



AllTorque Course GEN2 V1.3





## GEN2

### Training Course Outline: AllTorque Course GEN2 V1.3

This course is an introduction to running AllTorque Client Software including releases 5.099 thru 5.181 and ends with a knowledge exam to test your understanding. There are minor details between releases, but the content is relevant to all versions.

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## Section 1: Introduction to AllTorque

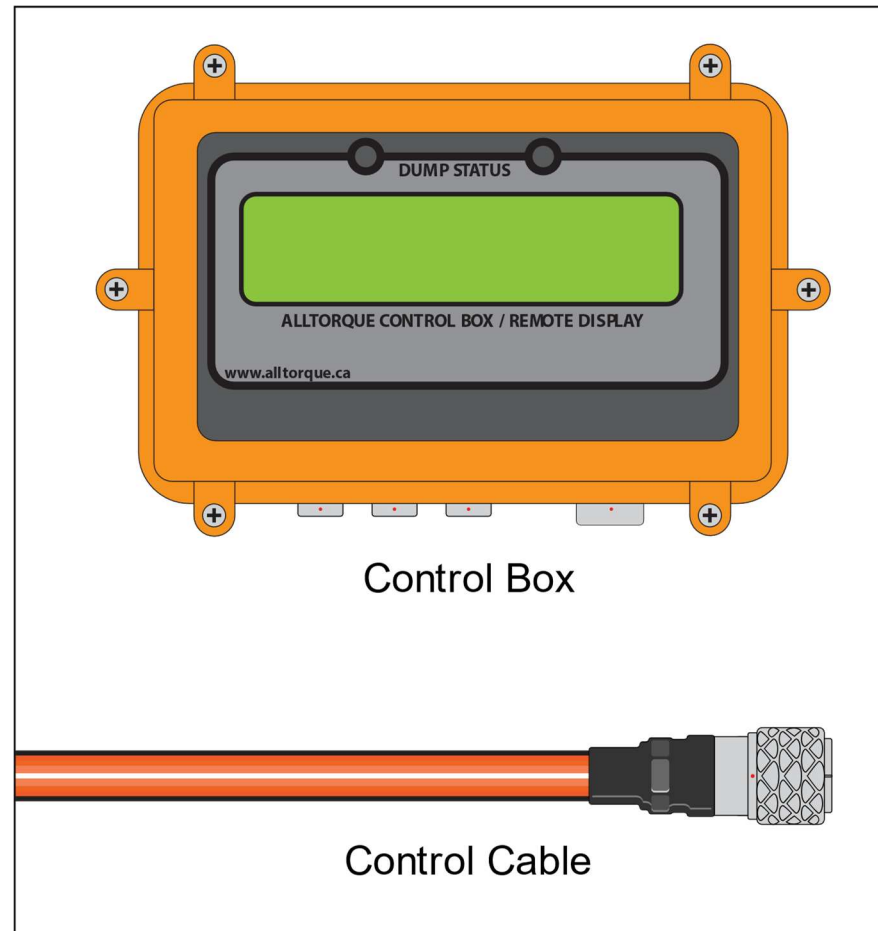
In 2004 AllWeigh Scale Systems created their first Torque Turn System. This is where AllTorque started and has grown into a leading technology supplier that has run more than 2 million casing and tubing connections. Our system is distinguished by our commitment to service and constant improvement, continuous recording, and military grade data encryption.

## Section 2: Hardware

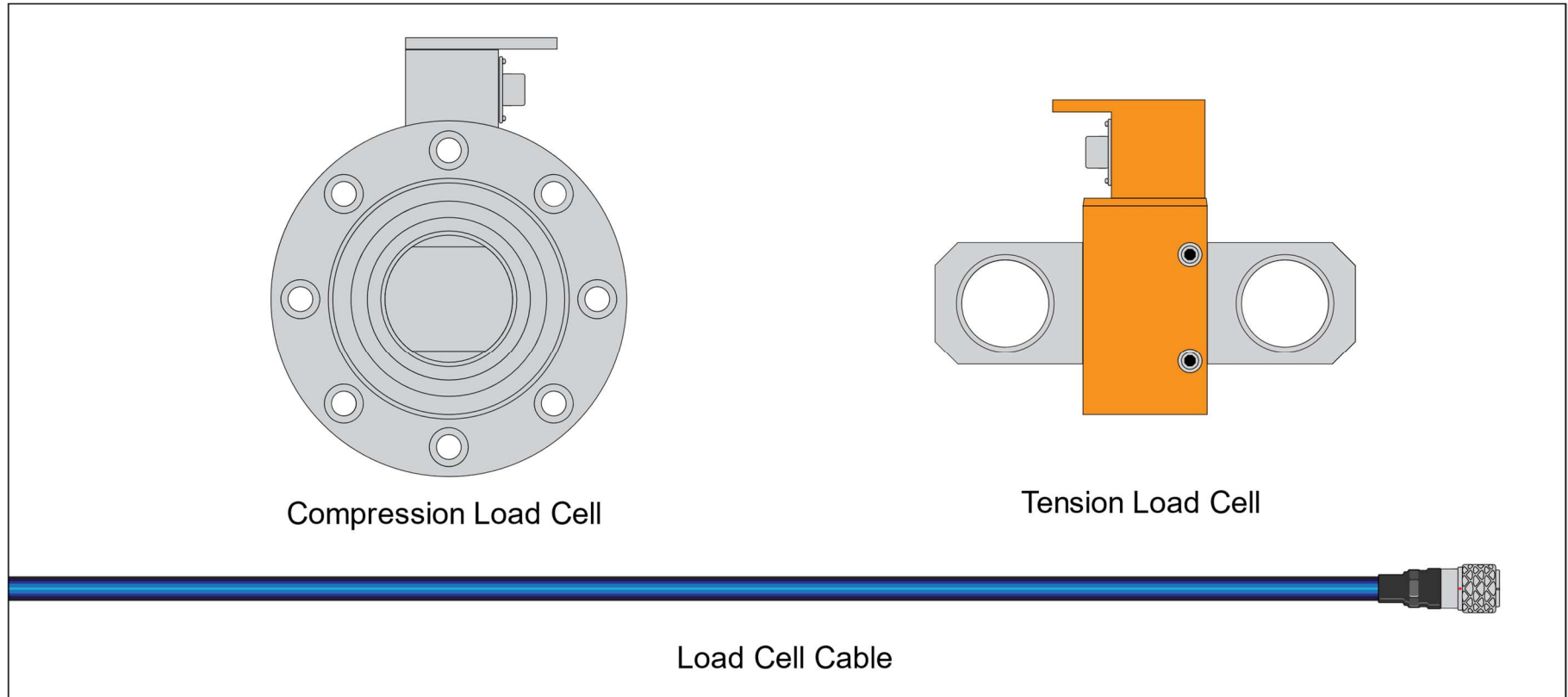
### Torque Computer and Power Cable:



