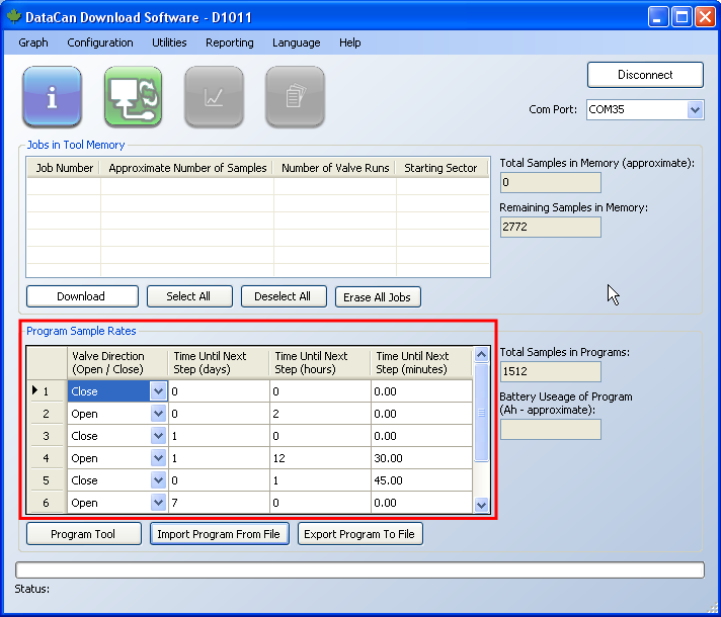
To import a saved program click on the **Import Program From File** button.



Select the program file you want to import and press **Open**.

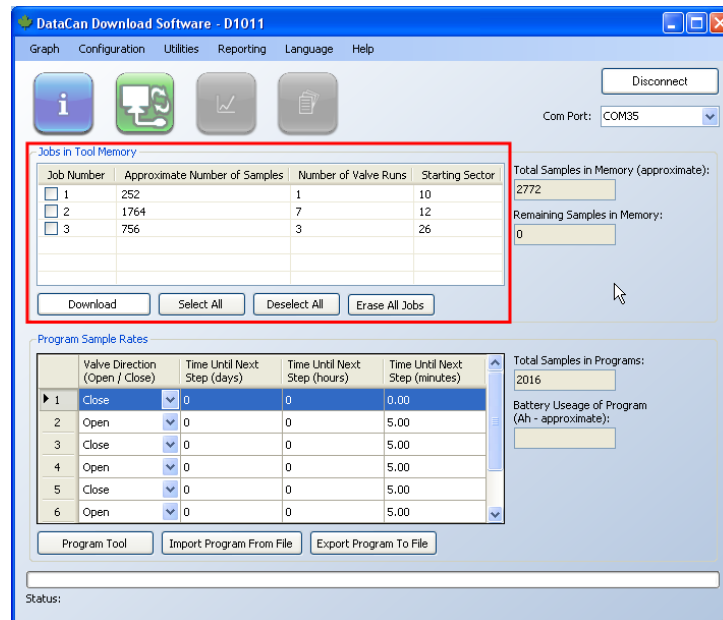


The stored program will show up in the **Program Sample Rates** section.