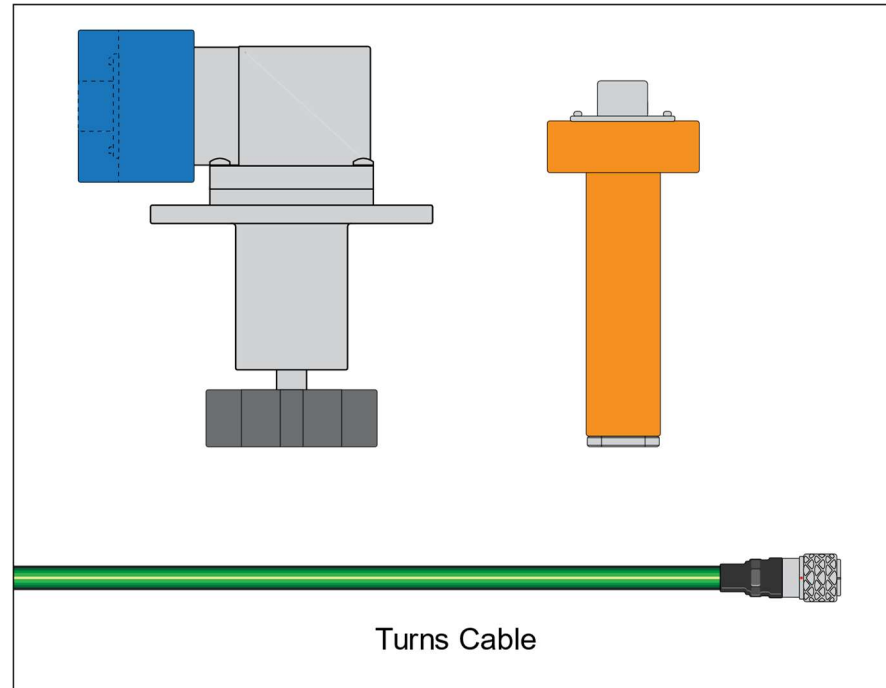
The GEN2 system consists of a Surface Pro Tablet running Windows, Power Switch, USB connections and a power adapter. AllTorques' Client Software must be setup with a valid Account, WiFi and Username with Password.

**Control Box and Cable:**

The control box, not the computer controls the makeup and creates the data. It knows the connection specs, evaluates the input data and controls the dump valve. It sends the encrypted data back to the computer for viewing and storage. The control box can be set to display Torque, Turns or RPM under "Settings> Hardware Display Mode.

**Load Cell and Cable:**

The serial number and type of Load Cell is engraved on each one. The ability to produce a hard copy of a certification is a requirement of most quality and control standards. AllTorque Load Cells are individually calibrated to a common zero reference point so that serial numbers don't need tracking within AllTorque's Software. There are different ratings and types of Load Cells and you must select the correct one.

**Rotary Encoder / Proximity Counter:**

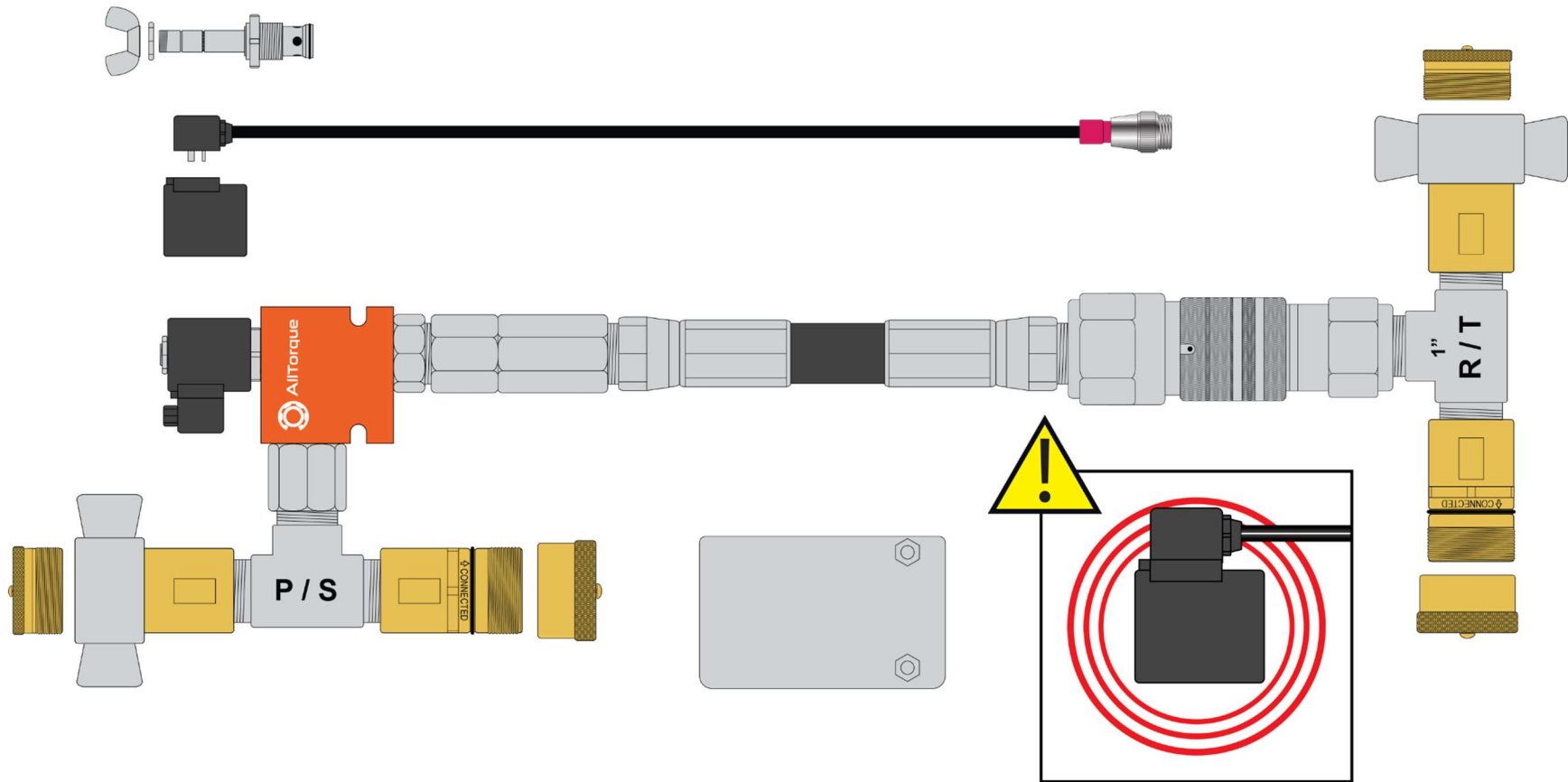
Turns are measured using pulses and require calibration. A proximity counter can be positioned horizontally or vertically to detect a tongs gear movement. AllTorque's rotary encoder records pulses and must be positioned to mesh perpendicular to the tongs gear. It can also read forward and reverse at a higher pulse count. You must select the appropriate turns device from Settings> Rotation Counter Type and choose:

1. Proximity/Other Sensor
2. AllTorque Encoder
3. Not using and encoder

Selecting the wrong encoder type can result in **reduced functionality: lower pulse count and may not record forward and reverse.**



## Dump Valve



Supplying a 12 or 14 volt current to the coil activates the cartridge and bypasses the power tongs hydraulic pressure by diverting it through the return line. Keep the Dump Valve clean and the connections protected. **If the dump valve is left on for extended periods it will become hot and can cause burns.**

## Section 3: Care, Maintenance and Testing

AllTorque equipment represents a considerable investment. Components must be handled carefully as they contain sensitive parts. Excessive heat, cold, moisture, impact, and dirt will quickly reduce performance and damage equipment.