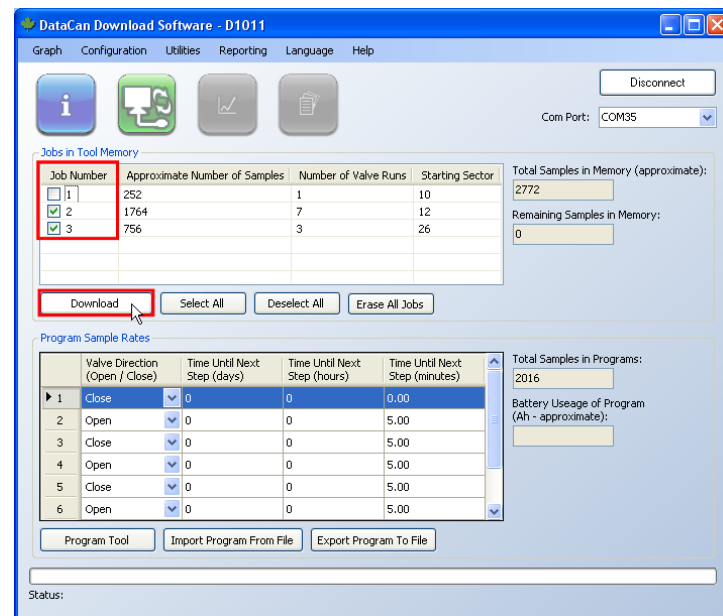


## Download Data

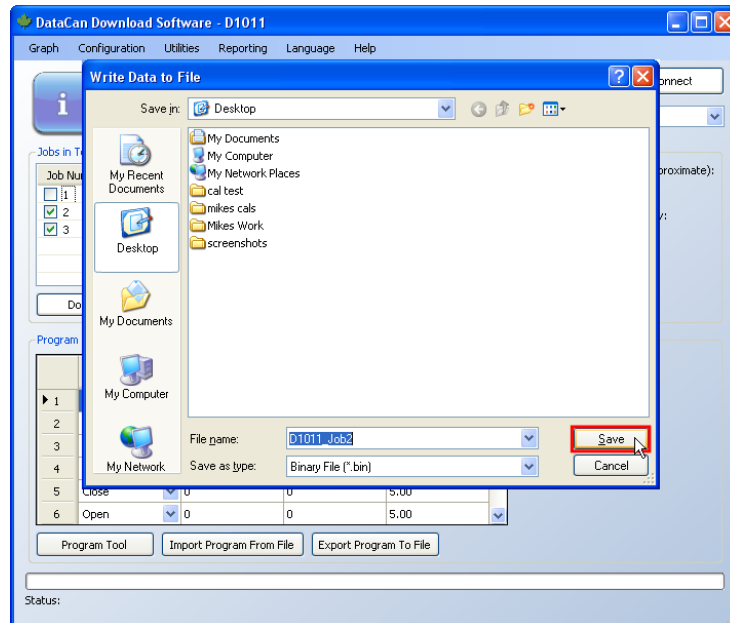
The **Jobs in Tool Memory** section will list the jobs stored in the tool memory when the tool is connected to the PC.



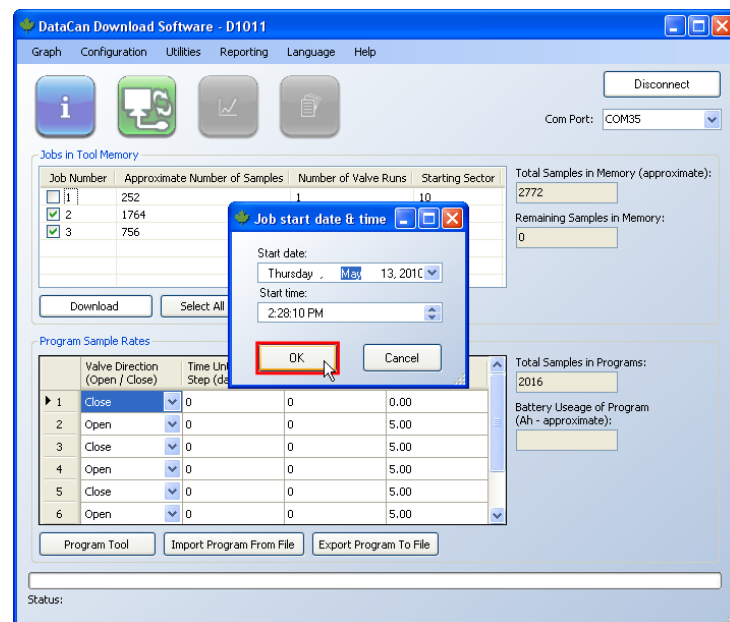
Select the check box next to the jobs that you want to download to your PC and click the **Download** button.