- Keep Torque Computer in a warm protected environment to maintain battery life.
- Use electrical contact cleaner and compressed air on dirty connectors. This can swell O-Rings so give them time to dry.
- Use dielectric or EP2 grease to keep moisture out of connectors.
- Use caps, plugs and electrical tape to keep the fittings and connectors protected and clean.
- When possible, keep equipment enclosed and dry in protective case until use.
- Rig in equipment and cables carefully and fasten in a way that minimizes exposure and damage.
- Clean and inspect all equipment and cables after use.
- Function test and fully charge all equipment prior to running.
- Following these guidelines will reduce downtime.

## Section 4: Wi-Fi Connectivity and Software Updates

The Surface Pro tablet used to run AllTorque's Client Software is installed on Windows. You need to keep the windows operating system up to date to protect the system from viruses and performance issues. This requires a good Wi-Fi connection and can take time and data to complete. **This should be done prior to a job**, not from the rig.

AllTorque's Client Software is updated regularly and periodically we may push minor updates to enhance performance. Major software releases are only pushed after informing a customer. Updates can include firmware upgrades to the Control Box which require it to be plugged in. Pre-job software update checks and function tests on all equipment must be performed to ensure equipment is working correctly. Updates and function testing should be done in this order:

1. Connect to Wi-Fi
2. Update Windows
3. Open AllTorques' Client Software and login: update prompts are automatic.
4. Function test and fully charge all equipment including backup gear.

A function test requires that all equipment be connected and powered up and run a test job to verify that you are able to measure turns, load, function the dump valve and record the data without issues. Ensuring equipment is fully charged is important in case the power available is not stable or "clean." This allows you to function off of the tablet or a UPS.

**These steps are best done from the shop with a good Wi-Fi signal during your function test.**

## Section 5: Pre-Job Setup

Before you start a job you must enter new preset information on all drop down menus. These presets must be uploaded via Wi-Fi before they can be used. This includes:

- A) Oil Company Name: .....Admin
- B) Casing Company Name:.....Admin
- C) Pipe Lot Details:.....Config> Pipe Manager
- D) Tong

Once you've setup a job you can adjust torque values on a Pipe Lot without Wi-Fi but not the connection Type, Weight, Grade and Size. To change these settings, you must upload it to the cloud before use. This is done to mitigate duplicate data. You can change Tong details such as Tong Arm Length and Pulse Count without Wi-Fi, but not the name of the tong. It is recommended that job settings be added in advance.



## Section 6: Job Setup

### Create Job



1. Create Job
2. Enter a unique name
3. Select an Oil Company
4. Select a Casing Company
5. Select Create New Job



Select the job you created and press start.

### Step 1: Define Torque Values

You must choose from a list of pre saved connections in the Pipe Manager. You can adjust torque values, RPM limits, shoulder detection, and target number of turns, but it will only apply to the job you are running. It will not save the settings to the pipe manager. **You can add shoulder detection during a job but not after a connection has been made and recorded.**

## Step 2: System Verification



### Select a Tong

Tongs are saved under Config to allow correct naming according to serial number, size or manufacturer. You can also save the tong arm length and calibrate pulses/turns.

### Select a Load Cell

To create the most accurate measurement you must **select the correct load cell** and understand the difference between each kind:

1. Compression
2. Tension

and rating:

1. 20k or
2. 30k or
3. Other

### Set a Tong Arm Length

Remember to measure the tong arm length:

1. Prior to starting a job.
2. **When changing power tongs, or when switching from an integral (clincher) to conventional (regular) makeup.**

### 3. Changing or adjusting the hold back line length or position.

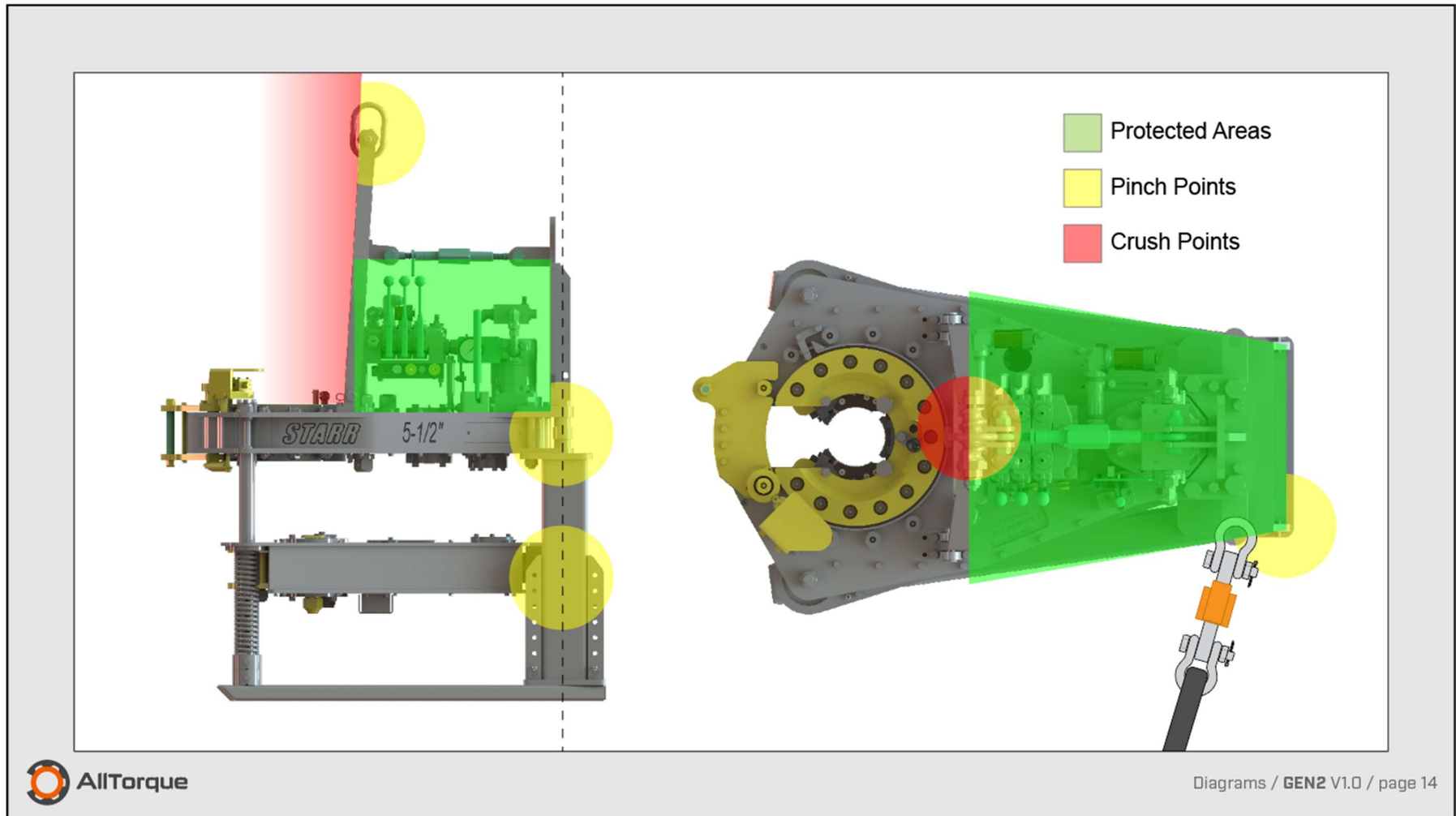
## Turns Counter

Checking your turns counter insures you have properly positioned the counter. This is important even if you have saved the pulse count under the tong manager list. You should always check the pulse count via a turns check as it may be broken or not positioned correctly. Even though calibrated it will not be accurate if you skip this step.

## Save the System Verification Settings

Everything up to this point can be done before a job starts.

## Section 7: Rig In



When rigging in it is important to do it carefully to prevent damage. Use tape, brackets, adapters, magnets, or Velcro and careful positioning to limit exposure and damage. Ensure all cables are positioned out of risk areas and taped up securely. The load cell cable is the most damaged part.



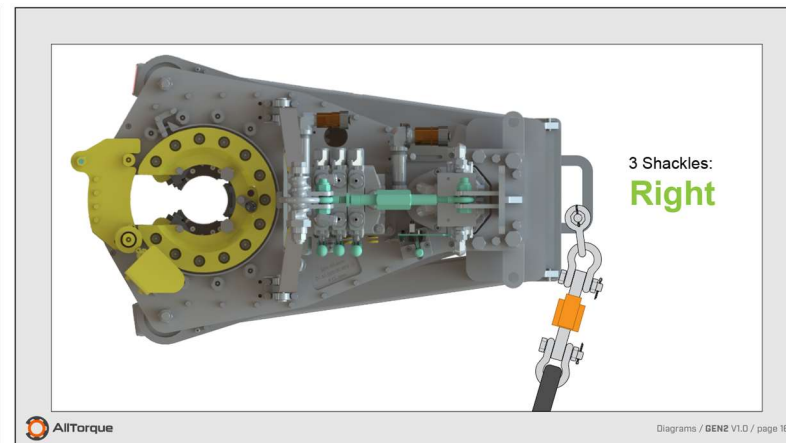
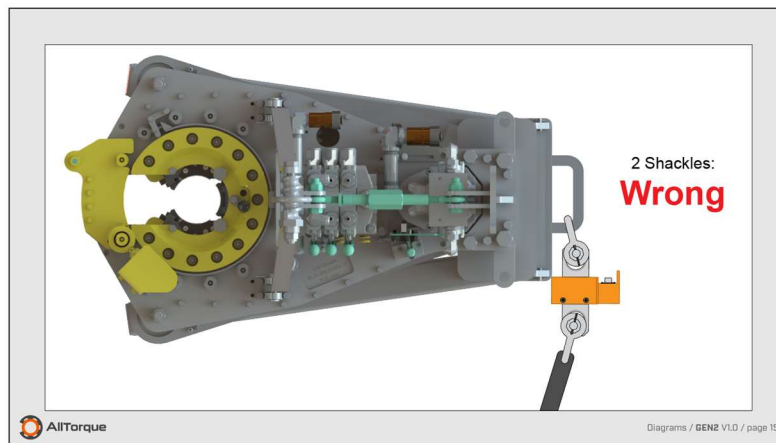
## Power Related Problems

Due to unreliable power sources at rigs, it is recommended that you use a UPS. Bad power can cause performance problems which is why the first step in trouble shooting is to disconnect the power supply.

## Order of Rig In

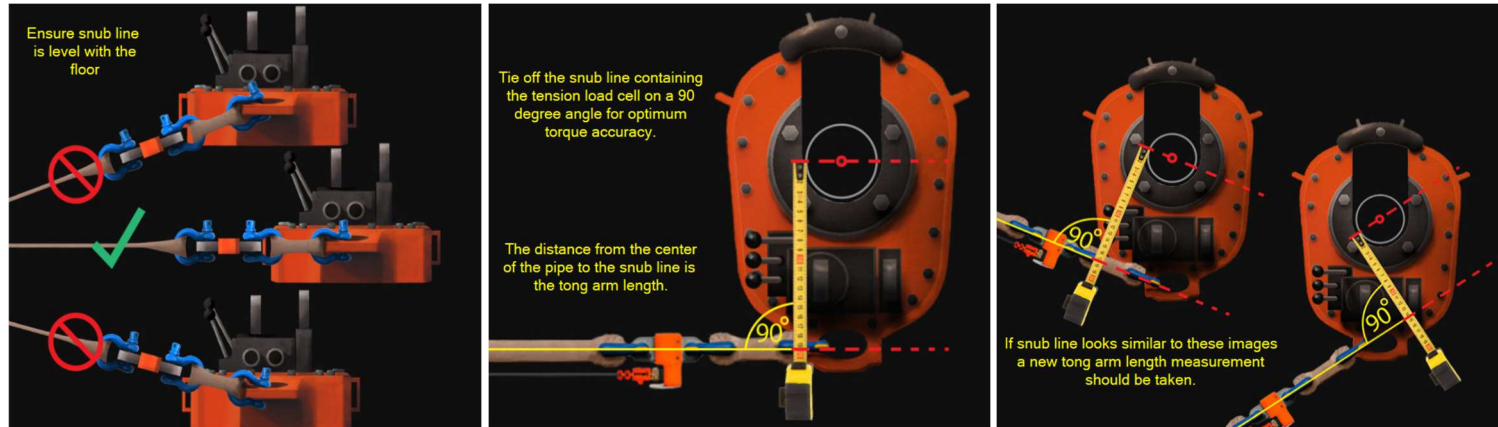
If you rig in this order, you can verify each equipment category using Steps 123: 1. Disconnect Power 2. Isolate 3. Swap

1. Setup your Torque Computer where you can maintain line of site with the Tong Operator. All your settings should be pre-entered. Un-plug it from the rigs power.
2. Connect the dump valve assembly.
3. Attach the Control Box securely to the tong in a way it will not be damaged and can be viewed easily by the Power Tong Operator.
4. Attach a tension load cell via clevises and a hold back line on a conventional tong. **The load cell must not contact anything when under tension so use a 3<sup>rd</sup> shackle if needed to keep it a safe distance from the tong:**

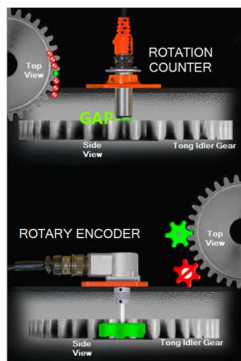


Leave all cables disconnected until the CT cable has been tested. Always double check the tong arm length. If you must switch between compression and tension load cells, make sure the tong arm length doesn't change.

Torque is calculated as arm length or leverage. The tong arm measurement must be level and at 90° or it will make your torque reading inaccurate:



5. Attach a Turns Encoder or a Proximity Counter. Never attach too tightly or damage may occur. After contacting the tongs gear with the encoder, leave approximately 1/8" space.



6. Run the CT Cable and connect the torque computer to the control box. Leave a loop of extra cable above the tong and try not to run it next to power cords as they can cause interference. Turn on the software and the control box power button:

The control box should light up and display a torque reading. This step verifies communication via the Torque Computer, Orange Control Cable and Control Box. A message of "NO PC" means the Control Box isn't communicating with the Torque Computer.

7. Connect the dump valve cable and do a function test or "spin test." You are looking for an obvious drop in RPM, not complete stoppage of the tongs rotation.
8. Connect the load cell cable. Zero the load cell. Function test it by applying weight to it:
9. Connect the turns encoder or proximity counter cable. Function test it by spinning the tong.

Note: The load cell cable is the most damaged part.