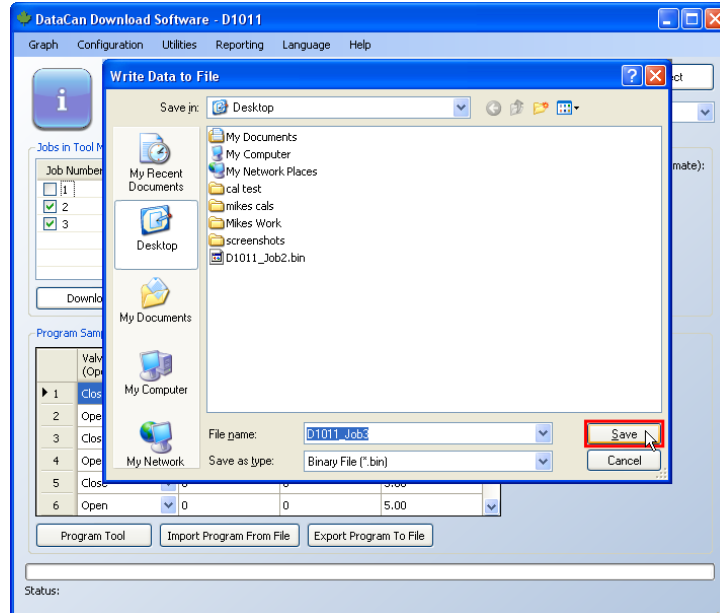
Select a location to save the data file from the tool. Press the **Save** button.



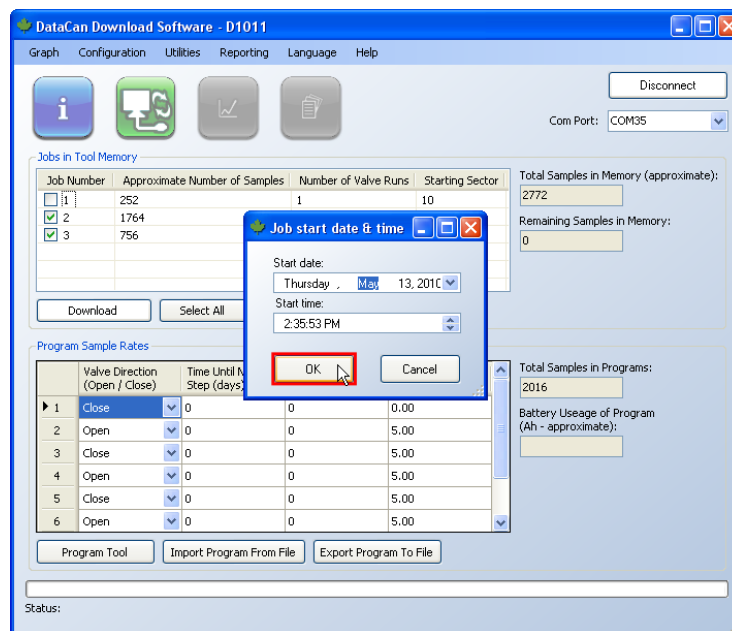
Select the start date and time that the tool battery was connected based on your records. Click **OK** to save the file.