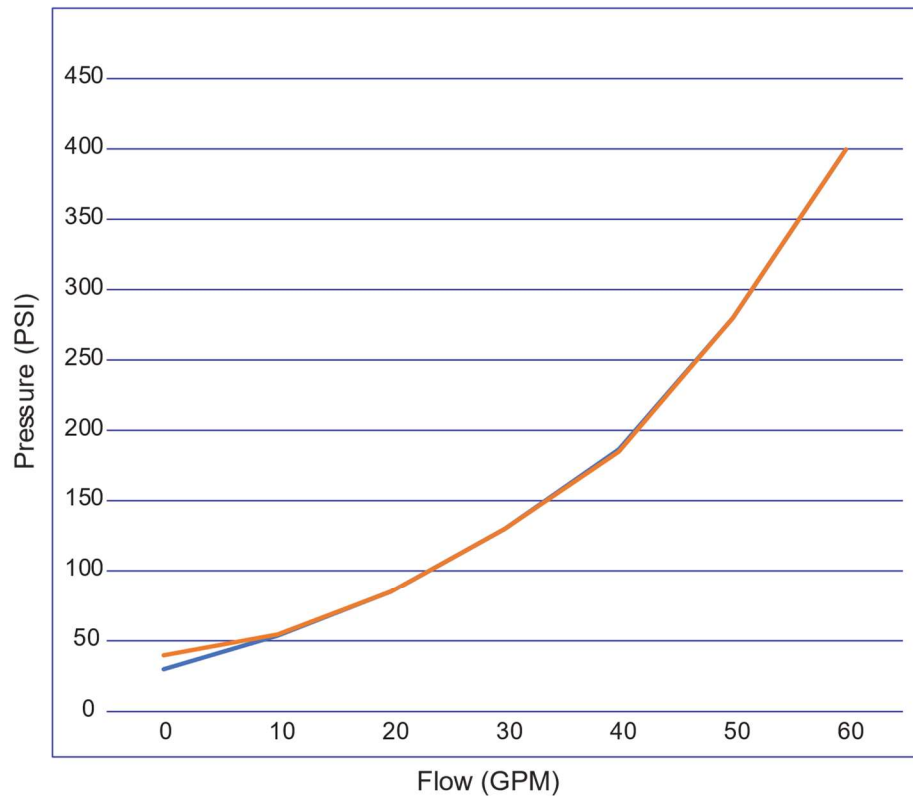
This completes the rig in and function testing of the equipment.

## Section 8: Job Running

### Dump Test or Stump Test

A Dump Test verifies all the working components of the system. It is suggested that a dump test be performed at optimum torque on a full length connection, and not on an accessory or critical item in case of equipment failure and the risk of pipe damage. Doing this at the start of the job and saving it as an accessory will add it to your PDF as a quality verification. Doing one from the Job Setup menu will not save a graph.

### Flow (GPM) vs. Pressure (PSI)



### Power Tongs

	Starr 9-7/8		McCoy 10-40	
PSI	Low	High	Low	High
250	4431	782	4000	600
312	5530	975	4992	749
400	7090	1251	6400	960
625	11078	1954	10000	1500
1250	22156	3908	20000	3000
2500	44312	7816	40000	6000

### Dump Valve

GPM	Hydraforce PSI	Eaton PSI
0	30	40
10	54	55
20	85	85
30	130	130
40	187	185
50	280	280
60	400	400

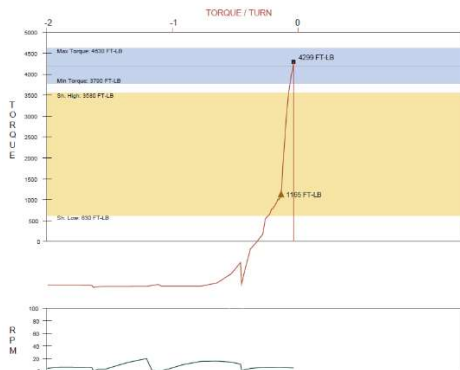
### Tong Output vs. Hydraulic Pressure:

A Power Tong that is capable of high torque can create issues while stump testing. If you do not understand the relationship of pressure, flow and it's relation to torque output. High pressure flow through the dump valve block can create back pressure with leaves residual torque in the tong resulting in only a partial depletion of torque. This is normal. **If a dump test goes over optimum torque, have the tong operator switch to high gear and gradually apply torque.**





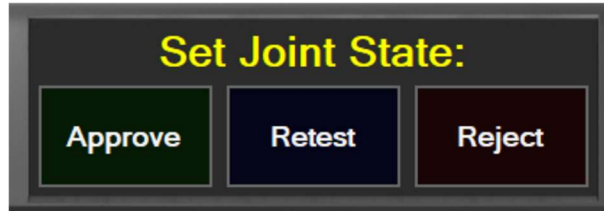
The recorded torque line is dark blue, and it switches to light blue after the dump valve is triggered. This is an important diagnostic tool. Torque spikes can be checked to see where the dump valve fired.



Fluctuations in power can dramatically affect your load cell accuracy. It is important to have a clear zero reading on the load cell. Power conditions can change at the rig and can distort the accuracy of a load cell. High negative values on the load cell reading can cause torque to hide. For this reason, you must make sure the load cell is at zero. It is recommended that you use a Power Conditioner / UPC / APC / Battery Backup that has “Pure Sine Wave.” To be accurate, a load cell should be reading a stable zero at the start of every connection.

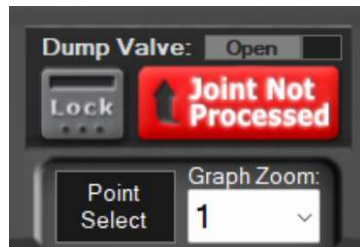
## Joint Not Processed – Software Change January 1, 2024

Previously if a Connection was made up and the user did not Press the “Approve” button:



an additional makeup would automatically approve the previous one. **This has changed.**

If a user does not press “Approve” to set the Joint State, and the tong operator tries to do another makeup it will trigger the dump valve and the dump valve button will display the “Joint Not Processed:”



If you press “Approve” button, the Tong operator will be able to continue. Not pressing the “Approve” button will cause the tong to be dumped and will require you to manually release it.

This change is meant to require the operator to select from one of two running modes:

1. Manually Approve each connection or
2. Use the Auto Accept function settings on page 27.

**Important:** If a load cell reads torque above 50% of optimum after the dump valve is activated it will interpret this as a possible attempt to do another makeup and will dump with the notice “Joint Note Processed.” To avoid this:

1. Have the tong hand release the torque by pulling back on the makeup lever as soon as a makeup is finished, and
2. Set the tong down gently: an integral tong can register a thousand pounds of torque if set down hard and unevenly.



## Manual Mode

Use Manual Mode to create “blank graphs” or adjust tally count. Manual Joints once added can’t be removed but can be “Set to Inactive.”

## Accessory

Accessories are not added to your joint count. They are marked as “A-X” and can be given custom names explained in Section 5 page 13. Insert Above/Below (as shown on the tally not the order in the hole) is a way of visually adding a row on your tally for double makeups.

## Set Joint State

Set Joint State to Inactive

1. Set As Re Tested: you can only set a joint as “Re-Tested” if there is a joint after it. To set a joint as Re-Tested will mark it as “R-X.”
2. Set As Inactive: to remove a graph from the tally.
3. Remove Joint State: to go to it’s original state.

## Removing a Joint State or “Undo”

To undo setting a joint as an Accessory, double click it, select Joint, Select Pipe and pick the pipe lot details from the list, and update. This will put it back into the tally order.

## Backing Out a Connection



Backing out a connection may require more than optimum torque. Rather than adjusting your torque settings, use the dump valve lock button to keep the tong from being dumped during a connection break. You can also turn off the power which stops reording.

## Adding Notes

Notes are added and stay with the associated connection regardless of the changes made to Accessory, Joint State, Re-Test or Manually Added Joints.

## Zero Torque







Ensure there is no load on the load cell while setting zero.

## Zero Turns

There are several reasons why you would Zero Turns: i.e. a power tong has to be realigned between connections.



## Cloud Upload, PDF and Job Management

	To back up the data connect to with the AllTorque Software logged in and open. The upload is automatic. To create a PDF of a job from the computer it was created on you exit the job, select the job and press PDF and save it. To allow another computer to PDF or edit it, you must first Release it from the computer that created it.
	Release - only one Computer can have permission to make edits to the job at a time. To allow another computer access to the file, the Torque Computer that ran the job has to release it.
	Download - Once a job has been uploaded to the cloud via WiFi, it can be "Downloaded."
	View – Once downloaded a job can be "Viewed."
	Acquire – To take possession of a job and edit it it has to be "Released."
	Complete – By marking a job "Complete", you hide it from the default view. It is still available for viewing, "Download" and "Acquire" under "Filter."

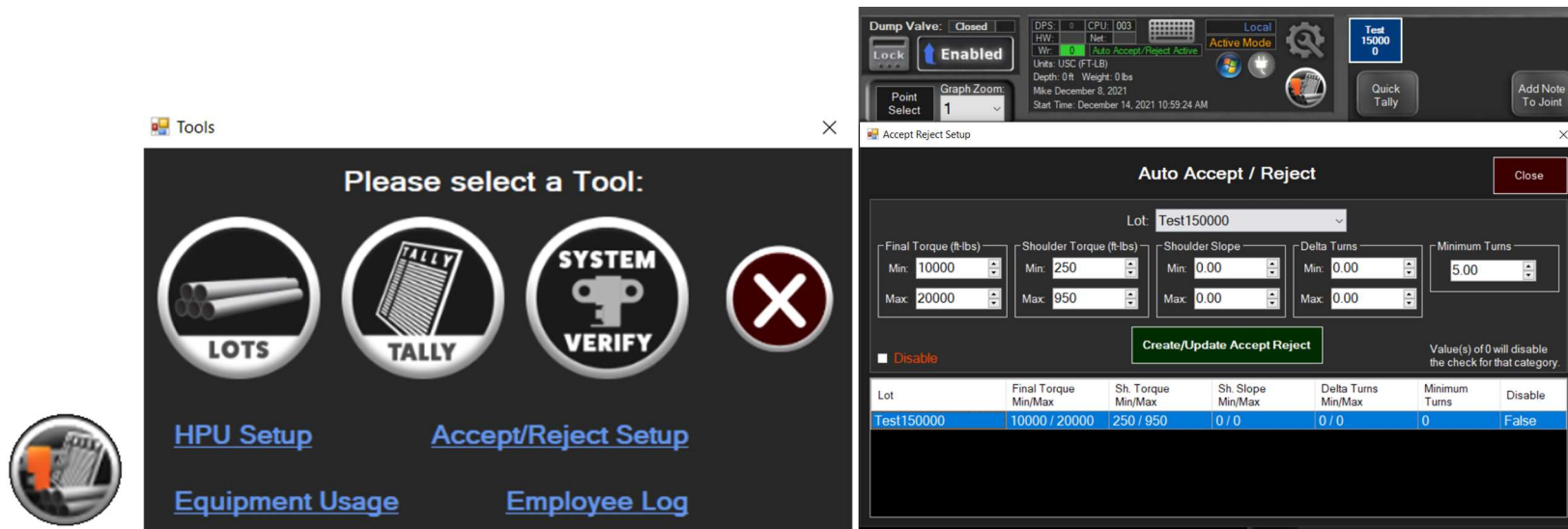
## Section 9: Trouble Shooting

Topic	Problem	Cause	Solution
Control Box	No PC	No communication between Control Box, Orange Cable and Torque Computer.	Ensure all power buttons are on. Use 123 Steps.
Dump Valve	Tong is turning slowly and will not dump.	Dump valve is connected to the return line instead pressure.	Turn off HPU before disconnecting and switching. Use 123 Steps.
Dump Valve	Connections are Leaking	Quick Connectors (Wing Half) are not tightened to position.	Turn off HPU before adjusting.
Turns Encoder	Turns reads going forward but intermittently in reverse.	Encoder Spring is broken or tension screw is loose.	Replace or tighten screws.
Load Cell	Un-predictable torque values.	Dirty Power.	Disconnect power/ use a filter/ find different power. Use 123 Steps.
Load Cell	Climbing torque values while tong is not in use.	Water in the connectors.	Use Dielectric Grease or EP2 Grease on cable connections. Use 123 Steps.
Load Cell	Poor/No torque reading	Damaged load cell, cable/ connectors.	Change Cable/ Load Cell. Use 123 Steps.

## Section 10: Optional Advanced Topics

### Auto Accept

In the Tools Menu go to Accept/Reject Setup:



Minimum parameters are torque minimum, maximum, and turns. Any fields left at a value of zero will accept all. If running torque only, you must select no turns encoder under Settings: see Section 2 Page 8. Only 1 parameter per lot. Any connections that are not Auto Accepted will trigger the Dump Valve until reset manually and connection details are set. Reason for rejection will be highlighted in Red. The Torque Turns window will stay on for 30 seconds as a default. To change this, exit the job and go to settings > Auto accept Reject Time to adjust window hold open time. Auto accept is not intended to run a Computer Torque Job unattended or without the presence of a trained technician. In certain cases of equipment failure, a technician may be required to stop a job to keep from damaging a connection. Example: Compression load cell falls out of it's cradle.

## Admin Settings

New User Setup can limit the access to certain presets including Casing Company, Service Provider, Pipe Details, and settings.

## Live Viewing



Live Viewing can be accessed by any users via Wi-Fi providing the job is being broadcast with a Wi-Fi connection. Depending on quality of signal, the delay should be less than 5 seconds. Select the job in the job list and press “View.”

## 3<sup>rd</sup> Party Viewing

This is to allow a specific person limited access to your job and client lists to view a job live. Thread Representatives or Oil Company Representatives can also view a job by installing the client software with the same steps as previously mentioned. To protect the privacy of other job data, you can limit access by Oil Company or Casing Company when you setup a new user under the Admin section.

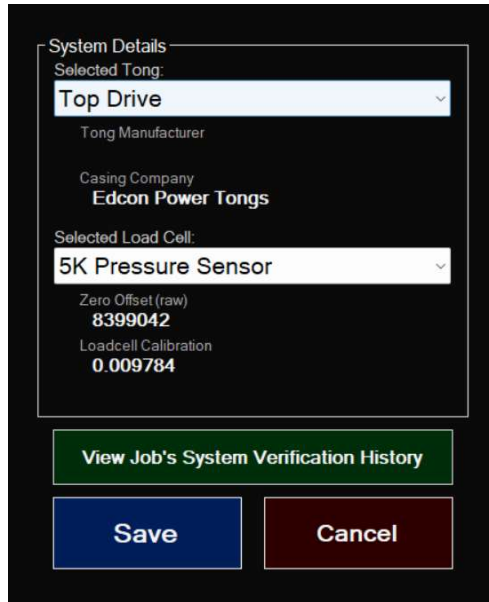
### Portal

AllTorque Portal Access requires a web browser and uses the following link: <https://portal.alltorque.ca/home>

## Section 11: Top Drive Make-Up



## 5K Pressure Sensor



System Details

Selected Tong:  
Top Drive

Tong Manufacturer  
Edcon Power Tongs

Casing Company  
Edcon Power Tongs

Selected Load Cell:  
5K Pressure Sensor

Zero Offset (raw)  
8399042

Loadcell Calibration  
0.009784

View Job's System Verification History

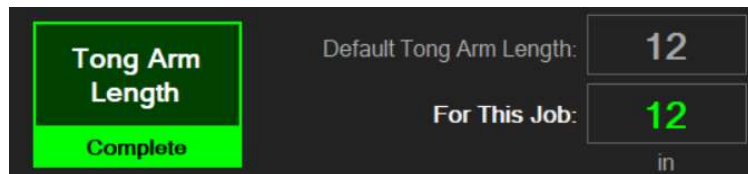
Save Cancel

5K pressure sensor must be added in your loadcell drop down list. It is recommended to add a Top Drive in your tong library as this will show on your report. You cannot save the tong arm length even if it is designated with a Rig Name and Number because it may change during calibration.