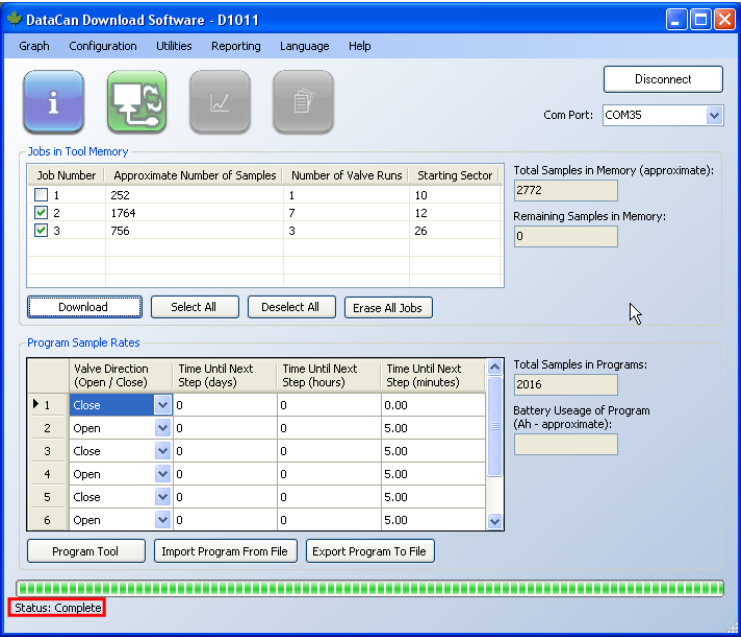
If multiple jobs are being downloaded you will be prompted to select a location to save each of them. Again select a location to save the file and press the **Save** button.



You will once again be asked to select the start date and time that the job was executed. Click **OK** to save the file.



The software will now automatically convert the data file to a text (ASCII) file based on the settings (see Configuration section) saved in the tool memory. The status will read Complete when all of the selected jobs have been saved to the PC.

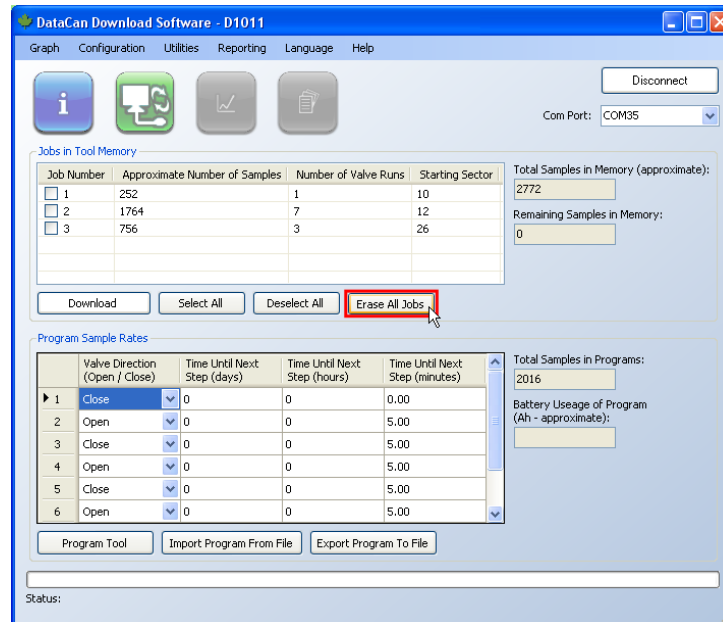




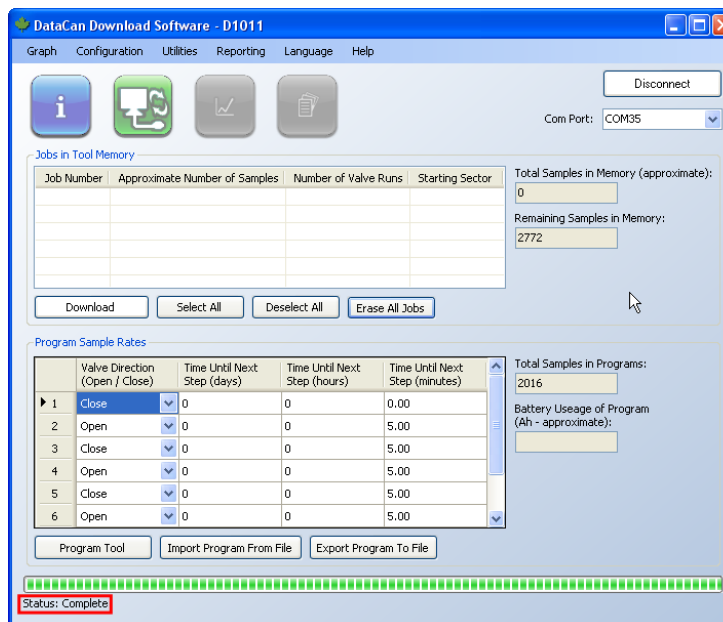
## Erase Jobs From Memory

When the data from the tool has been downloaded onto a PC you can erase the jobs contained within the tool memory. This frees up space in the tool memory for future jobs. You can not erase individual jobs as it would result in a fragmented memory, you must erase all jobs at once.

Erase the jobs from the memory by clicking on the the **Erase All Jobs** button.



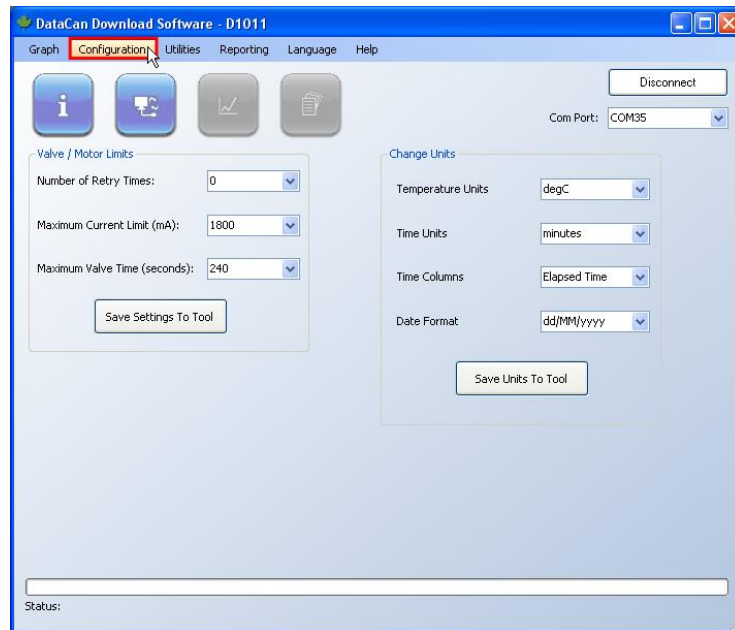
The status will read Complete when all of the selected jobs have been deleted from the tool memory. **Do not disconnect the tool or USB cable when erasing jobs from the tool.**



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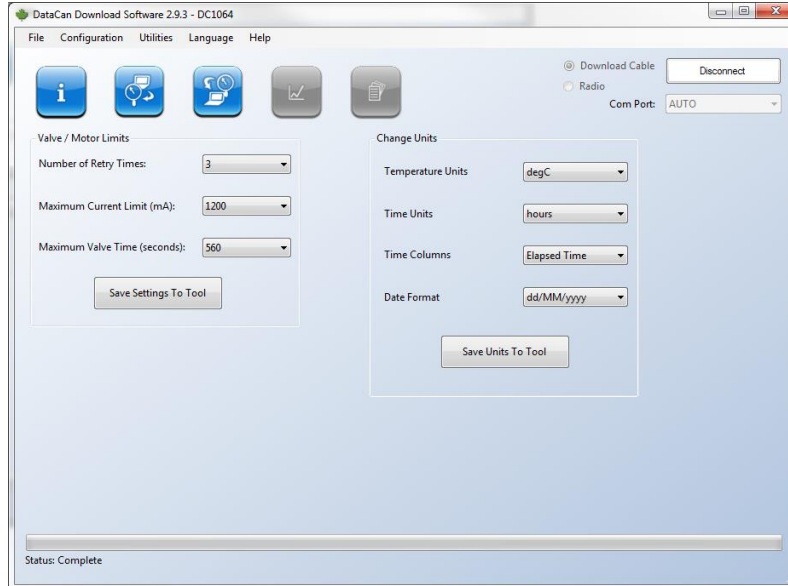
## 6.4 Configuration

Click on the **Configuration** tab to enter the configuration section of the software.