### Top Drive Torque Calibration Procedure

It is highly recommended that you use an AllTorque Torque Bar for calibration purposes to ensure accurate results. Using only the drillers torque reading is not accurate.

1. Start a Job using Top Drive as the tong and 5K Pressure Sensor for the Load Cell selected.
2. Use 12 inch Tong Arm Length



Tong Arm Length

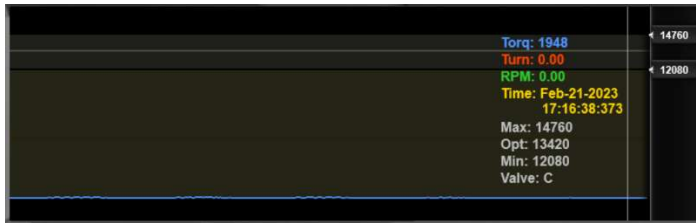
Default Tong Arm Length: 12

For This Job: 12 in

Complete



3. Have the driller keep the top drive and its attached hydraulics in idle and neutral while you zero the load cell settings. **Important: you should not zero the load cell after this is done without performing another calibration and stump test.**
4. Have the driller do a stump test at optimum torque, making sure the driller is in the same gear high/low that will be used during final make up. If you right click on the screen it will display the torque reading at that time:



5. Record the torque readings you see in AllTorque /Drillers torque gauge or Pason.
6. Use the two torque readings above and enter them into the formula below to get an adjusted arm length:
7.  $(12 \times \text{Driller or Torque Bar Torque Value}) \div (\text{Torque Reading in AllTorque}) = \text{NEW arm length to run job}$   
Example:  $12 \times 13420 \div 1948 = 82.67$
8. Record and enter the new calculated arm length under system verification settings.  
In the example above the new adjusted tong arm length would be 82.67 inches
9. Do a stump test with the new tong arm length. It should be very close to optimum.

If you need to make adjustments to the torque calculation you can adjust the arm length up or down to correct for error.

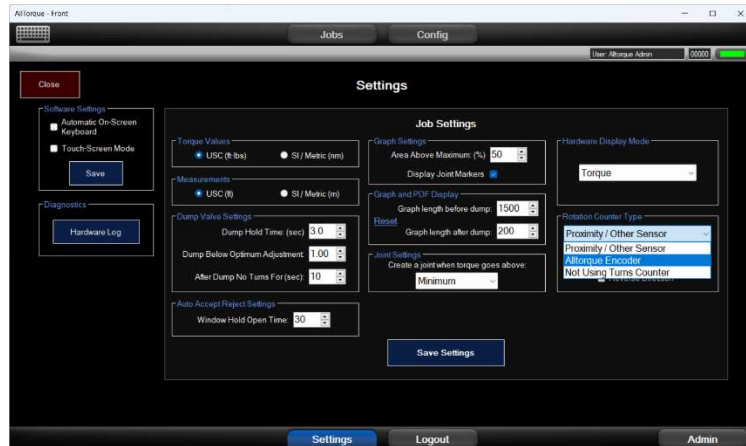
1. Driller torque is higher than AllTorque = Increase the arm length
2. Driller torque is lower than AllTorque = Decrease the arm length

This should not be needed if first calculation was done correctly.

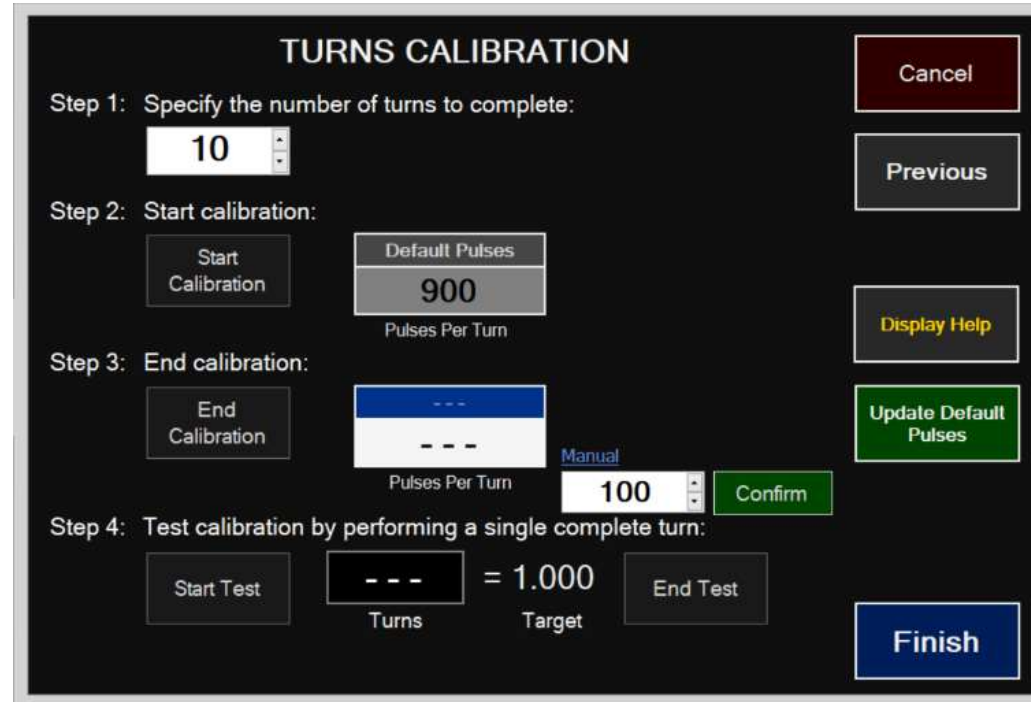
Note: The AllTorque software operates in a passive recording mode because it does not have the ability to dump or stop the driller from applying torque.

## Turns Calibration

For best results, set the Rotation Counter Type to AllTorque Encoder and save the settings.



It is difficult for the driller to stop the top drive precisely enough to do an accurate turns calibration using the same method used to calibrate a power tong. Pulse counts can be entered manually within the AllTorque Software by clicking the manual button, entering the pulse count and pressing confirm:



**TURNS CALIBRATION**

Step 1: Specify the number of turns to complete:

Step 2: Start calibration:  
   
 Default Pulses  
 Pulses Per Turn

Step 3: End calibration:  
   
 Pulses Per Turn

Step 4: Test calibration by performing a single complete turn:  
  = 1.000   
 Turns Target

Note that this skips Step 4: Test Calibration.

Calibrated pulse counts will change based on 3 variables:

1. the type of encoder selected,
2. the diameter of the wheel that contacts the casing, and
3. the diameter of the casing or tubing at the point it contacts the wheel.

The pulse count column must match the type of encoder setting being used. Use the following chart to select the correct pulse count. Enter it manually and press confirm.