## Valve Motor Limits

DataCan recommends not changing the Valve / Motor Limits.



**Number of Retry Times:** indicates the number of times the valve will retry after a current set-point has been reached. A retry will retract the valve for 5 seconds then reattempt the action. DataCan recommends 3 retry times.

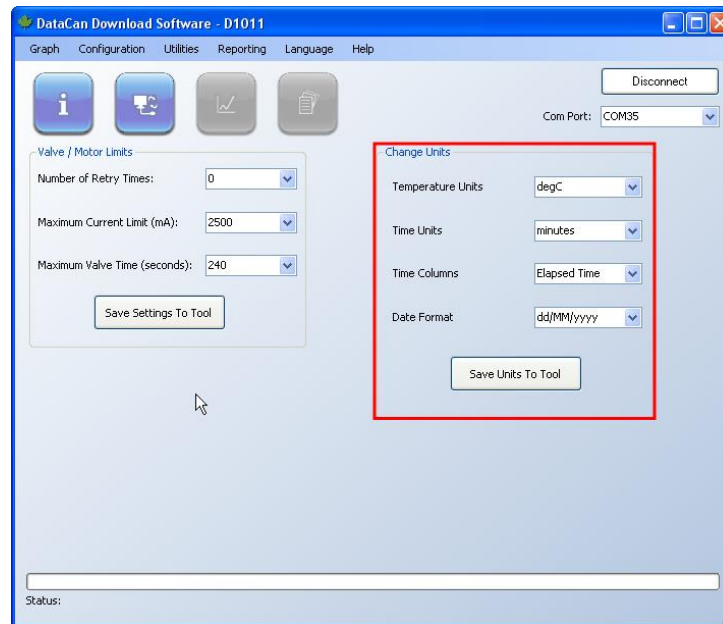
**Maximum Current Limit:** sets the current limit that the tool will trigger the end of a cycle. The maximum current limit is set to 1200mA (the maximum limit of the battery pack fuse). DataCan recommends 1200mA.

**Maximum Valve Time:** is the maximum time the valve will continue in a single direction on a single step. If the maximum time has been exceeded the control circuit assumes a part failure has occurred. An example would be the destruction of the drive shaft. DataCan recommends 600 seconds.

It is important that after any change to the valve motor limits you save the changes to the tool by clicking the **Save Settings To Tool** button.

### Change Units:

Select a variety of units for your tool to record. Each job will record samples during the close or open sequence. It is important that after any change to the valve motor units you save the changes to the tool by clicking the **Save Units To Tool** button.



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## 7 Troubleshooting and Investigation

In the event that your downhole shut in tool should fail to perform, the following steps should be taken to determine the root cause of the problem or failure.

---

### 7.1 Job Conditions

What were the job conditions?

What was the downhole pressure and temperature?

What was the expected differential pressure across the valve?

What was the well environment? CO<sub>2</sub>? H<sub>2</sub>S? Gas, oil, water ratio?

Was this a production or injection well?

Was the well deviated?

Was a centralizer or roller bogey used during the deployment?

Was the valve hung below a lock mandrel? How many times was the lock jarred?

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### 7.2 Visual Inspection

Visually inspect the valve, drive, and battery pack.

Did the tool leak?

Is the valve partially open or closed?

Is the battery pack in one piece? Has the battery pack ballooned or discolored? Are the cells intact?

If possible, take pictures of each valve assembly.

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### 7.3 Drive Assembly

The drive assembly houses the tools circuit board and motor. Disconnect the battery pack and connect the download cable.

Can you communicate with the drive section?

#### **YES, the drive communicates**

- Save the Job file. Go to the Download screen and download the newest job in the tools memory.

- Save the tool setting (configuration). Take a screen shot of the tools configuration settings.