		Pipe Size Chart	Pipe Circumference	Encoder Turns / 1 Pipe Turn	Turns Count (Proxy)	Turns Count (Encoder)
INPUTS	Diameter of Wheel (in)	5	4.500	14.1372	0.90	450
	Pulse Count Rating	250	5.000	15.7080	1.00	500
OUTPUT	Circumference of Wheel (in)	15.70796327	5.500	17.2788	1.10	550
	Pulse Count (Proxy Setting)	500	6.000	18.8496	1.20	600
	Pulse Count (Encoder)	1000	6.625	20.8131	1.33	663
			7.000	21.9911	1.40	700
			7.625	23.9546	1.53	763
			7.750	24.3473	1.55	775
			8.625	27.0962	1.73	863
			9.625	30.2378	1.93	963
			9.875	31.0232	1.98	988
			10.750	33.7721	2.15	1075
			11.750	36.9137	2.35	1175
			13.375	42.0188	2.68	1338
			16.000	50.2655	3.20	1600
			18.625	58.5122	3.73	1863
			20.000	62.8319	4.00	2000
						4000

The magnetic mount and encoder must be attached manually to the collar or pipe body of the casing or tubing that is in the slips and it must be held back by a tong to keep it from rotating and tangling the encoder cable. Failure to attach the encoder at the start of a makeup will result in incomplete turns being captured.

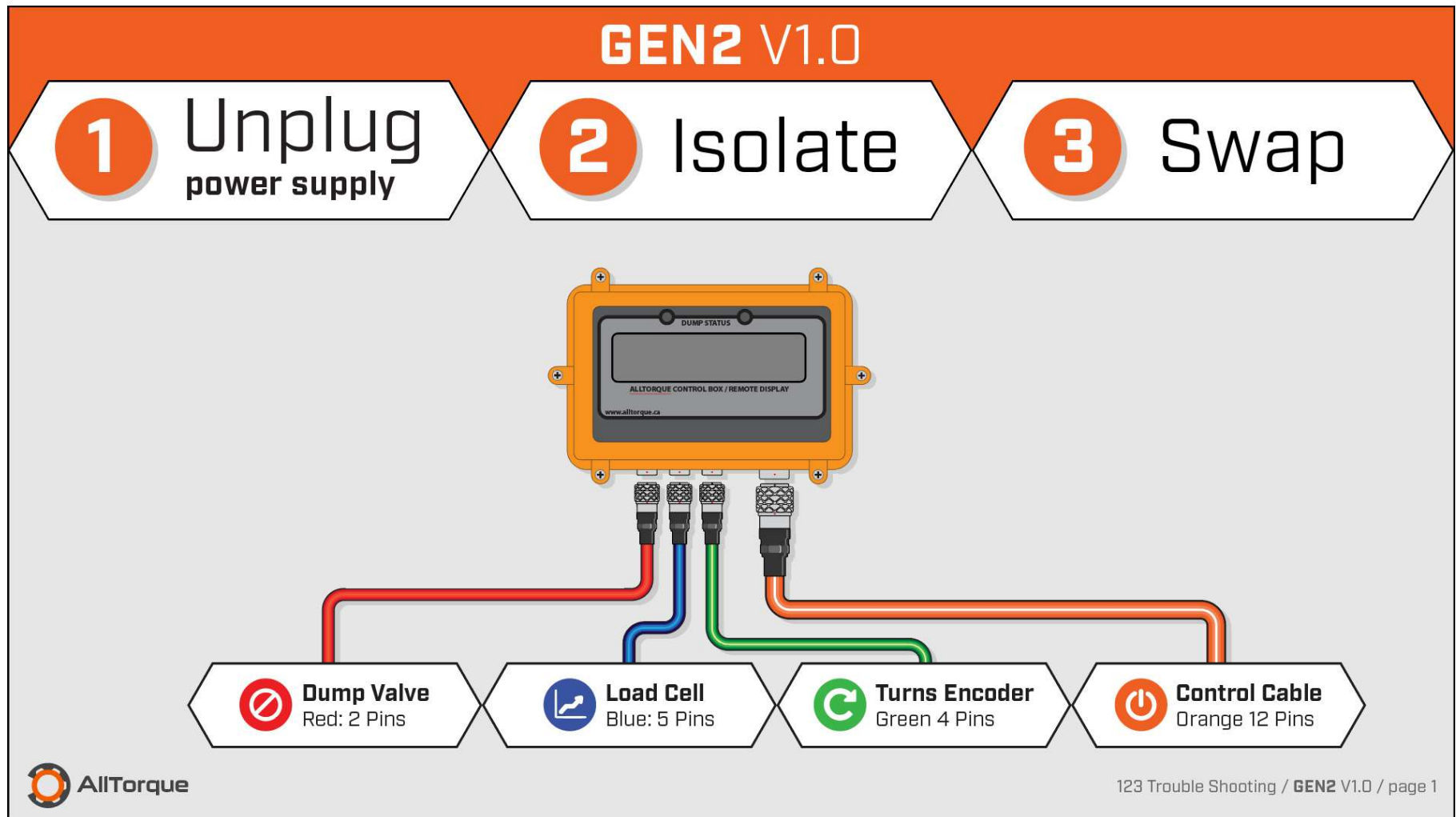
It is a good practice to verify a turns calibration by visually counting the number of turns required to complete a make-up with the number of turns recorded by the AllTorque Software.



A top drive may create pressure spikes that look like a makeup every time a CRT is engaged or disengaged. This has the potential to create a graph, making the joint count inaccurate. To record data neatly you can either run the job in Manual mode, requiring you to choose optimum for every connection. You can also use the dump valve lock button, only unlocking it when it is time to make-up a connection.

## Section 11: Tech Support

Toll Free: 1-888-506-TORQ (8677)





## Section 13: Glossary:

Battery Backup	Third party available power filter to clean dirty power common on drilling rigs.
Clevis or Shackle	Used to attach a tension load cell to a power tong and hold back line.
Control Box	Orange box with green backlit screen and 4 connectors.
Compression Load Cell	A calibrated “pancake” or “button” load cell for use in clincher or integral power tongs.
CT Cable	Orange Control Cable with 12 male pins.
Delta Torque	Final Torque - Shoulder Torque = Delta Torque
Delta Turns	Final Turns – Turns at Shoulder Position = Delta Turns
Dump Valve Assembly	Consists of male and female hydraulic fittings for both pressure and return lines, an aluminum fitting block, a cartridge, and a solenoid.
Dump Valve Cable	Red cable with 2 pin connectors.
Hold Back or Snub Line	Connects the load cell and power tong to a secure anchor point from which to measure load. Can be a braided nylon or wire sling.
Load Cell Cable	Red cable with 5 pin connectors.
Proximity Counter	Magnetic encoder on a shaft with a 4 pin female connector used to calibrate turns.
Rotary Encoder	Encoder with a shaft, rubber gear/spider with a 4 pin female connector used to calibrate turns.
Shoulder Slope	$\Delta \text{Torque} / \Delta \text{Turns} \times \text{Optimum Torque}$
Tension Load Cell	Load cell with 2 eyelets to connect the load cell to a hold back line to measure torque on a conventional power tong.
Tong Arm or Handle Length	Measurement from center of pipe positioned in tongs dies, perpendicular to a hold back line held at 90 degrees.



Torque Computer                      Orange case containing Windows Surface Pro Tablet.

Turns Cable                              Green cable with 4 pin connectors.