Investigate the job file:

- Does the elapsed time, program step, and valve status match the program?
  - If the recorded intervals are not expected, go to the program page and export your program to file.
- What temperature was the drive reading?
  - Higher drive temperatures could indicate the motor or circuit overheating.
- What is the current level of the motor?
- Can you see a current spike? Did the valve attempt a retry at any time?
- If a current spike is seen, this could be an indication of debris or blockages preventing the piston assembly from moving.
- Does the current suddenly drop off or go down suddenly? This This could mean that the motor gear box is broken, the coupling is broken, or the translation shaft is broken and the motor has no load.

#### **NO, the drive does not communicate**

Make sure that the problem is not with the download cable of software drivers. Can you try another cable? Do you have another tool that does communicate?

If the drive fails to communicate, then the problem most likely resides in the circuit card assembly. The drive assembly needs to be sent to an certified DataCan technician for disassembly and further investigation.

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## **7.4 Battery Pack**

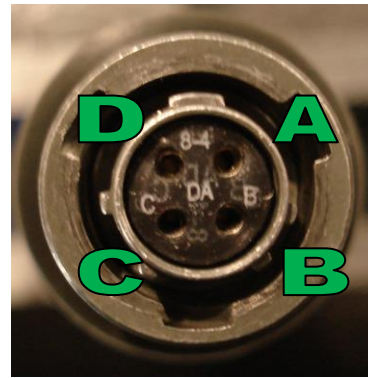
Battery power provides energy to the timing circuit, motor, and memory. The tools circuit requires a minimum of 6 Volts to count time, write to memory, and power the motor. However, at only 6V the motor will not have sufficient energy to move the shuttle piston or sliding sleeve assembly. Hence, DataCan provides a battery pack with 10.8V to sufficiently power the motor.

Before and after a Job, it is always a good idea to measure the battery packs voltage using a DataCan battery tester (PN: 100887). The battery pack should have about 10V or potential.

- If more than 10V  
AND the drive communicates  
THEN program the drive to close at 0 seconds and plug in battery. Does the valve move?



- If the valve doesn't move, then we need to look further at the pack. There are four sockets labeled ABCD on the front of the connector. Using a volt meter, you can measure the differential between Pin A-B. This measurement should match the reading from the battery tester. Pin C-D should be shorted together. If they are open, then the valve will not turn on.



- If less than 10V or no V. Then the pack is broken or has been used passed its rated capacity of 6.2Ahr.
  - How many times has the pack been used? At what temperature? How old is the battery pack? What temperature was it stored at?
  - Look for physical damage, we suspect the ground strap to fail due to physical shock during jarring, or a short circuit occurred and a fuse is blown.

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## 7.5 Valve Assembly

If the drive functions and the battery pack appears to be ok, then the problem may lie in the valve assembly.

- If the job file shows a current spike, then most likely some debris is lodged in the valve and is preventing it from moving.
- If no current spike, then maybe the seals failed. The valve moved correctly, but failed to seal the downhole fluid. Close the valve and place the valve in a pressure chamber. Measure the differential pressure.
- Disassemble valve slowly to find the problem. Look at each seal. Take pictures.
  - Is the coupling in place between the drive and valve?
  - Is the translation shaft broken?

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## 8 Pre Job Checklist

- ☐ Date
- ☐ Valve serial number
- ☐ Drive serial number
- ☐ Battery pack serial number
- ☐ Battery pack voltage (Measured using Battery Tester)
- ☐ Downhole pressure
- ☐ Downhole temperature
- ☐ Downhole environment
- ☐ Well deviation
- ☐ Redress kit material
- ☐ Last redress date
- ☐ Number of retry times
- ☐ Maximum current limit
- ☐ Maximum valve time
- ☐ Tool programmed
- ☐ Tool program saved
- ☐ Coupling installed between the drive and valve
- ☐ Tool completed open and close sequence prior to sending downhole
- ☐ Number of times lock was jarred.